

REDMOND PAIRED WATERSHED STUDY

WATER YEAR 2017 DATA SUMMARY REPORT

**Prepared for
City of Redmond**

**Prepared by
Herrera Environmental Consultants, Inc.**



Note:

Some pages in this document have been purposely skipped or blank pages inserted so that this document will copy correctly when duplexed.

REDMOND PAIRED WATERSHED STUDY

WATER YEAR 2017 DATA SUMMARY REPORT

**Prepared for
City of Redmond
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Redmond, Washington 98052**

**Prepared by
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July 18, 2018

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INTRODUCTION

The Redmond Paired Watershed Study (RPWS) is one of several effectiveness monitoring studies that was selected for implementation starting in 2014 for the Stormwater Action Monitoring (SAM) program for Puget Sound. The goal of effectiveness monitoring under the SAM program is to provide widely applicable information for improving stormwater management in the region. Phase I and Phase II Municipal Stormwater Permittees in the Puget Sound Region contribute to a Pooled Stormwater Resources Fund that supports the SAM program and associated effectiveness monitoring studies. Selection of the RPWS for implementation under the SAM program was made based on a monitoring proposal that was presented to permittee representatives at workshops that were held on March 20, 2014, and May 6, 2014. The specific study question to be addressed through the RPWS is as follows:

How effective are watershed rehabilitation efforts at improving receiving water conditions at the watershed scale?

To address this study question, a conceptual experimental design for the RPWS was subsequently developed and summarized in the *Redmond Paired Watershed Study Experimental Design Report* (Herrera 2015a). This conceptual experimental design was informed by a literature review (Herrera 2015b) that was conducted to identify lessons learned from past studies that have been implemented to achieve similar objectives. The conceptual experimental design was also developed based on input from a technical advisory committee that was formed for the study. This technical advisory committee includes representation from the following jurisdictions and agencies:

City of Redmond

City of Seattle

King County

Kitsap County

US Environmental Protection Agency

US Geological Society

Washington State Department of Ecology (Ecology)

Building on this previous work, a Quality Assurance Project Plan (QAPP) was developed to guide the implementation of all subsequent phases of the RPWS (Herrera 2015c). This QAPP

documents the experimental design and procedures that will be used during data collection, processing, and analysis to ensure all results obtained for the RPWS are scientifically defensible.

Monitoring pursuant to this QAPP initiated in 2016 and is anticipated to continue for a 10-year timeframe. Data summary reports will be prepared on an annual basis over this period to summarize compiled monitoring data collected through each of the major components of the RPWS. These reports will also document any quality assurance issues associated with these data and resultant limitations (if any) on their use or interpretation. Finally, these reports will document all rehabilitation efforts that have been implemented by the City of Redmond (City) over the previous year. Included will be detailed information on the design and operational status of structural stormwater controls and the frequency and geographic extent of nonstructural stormwater control implementation. Each annual data summary report will document this information based on monitoring that was conducted over the previous water year (i.e., October through September). Data collected over water year 2016 (WY2016) were summarized in Herrera (2017).

In years 4, 6, 8, and 10 of the RPWS' implementation, trend analyses reports will also be prepared as companion documents to the data summary reports described above. These reports will summarize the results of statistical analyses that will be performed on the compiled data from all previous years of monitoring to detect potential relationships between rehabilitation efforts and improved receiving water conditions. Each report will also present major conclusions from these analyses.

This document represents the data summary report for monitoring that occurred over water year 2017 (WY2017) for the RPWS. It is organized to include the following sections:

- **Background** – An explanation of why the project is needed
- **Experimental Design** – The sampling process design for the study, including sample types, monitoring locations, and sampling frequency
- **Sampling Procedures** – A description of any major deviations from the sampling procedures that were identified in the QAPP for the study (Herrera 2015c).
- **Rehabilitation Effort Summary** – A description of all watershed rehabilitation efforts that were implemented by the City over the preceding water year.
- **Monitoring Results Summary** – A summary of compiled monitoring data collected through each of the major components of the study over the preceding water year.

BACKGROUND

Municipal Stormwater Permits are issued by Ecology to regulate discharges from separated storm sewers owned or operated by Phase I and Phase II cities and counties. The Municipal Stormwater Permits establish the minimum requirements for permittees to address existing and future impacts to receiving waters from urbanization. Municipal Stormwater Permits require cities and counties to execute programmatic (nonstructural) activities and establish design standards for stormwater structural controls triggered by development (onsite stormwater management, runoff treatment, and flow control facilities). In theory, if all developed land in a watershed is equipped with nonstructural and structural stormwater controls, the receiving water would be protected from hydrologic and water quality impacts caused by urbanization. However, while the effectiveness of nonstructural and structural controls has been well documented at the site and parcel scale, limited data exists on the effectiveness of these controls in aggregate for improving conditions in receiving waters at the watershed scale (Herrera 2015b).

In February 2014, Ecology approved a Citywide Watershed Management Plan (WMP) (Herrera 2013) for the City that allows use of a watershed approach for stormwater management pursuant to the Municipal Stormwater Permit, Section 303(d) of the Clean Water Act, and salmon recovery. Through the implementation of this WMP, the City will focus stormwater best management practices (BMPs) in a subset of priority watersheds that are moderately impacted by urbanization and therefore expected to respond more quickly to rehabilitation efforts. This provides a unique opportunity to study the effectiveness of stormwater BMPs for improving receiving water conditions on an accelerated time frame and at a watershed scale. Recognizing this opportunity, the City is implementing the RPWS to quantify improvements in receiving water conditions with support from the SAM program.

EXPERIMENTAL DESIGN

As described in the *Introduction* to this report, the specific study question to be addressed through the RPWS is as follows:

How effective are watershed rehabilitation efforts at improving receiving water conditions at the watershed scale?

In this context, rehabilitation efforts could include any of the following practices:

- Stormwater management retrofits in upland areas that would include facilities for onsite stormwater management (e.g., low impact development [LID] practices), runoff treatment, and flow control
- Riparian and in-stream habitat improvements
- Programmatic practices for stormwater management

To answer the study question identified above, the experimental design for the RPWP has two primary components:

- **Status and Trends Monitoring:** routine and continuous measurements of various hydrologic, chemical, physical habitat, and biological indicators of stream health over an extended time frame to quantify improvements in receiving water conditions in response to watershed rehabilitation efforts.
- **Effectiveness Monitoring:** measurements of hydrologic and chemical parameters over a relatively short timeframe to document the effectiveness of specific structural stormwater controls that have been constructed to improve receiving water conditions.

The Status and Trends Monitoring utilizes a “paired watershed” experimental design that involves collecting these measurements in seven watersheds categorized as follows:

- Three “Application” watersheds with wadeable lowland streams that are moderately impacted by urbanization and prioritized for rehabilitation efforts pursuant to the WMP.
- Two “Reference” watersheds with relatively pristine wadeable lowland streams that do not require rehabilitation.
- Two “Control” watersheds with wadeable lowland streams that are significantly impacted by urbanization and not currently prioritized for rehabilitation.

Table 1 identifies the name, predominant land use/cover, and size of each watershed; the location of all the watersheds is shown in Figure 1. A detailed summary of conditions within each watershed is also provided in the QAPP that was prepared for the study (Herrera 2015c) with information on planned rehabilitation efforts in the Application watersheds as applicable.

Table 1. Application, Reference, and Control Watersheds for the Redmond Paired Watershed Study.				
Watershed Name	Watershed Type	Dominant Land Use/Cover	Watershed Total Area (acres)	Watershed Areas Inside Redmond (acres)
Evans Creek Tributary 108	Application	Residential	397	NA ^a
Monticello Creek	Application	Residential/Commercial	345	264
Tosh Creek	Application	Residential/Commercial	299	276
Colin Creek	Reference	Forest	1,990	90
Seidel Creek	Reference	Forest	1,188	615
Country Creek	Control	Residential/Commercial	212	212
Tyler's Creek	Control	Residential/Commercial	168	167

NA = Not applicable

Fixed monitoring stations were established in each watershed for monitoring various indicators of stream health. Due to the scale of the RPWP and the anticipated lag between applying stormwater controls and resultant improvements in receiving water conditions, quantifying a cause and effect relationship between these events may take many years. Therefore, monitoring at the fixed monitoring stations will occur over an anticipated 10-year timeframe. Furthermore, because the effectiveness of watershed rehabilitation practices (e.g., stormwater retrofits, in-stream habitat improvements, and programmatic practices) may vary for different types of receiving water impairments, a broad suite of indicators for assessing potential improvements are being monitored within the following categories: hydrologic, water quality, physical habitat, sediment quality, and biological. The pattern of interest will be evidence that receiving water conditions are improving based on one or more of these indicators in the Application watersheds while conditions in the Reference and Control watersheds remain relatively static.

The following subsections provide more detailed information on the Status and Trends Monitoring and Effectiveness Monitoring, respectively, including the monitoring stations, measurement frequency, indicators, and data analysis methods where applicable.

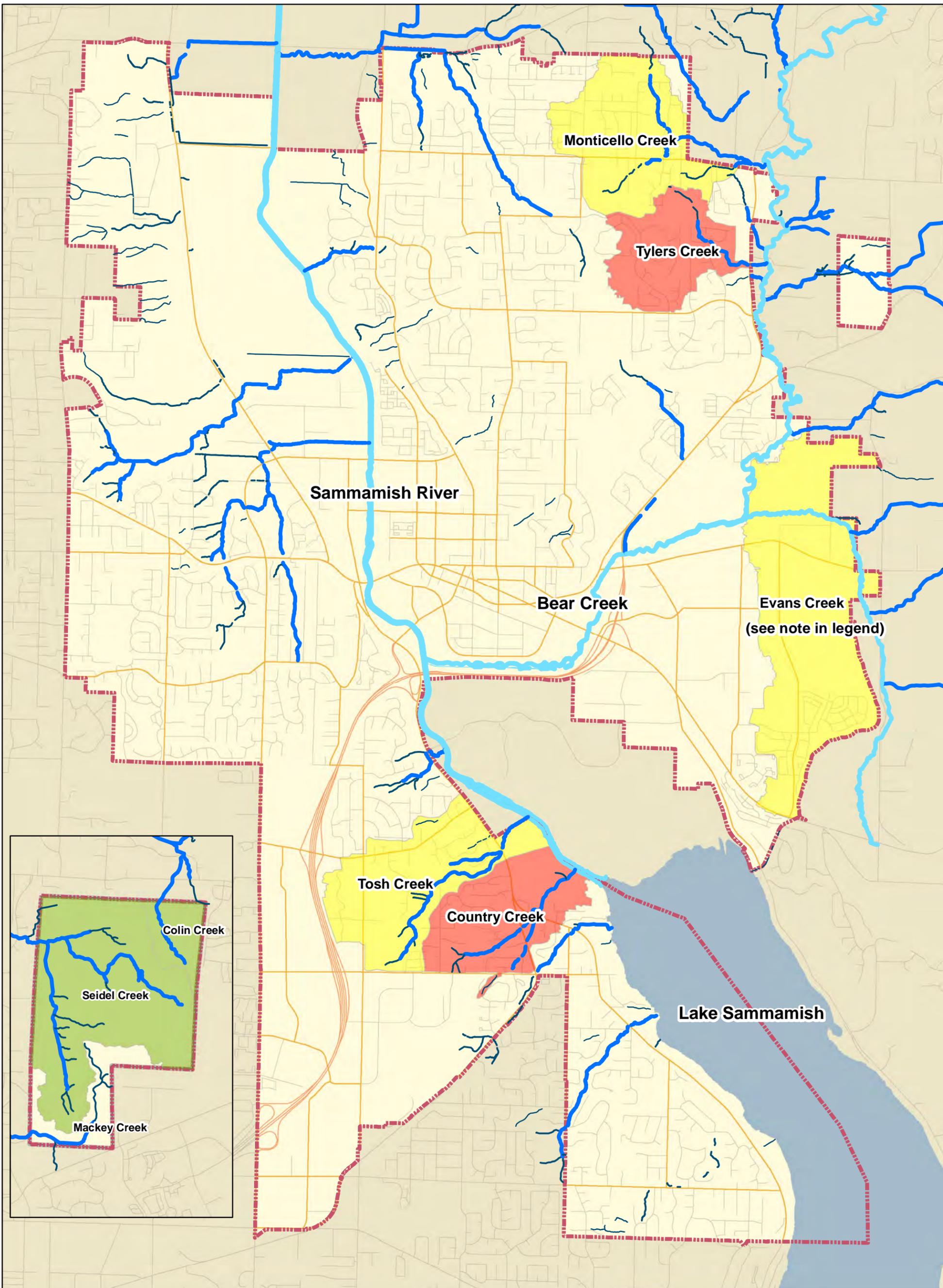
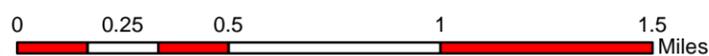


Figure 1. Application, Reference, and Control Watersheds.

City of Redmond, Washington
06/18/2015



Legend

- Class I Stream
- Class II Stream
- Class III Stream
- Class IV Stream
- City Limits
- Reference Watersheds
- Application Watersheds
- Control Watersheds

This figure shows Evans Creek watershed within Redmond. Evans 108 is east of Redmond and illustrated in Figure 2.

Disclaimer: This map is created and maintained by the Natural Resources Division of the City of Redmond, Washington, for reference purposes only. The City makes no guarantee as to the accuracy or completeness of the features shown on this map.

STATUS AND TRENDS MONITORING

This section describes the monitoring stations, measurement frequency, indicators, and data analysis methods that will be used for the Status and Trends Monitoring component of the RPWS. This information is organized under separate subsections for the following monitoring categories: hydrologic, water quality, physical habitat, sediment quality, and biological. The specific indicators of stream health that will be evaluated in these categories are also summarized in Table 2 with their associated measurement frequency.

Table 2. Indicators of Stream Health for the Redmond Paired Watershed Study.		
Indicator	Measurement Frequency	
Hydrology Monitoring		
Flow	Continuous	
High pulse count	Post-processed from continuous flow measurements	
High pulse duration		
High pulse range		
Low pulse count		
Low pulse duration		
Low pulse range		
Flow reversal		
Richards-Baker (RB) flashiness index		
TQ Mean		
Storm flow volume		
Base flow volume		
Total flow volume		
Water Quality Monitoring		
Total suspended solids	Twelve grab samples collected annually during storm events (three each quarter)	
Turbidity		
Conductivity		Four grab samples collected annually during base flow (one each quarter)
Hardness		
Dissolved organic carbon		
Fecal coliform bacteria		
Total phosphorus		
Total nitrogen		
Copper, total and dissolved		
Zinc, total and dissolved		
Temperature	Continuous	
Conductivity		
Physical Habitat Monitoring		
Bank-full width	Annually	
Wetted width		
Cumulative bar width		

Table 2 (continued). Indicators of Stream Health for the Redmond Paired Watershed Study.

Indicator	Measurement Frequency
Physical Habitat Monitoring (continued)	
Bank-full depth Wetted depth Substrate class Substrate embeddedness Fish cover Thalweg depth Presence of bars Presence of edge pools Main channel slope and bearing Large woody debris tally, including notation of diameter, length, category, zone, and key-pieces Evidence of vegetation colonization below OHWM that persists more than 1 year Slopes vegetated over the crown of the bank Presence of desirable native plant species Presence of invasive plant species Presence of good-habitat indicator liverwort species Channel incision or aggradation Channel widening, narrowing, or migration Changes in channel slope, sinuosity, and/or bed-form type	Annually
Sediment Quality Monitoring	
Total organic carbon; sieved, 2 mm Copper; sieved, 63 µm Zinc; sieved, 63 µm Polycyclic aromatic hydrocarbons; sieved, 2 mm Phthalates; sieved, 2 mm	Annually
Biological Monitoring	
Benthic macroinvertebrates	Annually
Benthic Index of Biotic Integrity Taxa Richness Ephemeroptera Richness Plecoptera Richness Trichoptera Richness Clinger Percent Long-Lived Richness Intolerant Richness Percent Dominant Predator Percent Tolerant Percent	Post-processed from benthic macroinvertebrate data

OHWM = Ordinary high water mark

Hydrologic Monitoring

A total of 14 fixed monitoring stations were established to facilitate hydrologic monitoring in each of the study watersheds. As noted in the literature review (Herrera 2001b) that was performed to inform the experimental design for the RPWS, numerous studies have been conducted with similar goals, but they have generally been conducted at the subbasin scale. In these studies, a hydrologic monitoring station was typically located at the outlet of the study subbasin. Therefore, efforts were made to establish hydrologic monitoring stations at the outlet of each of the study watersheds. However, because the watersheds are relatively large and because much of the rehabilitation will occur in the upper reaches of the Application watersheds, efforts were made to establish hydrologic monitoring stations at a mid-point location in each of the study watersheds as well. This goal could not be achieved for all of the study watersheds due to issues relating to their size and drainage patterns. The following deviations are specifically noted:

- Monticello Creek has two major tributaries that will be the target of rehabilitation efforts; therefore, three hydrologic monitoring stations were established in the watershed at the outlet and on each of the tributaries.
- The relatively pristine reach of Colin Creek that was identified for monitoring is confined to the Redmond Watershed Preserve Park. Because the watershed area within this park is relatively small, only one hydrologic monitoring station was established in this study watershed.
- The relatively pristine reach of Seidel Creek that was identified for monitoring is confined to the Redmond Watershed Preserve Park. Within this area, two major tributaries of the creek flow into a large wetland complex near the border of the park. To avoid confounding hydrologic and water quality influences from this wetland, hydrologic monitoring stations were established on each tributary; and no outlet station was identified.

In addition to these considerations, the specific location of each monitoring station was also influenced by safety and property access issues. The monitoring stations established in each of the study watersheds are as follows:

Application Watersheds

- Evans Creek Tributary 108: two stations designated Lower Stream Station (EVALSS) and Midstream Station (EVAMS), respectively (see locations in Figure 2).
- Monticello Creek: one station at the mouth designated Mont-Mouth (MONM); one station at the approximate midpoint of the watershed on the north tributary designated Mont-Mid-N (MONMN); and one station at the approximate midpoint of the watershed on the south tributary designated Mont-Mid-S (MONMS) (see locations in Figure 3).

- Tosh Creek: one station at the mouth designated Tosh-Mouth (TOSMO); and one station at the approximate midpoint of the watershed designated Tosh-Mid (TOSMI) (see locations in Figure 4).

Reference Watersheds

- Colin Creek: one station at the approximate midpoint of the watershed designated Colin-Mid (COLM) (see locations in Figure 5).
- Seidel Creek: one station at the approximate midpoint of the watershed on the north tributary designated Seidel-Mid-N (SEIMN); one station at the approximate midpoint of the watershed on the south tributary designated Seidel-Mid-S (SEIMS) (see locations in Figure 6).

Control Watersheds

- Country Creek: one station at the mouth designated Country-Mouth (COUMO); and one station at the approximate midpoint of the watershed designated Country-Mid (COUMI) (see locations in Figure 7).
- Tyler's Creek: one station at the mouth designated Tylers-Mouth (TYLMO); and one station at the approximate midpoint of the watershed designated Tylers-Mid (TYLMI) (see locations in Figure 8).

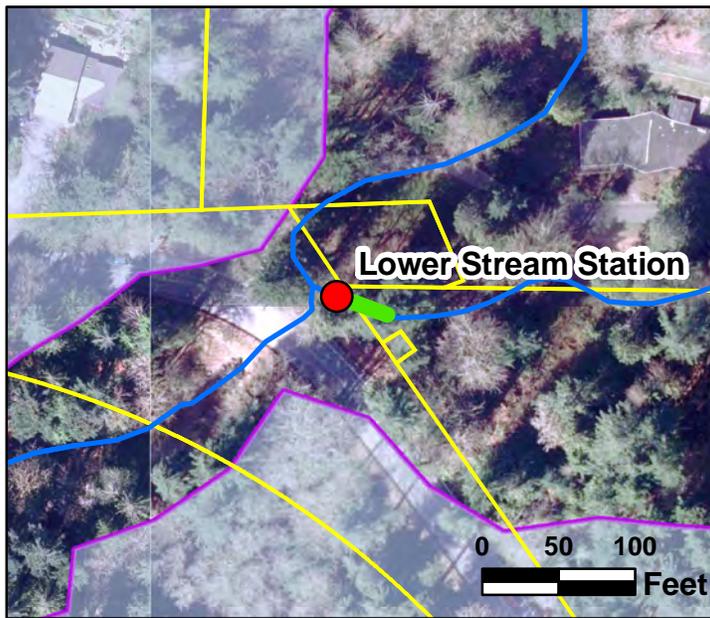
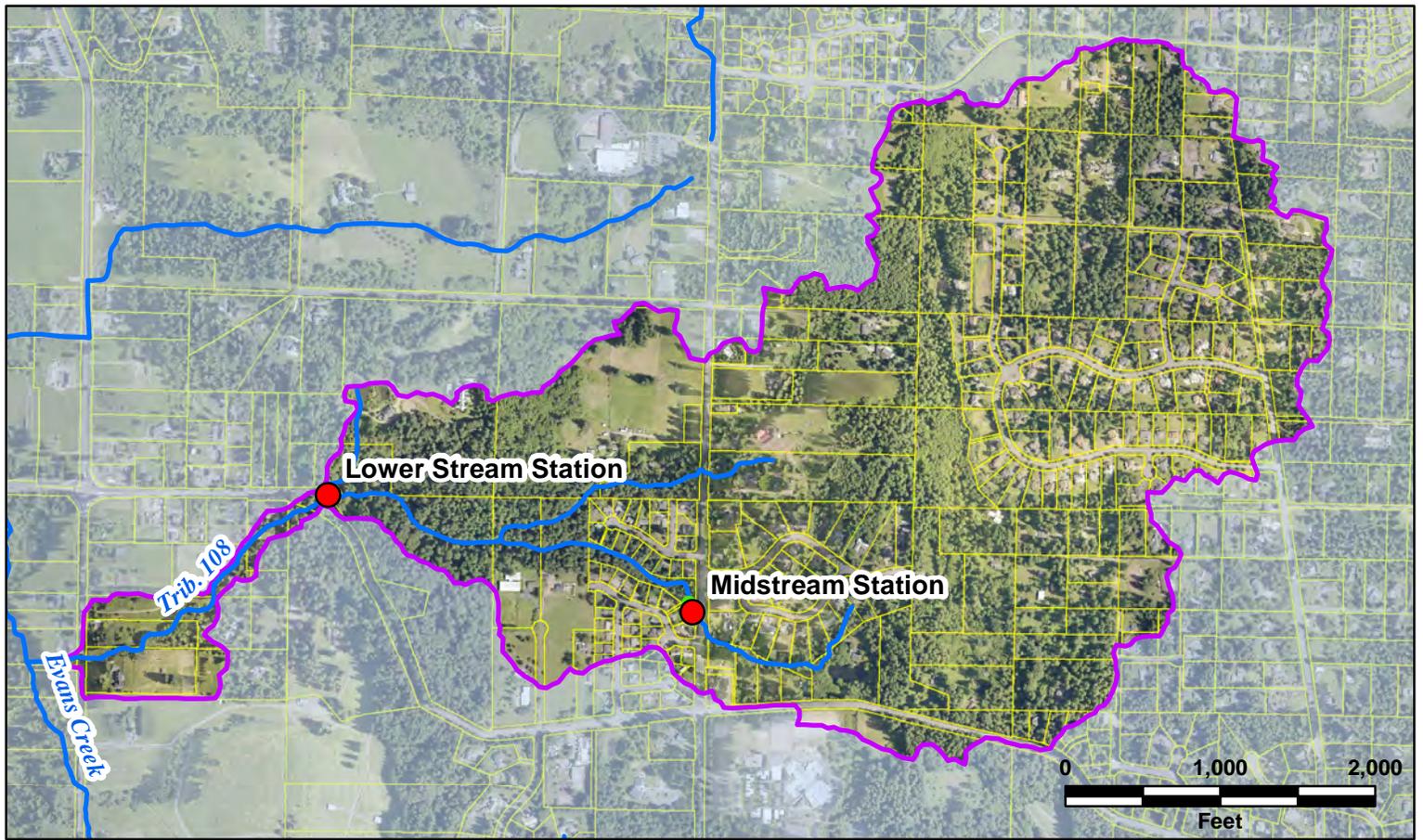


Figure 2. Evans Trib. 108 Paired Watershed Study Monitoring Locations.

King County, Washington

Dec. 17, 2015



Department of Natural Resources and Parks
Water and Land Resources Division

- Flow and WQ Monitoring
- Habitat, Biological, and Sediment Monitoring
- ~ Streams and Rivers
- King County Parcels
- Basin Boundary

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Continuous flow monitoring will occur at all 14 monitoring stations for the duration of the RPWS. Data from the continuous flow monitoring will be processed to calculate the following indicators for evaluating hydrologic impacts from urban development as described in DeGasperi et al. (2009):

- **High flow pulse:** occurrence of daily average flows that are equal to or greater than a threshold set at twice (two times) the long-term daily average flow rate.
 - **High pulse count:** number of days each water year that discrete high flow pulses occur.
 - **High pulse duration:** annual average duration (in days) of high flow pulses during a water year.
 - **High pulse range:** range in days between the start of the first high flow pulse and the end of the last high flow pulse during a water year.
- **Low pulse count:** occurrence of daily average flows that are equal to or less than a threshold set at 50 percent of the long-term daily average flow rate.
 - **Low pulse count:** number of times each calendar year that discrete low flow pulses occurred.
 - **Low pulse duration:** annual average duration (in days) of low flow pulses during a calendar year.
 - **Low pulse range:** range in days between the start of the first low flow pulse and the end of the last low flow pulse during a calendar year.
- **Flow Reversal:** The number of times that the flow rate changed from an increase to a decrease or vice versa during a water year. Flow changes of less than 2 percent are not considered.
- **Richards-Baker (RB) flashiness index:** a dimensionless index of flow oscillations relative to total flow based on daily average discharge measured during a water year.
- **TQ Mean:** the fraction of a year that mean daily discharge exceeds annual mean discharge.
- **Storm flow volume:** total discharge volume during storm events over a water year.
- **Base flow volume:** total discharge volume during base flow over a water year.
- **Total flow volume:** total discharge volume over a water year.

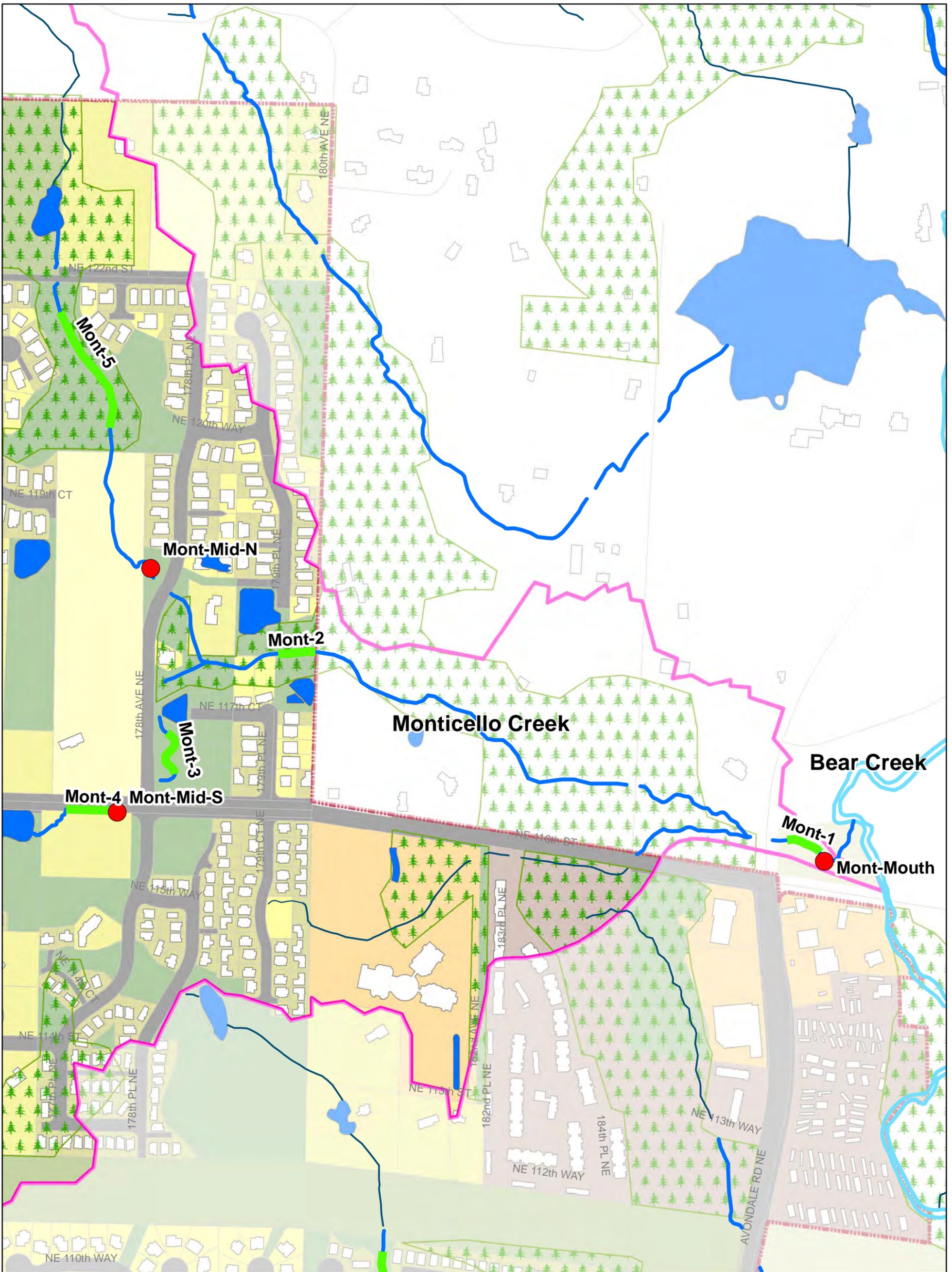


Figure 3. Monticello Creek Paired Watershed Study Monitoring Locations.

City of Redmond, Washington
6/25/2015





Legend

Class I Stream	Commercial	Single Family High Density	Flow & WQ Monitoring
Class II Stream	Industrial	Single Family Low Density	Habitat, Sediment & Biological Monitoring
Class III Stream	Multifamily	Single Family Medium Density	
Class IV Stream	Park / Undeveloped	Single Family Rural Density	
Ponds	Public ROW		
City Limits			
Watershed Boundary			

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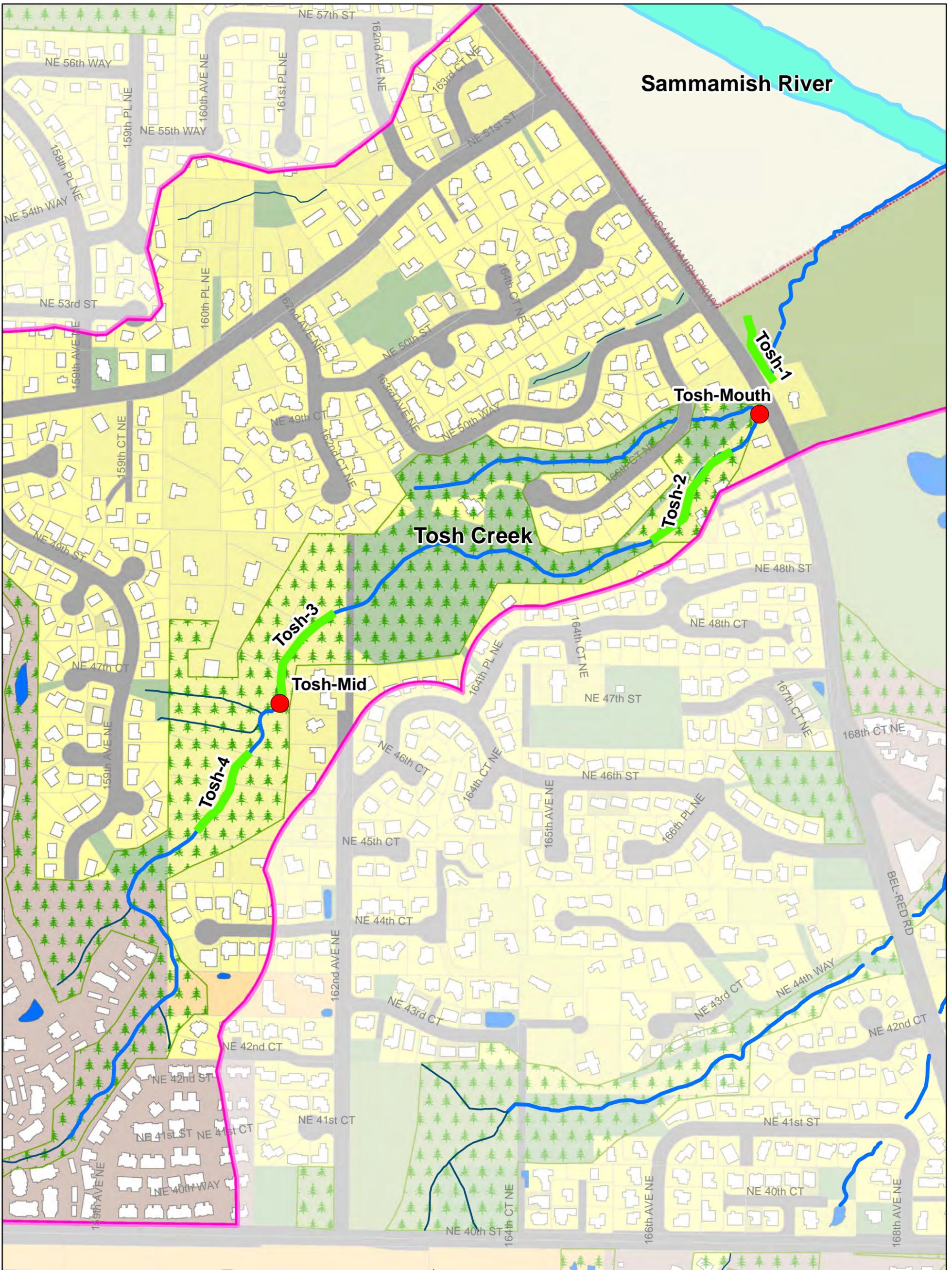


Figure 4. Tosh Creek Paired Watershed Study Monitoring Locations.

City of Redmond, Washington
11/22/2013



0 0.0375 0.075 0.15 Miles



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Legend

- Class I Stream
- Class II Stream
- Class III Stream
- Class IV Stream
- Ponds
- City Limits
- Watershed Boundary
- Commercial
- Industrial
- Multifamily
- Park / Undeveloped
- Public ROW
- Single Family High Density
- Single Family Low Density
- Single Family Medium Density
- Single Family Rural Density
- Hydrology & WQ Monitoring
- Physical Habitat, sediment & B-IBI Monitoring

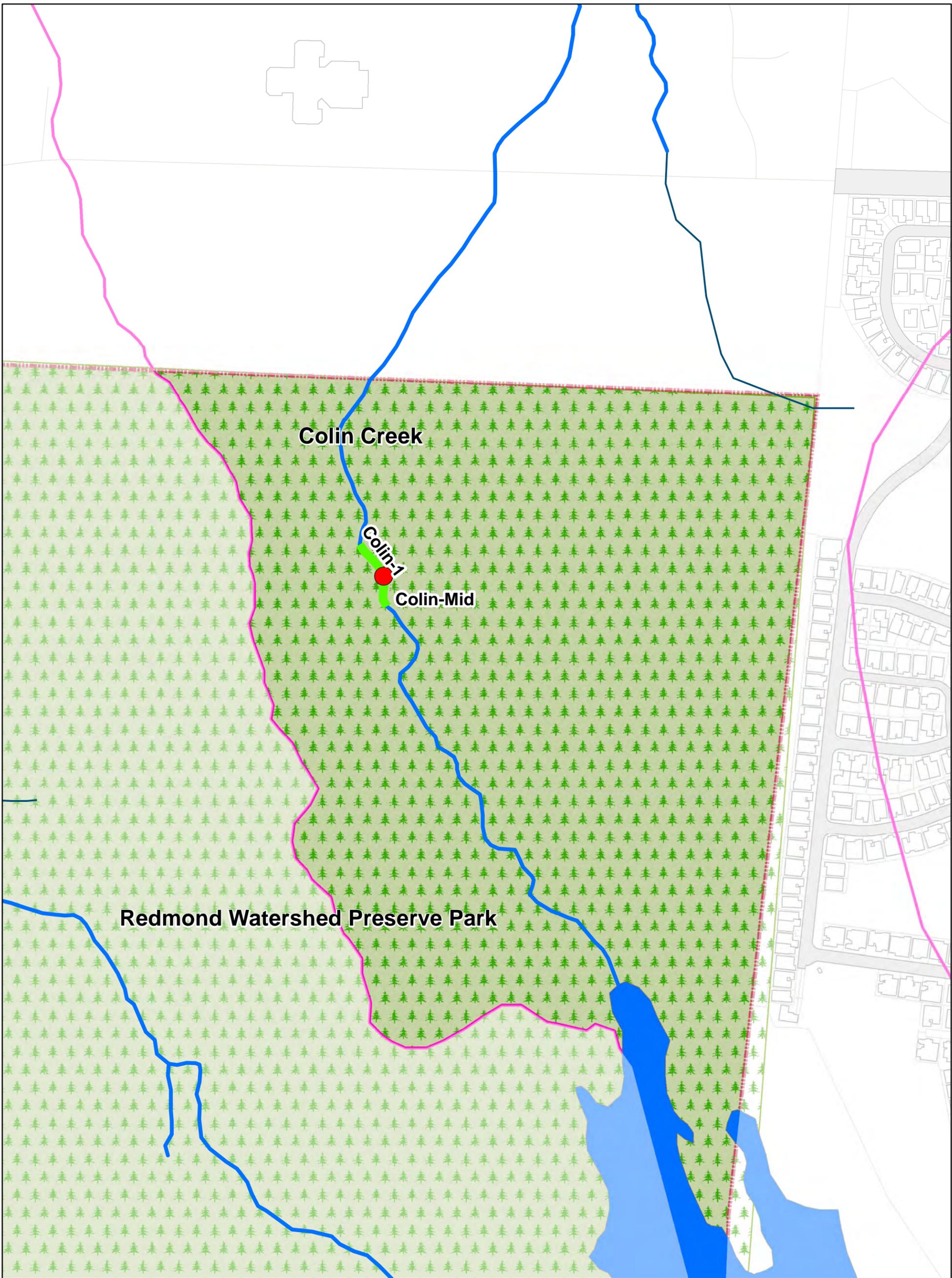


Figure 5. Colin Creek Paired Watershed Study Monitoring Locations.

City of Redmond, Washington
6/25/2015



0 0.0325 0.065 0.13 Miles

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Legend

- Class I Stream
- Class II Stream
- Class III Stream
- Class IV Stream
- Ponds
- City Limits
- Watershed Boundary
- Commercial
- Industrial
- Multifamily
- Park / Undeveloped
- Public ROW
- Single Family High Density
- Single Family Low Density
- Single Family Medium Density
- Single Family Rural Density
- Flow & WQ Monitoring
- Habitat, sediment & Biological Monitoring

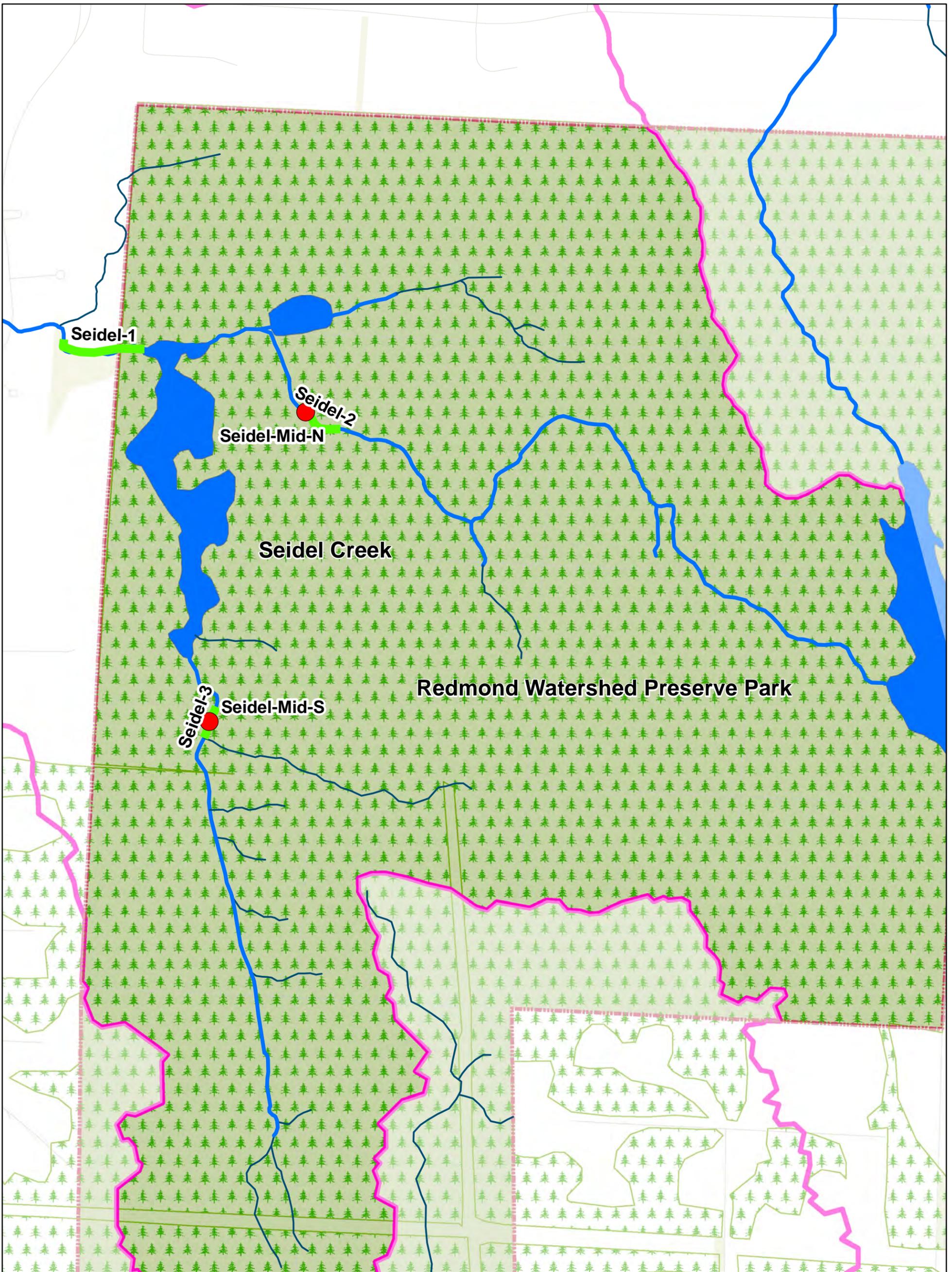


Figure 6. Seidel Creek Paired Watershed Study Monitoring Locations.

City of Redmond, Washington
11/22/2013



0 0.05 0.1 0.2 Miles

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Legend

- | | | | |
|--------------------|--------------------|------------------------------|---|
| Class I Stream | Commercial | Single Family High Density | Flow & WQ Monitoring |
| Class II Stream | Industrial | Single Family Low Density | Habitat, Sediment & Biological Monitoring |
| Class III Stream | Multifamily | Single Family Medium Density | |
| Class IV Stream | Park / Undeveloped | Single Family Rural Density | |
| Ponds | Public ROW | | |
| City Limits | | | |
| Watershed Boundary | | | |

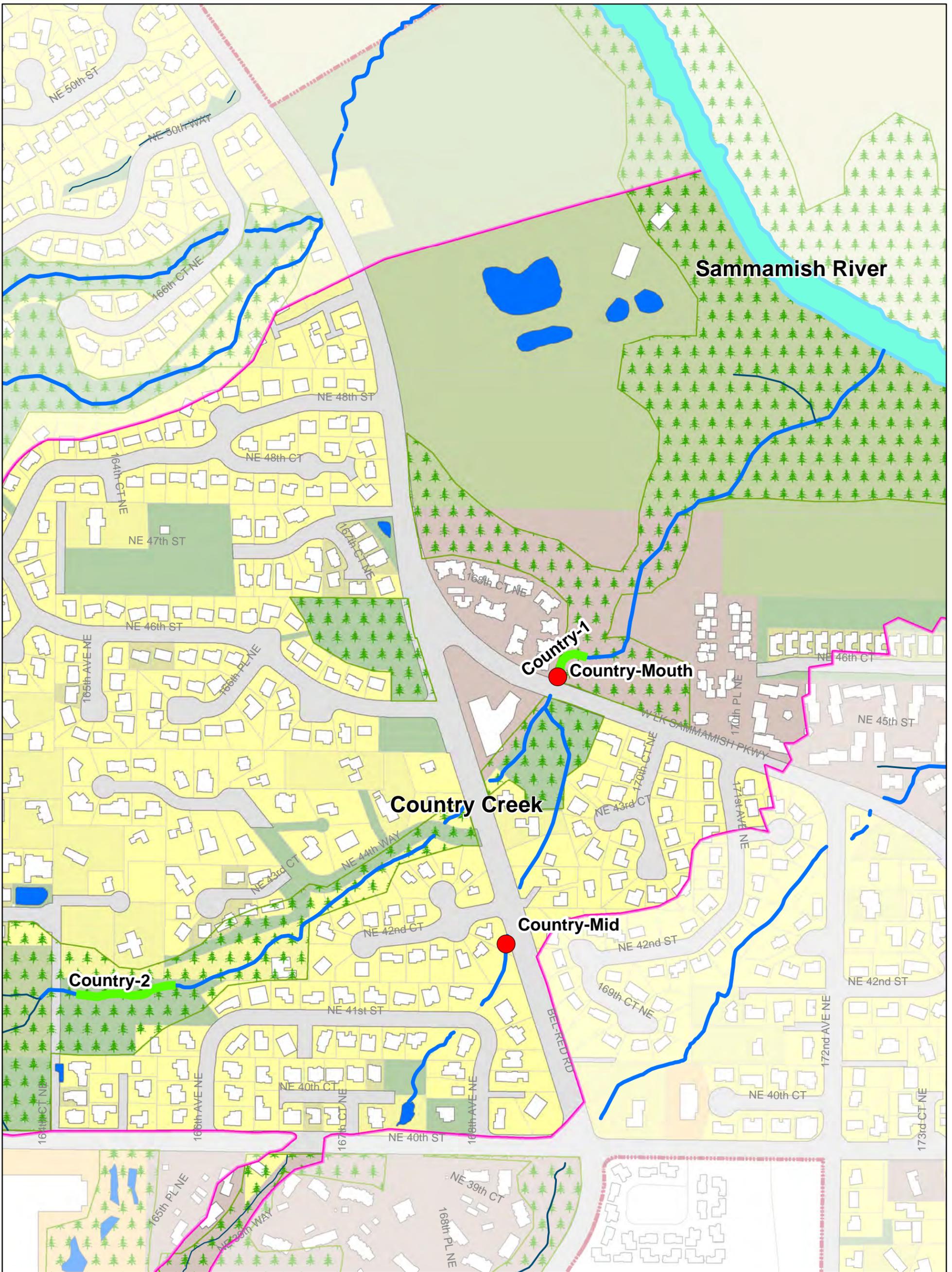


Figure 7. Country Creek Paired Watershed Study Monitoring Locations.

City of Redmond, Washington
6/25/2015



0 0.0325 0.065 0.13 Miles



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Legend

- | | | | |
|--------------------|--------------------|------------------------------|--|
| Class I Stream | Commercial | Single Family High Density | Flow & WQ Monitoring |
| Class II Stream | Industrial | Single Family Low Density | Habitat, Sediment, & Biological Monitoring |
| Class III Stream | Multifamily | Single Family Medium Density | |
| Class IV Stream | Park / Undeveloped | Single Family Rural Density | |
| Ponds | Public ROW | | |
| City Limits | | | |
| Watershed Boundary | | | |

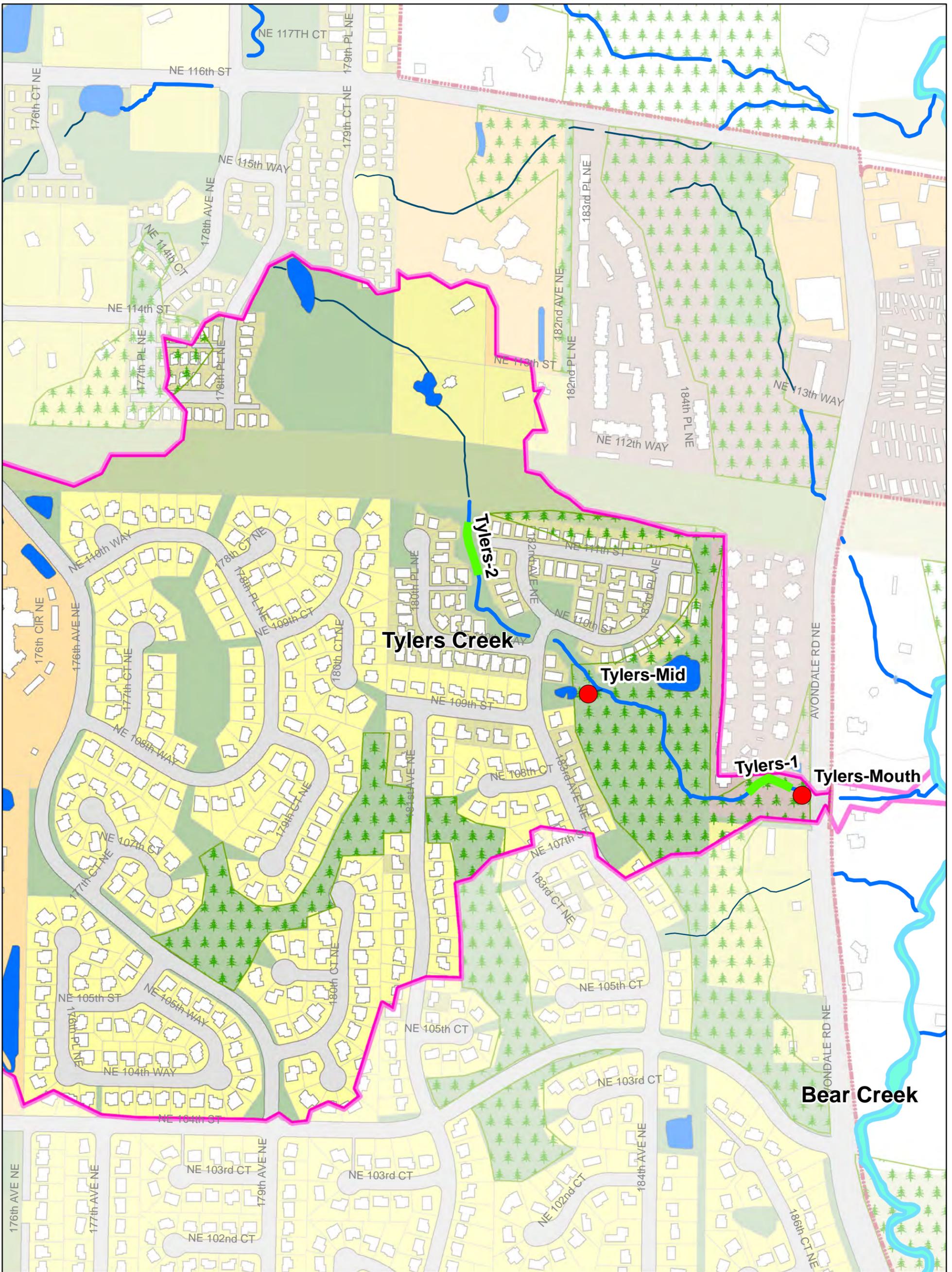


Figure 8. Tyler's Creek Paired Watershed Study Monitoring Locations.

City of Redmond, Washington
6/25/2015



0 0.0375 0.075 0.15 Miles



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Legend

- | | | | |
|--------------------|--------------------|------------------------------|---|
| Class I Stream | Commercial | Single Family High Density | Flow & WQ Monitoring |
| Class II Stream | Industrial | Single Family Low Density | Habitat, Sediment & Biological Monitoring |
| Class III Stream | Multifamily | Single Family Medium Density | |
| Class IV Stream | Park / Undeveloped | Single Family Rural Density | |
| Ponds | Public ROW | | |
| City Limits | | | |
| Watershed Boundary | | | |

Trends over time at each monitoring station will be evaluated using parametric (Pearson's r) and nonparametric (Kendall's tau or Spearman's rho) tests of correlation between these indicators and time. Statistical significance of the correlation coefficients will be evaluated based on an α -level of 0.05 for a one-tailed test. The pattern of interest will be evidence that receiving water conditions are improving based on the detection of statistically significant trends in the data for one or more of these indicators in the Application watersheds while these same trends are not detected in the data for the same indicators in the Reference and Control watersheds.

In addition to the correlation analyses, separate analyses will be performed to compare measured flows in Tosh Creek and Monticello Creek to modeled flows for forested and existing conditions in these watersheds that were derived using Hydrological Simulation Program—Fortran (HSPF) models. For these analyses, local rainfall data collected concurrently with the measured flows will serve as model input for predicting flows for forested and existing conditions. Using a custom program that is described in the QAPP for the study (Herrera 2015c), both the measured and modeled flows will be post-processed to delineate individual periods of base and storm flow, respectively, across the entire time series for a given water year. Separate statistical analyses (Paired Wilcoxon signed rank tests or Paired T-tests) will then be performed to determine if measured peak flows and flow volumes, respectively, during storm flow are significantly different from modeled flows for either the forested and existing conditions. Statistical significance in these tests will be evaluated based on an α -level of 0.05 for a one-tailed test. If watershed rehabilitation efforts are effective, measured peak flows and flow volumes should depart from the modeled equivalent for existing conditions and more closely resemble those for forested conditions.

Water Quality Monitoring

A total of 14 fixed monitoring stations were established to facilitate water quality monitoring in each of the study watersheds. These stations were co-located with the monitoring stations described above for hydrologic monitoring (see Figures 2 through 8). Twelve grab samples will be collected annually during storm events (three each quarter) at all 14 monitoring stations for the duration of the RPWS. In addition, four grab samples will also be collected annually during base flow (one each quarter) at these stations. Each sample will be analyzed for the following indicators for evaluating water quality impacts from urban development:

- Total suspended solids
- Turbidity
- Conductivity
- Hardness
- Dissolved organic carbon
- Fecal coliform bacteria

- Total phosphorus
- Total nitrogen
- Copper, total and dissolved
- Zinc, total and dissolved

In addition, the following indicators will be continuously measured *in situ* at each station using probes:

- Temperature
- Conductivity

Trends over time at each monitoring station will be evaluated using parametric (Pearson's *r*) and nonparametric (Kendall's tau or Spearman's rho) tests of correlation between these indicators and time. Where possible, variation in the indicator data related to changes in stream flow will be removed prior to performing the correlation analyses using methods described in Helsel and Hirsch (2002). Use of these methods is generally applicable for indicators that tend to increase (or decrease) as a function of flow (e.g., total suspended solids). By removing this variation, trends in the indicator data can be more readily detected in the correlation analyses. In all cases, statistical significance of the correlation coefficients will be evaluated based on an α -level of 0.05 for a one-tailed test.

The sample frequency identified above for water quality monitoring was evaluated using power tests that were performed for totals suspended solids and total zinc. Power tests are used to determine the probability of detecting a trend given: 1) sample size, 2) the desired α -level, 3) magnitude of the trend, and 4) amount of variation within the data. With 16 samples collected annually (12 samples during storm events and 4 samples during base flow) over a 10-year period and a desired α -level of 0.05, results from these tests showed there was a 66 to 100 percent probability of detecting a 4 milligram per liter (mg/L) decrease in total suspended solids concentrations depending on the variability that is assumed for the data and characteristics of the trend over time (i.e., linear or non-linear). These same tests showed there is a 38 to 100 percent probability of detecting a 2 microgram per liter ($\mu\text{g/L}$) decrease in total zinc concentrations. Results from these tests are documented in the QAPP that was prepared for the study (Herrera 2015c).

Annual mass load estimates will also be derived for the following subset of indicators using the nonparametric "smearing" approach described in Helsel and Hirsch (2002): total suspended solids, total phosphorus, total nitrogen, total copper, and total zinc. Trends over time at each monitoring station will again be evaluated using parametric (Pearson's *r*) and nonparametric (Kendall's tau or Spearman's rho) tests of correlation between these mass load estimates and time. Statistical significance of the correlation coefficients will be evaluated based on an α -level of 0.05 for a one-tailed test. These analyses will be used to detect potential improvements in

receiving water conditions from the combined effects of improved water quality and reduced stormwater runoff.

In all cases, the pattern of interest will be evidence that receiving water conditions are improving based on the detection of statistically significant trends in the data for one or more of these indicators in the Application watersheds while the same trends are not detected in the data for the same indicators in the Reference and Control watersheds.

Physical Habitat Monitoring

A total of 19 fixed monitoring stations were established to facilitate physical habitat monitoring in each of the study watersheds. As described in the literature review (Herrera 2001b) that was performed to inform the experimental design for the RPWS, most past studies that have been performed to assess physical habitat response to watershed rehabilitation were conducted in reaches where channel rehabilitation measures were directly applied. Consequently, they were designed to only assess the localized effects of these efforts. The RPWS involves both localized channel rehabilitation and watershed scale rehabilitation through the application of structural and programmatic practices for stormwater management. Therefore, a synoptic approach was applied for establishing monitoring stations for physical habitat monitoring where stations were established in the Application watersheds in reaches that will be restored and in reaches where no physical alterations to the channel are planned. In this way, the RPWS can assess physical habitat response to both localized and basin-wide rehabilitation efforts. In addition to these considerations, the specific location of each monitoring station was also influenced by safety and property access issues. The monitoring stations established in each of the study watersheds are as follows:

Application Watersheds

- Evans Creek Tributary 108: two stations designated Lower Stream Station (EVALSS) and Midstream Station (EVAMS), respectively (see locations in Figure 2).
- Monticello Creek: five stations designated Mont-1, Mont-2, Mont-3, Mont-4, and Mont-5, respectively (see locations in Figure 3).
- Tosh Creek: four stations designated Tosh-1, Tosh-2, Tosh-3, and Tosh-4, respectively (see locations in Figure 4).

Reference Watersheds

- Colin Creek: one designated Colin-1 (see locations in Figure 5).
- Seidel Creek: three stations designated Seidel-1, Seidel-2, and Seidel-3, respectively (see locations in Figure 6).

Control Watersheds

- Country Creek: two stations designated Country-1 and Country-2, respectively (see locations in Figure 7).
- Tyler's Creek: two stations designated Tylers-1 and Tylers-2, respectively (see locations in Figure 8).

The following monitoring stations were specifically selected to measure the localized physical habitat response in reaches that have either been recently restored or are likely to be restored in the future:

- Mont-3
- Mont-4
- Mont-5
- Tosh-1
- Tosh-3
- Tosh-4

Physical habitat monitoring will be conducted annually at each monitoring station for the duration of the RPWS. The characteristic bed-form type will be recorded at each monitoring station as a whole, and physical habitat quality indicators will be measured at 11 cross-sections (transects) and thalweg (line of steepest descent along the streambed) profile for each habitat monitoring station.

The following indicators will be measured at each transect:

- Bank-full width, wetted width, and cumulative bar width
- Bank-full depth, wetted depth, substrate class and embeddedness at 11 or more stations across the section
- Fish cover
- Human influence
- Riparian shading
- Riparian vegetation structure
- Presence of desirable/undesirable plant species

The following indicators will be measured along the thalweg profile:

- Thalweg depth and the presence of bars and/or edge pools
- Large woody debris and habit unit descriptions
- Side-channel descriptions
- Main channel slope and bearing
- Presence, source, size, of culvert or pipes draining to creek

Post-processing of recorded physical habitat indicators will allow monitoring of:

- Channel incision or aggradation
- Channel widening, narrowing, or migration
- Changes in channel slope, sinuosity, and/or bed-form type

The pattern of interest will be evidence that receiving water conditions are improving based on the detection of trends in the data for one or more of these indicators in the Application watersheds while the same trends are not detected in the data for the same indicators in the Reference and Control watersheds.

Sediment Quality Monitoring

A total of 19 fixed monitoring stations were established to facilitate sediment quality monitoring in each of the study watersheds. These stations were co-located with the monitoring stations described above for physical habitat monitoring (see Figures 2 through 8). Sediment samples will be collected annually at all 19 monitoring stations for the duration of the RPWS. Each sample will be analyzed for the following indicators for evaluating sediment quality impacts from urban development:

- Total organic carbon
- Copper
- Zinc
- Polycyclic aromatic hydrocarbons
- Phthalates

Trends over time at each monitoring station will be evaluated using parametric (Pearson's r) and nonparametric (Kendall's tau or Spearman's rho) tests of correlation between these indicators

and time. Statistical significance of the correlation coefficients will be evaluated based on an α -level of 0.05 for a one-tailed test. The pattern of interest will be evidence that receiving water conditions are improving based on the detection of statistically significant trends in the data for one or more of these indicators in the Application watersheds while the same trends are not detected in the data for the same indicators in the Reference and Control watersheds.

Biological Monitoring

A total of 19 fixed monitoring stations were established to facilitate biological monitoring in each of the study watersheds. These stations were co-located with the monitoring stations described above for physical habitat monitoring (see Figures 2 through 8). Benthic macroinvertebrate samples will be collected annually at each monitoring station for the duration of the RPWS. Each sample will be processed to calculate the following indicators for use in evaluating stream health:

- Benthic Index of Biotic Integrity (B-IBI)
- Taxa Richness
- Ephemeroptera Richness
- Plecoptera Richness
- Trichoptera Richness
- Clinger Percent
- Long-Lived Richness
- Intolerant Richness
- Percent Dominant
- Predator Percent
- Tolerant Percent

Trends over time at each monitoring station will be evaluated using parametric (Pearson's r) and nonparametric (Kendall's tau or Spearman's rho) tests of correlation between these indicators and time. Statistical significance of the correlation coefficients will be evaluated based on an α -level of 0.1 for a one-tailed test. The pattern of interest will be evidence that receiving water conditions are improving based on the detection of statistically significant trends in the data for one or more of these indicators in the Application watersheds while the same trends are not detected in the data for the same indicators in the Reference and Control watersheds.

The sampling frequency identified above for biological monitoring was evaluated using the power tests described above in the *Water Quality Monitoring* subsection. With samples collected annually over a 10-year period and a desired α -level of 0.05, results from these tests showed there was a 63 to 96 percent probability of detecting a 9-unit increase in B-IBI scores (equivalent to a change from “fair” to “good” in biological condition) depending on the variability that is assumed for the data and characteristics of the trend over time (i.e., linear or non-linear). Results from these tests are documented in the QAPP that was prepared for study (Herrera 2015c).

Effectiveness Monitoring

As described above, roving stations will be established for the Effectiveness Monitoring component of the RPWS to verify specific structural stormwater controls are constructed properly and performing as designed. The roving stations will be moved from one year to the next once a facility’s effectiveness has been verified and new facilities come online. The specific types of monitoring to be performed at each roving station will depend on the type of structural stormwater control that is being evaluated. For example, it is anticipated that only hydrologic monitoring would be performed at roving stations for facilities that are only designed for flow control (e.g., vaults). In these cases, a facility’s performance would be verified based on comparisons of measured flow from the roving station to the facility’s predicted flow based on models used in its design. For facilities that are designed for runoff treatment, monitoring will follow guidelines from Ecology’s Technology Assessment Protocol-Ecology (TAPE) (Ecology 2011) and include both hydrologic (e.g., influent and effluent flow) and water quality monitoring. In these cases, a facility’s performance would be verified based on comparisons of its measured pollutant removal efficiency relative to targets that are identified in TAPE for specific treatment categories.

At present, no new structural stormwater controls have come online in an Application watershed that are suitable for Effectiveness Monitoring. For planning purposes, it is anticipated that two separate facilities will be completed and made available for monitoring in years 2 and 3 of the study, respectively. For each facility, detailed information on the procedures that will be used for data collection, quality assurance and control, management, and analysis will be provided in separate addendums to the QAPP that was prepared for the study (Herrera 2015c).

REHABILITATION EFFORT SUMMARY

As noted in the previous section, the pattern of interest for this study will be evidence that receiving water conditions are improving based on one or more indicators in the Application watersheds while conditions in the Reference and Control watersheds remain relatively static. To increase the likelihood of detecting this trend, it is important to characterize conditions in the Application watersheds over a “baseline” period prior to the implementation of any rehabilitation efforts. To that end, rehabilitation efforts over WY2017 were limited. With funding from a King County WaterWorks grant, the City initiated street sweeping in the Monticello Creek Watershed in August of WY2017. The street sweeping occurs once a month on all public roads that drain to Monticello Creek. This street sweeping is being implemented to meet the specific goal of improving water quality in the creek and is being conducted in addition to other street sweeping that occurs in the watershed for other operational reasons, such as collecting leaves in fall. In Tosh Creek watershed, a high flow bypass pipe weir was adjusted in July of WY2017 to divert more high flow stormwater from Tosh Creek. Rehabilitation efforts within the Application watersheds will gradually increase over the 10-year duration of the study. All efforts will be documented in subsequent data summary reports.

SAMPLING PROCEDURES

The QAPP that was prepared for the RPWS (Herrera 2015c) provides detailed information on the sampling procedures that are being used for each of the following monitoring categories: hydrologic, water quality, physical habitat, sediment quality, and biological. The following deviations from these sampling procedures are noted for monitoring that took place in WY2017:

- The YSI Pro Model 2030 that was used to make discrete *in situ* measurements of water temperature and conductivity was calibrated using a 1,000 μS standard instead of a 100 μS standard as specified in the QAPP. This change was made based on manufacturer recommendations for meter calibration. Given this change, the calibration of the meter was subsequently checked before and after each sampling event using both the 100 and 1,000 μS standards. Results from these calibration checks were documented on standardized field forms.
- Guidelines in the QAPP indicated storm sampling should occur after a period of at least 24 hours preceding the event with less than 0.04 inches of precipitation. However, this guideline was deemed too restrictive following monitoring that occurred over WY2016. Based on input from the SAM program coordinator and technical advisory committee for the RPWS, this criterion was changed to allow storm event sampling after a period of at least 12 hours preceding the event with less than 0.04 inches of precipitation.

MONITORING RESULTS SUMMARY

This section summarizes results for the Status and Trends Monitoring component of the RPWS from monitoring that was conducted over WY2017; as noted previously, no monitoring for the Effectiveness Monitoring component of the study occurred over this period. The presentation of these results is organized under separate subsections for the following monitoring categories: hydrologic, water quality, physical habitat, sediment quality, and biological. As noted in the *Introduction* section of this document, trend analyses reports will be prepared in years 4, 6, 8, and 10 of the RPWS' implementation to summarize the results of statistical analyses that will be performed on the compiled data from all previous years of monitoring to detect potential relationships between rehabilitation efforts and improved receiving water conditions. Therefore, this data summary report does not provide detailed analyses of the monitoring results from WY2017.

HYDROLOGIC MONITORING

Hydrologic monitoring for WY2017 initiated on October 1, 2016, at the 14 fixed monitoring stations that are identified in the *Experimental Design* section of this document and continued through September 30, 2017. In addition, continuous precipitation monitoring occurred over the same period at four separate precipitation monitoring stations: three stations were established for the RPWS – Tosh, Monticello, and Evans; and one station is maintained by King County for other purposes – Trilogy. Each station is used for measuring precipitation in the watershed for a specific creek as follows:

- Tosh station: Tosh Creek and Country Creek
- Monticello station: Tyler Creek and Monticello Creek
- Evans station: Evans Creek
- Trilogy station: Seidel Creek and Colin Creek.

Line plots showing the continuous flow and precipitation data collected at each of these stations (grouped by watershed) are provided in Appendix A. The quality assurance review memorandum for these data is provided in Appendix B while Appendix C documents the manual flow measurements that were used to develop discharge rating curves for each station. In general, the quality assurance review memorandum indicates there were no serious quality assurance problems associated with these data that would impose severe limitations on their use and interpretation. As documented in the quality assurance review memorandum, the continuous flow data at each station was rated as either "fair" or "good" with the exception of MONMN station where the data were rated "poor" due to an unstable channel that makes it difficult to

develop a consistent discharge rating curve. There was also evidence of vandalism at the MONMN station that may have impacted data quality. Finally, there were minor gaps in the continuous flow data for several stations (MONMS, COLMI, TYLMO) as shown in Table 3.

Table 3. Gaps in Continuous Flow Data.				
Station	Gap Start Date/ Time^a	Gap Stop Date/ Time^a	Gap Duration in Hours	Flow Estimation Method
MONMS	3/6/2017 16:05	3/7/2017 11:55	19.8	ANFIS model using input data from MONMN
COUMI	2/15/2017 23:40	2/16/2017 17:10	17.5	ANFIS model using input data from COUMO
TYLMO	10/25/2016 13:15	10/25/2016 20:20	7.1	Linear interpolation

^a All times are reported as Pacific Standard Time.

ANFIS = adaptive network-based fuzzy inference system

To facilitate future analyses of hydrologic trends, the gaps identified in Table 3 were filled using estimated flow data. These estimates were derived by first importing the continuous flow data from all stations into the Aquarius Continuous Data Management System software package (Aquarius software package). Using the Aquarius software package's built-in capabilities, gaps of fewer than 10 hours were filled using linear interpolation. Longer gaps were filled using models that were developed to estimate missing flow data for one station based on measured flow data from another station having a similar hydrograph form and response. The Aquarius software package was used to determine whether a linear or adaptive network-based fuzzy inference system (ANFIS) model provided the best fit based on a training period where measured data were available for both stations. The specific type of model that was used for each station and the associated source of input data, where applicable, are identified in Table 3. The average model error across all the stations was 15.4 percent.

Once a complete data record was available for all the stations using either estimated or measured flow, the continuous flow data from each station and the applicable precipitation data were post-processed using a custom program written in Visual Basic that delineates the start and stop time of individual storm events based on user selectable storm criteria (e.g., antecedent dry period, minimum rainfall, interevent dry period, etc.). The program then computes the following suite of summary statistics for each storm event:

- Precipitation start and stop time
- Precipitation duration
- Precipitation depth
- Precipitation average intensity
- Precipitation maximum intensity

- Precipitation antecedent dry period
- Flow start and stop time
- Flow duration
- Average flow rate
- Maximum flow rate
- Flow volume

Appendix D provides these summary statistics for the individual storm events that were delineated based on the continuous flow data from each station. Summary statistics computed across all the events for each station are provided in Table 4.

Station	Watershed Type	Median Average Flow Rate (cfs)	Maximum Flow Rate (cfs)	Median Flow Volume (cf)	Maximum Flow Volume (cf)
EvalSS	A	2.51	27.00	228,782	2,062,252
EVAMS	A	0.93	12.51	79,391	631,811
MONM	A	1.84	37.76	143,358	2,025,417
MONMN	A	0.64	16.67	53,481	932,828
MONMS	A	0.18	4.20	15,479	215,917
TOSMO	A	0.86	21.02	81,189	1,304,513
TOSMI	A	0.58	15.42	52,854	845,743
COLM	R	1.79	14.49	151,167	2,311,163
SEIMN	R	0.74	8.2	167,094	2,220,758
SEIMS	R	0.64	8.74	50,745	614,923
COUMO	C	0.68	19.25	60,966	826,192
COUMI	C	0.16	10.57	15,117	311,984
TYLMO	C	0.71	16.87	160,200	2,371,271
TYLMI	C	0.22	4.02	20,774	307,479

cfs = cubic feet per second

cf = cubic feet

A = Application

R = Reference

C = Control

As described in the *Experimental Design* section of this document, data from the continuous flow monitoring are processed to calculate a suite of thirteen indicators for evaluating hydrologic impacts from urban development. Values for the following five indicators were derived using a custom script that was developed using the R statistical programming language:

- High pulse count
- High pulse duration
- High pulse range
- Flow reversal
- Richards-Baker flashiness index
- TQ Mean

Values for the following three indicators were derived using a hydrograph separation algorithm that has been successfully used in several other studies (Herrera 2004, 2011) for this purpose:

- Storm flow volume
- Base flow volume
- Total flow volume

The computed values for these nine of these indicators are shown in Table 5. Values for the three remaining indicators (low pulse count, low pulse duration, low pulse range) could not be computed at this time because they rely on data collected over a calendar year as opposed to a water year.

Table 5. Computed Indicator Values for Evaluating Hydrologic Impacts.

Station	Watershed Type	High Pulse Count (count)	High Pulse Duration (days)	High Pulse Range (days)	Flow Reversal (count)	Richards-Baker Flashiness Index	TQ Mean (fraction of year)	Storm Flow Volume (cf)	Base Flow Volume (cf)	Total Flow Volume (cf)
VALSS	A	18	1.4	195	124	0.28	0.38	15,502,660	52,379,597	67,882,257
EVAMS	A	23	1.4	200	123	0.31	0.41	5,498,826	18,402,546	23,901,372
MONM	A	28	1.8	220	137	0.53	0.35	19,589,468	21,719,092	41,308,560
MONMN	A	28	2.1	249	142	0.62	0.34	9,509,019	5,692,158	15,201,177
MONMS	A	30	1.3	208	153	0.73	0.29	2,365,115	2,136,459	4,501,574
TOSMO	A	28	1.1	252	139	0.80	0.19	10,803,538	13,144,292	23,947,830
TOSMI	A	29	1.3	252	138	0.84	0.21	8,038,188	6,624,381	14,662,569
COLM	R	17	5.3	208	86	0.35	0.37	26,722,586	16,751,593	43,474,179
SEIMN	R	23	2.7	208	112	0.28	0.43	5,897,179	11,609,888	17,243,403
SEIMS	R	20	1.3	250	136	0.32	0.35	3,957,275	13,883,656	17,840,931
COUMO	C	29	1.5	250	131	0.54	0.32	7,582,003	9,714,509	17,296,512
COUMI	C	19	1.7	209	127	0.44	0.30	1,809,138	2,944,689	4,753,827
TYLMO	C	30	1.7	221	139	0.76	0.28	10,242,758	5,953,921	14,748,453
TYLMI	C	32	1.8	220	117	0.75	0.25	3,986,339	1,858,657	5,844,996

cf = cubic feet

A = Application

R = Reference

C = Control

WATER QUALITY MONITORING

Pursuant to the QAPP that was prepared for the study (Herrera 2015c), 12 grab samples are to be collected during storm events (three each quarter) at the 14 fixed monitoring stations that are identified in the *Experimental Design* section of this document for water quality monitoring. In addition, four grab samples are to be collected during base flow (one each quarter) at these same stations. The dates when samples were collected during storm events are identified in Table 6. Storm event sampling was temporarily suspended in the first quarter of WY2017 while property access issues were being resolved; due to this suspension, only two storm events were sampled in the quarter. Five storm events were sampled in the both the second and third quarters of WY2017 to make up for the missed event in the first quarter and missed events from WY2016. No storm events were sampled in the fourth quarter of WY2017 due to extremely dry conditions. Additional storm events will be sampled in water year 2018 (WY2018) to make up for these missed events.

The following criteria from the QAPP serve as guidelines for defining the acceptability of specific storm events for sampling:

- **Target precipitation depth:** A minimum of 0.25 inches of precipitation over a 24-hour period
- **Antecedent conditions:** A period of at least 12 hours preceding the event with less than 0.04 inches of precipitation

Table 6 compares these criteria to data collected in WY2017 during each sampled storm event from the precipitation monitoring stations described in the previous section (Tosh, Monticello, Evans, and Trilogy). As shown, these criteria were met for all storm events sampled over WY2017. To provide additional information for assessing the acceptability of sampled storm events, line plots showing the actual time samples were collected at each station relative to the storm event hydrograph are provided in Appendix E; storm event hydrographs in these plots are shaded grey to distinguish them from periods of base flow. These plots generally show most samples were collected early on the rising limb or peak of the hydrograph with the following exceptions:

- During the storm event on December 9, 2017, samples were collected at the onset of rainfall and before there was an appreciable rise in the hydrograph at all stations except COUMO, COUMI, and TYLMO.
- During the storm event on January 8, 2017, samples were collected at the EVALSS, EVAMS, TOSMI, TOSMO, COUMI, and COUMO stations after rainfall was observed but before there was an appreciable rise in the hydrograph.

- During the storm event on January 17, 2017, samples were collected at the EVALSS, EVAMS, COUMI, and COUMO stations after rainfall was observed but before there was an appreciable rise in the hydrograph.

The representativeness of the data from these samples for assessing water quality during storm events will be more thoroughly assessed prior to their use in trend analyses for the study. If necessary, they may be reclassified as base flow samples for these analyses to avoid introducing bias in the associated results. In all cases, they will be used with extreme caution. In WY2018, care will be taken to sample stations in the Country Creek watershed later in the storm event to ensure an appreciable rise in the hydrograph has occurred from inputs of stormwater.

As described in the QAPP for the RPWS, base flow samples should be collected following a period of at least 48 hours without rain. Table 6 shows the dates when samples were collected during base flow with a comparison to this criterion using data from the precipitation monitoring stations described in the previous section. This comparison shows the criterion was met during all base flow sampling events except for the November 18, 2016, event when the antecedent dry period was just under 40 hours at most of the stations. Note the COLM station was not sampled during the August 9, 2017, base flow event because the channel was dry. Consequently, a make-up sample will be collected at this station during a base flow event in WY2018 when water is again flowing in the channel.

Field data collection forms, chain-of-custody records, laboratory reports, and data quality audit forms from the storm event and base flow sampling during WY2017 are provided in Appendix F. The memorandum documenting results from the quality assurance review that was performed on these data is provided in Appendix G. Based on this review, 32 values were qualified as estimates as documented in Table 7, and no values were rejected. A significant number of the qualified values were related to the detection of monitoring parameters in a transfer blank that was collected on November 18, 2017. As described in Appendix G, values were qualified as estimates for any of the parameters when detected above the reporting limit but less than 5 times the transfer blank result; values that exceeded this threshold would have been rejected. Estimated values will be used with caution in subsequent trend analyses that will be performed for the study.

Appendix H presents tables with the following summary statistics for pollutant concentrations measured in storm event and base flow samples over WY2017:

- N (sample size)
- Minimum
- 25th Percentile
- Median
- 75th Percentile

- Maximum
- Quartile range
- Percent detected
- Percent exceeding the water quality standard for surface waters of the state of Washington (Ecology 2016), where applicable

Table 6. Sampling Dates and Comparison to Criteria for Storm Event and Base Flow Sampling.

Water Year Quarter	Event Type	Event Date	Tosh Station ^a			Monticello Station ^b			Evans Station ^c			Trilogy Station ^d		
			Precipitation Duration (hour)	Precipitation Depth ^e (inch)	Antecedent Dry Period ^f (hour)	Precipitation Duration (hour)	Precipitation Depth ^e (inch)	Antecedent Dry Period ^f (hour)	Precipitation Duration (hour)	Precipitation Depth ^e (inch)	Antecedent Dry Period ^f (hour)	Precipitation Duration (hour)	Precipitation Depth ^e (inch)	Antecedent Dry Period ^f (hour)
1	Storm	11/5/2016	22.6	1.18	53.8	22.5	1.10	53.8	22.7	1.14	54.1	22.6	1.13	54.0
1	Base	11/18/2016	NA	NA	58.8	NA	NA	39.2	NA	NA	39.1	NA	NA	38.9
1	Storm	12/9/2016	23.3	0.49	161.0	13.3	0.33	97.1	13.4	0.59	113.8	6.1	0.81	120.3
2	Base	1/5/2017	NA	NA	94.0	NA	NA	93.3	NA	NA	67.5	NA	NA	68.1
2	Storm	1/8/2017	13.3	0.47	168.5	13.4	0.43	166.8	13.4	0.40	68.1	15.9	0.48	139.3
2	Storm	1/17/2017	52.8	2.18	164.0	52.4	2.37	163.5	43.7	1.99	164.7	60.9	2.31	161.8
2	Storm	2/3/2017	98.3	2.21	280.8	66.8	1.77	350.2	63.1	1.70	346.5	60.9	1.93	83.7
2	Storm	2/8/2017	50.3	2.35	18.5	46.8	2.46	16.9	49.3	2.54	17.9	51.0	2.45	19.7
2	Storm	3/7/2017	14.8	0.46	48.0	14.8	0.41	47.9	15.2	0.37	48.2	16.3	0.48	48.0
3	Storm	4/12/2017	35.8	1.02	29.9	35.5	1.12	45.2	36.3	1.00	29.5	47.1	1.18	29.5
3	Storm	5/4/2017	12.3	0.98	35.4	13.4	1.23	35.6	19.8	1.02	35.4	17.1	1.18	32.1
3	Base	5/8/2017	NA	NA	58.5	NA	NA	79.8	NA	NA	79.7	NA	NA	79.6
3	Storm	5/15/2017	33.0	1.13	91.0	31.7	1.18	40.5	33.7	1.32	41.4	39.1	1.44	40.5
3	Storm	6/8/2017	10.6	0.33	160.6	10.3	0.27	161.1	11.9	0.35	160.8	10.3	0.37	160.8
3	Storm	6/15/2017	13.6	0.87	168.4	12.3	0.57	169.6	16.6	0.73	164.2	15.8	0.73	34.0
4	Base	8/9/2017	NA	NA	166.6	NA	NA	1,248.0	NA	NA	1,248.8	NA	NA	1,248.8

^a Station is used for measuring precipitation in the watersheds for Tosh Creek and Country Creek.

^b Station is used for measuring precipitation in the watersheds for Tyler Creek and Monticello Creek.

^c Station is used for measuring precipitation in the watershed for Evans Creek.

^d Station is used for measuring precipitation in the watersheds for Seidel Creek and Colin Creek.

^e Criteria for precipitation total is ≥ 0.25 inches in 24 hours for storm event sampling.

^f Criteria for antecedent dry period is ≥ 12 hours with < 0.04 inches of rain for storm event sampling and ≥ 48 hours with no rain for base flow sampling.

NA = not applicable

Bold values indicate events which did not meet criteria for storm event or base flow sampling.

Table 7. Qualified Results from Discrete Water Quality Sampling.

Event Date	Station	Water Quality Indicator	Reason for Qualification	Data Flag
11/05/2016	All locations	Fecal coliform bacteria	Holding time exceedance	J
11/17/2016	TYLMO	Dissolved zinc	Filter blank exceedance	J
11/18/2016	EVAMS	Turbidity	Transfer blank exceedance	J
11/18/2016	COUMI	DOC, total nitrogen, total copper	Transfer blank exceedance	J
11/18/2016	COUMO	DOC, total nitrogen	Transfer blank exceedance	J
11/18/2016	COLM	Total nitrogen	Transfer blank exceedance	J
11/18/2016	MONMN	Total nitrogen	Transfer blank exceedance	J
11/18/2016	MONMS	Total nitrogen, total copper	Transfer blank exceedance	J
11/18/2016	MONM	Total nitrogen	Transfer blank exceedance	J
11/18/2016	SEIMN	Total nitrogen	Transfer blank exceedance	J
11/18/2016	SEIMS	Total nitrogen	Transfer blank exceedance	J
11/18/2016	TOSMI	Total nitrogen, total and dissolved copper	Transfer blank exceedance	J
11/18/2016	TOSMO	DOC, total nitrogen, total copper	Transfer blank exceedance	J
11/18/2016	TYLMI	Total nitrogen, total and dissolved copper	Transfer blank exceedance	J
11/18/2016	TYLMO	Total nitrogen, total copper	Transfer blank exceedance	J
11/18/2016	COUMO	Fecal coliform	Lab duplicate exceedance	J
12/09/2016	MONMS	Total nitrogen	Lab duplicate exceedance	J
2/03/2017	TYLMO	Fecal coliform	Lab duplicate exceedance	J
2/08/2017	TYLMO	Fecal coliform	Lab duplicate exceedance	J
2/08/2017	EVALS	Total nitrogen	Lab duplicate exceedance	J
11/05/2016	TYLMI	TSS	Field duplicate exceedance	J

Table 7 (continued). Qualified Results from Discrete Water Quality Sampling.				
Event Date	Station	Water Quality Indicator	Reason for Qualification	Data Flag
12/09/2016	COUMI	Total nitrogen	Field duplicate exceedance	J
1/05/2017	MONMS	Total nitrogen	Field duplicate exceedance	J
1/08/2017	EVALSS	TSS and turbidity	Field duplicate exceedance	J
1/17/2017	MONM	Turbidity and total nitrogen	Field duplicate exceedance	J
2/03/2017	EVAMS	Total nitrogen and fecal coliform	Field duplicate exceedance	J
2/08/2017	COUMO	Total phosphorus and total nitrogen	Field duplicate exceedance	J
4/12/2017	COLM	TKN and fecal coliform	Field duplicate exceedance	J
5/04/2017	TOSMI	TSS, turbidity, hardness, total phosphorus, TKN, total copper and zinc	Field duplicate exceedance	J
5/08/2017	TOSMO	Turbidity	Field duplicate exceedance	J
5/15/2017	TYLMO	Hardness, TKN, total copper and zinc	Field duplicate exceedance	J
6/15/2017	SEIMN	Turbidity	Field duplicate exceedance	J

J = Value qualified as an estimate based on quality assurance review.

DOC = dissolved organic carbon

TKN = Total Kjeldahl nitrogen

TSS = total suspended solids

In addition, Appendix I presents box and whisker plots that were developed from these same data that show the minimum and maximum values (lower and upper whiskers, respectively), 25th and 75th percentile values (lower and upper box edges, respectively), and median value (line in box). Following guidance from Helsel and Hirsch (2002), regression on order statistics (ROS) was used to estimate the summary statistics identified above when nondetect values were present in the data. If the estimated summary statistic was less than the highest detection limit in the dataset, the highest detection limit was reported instead.

In addition to the collection of grab samples during storm events and base flow, continuous monitoring of temperature was performed at all 14 of the fixed monitoring stations that are identified in the *Experimental Design* section of this document for water quality monitoring. Continuous monitoring of conductivity was also performed at the following subset of stations: EVALSS, EVAMS, MONM, MONMS, TOSMO, SEIMN, COUMO, and TYLMO. Line plots showing

the continuous temperature and conductivity data collected at each of these stations are provided in Appendices J and K, respectively. The line plots for the continuous temperature data also show the 7-day average of the daily maximum temperatures (7-DADMAX) relative to the applicable aquatic life temperature criterion for surface waters of the state of Washington (Ecology 2016).

Based on reviews of the continuous temperature and conductivity data presented in Appendices J and K, the following quality assurance issues were identified in connection with these data:

- No continuous conductivity data are available for the MONMS station over the period from December 14, 2016, through December 15, 2016.
- No continuous conductivity data are available for the MONMS station over the period from January 2, 2017, through January 5, 2017.
- No continuous conductivity data are available for the MONMS station over the period from March 27, 2017, through April 12, 2017.
- No continuous conductivity data are available for the COUMO station over the period from February 17, 2017, through March 7, 2017.

PHYSICAL HABITAT MONITORING

Physical habitat monitoring for WY2017 was completed at the 19 fixed monitoring stations that are identified in the *Experimental Design* section of this document on the following dates:

- EVALSS 7/26/2017
- EVAMS 7/11/2017
- MONT 1 7/18/2017
- MONT 2 7/27/2017
- MONT 3 7/27/2017
- MONT 4 7/28/2017
- MONT 5 7/14/2017
- TOSH 1 8/1/2017
- TOSH 2 7/19/2017
- TOSH 3 7/27/2017

- TOSH 4 7/28/2017
- COLIN 1 7/14/2017
- SIDL-1 7/17/2017
- SIDL-2 7/17/2017
- SIDL-3 7/28/2017
- CTRY-1 7/12/2017
- CTRY-2 7/13/2017
- TYLR-1 8/2/2017
- TYLR-2 8/1/2017

Compiled field data from this monitoring are presented in Appendix L and the computed indicators for evaluating physical habitat quality are presented in Appendix M. Finally, Appendix N provides tables with summary statistics for the indicators that are organized in the following categories:

- Bed stability (Table N-1)
- Channel dimensions (Table N-2)
- Fish cover (Table N-3)
- Habitat dimensions (Table N-4)
- Habitat unit extents (Table N-5)
- Large woody debris (Table N-6)
- Riparian cover (Table N-7)
- Riparian Disturbance (Table N-8)
- Riparian vegetation structure (Table N-9)
- Sinuosity (Table N-10)
- Substrate (Table N-11)

SEDIMENT QUALITY MONITORING

Sediment quality monitoring for WY2017 was completed at 18 of the 19 fixed monitoring stations that are identified in the *Experimental Design* section of this document on the following dates:

- EVALSS 9/1/2017
- EVAMS 9/1/2017
- MONT-1 9/13/2017
- MONT-2 8/30/2017
- MONT-3 9/20/2017
- MONT-4 9/20/2017
- MONT-5 9/20/2017
- TOSH-1 9/11/2017
- TOSH-2 8/28/2017
- TOSH-3 8/28/2017
- TOSH-4 9/1/2017
- SIDL-1 9/22/2017
- SIDL-2 9/22/2017
- SIDL-3 9/13/2017
- CTRY-1 9/11/2017
- CTRY-2 9/11/2017
- TYLR-1 8/30/2017
- TYLR-2 8/30/2017

The COLIN-1 station was not sampled in WY2017 because the channel was dry during the scheduled period for sediment quality monitoring.

Field data laboratory reports and data quality audit forms from sediment quality sampling in WY2017 are provided in Appendix O. The memorandum documenting results from the quality

assurance review that was performed on these data is provided in Appendix P. No values were qualified as estimates or rejected based on this review.

Total organic carbon, zinc, and copper concentrations measured in sediment samples are presented in Table 8. Concentrations of polycyclic aromatic hydrocarbons (PAHs) and phthalates are presented in Tables 9 and 10, respectively.

Table 8. Concentrations of Total Organic Carbon, Copper, and Zinc Measured in Sediment Samples.^a				
Station	Watershed Type	Total Organic Carbon (%)	Copper (mg/Kg)	Zinc (mg/Kg)
EVALSS	A	4.1	34	86
EVAMS	A	20.0	22	86
MONT-1	A	1.9	35	270
MONT-2	A	9.6	61	370
MONT-3	A	8.3	53	670
MONT-4	A	1.1	40	550
MONT-5	A	8.2	24	120
TOSH-1	A	1.0	39	340
TOSH-2	A	2.0	41	380
TOSH-3	A	3.7	35	440
TOSH-4	A	4.5	44	880
COLIN-1	R	ND	ND	ND
SIDL-1	R	2.0	28	56
SIDL-2	R	0.6	35	85
SIDL-3	R	11.0	22	80
CTRY-1	C	2.3	40	350
CTRY-2	C	5.1	26	94
TYLR-1	C	1.9	37	270
TYLR-2	C	4.6	94	520

^a Samples were processed (sieved) in the field to make two unique samples. The first sample was sieved to less than 2.0 mm and analyzed for multiple organic compounds (PAHs and phthalates) and total-organic carbon. The second sample was sieved to less than 63 µm and analyzed for metals (copper and zinc).

mg/Kg = milligram/kilogram

A = Application

R = Reference

C = Control

ND = no data

Table 9. Concentrations of Polycyclic Aromatic Hydrocarbons Measured in Sediment Samples.^a

Station	Watershed Type	1-Methyl-naphthalene (mg/Kg)	2-Methyl-naphthalene (mg/Kg)	Ace-naphthene (mg/Kg)	Ace-naphthylene (mg/Kg)	Anthracene (mg/Kg)	Benz[a]-anthracene (mg/Kg)	Benzo(a)-pyrene (mg/Kg)	Benzo(b)-fluoranthene (mg/Kg)	Benzo(ghi)-perylene (mg/Kg)	Benzo(j,k)-fluoranthene (mg/Kg)	Chrysene (mg/Kg)	Dibenzo(a,h)-anthracene (mg/Kg)	Fluoranthene (mg/Kg)	Fluorene (mg/Kg)	Indeno-(1,2,3-cd)-pyrene (mg/Kg)	Naphthalene (mg/Kg)	Phenanthrene (mg/Kg)	Pyrene (mg/Kg)	Total PAHs (mg/Kg)
EVALSS	A	0.0099 U	0.0099 U	0.0099 U	0.0099 U	0.0099 U	0.0540	0.0560	0.0850	0.0170	0.0220	0.0540	0.0099 U	0.0440	0.0099 U	0.0290	0.0099 U	0.0099 U	0.0650	0.4260
EVAMS	A	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0220	0.0300	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0290	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0270	0.1080
MONT-1	A	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U
MONT-2	A	0.0180 U	0.0180 U	0.0180 U	0.0180 U	0.0180 U	0.0180 U	0.0180 U	0.0180 U	0.0180 U	0.0180 U	0.0180 U	0.0180 U	0.0180 U	0.0180 U	0.0180 U	0.0180 U	0.0180 U	0.0280	0.0280
MONT-3	A	0.0210 U	0.0210 U	0.0210 U	0.0210 U	0.0210 U	0.0210 U	0.0210 U	0.0220	0.0210 U	0.0210 U	0.0210 U	0.0210 U	0.0210 U	0.0210 U	0.0210 U	0.0210 U	0.0210 U	0.0210 U	0.0430
MONT-4	A	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U
MONT-5	A	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U
TOSH-1	A	0.0064 U	0.0064 U	0.0064 U	0.0064 U	0.0064	0.0085	0.0100	0.0130	0.0064 U	0.0064 U	0.0110	0.0064 U	0.0250	0.0064 U	0.0075	0.0064 U	0.0120	0.0210	0.1080
TOSH-2	A	0.0160 U	0.0160 U	0.0160 U	0.0160 U	0.0160	0.0200	0.0210	0.0300	0.0160 U	0.0160 U	0.0240	0.0160 U	0.0560	0.0160 U	0.0170	0.0160 U	0.0330	0.0450	0.2460
TOSH-3	A	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200	0.0240	0.0290	0.0450	0.0270	0.0200 U	0.0310	0.0200 U	0.0620	0.0200 U	0.0260	0.0200 U	0.0260	0.0520	0.3220
TOSH-4	A	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0110	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0110
COLIN-1	R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
SIDL-1	R	0.0084 U	0.0084 U	0.0084 U	0.0084 U	0.0084	0.0084 U	0.0084 U	0.0084 U	0.0084 U	0.0084 U	0.0084 U	0.0084 U	0.0084 U	0.0084 U	0.0084 U	0.0084 U	0.0084 U	0.0084 U	0.0084 U
SIDL-2	R	0.0055 U	0.0055 U	0.0055 U	0.0055 U	0.0055 U	0.0055 U	0.0055 U	0.0055 U	0.0055 U	0.0055 U	0.0055 U	0.0055 U	0.0055 U	0.0055 U	0.0055 U	0.0055 U	0.0055 U	0.0055 U	0.0055 U
SIDL-3	R	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U
CTRY-1	C	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0170	0.0750	0.0740	0.1100	0.0470	0.0340	0.0830	0.0120	0.2500	0.0071 U	0.0550	0.0071 U	0.0860	0.2100	1.0530
CTRY-2	C	0.0110 U	0.0110 U	0.0110 U	0.0110 U	0.0110 U	0.0110 U	0.0110 U	0.0110 U	0.0110 U	0.0110 U	0.0110 U	0.0110 U	0.0110 U	0.0110 U	0.0110 U	0.0110 U	0.0110 U	0.0110 U	0.0110 U
TYLR-1	C	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U	0.0057 U
TYLR-2	C	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0180	0.0180	0.0280	0.0110	0.0093 U	0.0150	0.0093 U	0.0380	0.0093 U	0.0180	0.0093 U	0.0230	0.0270	0.1960

^a Samples were processed (sieved) in the field to make two unique samples. The first sample was sieved to less than 2.0 mm and analyzed for multiple organic compounds (PAHs and phthalates) and total-organic carbon. The second sample was sieved to less than 63 µm and analyzed for metals (copper and zinc).

mg/Kg = milligram/kilogram

A = Application

R = Reference

C = Control

U = Undetected at the detection limit noted

ND = no data

Table 10. Concentrations of Phthalates Measured in Sediment Samples.^a

Station	Watershed Type	bis(2-Ethylhexyl)-phthalate (mg/Kg)	Butylbenzyl-phthalate (mg/Kg)	Diethyl-phthalate (mg/Kg)	Dimethyl-phthalate (mg/Kg)	Di-n-butylphthalate (mg/Kg)	Di-n-octylphthalate (mg/Kg)
EVALSS	A	1.2 U	1.2 U	1.2 U	0.25 U	1.2 U	1.2 U
EVAMS	A	2.5 U	2.5 U	2.5 U	0.49 U	2.5 U	2.5 U
MONT-1	A	0.15 U	0.15 U	0.15 U	0.030 U	0.15 U	0.15 U
MONT-2	A	2.2 U	2.2 U	2.2 U	0.44 U	2.2 U	2.2 U
MONT-3	A	2.6 U	2.6 U	2.6 U	0.52 U	2.6 U	2.6 U
MONT-4	A	0.14 U	0.14 U	0.14 U	0.029 U	0.44	0.14 U
MONT-5	A	0.24 U	0.24 U	0.24 U	0.049 U	0.56	0.24 U
TOSH-1	A	0.16 U	0.16 U	0.16 U	0.032 U	0.16 U	0.16 U
TOSH-2	A	2.0 U	2.0 U	2.0 U	0.40 U	2.0 U	2.0 U
TOSH-3	A	2.5 U	2.5 U	2.5 U	0.51 U	2.5 U	2.5 U
TOSH-4	A	1.3 U	1.3 U	1.3 U	0.26 U	1.3 U	1.3 U
COLIN-1	R	ND	ND	ND	ND	ND	ND
SIDL-1	R	0.21 U	0.21 U	0.21 U	0.042 U	0.28	0.21 U
SIDL-2	R	0.14 U	0.14 U	0.14 U	0.028 U	0.30	0.14 U
SIDL-3	R	0.34 U	0.34 U	0.34 U	0.068 U	0.34 U	0.34 U
CTRY-1	C	0.89 U	0.89 U	0.89 U	0.18 U	0.89 U	0.89 U
CTRY-2	C	0.27 U	0.27 U	0.27 U	0.053 U	0.27 U	0.27 U
TYLR-1	C	0.71 U	0.71 U	0.71 U	0.14 U	0.71 U	0.71 U
TYLR-2	C	1.2 U	1.2 U	1.2 U	0.23 U	1.2 U	1.2 U

^a Samples were processed (sieved) in the field to make two unique samples. The first sample was sieved to less than 2.0 mm and analyzed for multiple organic compounds (PAHs and phthalates) and total-organic carbon. The second sample was sieved to less than 63 µm and analyzed for metals (copper and zinc).

mg/Kg = milligram/kilogram

A = Application

R = Reference

C = Control

U = Undetected at the detection limit noted

ND = no data

BIOLOGICAL MONITORING

Biological monitoring for WY2017 was completed at 18 of the 19 fixed monitoring stations that are identified in the *Experimental Design* section of this document on the following dates:

- EVALSS 9/1/2017
- EVAMS 9/1/2017
- MONT-1 9/13/2017
- MONT-2 8/30/2017
- MONT-3 9/20/2017
- MONT-4 9/20/2017
- MONT-5 9/20/2017
- TOSH-1 9/11/2017
- TOSH-2 8/28/2017
- TOSH-3 8/28/2017
- TOSH-4 9/1/2017
- SIDL-1 9/22/2017
- SIDL-2 9/22/2017
- SIDL-3 9/13/2017
- CTRY-1 9/11/2017
- CTRY-2 9/11/2017
- TYLR-1 8/30/2017
- TYLR-2 8/30/2017

The COLIN-1 station was not sampled in WY2017 because the channel was dry during the scheduled period for biological monitoring.

The laboratory report for biological monitoring in WY2016 is provided in Appendix Q. Quality assurance review documentation for these data is provided in Appendix R. Results from this review indicated there were no significant quality assurance issues that would limit the use of the data. The indicators computed from these data for use in evaluating stream health are summarized in Table 11.

Table 11. Computed Biological Indicators for Evaluating Stream Health.

Station	Watershed Type	Overall Condition	Benthic Index of Biotic Integrity	Total Taxa Richness	Ephemeroptera Richness	Plecoptera Richness	Trichoptera Richness	Clinger Taxa Richness	Long-Lived Taxa Richness	Intolerant Taxa Richness	Percent Dominant (top 3)	Percent Predator Individuals	Percent Tolerant Individuals
EVALSS	A	Poor	37.0	29	2	6	7	15	8	2	67.3%	10.4%	42.9%
EVAMS	A	Fair	53.3	27	3	6	4	14	9	3	48.7%	28.1%	13.4%
MONT-1	A	Fair	51.9	34	5	5	5	13	8	2	42.4%	10.8%	12.6%
MONT-2	A	Very Poor	12.8	24	1	1	2	5	4	0	71.0%	1.8%	6.0%
MONT-3	A	Very Poor	7.4	12	1	1	0	1	2	0	86.4%	0.7%	11.0%
MONT-4	A	Fair	49.2	32	5	5	6	14	6	2	52.2%	10.2%	5.8%
MONT-5	A	Fair	41.7	38	5	6	6	14	4	2	61.6%	4.2%	18.2%
TOSH-1	A	Poor	29.4	25	3	4	5	9	5	0	64.8%	5.5%	4.4%
TOSH-2	A	Poor	23.9	22	2	3	4	10	4	0	63.2%	27.1%	49.4%
TOSH-3	A	Very Poor	13.4	24	2	2	4	8	4	0	65.0%	6.2%	49.6%
TOSH-4	A	Very Poor	9.1	23	2	2	3	6	2	0	80.2%	1.2%	27.4%
COLIN-1	R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SIDL-1	R	Fair	51.4	30	3	5	6	13	9	3	50.3%	15.6%	14.7%
SIDL-2	R	Fair	45.9	35	7	3	2	15	8	4	48.9%	3.8%	18.6%
SIDL-3	R	Fair	46.5	27	4	6	5	14	7	2	62.7%	29.7%	20.7%
CTRY-1	C	Very Poor	0.0	12	1	1	0	3	2	0	74.0%	0.0%	44.9%
CTRY-2	C	Fair	43.0	34	4	5	6	11	6	1	48.6%	9.4%	18.0%
TYL-1	C	Poor	20.8	22	2	4	5	9	5	0	68.0%	1.2%	22.2%
TYL-2	C	Very Poor	6.5	13	2	1	0	2	1	0	65.2%	0.2%	25.6%

A = Application

R = Reference

C = Control

ND = no data

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APPENDIX A

Line Plots Showing Continuous Flow Data by Watershed

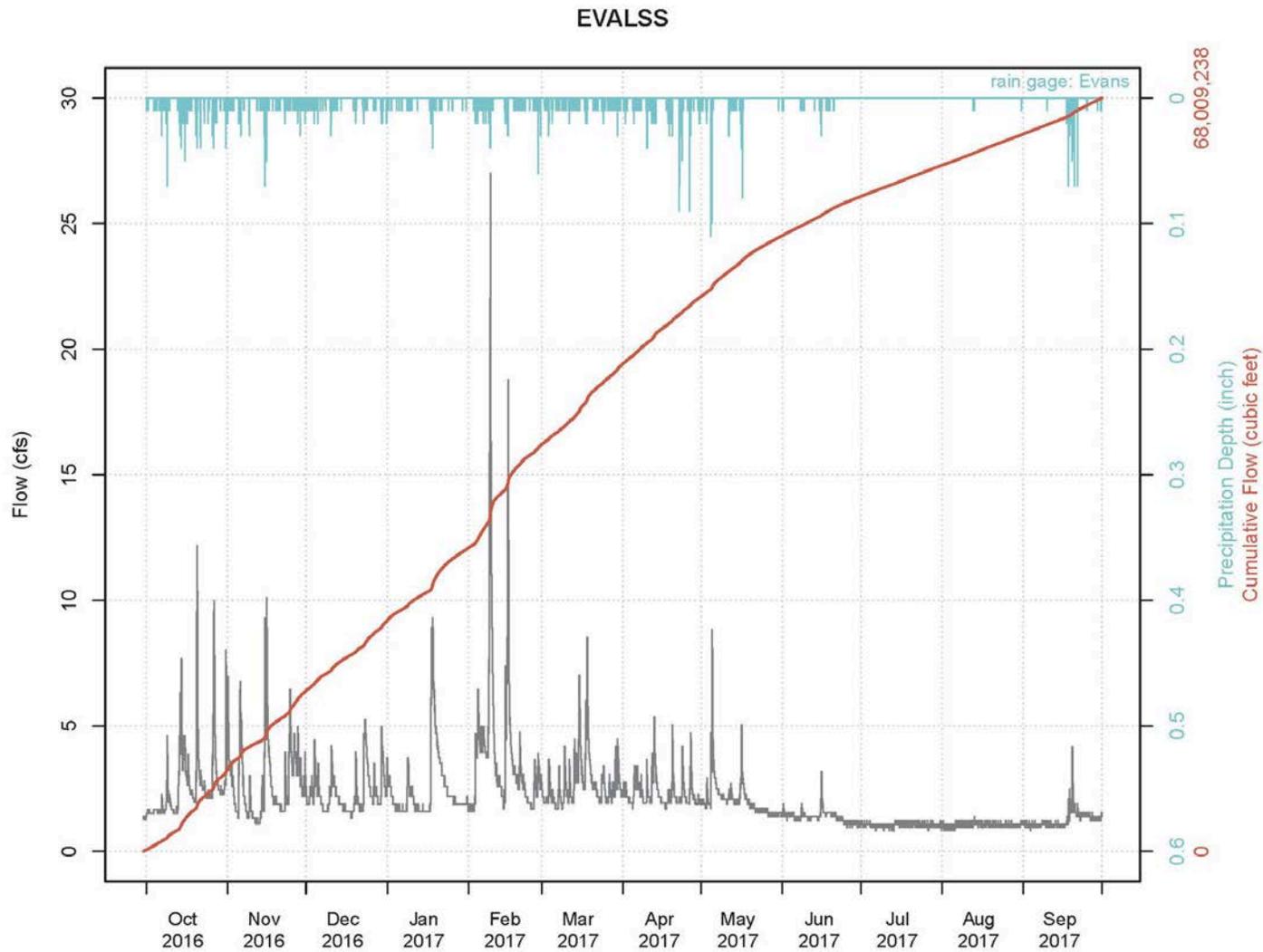


Figure A-1. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the EVALSS Station.

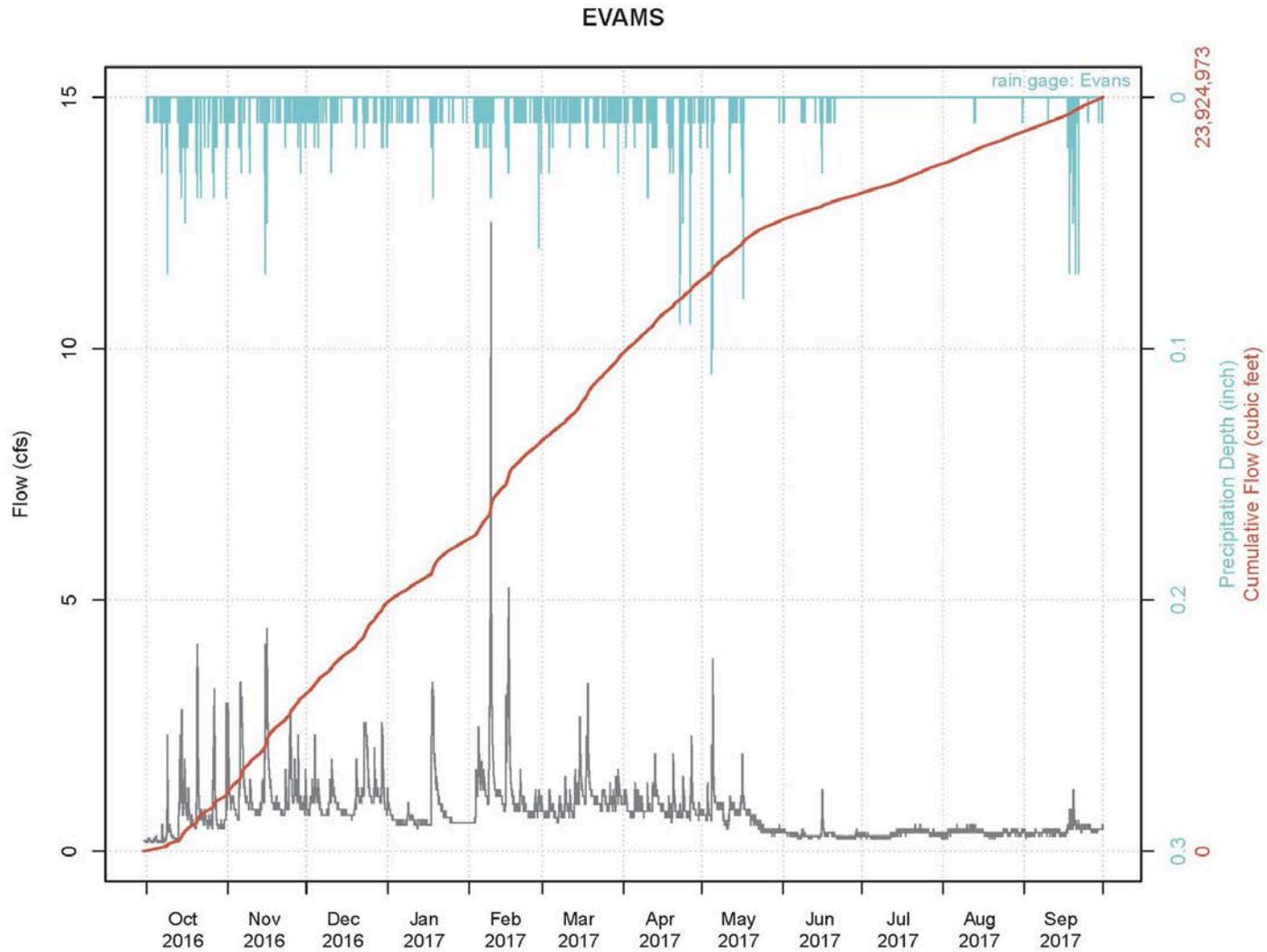


Figure A-2. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the EVAMS Station.

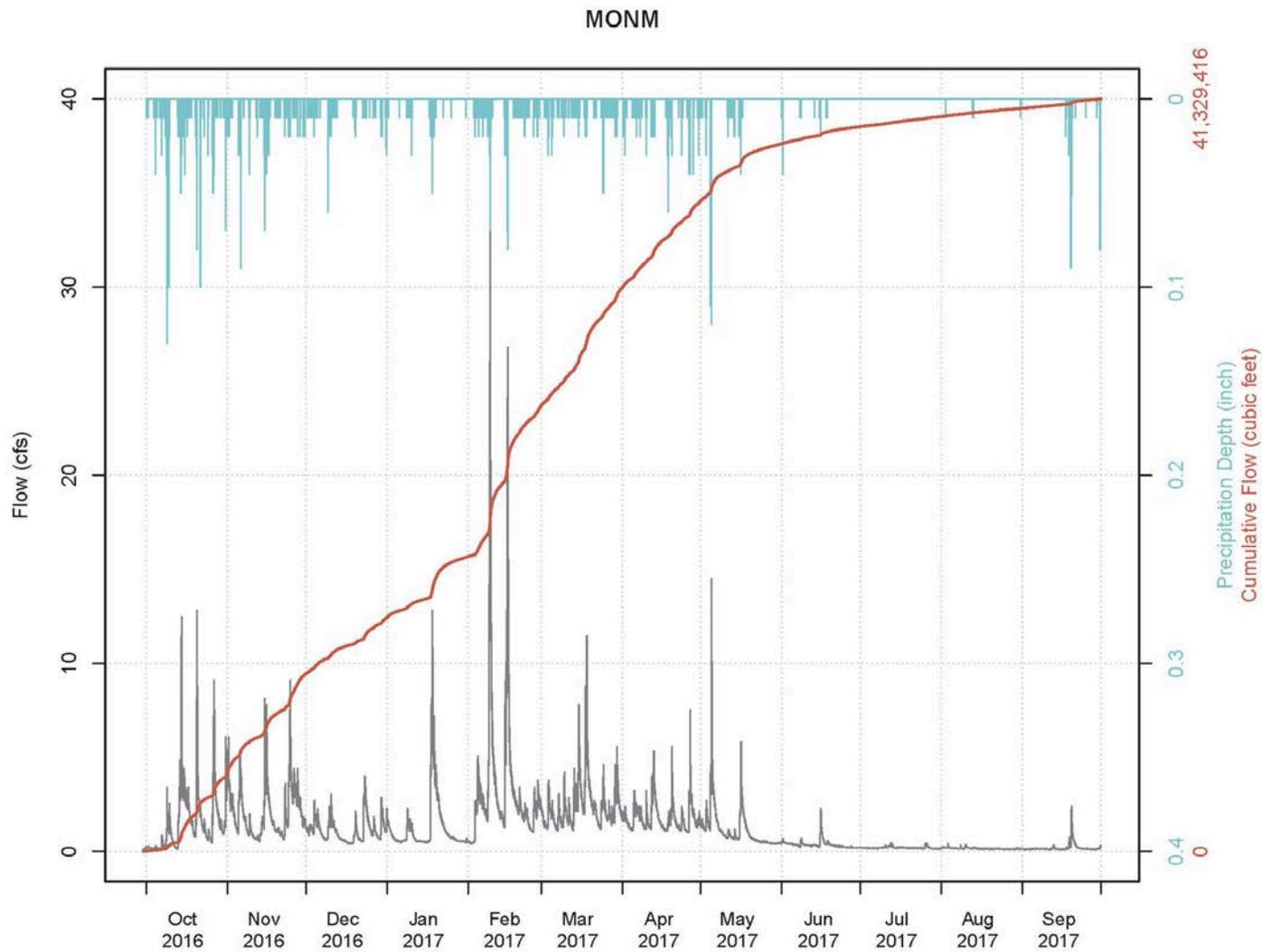


Figure A-3. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the MONM Station.

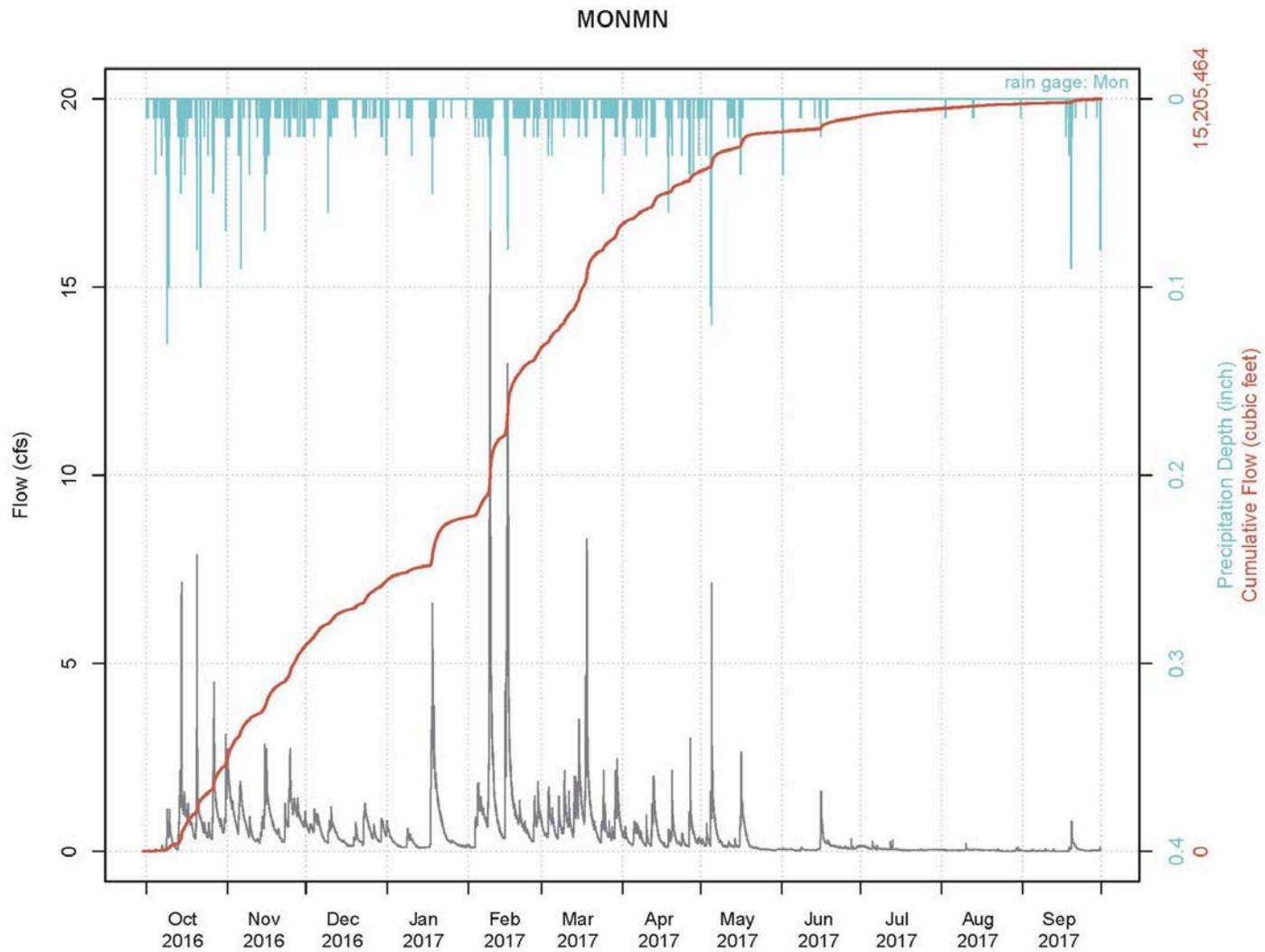


Figure A-4. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the MONMN Station.

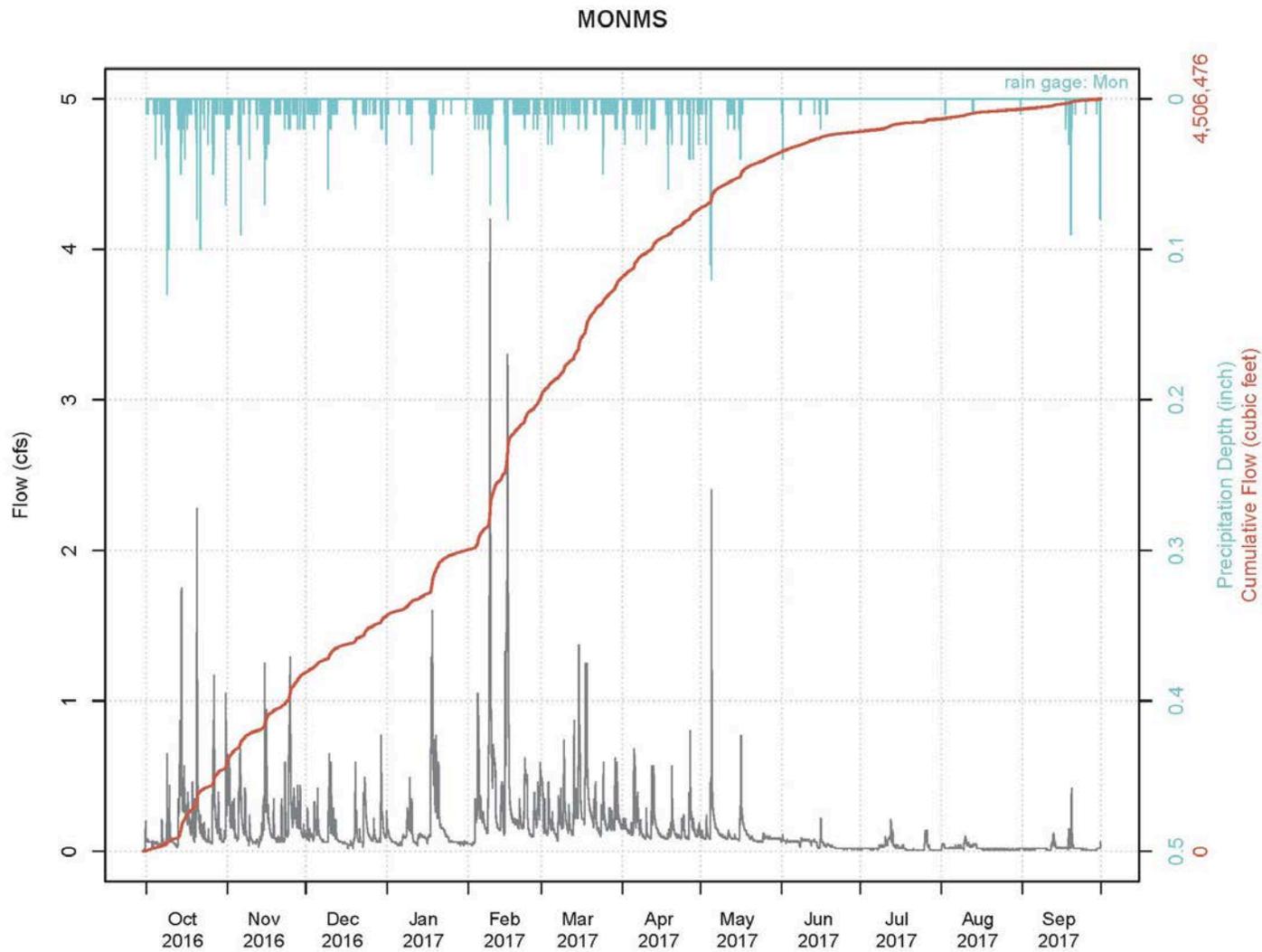


Figure A-5. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the MONMS Station.

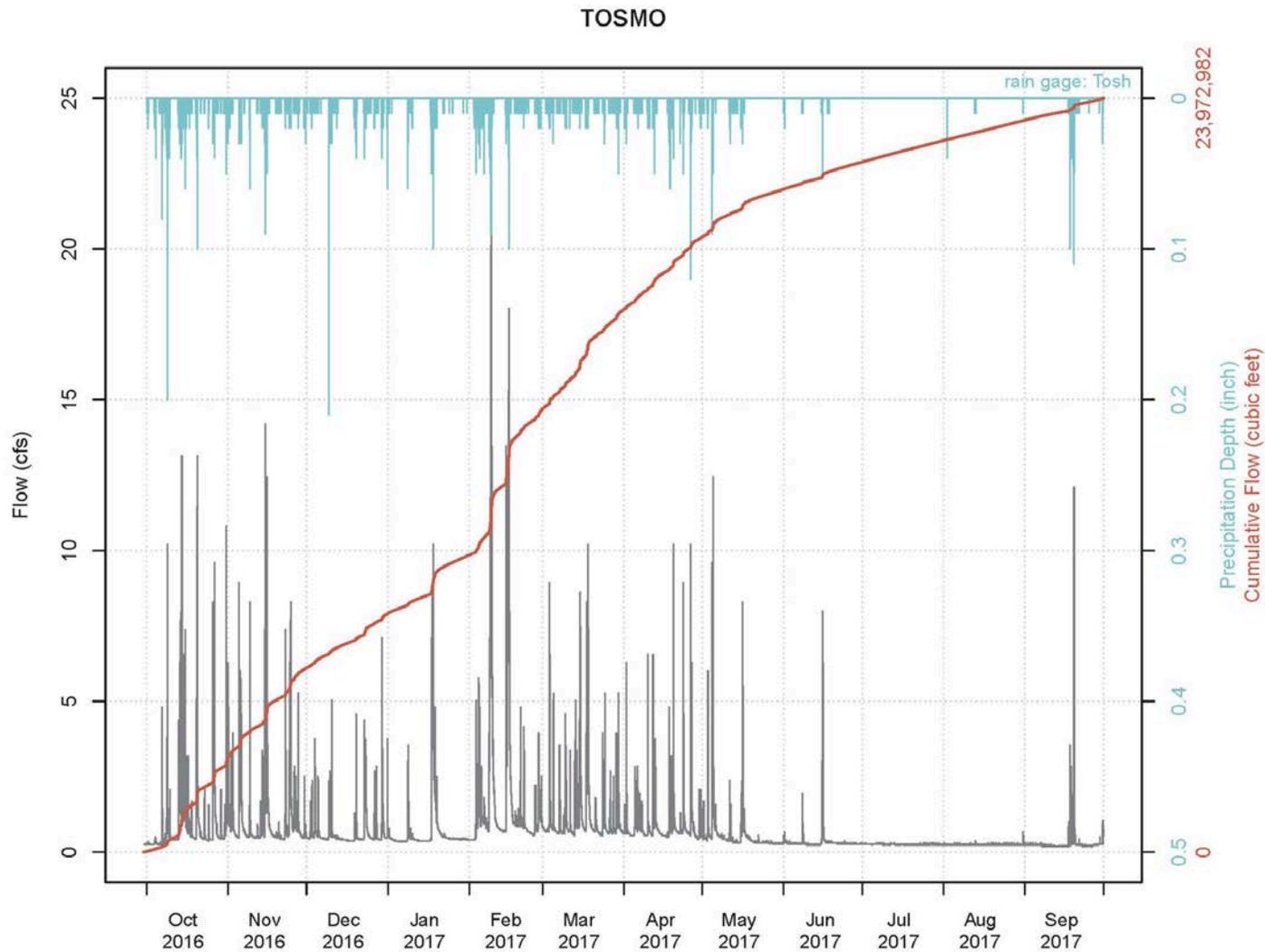


Figure A-6. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the TOSMO Station.

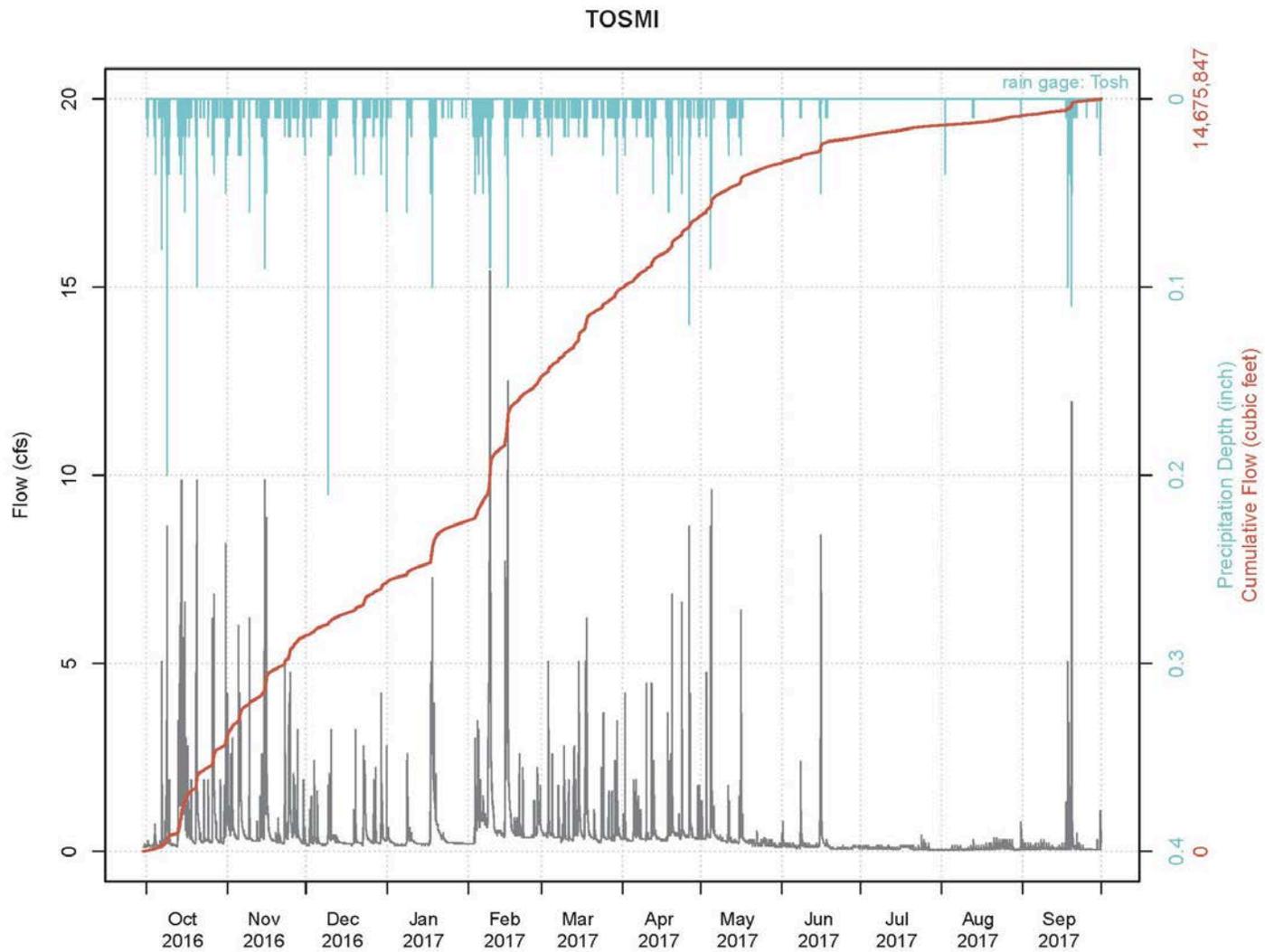


Figure A-7. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the TOSMI Station.

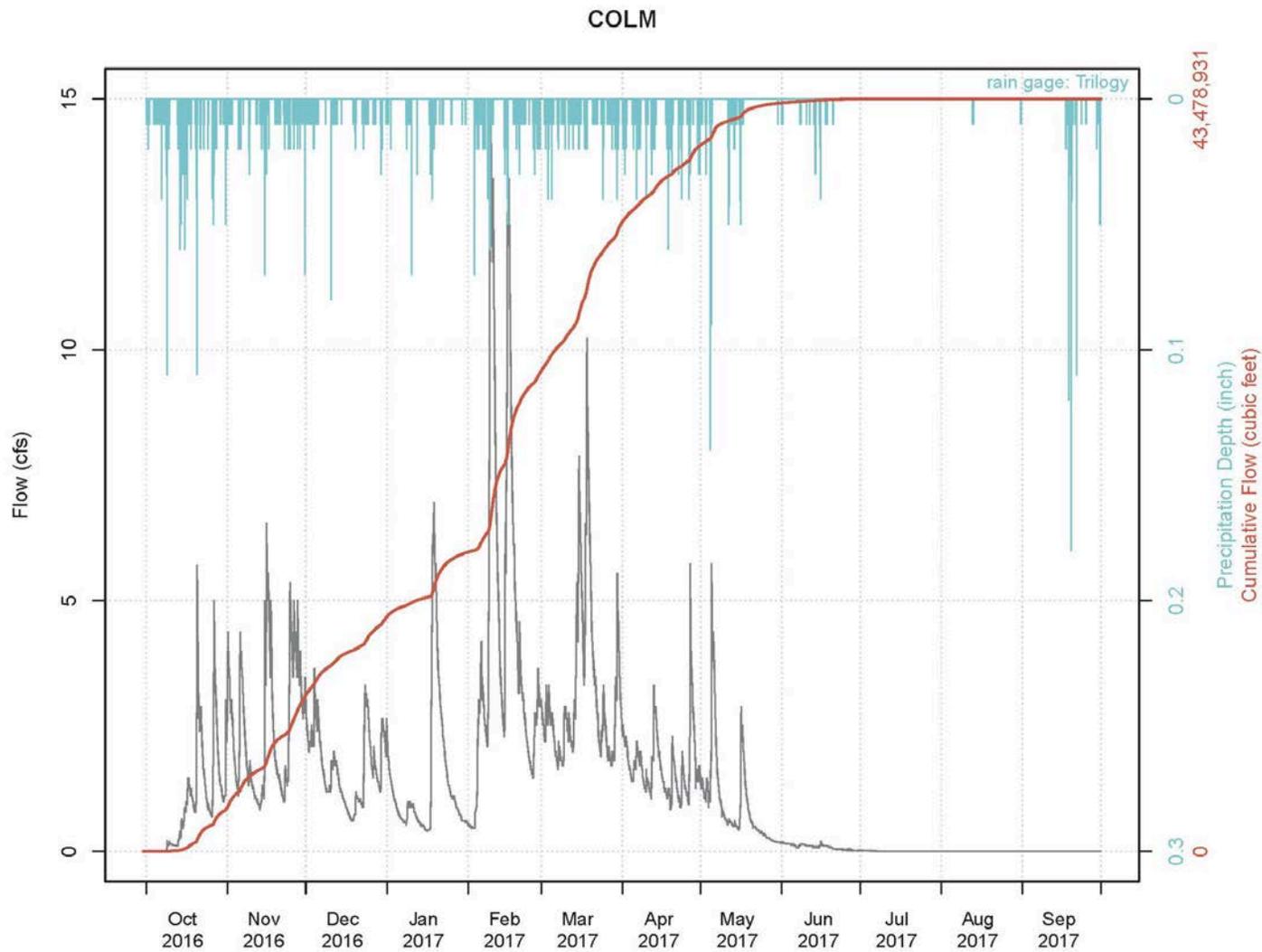


Figure A-8. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the COLM Station.

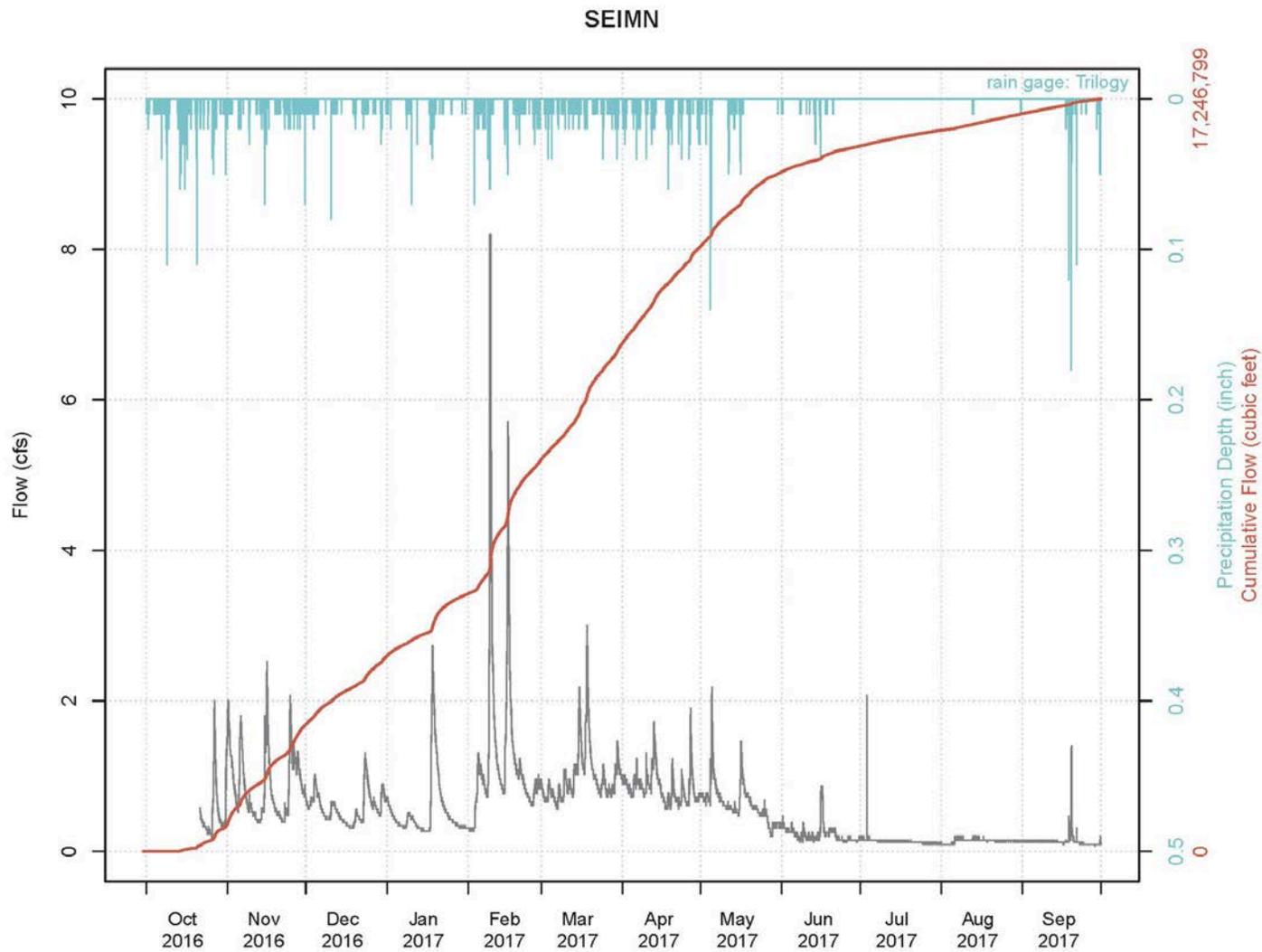


Figure A-9. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the SEIMN Station.

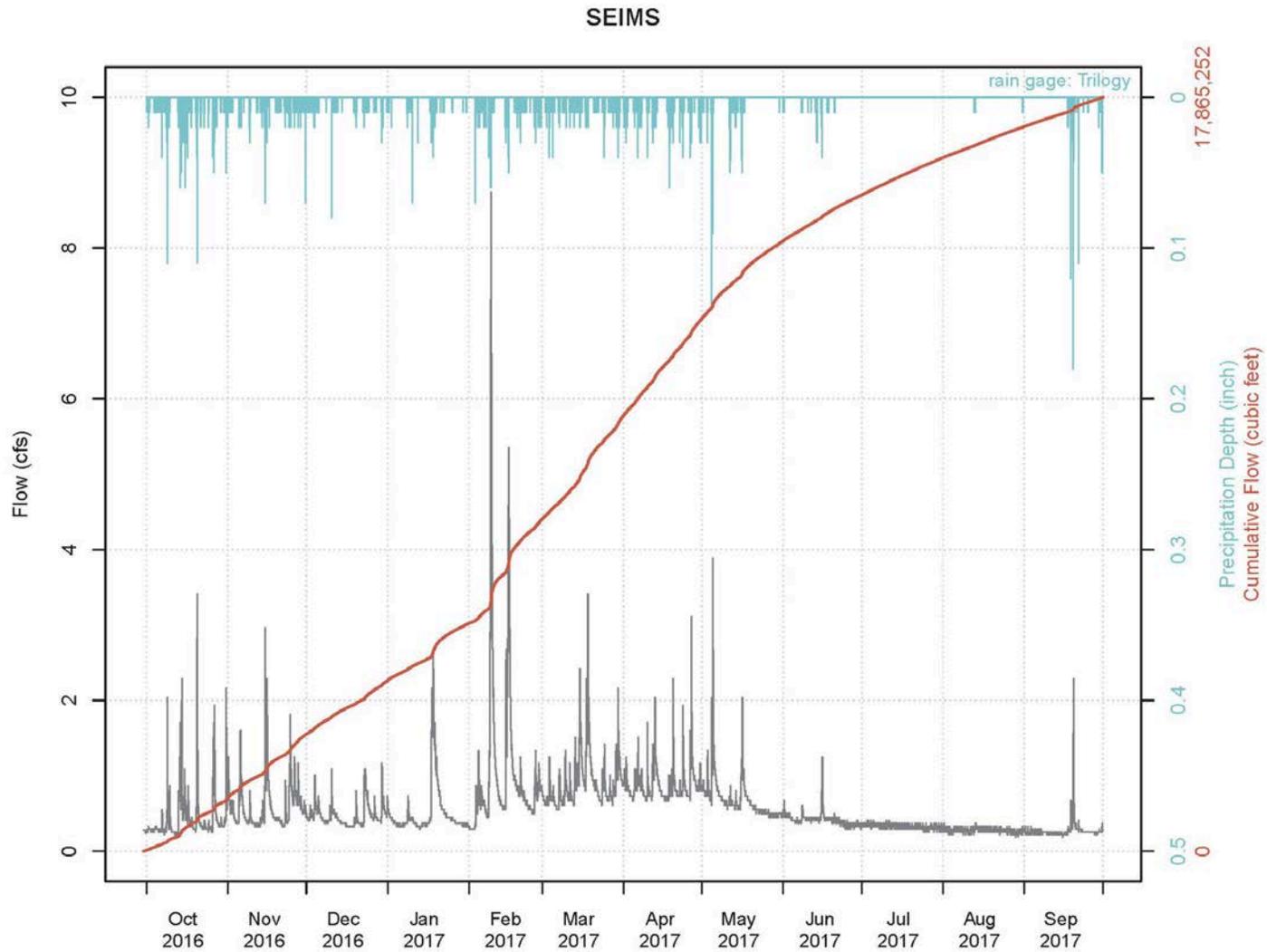


Figure A-10. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the SEIMS Station.

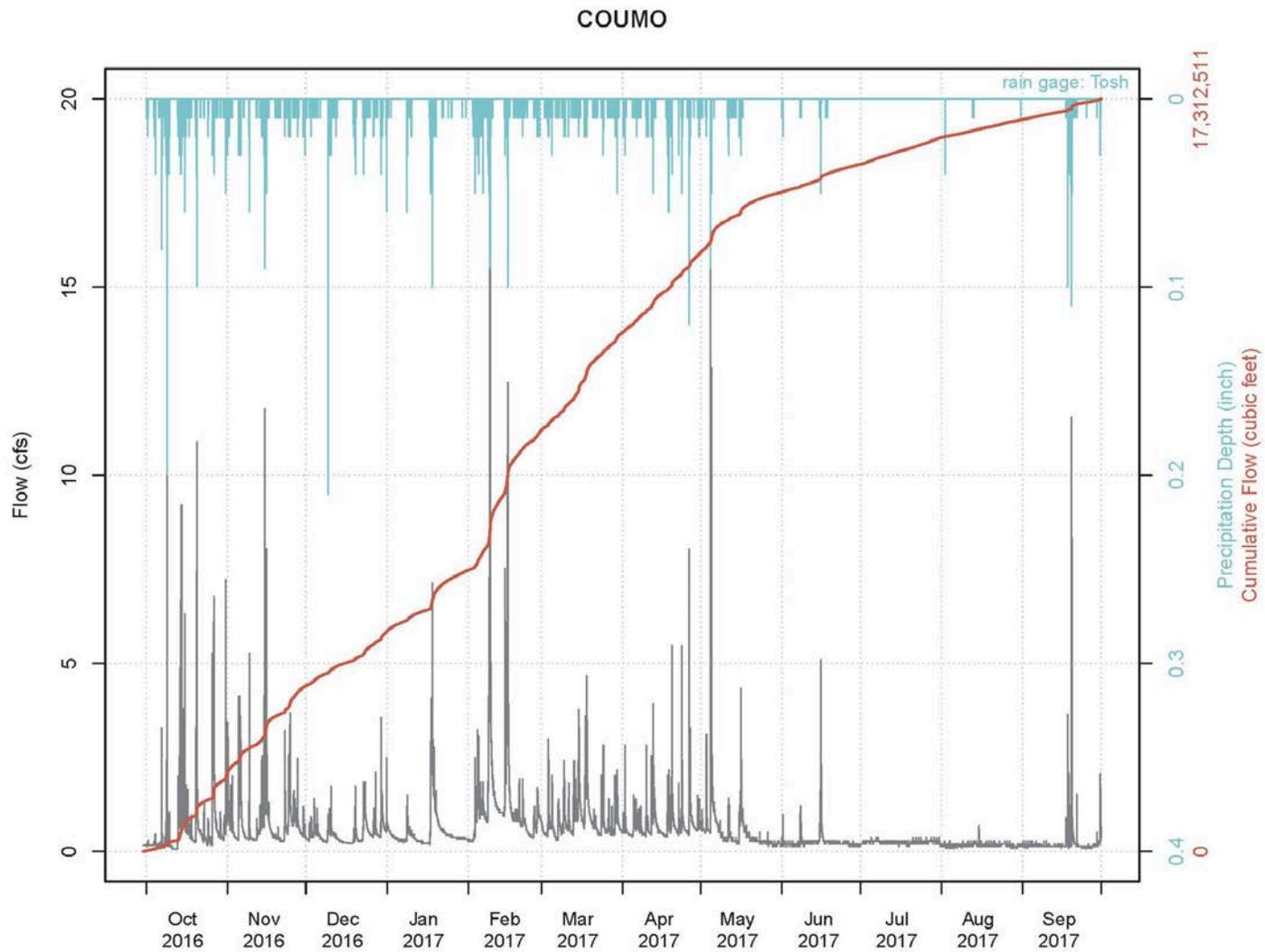


Figure A-11. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the COUMO Station.

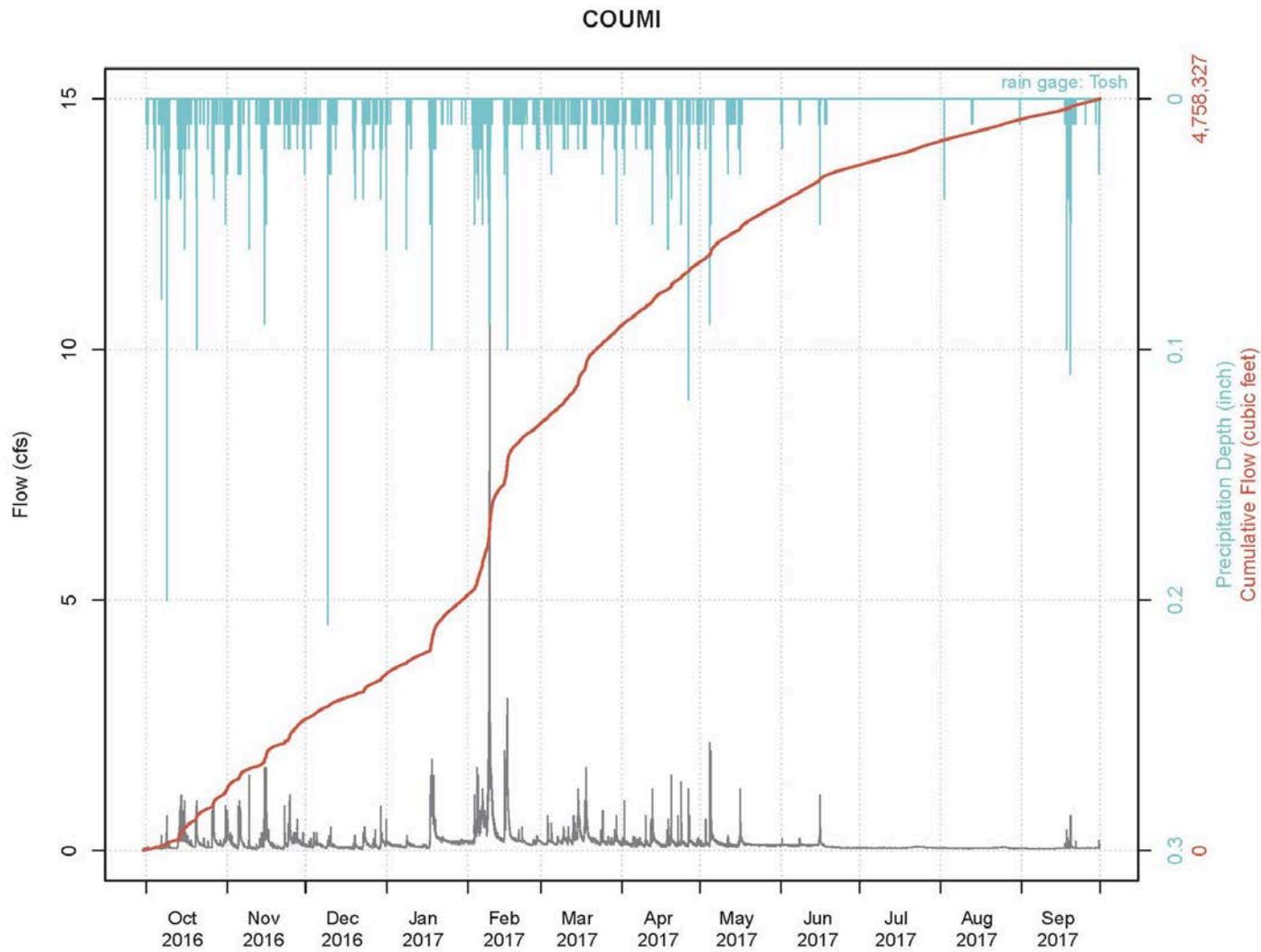


Figure A-12. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the COUMI Station.

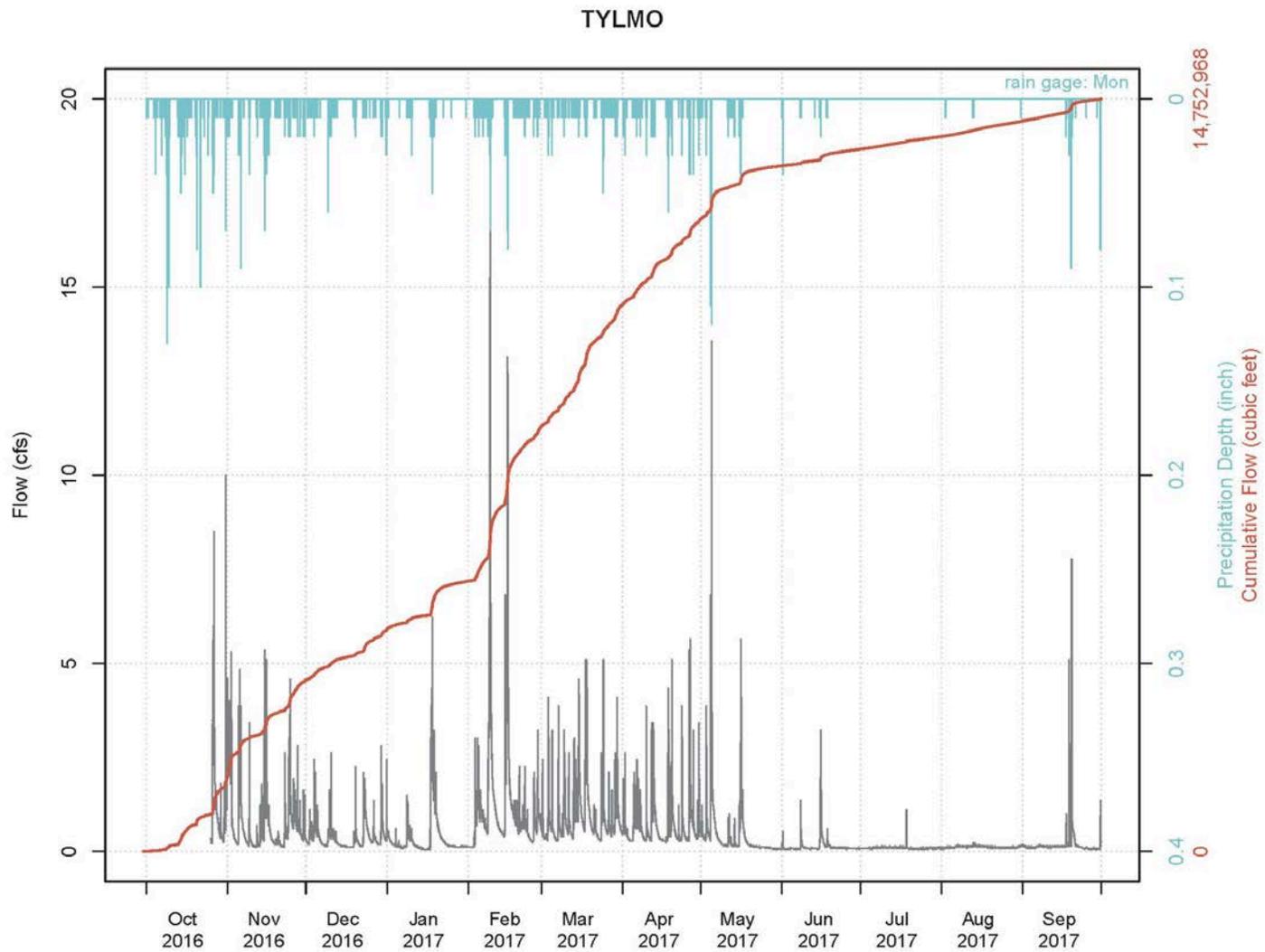


Figure A-13. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the TYLMO Station.

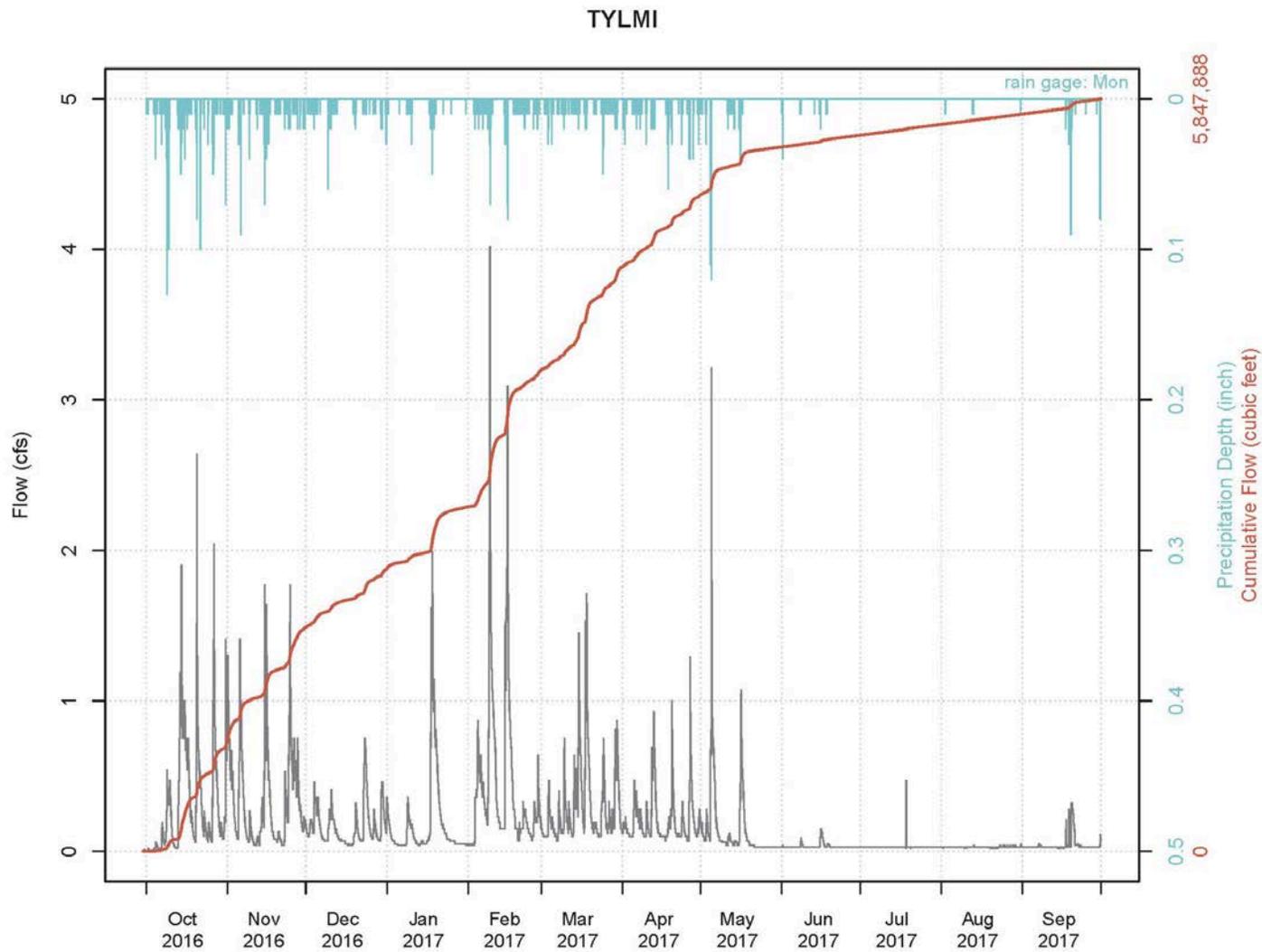


Figure A-14. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the TYLMI station.

APPENDIX B

Data Quality Assurance Review Memorandum for Hydrologic Monitoring



King County

Water and Land Resources Division

Department of Natural Resources and Parks
King Street Center
201 South Jackson Street, Suite 600
Seattle, WA 98104-3855

206-477-4800 Fax 206-296-0192

TTY Relay: 711

TECHNICAL MEMORANDUM

February 9, 2018

TO: Dylan Ahern, Associate Scientist, Herrera

FM: David Funke, Science and Technical Support Section, Water and Land Resources Division, Department of Natural Resources and Parks

RE: RPWS Hydrologic Data QA Memo

Introduction

This memo summarizes the results of the Quality Assurance review of hydrologic data collected by King County Department of Natural Resources (KCDNRP), Water and Land Resources Division (WLRD), Hydrologic Monitoring Program for the Redmond Paired Watershed Study for the period ending September 30, 2017. Streamflow is determined at 14 sites for the study. Water temperature is recorded at all 14 sites and conductivity loggers were deployed at eight sites for the 2017 water year.

Quality Assurance Review of 2017 Data

QA Review Methods

While all 14 project stream gages are updated via telemetry, ultimately the final continuous hydrologic data is input into the King County Hydrologic database with a supervised process using a desktop computer application. The technician works from a plot (printed chart created in a spreadsheet) of the continuous values for a set period, usually four to eight weeks and bracketed by field observations. For discharge data, the water level corrections, rating table and shifts used are noted on the plot, along with explanatory notes. The plot is stored in the project file for the gage along with field notes and other materials. Rating curve development and gage problem solving occurs in a collegial environment with the team staff. Recorded data

and field measurements are reviewed throughout the year to identify problems and target necessary measurements.

Annual review of the water year is performed after the final supervised workup. Data are reviewed by a different team member than who performed the initial workup. A spreadsheet template is used with daily mean, max and min values, rainfall, comparison gages, field observations, and a QC checklist to structure the review.

RPWS WY 2017

Rainfall totals were above average for October 2016 and February – April 2017. Two inches in 24 hours were recorded February 8-9 in the Redmond area, producing the peak flow for the water year. One inch 24 hour storm in May and September had significant short term intensities that also generated significant stormflows. Rainfall was light in December and January. Only about one inch was recorded in the June – August summer period.

COLM Colin Creek Mid Site

The record is fair, with the stream going dry at times. Some changes in flow are the result of beaver dam build up and release.

COUMO Country Creek at Mouth

Record fair. Frequent scour and fill at this site necessitates rating shifts. Peak recorded discharge 19 cfs in both February and May.

COUMI Country Creek Mid Site

Record fair. Scour and fill at this site necessitates rating shifts. The main gage water level sensor seemed to work poorly and was replaced. 15 minute data from the backup water level recorder was used during that period.

EVALSS Evans Lower Stream Site

Record fair. Peak recorded discharge 27 cfs, highest discharge measurement 16 cfs. The February 9 storm significantly scoured the channel at the gage necessitating a new rating curve.

EVAMSS Evans Mid Stream Site

Record fair. Scour and fill at this site necessitates rating shifts.

MONMO Monticello Mouth Site

Record good. Water level measured behind a metal weir, but flow is very turbulent during stormflow. Peak recorded discharge 37 cfs, highest discharge measurement 25 cfs.

MONMN Monticello Mid North Site

Record poor. Channel not conducive to stable rating. Some evidence vandalism at the site.

MONMS Monticello Mid South Site

Record fair. Flow goes very low at times. Difficult to measure low flows.

SEIMN Seidel Mid North Site (formerly 02o)

Record fair. Stream gage operated at this site since 2008. Water level measured behind an old existing concrete weir. There is some evidence that the sediment load is increasing in the channel making the weir rating less stable.

SEIMS Seidel Mid South Site (formerly 02p)

Record fair. Stream gage operated at this site since 2008. Water level measured behind an old existing concrete flume structure

TOSMO Tosh Mouth Site

Record good except for peak flows. Water level measured behind a concrete weir, but flow is not contained in the notch during high stormflows. Peak recorded discharge 21 cfs, highest discharge measurement 14 cfs. Data will be rework is still possible as we better measure the higher discharges.

TOSMI Tosh Mid Site

Record fair. The channel here gives a low resolution rating. Access to the site is difficult.

TYLMO Tyler Mouth Site

Record fair. Water level measured behind a metal weir, but the channel is silted in such that there is not a level pool. Very flashy response to rainfall. Peak recorded discharge 17 cfs, highest discharge measurement 11 cfs.

TYLMI Tyler Mid Site

Record fair. Water level measured at outlet to 4.5' diameter culvert, behind a rock control. Stream reacts quickly to rainfall with nearby street runoff getting to the channel quickly. Peak recorded discharge 4.1 cfs, highest discharge measurement 2.9 cfs

STREAM GAGE DATA WORKUP QA/QC

A streamflow data workup should be checked by another technician before approving the data for publication. This is not a rote process or simple checklist. It requires an understanding of the basic elements of a data workup as well as a questioning attitude. The check can go pretty quickly if the person doing the original workup has taken good notes, kept the file in good order, made the necessary graphs and reports, and did not make any mistakes. The QA/QC check should be performed by someone other than the person who did the original workup. This ensures that we get a realistic assessment of the coherence and legibility of the workup and documentation. We want to be able to return to the file at a later date and figure out how the flow data were derived from the primary data. We also want to make sure that the data make sense and contain no errors. Of course we will never know if our flow data are accurate, but we can know that they are the best numbers possible if rating tables are well developed and the rating properly applied to a carefully corrected stage record. The following steps are outlined in the order they should occur.

Three Objectives

1. Well documented work, so in the future we can figure out what was done and why. If the file and notes are a mess and don't make sense, you give it back and tell them to get it together.
2. Careful work, i.e. no stupid or gross mistakes. No gaps, no big jumps in discharge when there shouldn't be, flow in data table matches the discharge measurement made at that time, sensor garbage is cleaned up. Stupid mistake example: the flow record changes 15% in one log between sessions because the initial sensor correction was set incorrectly.
3. Technically defensible work, no errors in judgment. Rating curves make sense, stage corrections are reasonable, rating shifts applied appropriately, estimated periods make sense.

QA/QC steps to checking flow records

Documentation

There may be some minor problems with the file organization that did not affect the workup quality. These the checker can fix. Make sure that:

- The paper file is organized correctly
- There is a workup cover sheet with session by session notes
- Workup charts are all there and gaps noted, workup detail is written on the chart
- Discharge Measurement Summary form is up to date
- Flows are correctly plotted on rating curve
- Data input files are stored correctly

- Water year QA spreadsheet is complete (use StreamGage_WaterYear_Report.xlsx template). Charts titles should be correct, rain gage and comparison gage data included, also any continuous water temperature or other water quality data if applicable.

Look for mistakes

- Is water year complete? Complete 15 minute years have 35,040 records, leap years 35,136 (5 minute have 105,120). Missing data will reduce that number. The logs for the year are displayed on the workup screen. Also, missing data will be held with asterisks in the 15-minute report. Dump the report into excel and sort by value.
- Compare the graph of the daily mean and max flow to that of an equivalent gage. You're looking at the timing and relative magnitude of peaks and low flow periods.
- Examine daily mean and min flows chart. You're looking for periods where the flow drops unrealistically, usually due to sensor problems, a negative value, or a mistaken filled value.
- Check the data table at date and time of discharge measurements. The record should match the flow or there should be a good reason why in the notes.
- Check the plotting of each flow measurement on the rating curve. Sometimes the offset is incorrectly added or just it's just put in the wrong place. It can look right and be wrong, so check.
- Give flow measurements a once over to make sure they are sensible, $V \cdot A = Q$, the calculated width seems right given the start and end of the cross section. Pay special attention to high flow measurements or any flow that shifts off the normal rating.
- Does the flow record connect well? No unjustified jumps in the discharge between sessions, stage corrections or other events.
- Are estimate periods flagged correctly

Technical quality

- Can you understand what rating curves were used, and what they are based on? What defines the high end?
- If the high end depends on a curve extension, are there indirect discharge calculations made to justify the peak flow estimate? Do you agree? This is a highly subjective area that bears careful examination. We expect, of course, that consultation was done during the initial workup, so there will be no big surprises.
- Are base flows accurate? It may be more accurate to estimate low flow periods or fill the stage record than use stage record with known error.
- Check how daily flow estimates to fill gaps were made.
- Compare mean daily discharge with an appropriate nearby station for timing and magnitude of peaks, baseflow etc.

Final approval

If everything is in order, or after corrections have been made, complete QC checklist sheet in the Water Year spreadsheet. Printout checklist for the paper file. Include name and date.

DRAFT

APPENDIX C

Manual Flow Measurements Used to Develop Discharge Rating Curves

Table C-1. Manual Flow Measurements Used to Develop Rating Curves at EVAMS.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/24/2015 14:05		0.80				
10/21/2015 15:30	1	0.85	0.43	11.9	235	
11/9/2015 15:04	2	0.94	1.12	10.0	154	
11/14/2015 16:33	3	1.05	3.46	9.9	130	
11/18/2015 14:17	4	0.90	0.85	8.9	120	
12/2/2015 14:31	5	0.85	0.61	6.9	179	
12/10/2015 14:29	6	0.90	1.61			
12/11/2015 14:05	6.1	0.82	1.24	8.4	163	
1/20/2016 14:10	7	0.79	0.70	7.8	186	
1/21/2016 13:44	8	0.96	2.31			
3/1/2016 15:03	9	0.86	0.96	8.9	175	
4/26/2016 12:01	10	0.78	0.53	10.0	212	
6/14/2016 13:28	11	0.78	0.41	11.7	229	
8/30/2016 16:30	12	0.82	0.30	14.4	232	
10/13/2016 15:20	13	0.95	1.07	11.4	172	
11/2/2016 15:20	14	0.90	1.10	11.3	170	
11/29/2016 14:01	15	0.89	0.81	9.5	178	
1/12/2017 13:46	16	0.85	0.48	3.2	32	
1/13/2017 13:50	17	0.85	0.53	2.6	206	
1/18/2017 13:36	18	1.01	2.83			
2/9/2017 13:17	19	1.22	7.09			
2/9/2017 14:34	20	1.16	5.08	5.7	95.9	
2/15/2017 11:54	21	1.02	1.86			
3/15/2017 12:13	22	1.08	2.52	8.8	127	
4/13/2017 15:50	23	0.97	1.11			
4/26/2017 13:06	24	0.94	0.67	11.6	190	
5/24/2017 13:10	25	0.91	0.48	12.4	206	
6/6/2017 12:07		0.91		13.2	219	
6/28/2017 14:20	26	0.90	0.37	13.4	225	
7/13/2017 12:30	27	0.90	0.38	14.2		
8/29/2017 11:20	28	0.89	0.40	14.5	234	
10/17/2017 14:40	29	0.58	0.65	10.2	217	
Average		0.91	1.40	10.0	179	
Minimum		0.58	0.30	2.6	32.0	
Maximum		1.22	7.09	14.5	235	

Table C-2. Manual Flow Measurements Used to Develop Rating Curves at EVALSS.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
10/2/2015 14:09		2.22				
10/21/2015 15:15		2.26		11.6	207	
11/10/2015 12:35	1	2.31	1.80	9.2	134	
11/14/2015 16:53	2	2.60	9.33	9.8	97.0	
11/18/2015 14:58	3	2.43	2.81	8.9	162	
12/2/2015 14:50	4	2.40	1.71	7.0	174	
12/11/2015 14:45	5	2.41	3.56	8.4	151	
1/20/2016 13:47	6	2.38	2.12	7.8	160	
3/1/2016 14:05	7	2.41	3.27	8.7	151	
4/26/2016 12:37	8	2.33	1.67	9.9	195	
6/15/2016 12:42	9	2.31	1.37	11.4	199	
8/24/2016 14:45	10	2.27	1.22	15.1	210	
10/13/2016 15:55	11	2.39	3.58	11.2	170	
11/2/2016 12:25	12	2.39	3.31	11.4	158	
11/29/2016 14:26	13	2.37	2.60	9.5	164	
1/12/2017 14:28	14	2.33	1.66	2.9	186	
1/13/2017 14:30	15	2.34	1.69	2.9	187	
1/18/2017 13:56	16	2.54	6.62			
2/9/2017 15:15	17	2.32	16.16	6.3	69.0	
2/14/2017 13:59	18	2.36	2.19	6.8	163	
2/15/2017 11:31	19	2.45	4.95			
2/28/2017 14:08	20	2.37	3.23	5.9	150	
3/15/2017 11:31	21	2.50	6.93	9.0	115	
4/13/2017 15:20	22	2.37	3.22	10.2	147	
4/26/2017 13:30	23	2.33	1.89	11.1	170	
5/18/2017 13:48	24	2.32	2.12	11.6	176	
6/28/2017 15:30	25	2.27	1.29	13.4	204	
7/13/2017 12:56	26	2.26	1.04	14.4		
8/29/2017 12:05	27	2.25	1.07	14.9	213	
10/17/2017 13:55	28	2.30	1.70	10.3	201	
Average		2.36	3.36	9.6	166	
Minimum		2.22	1.04	2.9	69.0	
Maximum		2.60	16.16	15.1	213	

Table C-3. Manual Flow Measurements Used to Develop Rating Curves at MONM.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
6/10/2014 15:15	1	1.15	0.25	12.8	225	
6/18/2014 14:15	2	1.19	0.39	13.1	210	
7/24/2014 11:15	3	1.33	1.06	15.6	162	
9/10/2014 15:15	4	1.14	0.19	14.5	233	
9/24/2014 12:35	5	1.40	2.13	16.2	144	
10/29/2014 13:50		1.37		13.1	147	
10/31/2014 12:00	6	1.83	13.34	12.5	94	
12/4/2014 14:30	7	1.28	0.88	6.2	165	
1/30/2015 13:25		1.24		6.2	187	
4/24/2015 14:00		1.25		10.8	187	
7/30/2015 15:20		1.12	0.10	16.5	251	
9/28/2015 15:45	8	1.14	0.12	11.3	237	
9/29/2015 15:00	9	1.14	0.14			
9/29/2015 15:20	9.1	1.14	0.14			
10/5/2015 15:20		1.13		11.7	237	
1/21/2016 14:10	10	1.74	10.35			
1/27/2016 14:59	11	1.41	2.09	8.8	139	
7/27/2016 13:00	12	1.13	0.15	15.2	232	
9/16/2016 15:30		1.14				
9/16/2016 15:30		1.14				
10/14/2016 11:20		1.60		12.0	101	
10/14/2016 11:20	13	1.60	7.09	12.0	101	
11/2/2016 12:00	14	1.45	3.17	11.6	134	
1/13/2017 17:45	15	1.24	0.54	3.1	212	
2/9/2017 13:45	16	2.14	25.25	5.8	68.5	
3/7/2017 13:00	17	1.39	1.98	6.0	158	
3/15/2017 16:10				9.8	112	
4/18/2017 15:10	18	1.32	1.24	12.1	165	
5/18/2017 16:00	19	1.32	1.22			
6/13/2017 16:00	20	1.19	0.33	12.8	236	
8/16/2017 15:50	21	1.12	0.13	15.0	241	
9/19/2017 16:10	23	1.02	0.20	13.6	230	
10/4/2017 12:20	24	0.94	0.02	10.9	219	
10/10/2017 10:15	25	0.96	0.04	10.9	199	
10/19/2017 9:45	26	1.21	0.89			
Average		1.29	2.72	11.43	180	
Minimum		0.94	0.02	3.10	68.5	
Maximum		2.14	25.25	16.50	251	

Table C-4. Manual Flow Measurements Used to Develop Rating Curves at MONMN.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/22/2015 12:36		0.91				
10/16/2015 13:10	1	0.93	0.04	12.5	173	
11/14/2015 15:03	2	1.33	2.29	10.3	93.0	
12/9/2015 16:25	3	1.34	2.57	9.6	160	
2/3/2016 13:30	4	1.09	0.42	7.1	104	
9/23/2016 18:35	5	0.96	0.02	13.8	213	
10/13/2016 13:40	6	1.27	0.71	11.8	102	
10/14/2016 12:25	7	1.55	3.78			
11/2/2016 13:55	8	1.31	1.23	11.6	104	
11/30/2016 16:45	9	1.23	0.70	9.0	109	
1/13/2017 17:20	10	1.04	0.11	2.9	150	
1/18/2017 9:25	11	1.50	4.45			
2/8/2017 15:25	12	1.25	0.81			
2/9/2017 12:00	13	1.76	16.20	5.5	65.5	
2/9/2017 16:20	14	1.62	8.18			
2/15/2017 15:10	15	1.32	2.73	7.0	74	
3/6/2017 17:25	16	1.10	0.41	6.6	114	
4/13/2017 11:30	17	1.21	1.16	10.2	94	
5/18/2017 14:30	18	1.09	0.40	13.0	130	
6/13/2017 14:30	19	0.95	0.06	13.0	130	
7/20/2017 11:30	20	0.94	0.03	15.1	212	
8/16/2017 14:05	22	0.96	0.05	15.1	204	
9/19/2017 16:10	23	1.02	0.20	13.6	230	
10/4/2017 12:20	24	0.94	0.02	10.9	219	
10/10/2017 10:15	25	0.96	0.04	10.9	199	
10/19/2017 9:45	26	1.21	0.89			
11/8/2017 16:00	27	1.02	0.12	8.5	157	
Average		1.18	1.83	10.38	145	
Minimum		0.91	0.02	2.90	65.5	
Maximum		1.76	16.20	15.10	230	

Table C-5. Manual Flow Measurements Used to Develop Rating Curves at MONMS.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/29/2015 13:30	1	1.07	0.01	11.4	430	
10/5/2015 14:34		1.08		12.3	423	
11/14/2015 14:24	2	1.44	1.00	10.5	195	
12/9/2015 16:00	3	1.44	0.67	9.6	160	
2/3/2016 14:00	4	1.20	0.19	7.4	238	
9/8/2016 14:15	5	1.16	0.06	15.7	312	
10/13/2016 14:10	6	1.28	0.34	12.1	174	
10/14/2016 12:50	7	1.76	1.53			
11/2/2016 14:15	8	1.34	0.32	11.8	195	
11/30/2016 17:20	9	1.23	0.12	9.2	243	
12/16/2016 15:00	10	1.15	0.04	3.4	291	
1/13/2017 15:50	11	1.23	0.12			
1/18/2017 15:50	12	1.63	1.07			
2/9/2017 12:35	13	1.97	2.89			
3/6/2017 16:30	14	1.21	0.11	8.4	262	
4/13/2017 12:30	15	1.31	0.20	10.7	229	
5/18/2017 15:40	16	1.23	0.13	13.9	273	
6/13/2017 13:00	17	1.19	0.06	12.6	311	
8/16/2017 14:35	18	1.10	0.00	17.4	413	
10/4/2017 11:20	19	1.11	0.02	9.6	399	
Average		1.31	0.47	11.00	284	
Minimum		1.07	0.00	3.40	160	
Maximum		1.97	2.89	17.40	430	

Table C-6. Manual Flow Measurements Used to Develop Rating Curves at TOSMO.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/21/2015 13:54		0.52				
10/21/2015 13:40	1	0.52	0.33	11.4	271	
11/9/2015 13:01	2	0.64	0.91	10.6	145	
11/14/2015 13:15	3	0.84	4.24	10.5	127	
11/20/2015 13:33	4	0.58	0.54	6.6	211	
12/8/2015 13:49	5	1.05	8.56			
1/19/2016 14:00	6	0.58	0.45	7.6	233	
3/14/2016 12:32	7	0.59	0.55	8.2	191	
4/25/2016 12:13	8	0.64	1.08	10.6	146	
7/28/2016 15:22	9	0.50	0.21	16.3	262	
10/13/2016 11:50	10	0.82	3.41	12.4	83.8	
11/2/2016 11:25	11	0.73	1.75	11.8	107	
1/13/2017 10:20	12	0.53	0.38	1.8	236	
1/18/2017 13:40	13	0.84	3.36	6.1	125	
2/9/2017 9:05	14	1.24	13.95	5.3	58.3	
3/8/2017 17:30	15	0.59	0.59	6.6	217	
4/18/2017 10:30	16	0.66	1.10	10.3	111	
5/2/2017 13:15	17	0.58	0.39	10.9	241	
5/2/2017 13:30	18	0.58	0.42	10.9	241	
5/19/2017 12:00	19	0.55	0.39	11.3	246	
6/28/2017 9:40	20	0.53	0.31	13.0	260	
9/7/2017 12:05	21	0.52	0.21	15.1	269	
10/17/2017 12:05	22	0.58	0.49		275	
11/9/2017 14:05	23	0.66	1.18	9.6	223	
Average		0.66	1.95	9.85	195	
Minimum		0.50	0.21	1.80	58.3	
Maximum		1.24	13.95	16.30	275	

Table C-7. Manual Flow Measurements Used to Develop Rating Curves at TOSMI.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/25/2015 13:44		0.74				
10/21/2015 13:45		0.74				
10/27/2015 12:57	1	0.73	0.12			
11/9/2015 14:26	2	0.85	0.69	11.2	150	
11/20/2015 14:11	3	0.79	0.32	7.6	217	
12/2/2015 13:32	4	0.80	0.22			
12/8/2015 14:37	5	1.12	6.33			
1/20/2016 12:58	6	0.84	0.40	8.0	178	
3/14/2016 12:02	7	0.79	0.34	8.3	198	
4/25/2016 13:33	8	0.84	0.80	12.1	106	
6/29/2016 11:18	9	0.72	0.12	14.4	291	
8/11/2016 14:25	10	0.75	0.09	16.1	277	
10/13/2016 13:40	11	0.93	1.85	13.1	94.1	
11/2/2016 10:40	12	0.94	1.72	12.1	83.7	
11/30/2016 14:20	13	0.77	0.24	9.9	232	
1/13/2017 12:50	14	0.76	0.19	2.9	250	
1/18/2017 11:35	15	1.01	3.49			
2/9/2017 10:50	16	1.40	13.82	5.9	54.0	
2/15/2017 14:00	17	0.98	4.20	8.6	78.5	
3/8/2017 14:15	18	0.75	0.34	7.0	198	
4/18/2017 12:30	19	0.80	0.54	11.5	170	
5/19/2017 10:30	20	0.78	0.22	11.3	275	
6/28/2017 12:10	21	0.79	0.15	14.5	275	
9/7/2017 10:50	22	0.76	0.11	16.4	266	
10/17/2017 10:50	23	0.92	1.40	12.4	145	
11/9/2017 12:20	24	0.85	0.72	11.2	196	
Average		0.85	1.60	10.73	187	
Minimum		0.72	0.09	2.90	54.0	
Maximum		1.40	13.82	16.40	291	

Table C-8. Manual Flow Measurements Used to Develop Rating Curves at COLM.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/25/2015 13:35	1	0.44	0.01	12.9	61.0	
12/8/2015 15:55	3	0.38	10.33			
12/9/2015 14:55	4	0.53	16.16	8.3	29.0	
5/4/2016 13:00	4.5	5.41	0.25	12.5	27.7	gage relocated
5/20/2016 13:30	4.6	5.42	0.15	11.8	60	
9/27/2016 13:30		0.00	0.00			
10/14/2016 13:25	5	5.65	0.58			
10/24/2016 14:00	6	5.64	0.83	11.7	40.0	
10/27/2016 13:15	7	5.90	3.15	11.2	39.0	
10/31/2016 13:40	8	5.89	2.56			
11/28/2016 14:39	9	5.94	3.67	7.8	28.9	
1/12/2017 13:18	10	5.61	0.66	1.1	36.6	
1/18/2017 13:30	11	6.09	5.58	2.4	32.0	
2/10/2017 13:10	12	6.33	13.47	3.7	25.0	
3/15/2017 13:20	13	6.13	7.59	8.8	28.1	
4/27/2017 12:15	14	5.97	3.79			
6/19/2017 17:15	15	5.43	0.08	14.6	36.2	
10/19/2017 14:00	16	5.45	0.18	10.3	45.1	
Average		4.57	3.84	9.01	37.6	
Minimum		0.00	0.00	1.10	25.0	
Maximum		6.33	16.16	14.60	61.0	

Table C-9. Manual Flow Measurements Used to Develop Rating Curves at SEIMN.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/4/2008 10:30	1	1.19	0.06	11.3	119	
10/16/2008 13:42	2	1.19	0.08	9.6	118	
11/7/2008 12:25	3	1.55	1.94			
12/10/2008 12:56	4	1.27	0.24	7.7	76.9	
1/14/2009 14:45	5	1.32	0.77	5.7	76.9	
2/22/2009 14:49	6	1.26	0.33			
3/2/2009 11:56	7	1.26	0.31	7.1	72.8	
3/16/2009 13:43	8	1.33	0.67	4.9	54.8	
3/25/2009 12:33	9	1.54	2.13			
5/6/2009 11:26	10	1.32	0.54	9.4	60.7	
6/30/2009 12:00	11	1.20	0.10	11.3	113	
7/1/2009 10:46	12	1.20	0.13			
9/15/2009 10:36	13	1.20	0.10	12.4	116	
11/17/2009 11:22	14	1.43	1.24	7.2	55.9	
12/15/2009 13:55	15	1.25	0.18	4.3	88.4	
1/12/2010 13:50	16	1.44	1.21			
1/25/2010 11:27	17	1.32	0.46	6.1	62.0	
2/8/2010 13:34	18	1.27	0.27	6.6	74.8	
3/9/2010 11:26	19	1.24	0.19	4.4	87.3	
4/21/2010 12:05	20	1.40	0.82	9.1	48.4	
5/18/2010 12:46	21	1.24	0.16	10.7	93.3	
6/16/2010 12:33	22	1.34	0.61	10.6	59.2	
7/13/2010 11:13	23	1.23	0.13	11.5	107	
8/3/2010 10:19	24	1.22	0.12	12.1	109	
10/20/2010 11:54	25	1.21	0.12	9.0	112	
12/7/2010 13:39	26	1.24	0.23	7.1	83.4	
2/9/2011 14:25	27	1.30	0.53	5.0	61.1	
4/5/2011 11:20	28	1.46	1.38	7.0	44.8	
5/26/2011 11:27	29	1.32	0.54	9.8	61.7	
7/7/2011 12:38	30	1.24	0.18	11.5	104	
8/31/2011 13:16	31	1.20	0.10	11.8	117	
10/13/2011 11:50	32	1.20	0.10	9.4	119	
12/14/2011 14:24	33	1.22	0.11	4.8	100	
3/2/2012 12:39	34	1.34	0.58	5.2	55.7	
4/5/2012 12:46	35	1.38	0.77	5.9	54.2	
5/30/2012 12:40	36	1.24	0.19	10.5	90.1	
8/13/2012 14:06	37	1.21	0.12	13.9	113	
10/12/2012 13:50	38	1.20	0.11			
2/7/2013 11:42	39	1.34	0.73			
7/8/2014 12:59		1.21		14.1	100	
9/9/2014 11:53	40	1.19	0.09	12.5	114	
10/30/2014 13:10		1.26		11.5	74.3	
12/17/2014 12:56				7.2	93.8	
12/19/2014 12:59	42	1.32	0.64			
2/3/2015 13:40	43	1.28	0.43	7.7	61.8	
3/25/2015 11:55	44	1.35	0.75	8.6	40.8	
5/11/2015 12:48	45	1.22	0.18			
7/1/2015 13:17	46	1.21	0.14	15.0	119	
8/26/2015 12:52	47	1.21	0.09	13.0	124	
10/15/2015 13:11	48	1.20	0.08	10.8	95.4	
10/16/2015 13:40		1.19		11.8	119	
12/3/2015 14:11	49	1.29	0.48	6.6	57.0	
1/27/2016 13:58	50	1.36	0.91	7.9	46.3	
2/1/2016 13:42		1.35		6.6	37.8	
3/16/2016 10:59	51	1.28	0.44	7.2	57.8	
6/1/2016 12:12	52	1.21	0.12	12.0	111	
7/15/2016 11:53	53	1.20	0.09	12.6	120	
10/21/2016 14:30	54	1.30	0.54	11.2	63.0	
10/31/2016 12:59	55	1.36	0.85			
11/15/2016 13:43	56	1.46	1.51	10.7	41.6	
11/28/2016 13:49	57	1.40	0.86	8.7	49.5	
11/29/2016 14:01	58	1.39	0.81	9.5	178	
1/12/2017 12:18	59	1.29	0.34	2.3	69.0	
1/18/2017 12:52	60	1.62	2.78			
2/15/2017 12:35	61	1.51	1.59			
2/28/2017 13:15	62	1.45	0.87	4.8	46.3	
3/15/2017 14:58	63	1.57	2.04	8.3	37.8	
4/21/2017 12:59	64	1.35	0.68	10.0	54.1	
4/25/2017 13:26	65	1.34	0.67	10.1	55.1	
6/22/2017 12:00	68	1.30	0.20	11.5	99.7	
7/13/2017 11:34	69	1.29	0.14	12.8		
8/29/2017 15:10	70	1.27	0.12	14.2	119	
10/10/2017 14:05	71	1.27	0.10	10.1	121	
10/19/2017 14:05	72	1.38	0.68			
Average		1.30	0.55	9.22	83.6	
Minimum		1.19	0.06	2.30	37.8	
Maximum		1.62	2.78	15.00	178	

Table C-10. Manual Flow Measurements Used to Develop Rating Curves at SEIMS.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/17/2008 13:09	1	0.69	0.23			
10/16/2008 12:29	2	0.71	0.31			
11/12/2008 12:08	3	0.87	1.13			
12/10/2008 14:05	4	0.72	0.33			
1/14/2009 12:47	5	0.78	0.73			
3/2/2009 13:18	6	0.75	0.42			
3/25/2009 13:12	7	0.91	1.52			
5/6/2009 12:40	8	0.84	0.95			
6/30/2009 11:00	9	0.74	0.27			
7/30/2009 12:42	10	0.74	0.19			
9/25/2009 11:26	11	0.70	0.19			
1/12/2010 14:31	12	0.87	1.25			
3/9/2010 10:11	13	0.74	0.31			
4/21/2010 11:06	14	0.90	1.46			
6/16/2010 11:25	15	0.82	0.80			
8/27/2010 10:16	16	0.72	0.30			
8/25/2014 11:27	17	0.71	0.30	14.6	120	
10/30/2014 11:25		0.72		11.4	101	
12/17/2014 13:53		0.76		7.2	93.8	
12/19/2014 11:17	18	0.80	0.72			
2/3/2015 12:23		0.77		7.6	91.3	
3/26/2015 11:32		0.80		10.4	71.2	
5/18/2015 12:05		0.73		14.3	111	
7/17/2015 11:12	19	0.71	0.18	14.1	120	
8/26/2015 11:55		0.71		14.2	118	
12/3/2015 13:12	20	0.77	0.45	7.0	86.00	
1/27/2016 12:26		0.80		8.4	70.00	
4/20/2016 12:48		0.75		14.8	114	
6/1/2016 10:39		0.75		14.2	108	
8/3/2016 16:00	21	0.70	0.23	14.3	87.3	
8/4/2016 11:40		0.71				
10/13/2016 17:40	22	0.86	0.95	10.7	89.0	
1/12/2017 15:37	23	0.74	0.36	1.8	96.0	
1/18/2017 12:01	24	1.00	2.41			
2/9/2017 12:21	25	1.30	8.63			
3/7/2017 14:20	26	0.85	0.99	5.0	62.2	
4/18/2017 14:15	27	0.81	0.75	10.7	89.0	
6/19/2017 14:15	28	0.76	0.42	13.0	112	
8/29/2017 13:45	29	0.72	0.25	14.7	127	
9/7/2017 14:45	30	0.72	0.29	14.6	131	
10/10/2017 11:40	31	0.73	0.28	9.8	126	
Average		0.78	0.89	11.09	101	
Minimum		0.69	0.18	1.80	62.2	
Maximum		1.30	8.63	14.80	131	

Table C-11. Manual Flow Measurements Used to Develop Rating Curves at COUMO.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/21/2015 13:06		1.27				
11/9/2015 13:37	1	1.11	0.72	11.2	189	
11/14/2015 13:45	2	1.27	2.58	11.1	161	
11/20/2015 13:08	3	1.04	0.42	7.6	232	
12/2/2015 13:55	4	1.04	0.36	7.8	248	
12/8/2015 14:09	5	1.46	5.98			
1/19/2016 13:09	6	1.04	0.39	7.7	207	
3/14/2016 11:04	7	1.05	0.43	8.2	205	
4/25/2016 13:00	8	1.06	0.77			
7/20/2016 16:45	9	0.98	0.14	16.9	304	
10/13/2016 12:45	10	1.08	0.66	12.6	168	
10/27/2016 14:05	11	1.05	0.83	13.0	190	
11/2/2016 10:00	12	1.16	1.35	11.9	126	
11/30/2016 13:00	13	1.00	0.41	9.9	214	
1/13/2017 11:55	14	0.97	0.28	2.8	247	
1/18/2017 13:00	15	1.22	2.56	5.9	134	
2/8/2017 16:30	16	1.18	1.85	4.5	247	
2/9/2017 9:40	17	1.74	15.41	5.4	37.3	
2/9/2017 15:25	16	1.92	6.32	4.3	33.00	
2/15/2017 12:30	18	1.17	2.07	7.2	148	
3/8/2017 16:50	19	1.01	0.51	6.7	204	
4/18/2017 11:10	20	1.04	0.65	10.7	206	
5/18/2017 11:25	21	1.03	0.45	11.4	236	
6/28/2017 11:25	22	1.00	0.21	11.4	236	
9/7/2017 16:00	23	1.00	0.14	17.5	322	
10/17/2017 10:45	24	1.01	0.14	11.3	305	
11/9/2017 13:40	25	1.10	0.41	9.5	232	
Average		1.15	1.77	9.44	201	
Minimum		0.97	0.14	2.80	33.0	
Maximum		1.92	15.41	17.50	322	

Table C-12. Manual Flow Measurements Used to Develop Rating Curves at COUMI.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/22/2015 11:30	1	0.65	0.05			
11/9/2015 12:19	2	0.76	0.13	10.8	158	
11/20/2015 11:53	3	0.77	0.18	7.0	210	
12/8/2015 15:02	4	0.92	1.52			
1/19/2016 13:30	5	0.71	0.10	7.5	242	
1/21/2016 14:11	6	0.85	0.71			
3/14/2016 11:37	7	0.72	0.16	8.0	201	
4/29/2016 14:09	8	0.67	0.09			
7/14/2016 14:27	9	0.65	0.04	14.6	336	
7/20/2016 11:20	10	0.65	0.04			
10/13/2016 12:18	11	0.77	0.18	11.8	206	
11/2/2016 9:25	12	0.79	0.31	11.5	121	
11/23/2016 16:45	13	0.71	0.09	9.9	214	
11/30/2016 12:10	14	0.71	0.08	9.4	204	
1/13/2017 11:10	15	0.67	0.07	1.9	289	
1/18/2017 12:25	16	0.87	0.88	5.6	127	
1/18/2017 16:20	17	0.86	0.83			
2/9/2017 10:10	18	1.09	5.70	5.8	53.0	
3/8/2017 16:15	21	0.72	0.16	6.3	214	
4/13/2017 10:30	22	0.76	0.25	9.2	148	
4/18/2017 11:35	23	0.71	0.14	10.2	230	
5/18/2017 10:45	24	0.69	0.15	10.7	137	
6/28/2017 11:15	25	0.66	0.04	13.5	332	
9/7/2017 17:15	26	0.64	0.04	16.4		
9/20/2017 14:50	27	0.66	0.05	12.1	277	
10/17/2017 11:25	28	0.65	0.03	10.8	334	
11/9/2017 13:10	29	0.69	0.10	8.8	229	
Average		0.74	0.45	9.61	213	
Minimum		0.64	0.03	1.90	53.0	
Maximum		1.09	5.70	16.40	336	

Table C-13. Manual Flow Measurements Used to Develop Rating Curves at TYLMO.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/21/2015 15:15	1	1.08	0.10	14.7	146	
10/30/2015 13:30		1.15		13.7	141	
11/14/2015 15:25	2	1.39	3.52	10.7	97	
12/11/2015 15:15	3	1.24	1.12	8.8	116	
2/3/2016 15:45	4	1.16	0.24	7.8	159	
7/19/2016 14:30	5	1.08	0.05	15.7	213	
9/13/2016 14:00		1.10				
9/15/2016 16:10		1.09				
10/13/2016 14:45	6	1.35	3.46	13.1	60.0	
10/14/2016 11:50	7	1.52	8.48	12.0	60.0	
10/25/2016 13:00	8	1.17	0.20	12.0	146	
11/2/2016 14:55	9	1.29	1.06	12.2	95.0	
1/12/2017 14:55	10	1.17	0.12	12.2	95.0	
1/18/2017 10:00	11	1.52	6.51			
2/9/2017 12:40	12	1.68	10.91	6.1	67.0	
2/10/2017 15:40	13	1.34	1.59	6.6	107	
3/6/2017 14:30	14	1.21	0.33	7.2	155	
4/13/2017 14:45	15	1.28	0.93	11.5	115	
5/19/2017 13:45	16	1.18	0.18	13.7	177	
6/19/2017 15:30	17	1.15	0.10	14.9	192	
8/22/2017 16:45	18	1.14	0.07	16.8	228	
10/4/2017 14:35	19	1.13	0.05	10.5	219	
10/19/2017 11:05	20	1.30	1.05			
Average		1.25	2.00	11.59	136	
Minimum		1.08	0.05	6.10	60.0	
Maximum		1.68	10.91	16.80	228	

Table C-14. Manual Flow Measurements Used to Develop Rating Curves at TYLMI.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/25/2015 14:45	1	1.08	0.05	14.7	209	
10/30/2015 14:30	2	1.15	0.17	14.1	133	
11/14/2015 15:50	3	1.30	1.38	10.3	97.0	
2/3/2016 16:30	4	1.05	0.10	7.7	152	
10/4/2016 16:10	5	1.02	0.06	14.3	263	
10/13/2016 15:10	6	1.14	0.59	12.9	95.0	
10/27/2016 12:00	7	1.17	0.74	12.5	96.0	
10/27/2016 12:30	8	1.17	0.69			
11/2/2016 15:30	9	1.15	0.50	11.9	100	
11/30/2016 15:30	10	1.08	0.16	9.4		
1/12/2017 17:30	11	1.02	0.05	3.4	212	
1/18/2017 10:30	12	1.36	1.94	2.9	75.0	
2/8/2017 15:50	13	1.11	0.29			
2/9/2017 13:10	14	1.45	2.91	3.1	63.0	
2/9/2017 15:50	15	1.32	1.93			
3/6/2017 15:30	16	1.08	0.11	7.2	148	
4/13/2017 13:45	17	1.17	0.56	10.8	105	
5/19/2017 14:30	18	1.02	0.05	13.7	175	
6/19/2017 16:15	19	1.00	0.03	15.2	185	
8/22/2017 16:10	20	0.99	0.02	17.8	235	
9/20/2017 12:00	21	1.08	0.23	14.2	83.2	
10/4/2017 15:15	22	0.98	0.02	13.2	241	
10/19/2017 10:20	23	1.14	0.47			
11/8/2017 16:30	24	1.03	0.05	9.5	156	
Average		1.13	0.55	10.94	149	
Minimum		0.98	0.02	2.90	63.0	
Maximum		1.45	2.91	17.80	263	

APPENDIX D

Summary Statistics for Individual Storm Events by Monitoring Station

Table D-1. Summary Statistics for Individual Storm Events at the EVALSS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/1/2016 4:35	10/1/2016 18:55	14.3	0.08	0.01	0.12	0.0	10/1/2016 4:30	10/2/2016 6:55	26.5	1.58	1.66	150,636
10/3/2016 22:20	10/4/2016 23:40	25.3	0.17	0.01	0.12	56.2	10/3/2016 22:15	10/5/2016 11:35	37.4	1.65	1.66	222,425
10/6/2016 3:20	10/6/2016 5:15	1.9	0.05	0.03	0.12	36.7	10/6/2016 3:20	10/6/2016 17:10	13.9	1.61	1.66	80,478
10/6/2016 21:15	10/7/2016 6:05	8.8	0.25	0.03	0.36	17.6	10/6/2016 21:10	10/7/2016 18:00	20.9	1.77	2.27	132,999
10/7/2016 22:40	10/9/2016 3:10	28.5	1.00	0.04	0.84	22.2	10/7/2016 22:40	10/9/2016 15:10	40.6	2.29	4.61	334,557
10/9/2016 19:30	10/9/2016 23:15	3.8	0.18	0.05	0.12	18.2	10/9/2016 19:25	10/10/2016 11:10	15.8	2.01	2.27	114,333
10/13/2016 2:30	10/17/2016 12:00	105.5	3.75	0.04	0.60	76.5	10/13/2016 2:25	10/17/2016 23:55	117.6	3.70	7.66	1,567,718
10/18/2016 0:25	10/18/2016 6:40	6.3	0.15	0.02	0.12	17.8	10/18/2016 0:20	10/18/2016 18:40	18.4	2.33	2.44	154,644
10/19/2016 21:30	10/20/2016 18:35	21.1	1.38	0.07	0.48	39.6	10/19/2016 21:30	10/21/2016 6:30	33.1	5.56	12.18	662,243
10/21/2016 18:25	10/21/2016 19:00	0.6	0.11	0.19	0.48	32.0	10/21/2016 18:20	10/22/2016 7:00	12.8	2.90	3.21	133,317
10/23/2016 0:50	10/23/2016 5:10	4.3	0.16	0.04	0.24	30.2	10/23/2016 0:45	10/23/2016 17:10	16.5	2.53	2.81	149,985
10/24/2016 17:40	10/25/2016 1:05	7.4	0.17	0.02	0.24	38.1	10/24/2016 17:35	10/25/2016 13:05	19.6	2.29	2.44	161,748
10/26/2016 6:20	10/27/2016 0:30	18.2	1.52	0.08	0.48	35.0	10/26/2016 6:20	10/27/2016 12:30	30.3	5.97	9.97	650,468
10/27/2016 16:00	10/27/2016 20:10	4.2	0.05	0.01	0.24	16.7	10/27/2016 15:55	10/28/2016 8:10	16.3	2.98	3.64	175,200
10/29/2016 9:45	10/29/2016 12:45	3.0	0.11	0.04	0.12	38.6	10/29/2016 9:40	10/30/2016 0:40	15.1	2.43	2.62	131,880
10/30/2016 15:10	11/2/2016 5:05	61.9	1.60	0.03	0.48	28.1	10/30/2016 15:10	11/2/2016 8:00	64.9	4.05	8.02	946,363
11/2/2016 8:00	11/3/2016 9:30	25.5	0.31	0.01	0.12	13.2	11/2/2016 8:00	11/3/2016 21:30	37.6	2.69	3.50	363,897
11/5/2016 6:20	11/6/2016 5:00	22.7	1.14	0.05	0.36	54.1	11/5/2016 6:20	11/6/2016 17:00	35.8	4.43	6.76	569,807
11/9/2016 5:45	11/9/2016 10:40	4.9	0.28	0.06	0.36	73.2	11/9/2016 5:45	11/9/2016 22:40	17.0	2.13	3.01	130,488
11/12/2016 6:00	11/12/2016 8:20	2.3	0.06	0.03	0.12	67.6	11/12/2016 5:55	11/12/2016 20:15	14.4	1.17	1.33	60,909
11/13/2016 8:30	11/14/2016 6:20	21.8	0.48	0.02	0.12	26.2	11/13/2016 8:25	11/14/2016 18:20	34.0	1.82	3.01	222,888
11/14/2016 23:25	11/16/2016 2:00	26.6	1.72	0.06	0.84	18.1	11/14/2016 23:25	11/16/2016 14:00	38.7	6.08	10.11	845,806
11/16/2016 18:30	11/16/2016 20:55	2.4	0.04	0.02	0.12	18.8	11/16/2016 18:30	11/17/2016 8:55	14.5	3.70	4.20	193,011
11/19/2016 23:15	11/20/2016 14:40	15.4	0.14	0.01	0.12	76.8	11/19/2016 23:10	11/21/2016 1:05	26.0	1.87	1.87	175,032
11/21/2016 1:10	11/21/2016 2:35	1.4	0.03	0.02	0.12	14.4	11/21/2016 1:05	11/21/2016 14:35	13.6	1.73	1.87	84,570
11/22/2016 16:40	11/23/2016 13:50	21.2	0.44	0.02	0.24	50.0	11/22/2016 16:40	11/23/2016 20:00	27.4	2.60	3.95	256,309
11/23/2016 20:00	11/24/2016 23:45	27.8	1.08	0.04	0.12	18.2	11/23/2016 20:00	11/25/2016 11:45	39.8	3.93	6.44	563,050
11/25/2016 21:40	11/28/2016 5:40	56.0	0.82	0.01	0.24	22.2	11/25/2016 21:40	11/28/2016 16:50	67.3	3.65	4.97	883,662
11/28/2016 16:55	11/29/2016 3:20	10.4	0.18	0.02	0.36	22.0	11/28/2016 16:50	11/29/2016 15:20	22.6	2.95	3.72	239,821
11/30/2016 0:20	11/30/2016 2:25	2.1	0.10	0.05	0.12	28.5	11/30/2016 0:20	11/30/2016 14:25	14.2	2.47	3.01	125,817
11/30/2016 15:25	11/30/2016 15:45	0.3	0.06	0.18	0.24	13.9	11/30/2016 15:20	12/1/2016 3:40	12.4	2.67	3.95	119,526
12/1/2016 21:15	12/3/2016 3:45	30.5	0.39	0.01	0.12	29.7	12/1/2016 21:10	12/3/2016 15:40	42.6	2.25	3.01	344,439
12/3/2016 20:25	12/4/2016 15:05	18.7	0.48	0.03	0.24	17.4	12/3/2016 20:25	12/5/2016 3:00	30.7	3.12	4.44	344,175
12/5/2016 7:10	12/5/2016 12:35	5.4	0.18	0.03	0.24	16.9	12/5/2016 7:05	12/6/2016 0:30	17.5	2.93	3.50	184,833
12/10/2016 6:05	12/10/2016 19:30	13.4	0.59	0.04	0.36	113.8	12/10/2016 6:00	12/11/2016 7:25	25.5	3.19	4.20	292,770
12/11/2016 9:55	12/11/2016 20:30	10.6	0.09	0.01	0.12	17.5	12/11/2016 9:55	12/12/2016 8:10	22.3	2.63	3.01	211,443
12/12/2016 8:15	12/12/2016 13:00	4.8	0.05	0.01	0.12	18.8	12/12/2016 8:10	12/12/2016 23:35	15.5	2.23	2.58	124,470
12/12/2016 23:40	12/13/2016 1:50	2.2	0.03	0.01	0.12	13.0	12/12/2016 23:35	12/13/2016 13:50	14.3	2.20	2.20	113,322
12/19/2016 3:50	12/20/2016 3:00	23.2	0.43	0.02	0.24	158.8	12/19/2016 3:45	12/20/2016 14:55	35.3	2.44	3.95	309,369
12/22/2016 16:15	12/24/2016 12:05	43.8	1.07	0.02	0.24	64.4	12/22/2016 16:15	12/25/2016 0:00	55.8	3.76	5.24	754,830
12/26/2016 15:35	12/26/2016 22:40	7.1	0.23	0.03	0.12	51.8	12/26/2016 15:35	12/27/2016 10:40	19.2	2.79	3.50	192,813
12/29/2016 12:45	12/30/2016 9:10	20.4	0.69	0.03	0.24	62.4	12/29/2016 12:40	12/30/2016 21:10	32.6	3.61	4.97	423,015
12/31/2016 17:25	12/31/2016 20:50	3.4	0.10	0.03	0.24	35.2	12/31/2016 17:25	1/1/2017 8:45	15.4	3.26	3.72	180,831
1/2/2017 13:45	1/2/2017 15:40	1.9	0.06	0.03	0.12	43.0	1/2/2017 13:40	1/3/2017 3:40	14.1	2.21	2.58	111,882
1/5/2017 10:45	1/5/2017 15:10	4.4	0.05	0.01	0.12	68.8	1/5/2017 10:40	1/6/2017 3:10	16.6	1.63	1.87	97,110
1/6/2017 12:20	1/6/2017 14:10	1.8	0.03	0.02	0.12	23.4	1/6/2017 12:20	1/7/2017 2:10	13.9	1.58	1.87	79,245
1/8/2017 11:15	1/9/2017 0:40	13.4	0.40	0.03	0.12	68.1	1/8/2017 11:10	1/9/2017 12:40	25.6	2.90	3.72	267,121
1/9/2017 14:15	1/10/2017 9:35	19.3	0.12	0.01	0.12	16.6	1/9/2017 14:10	1/10/2017 21:30	31.4	2.34	2.58	264,667
1/17/2017 4:30	1/19/2017 0:10	43.7	1.99	0.05	0.48	164.7	1/17/2017 4:25	1/19/2017 11:55	55.6	5.94	9.29	1,187,698

Table D-1. Summary Statistics for Individual Storm Events at the EVALSS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
1/19/2017 12:00	1/19/2017 16:15	4.3	0.11	0.03	0.12	13.0	1/19/2017 11:55	1/20/2017 4:15	16.4	4.67	4.97	276,057
1/29/2017 19:20	1/29/2017 20:05	0.8	0.03	0.04	0.12	244.0	1/29/2017 19:15	1/30/2017 8:00	12.8	1.87	1.87	86,394
2/3/2017 1:50	2/5/2017 16:55	63.1	1.70	0.03	0.24	346.5	2/3/2017 1:50	2/6/2017 4:50	75.1	4.19	6.44	1,132,080
2/6/2017 11:45	2/6/2017 22:55	11.2	0.49	0.04	0.24	19.6	2/6/2017 11:45	2/7/2017 10:50	23.2	4.47	4.97	372,942
2/7/2017 11:05	2/8/2017 2:20	15.3	0.06	0.00	0.24	13.9	2/7/2017 11:00	2/8/2017 10:30	23.6	3.82	3.95	324,590
2/8/2017 10:35	2/10/2017 11:50	49.3	2.54	0.05	0.48	17.9	2/8/2017 10:30	2/10/2017 23:45	61.3	9.34	27.00	2,062,252
2/14/2017 20:50	2/16/2017 5:55	33.1	2.32	0.07	0.36	114.8	2/14/2017 20:45	2/16/2017 17:55	45.3	7.43	18.78	1,210,720
2/18/2017 8:10	2/19/2017 16:50	32.7	0.29	0.01	0.12	50.5	2/18/2017 8:10	2/20/2017 3:30	43.4	2.94	3.40	459,732
2/20/2017 3:35	2/22/2017 3:20	47.8	0.61	0.01	0.12	12.9	2/20/2017 3:30	2/22/2017 15:20	59.9	2.98	4.75	641,817
2/25/2017 22:05	2/26/2017 18:40	20.6	0.49	0.02	0.12	93.8	2/25/2017 22:05	2/27/2017 6:40	32.7	2.62	3.65	307,545
2/27/2017 9:35	2/27/2017 15:40	6.1	0.29	0.05	0.72	23.8	2/27/2017 9:30	2/28/2017 3:40	18.3	3.27	3.91	214,656
2/28/2017 10:20	2/28/2017 12:45	2.4	0.23	0.10	0.36	20.0	2/28/2017 10:15	3/1/2017 0:40	14.5	2.74	3.06	142,932
3/2/2017 3:00	3/2/2017 20:15	17.3	0.11	0.01	0.12	38.3	3/2/2017 2:55	3/3/2017 8:10	29.3	1.92	2.17	202,977
3/3/2017 9:30	3/3/2017 21:05	11.6	0.36	0.03	0.36	16.0	3/3/2017 9:30	3/4/2017 9:00	23.6	2.76	3.65	234,675
3/4/2017 21:55	3/5/2017 3:20	5.4	0.13	0.02	0.24	25.5	3/4/2017 21:55	3/5/2017 15:20	17.5	2.21	2.45	139,506
3/7/2017 3:10	3/7/2017 18:20	15.2	0.37	0.02	0.12	48.2	3/7/2017 3:10	3/8/2017 6:20	27.3	2.40	3.40	235,701
3/8/2017 18:25	3/10/2017 9:00	38.6	0.55	0.01	0.12	27.2	3/8/2017 18:20	3/10/2017 20:55	50.7	2.55	4.18	465,097
3/11/2017 9:35	3/11/2017 20:15	10.7	0.31	0.03	0.24	37.8	3/11/2017 9:30	3/12/2017 8:10	21.8	2.64	3.65	206,481
3/13/2017 6:05	3/15/2017 15:10	57.1	1.55	0.03	0.12	37.1	3/13/2017 6:00	3/16/2017 3:10	69.3	3.87	7.01	963,600
3/17/2017 13:20	3/18/2017 12:35	23.3	1.33	0.06	0.24	48.8	3/17/2017 13:20	3/19/2017 0:35	35.3	5.23	8.51	664,634
3/20/2017 20:10	3/22/2017 0:40	28.5	0.21	0.01	0.12	56.2	3/20/2017 20:10	3/22/2017 12:00	39.9	2.47	2.74	355,633
3/22/2017 12:05	3/22/2017 15:00	2.9	0.05	0.02	0.12	15.6	3/22/2017 12:00	3/23/2017 2:55	15.0	2.17	2.17	117,180
3/23/2017 21:30	3/24/2017 19:20	21.8	0.55	0.03	0.24	33.2	3/23/2017 21:30	3/25/2017 7:20	33.9	2.75	3.40	336,254
3/26/2017 10:35	3/26/2017 23:50	13.3	0.31	0.02	0.12	40.0	3/26/2017 10:30	3/27/2017 11:45	25.3	2.39	3.06	217,533
3/27/2017 12:30	3/28/2017 13:50	25.3	0.23	0.01	0.12	13.9	3/27/2017 12:30	3/28/2017 22:50	34.4	2.27	2.74	281,568
3/28/2017 22:55	3/29/2017 13:05	14.2	0.45	0.03	0.12	18.1	3/28/2017 22:50	3/29/2017 22:50	24.1	3.19	4.18	276,732
3/29/2017 22:55	3/30/2017 14:05	15.2	0.41	0.03	0.36	14.1	3/29/2017 22:50	3/31/2017 2:00	27.3	3.28	4.46	321,303
4/1/2017 7:05	4/2/2017 20:40	37.6	0.38	0.01	0.24	51.7	4/1/2017 7:05	4/3/2017 8:35	49.6	2.36	2.74	420,945
4/4/2017 22:05	4/6/2017 14:25	40.3	0.71	0.02	0.24	60.1	4/4/2017 22:05	4/7/2017 1:50	51.8	2.69	3.40	501,196
4/7/2017 1:55	4/7/2017 9:30	7.6	0.09	0.01	0.12	16.1	4/7/2017 1:50	4/7/2017 19:30	17.8	2.45	2.74	156,276
4/7/2017 19:35	4/8/2017 1:50	6.3	0.18	0.03	0.12	15.7	4/7/2017 19:30	4/8/2017 13:50	18.4	2.49	3.06	165,297
4/10/2017 2:35	4/11/2017 8:25	29.8	0.40	0.01	0.48	50.0	4/10/2017 2:35	4/11/2017 20:25	41.9	2.34	3.65	353,337
4/12/2017 1:30	4/13/2017 13:50	36.3	1.00	0.03	0.24	29.5	4/12/2017 1:25	4/13/2017 17:25	40.1	3.62	5.35	522,589
4/13/2017 17:30	4/13/2017 19:10	1.7	0.07	0.04	0.24	15.0	4/13/2017 17:25	4/14/2017 7:05	13.8	2.76	3.06	136,398
4/17/2017 17:25	4/19/2017 1:15	31.8	0.34	0.01	0.36	95.8	4/17/2017 17:25	4/19/2017 10:40	41.3	2.06	2.45	307,244
4/19/2017 10:45	4/20/2017 1:35	14.8	0.66	0.04	0.36	15.1	4/19/2017 10:40	4/20/2017 13:30	26.9	3.08	5.04	298,578
4/22/2017 14:20	4/22/2017 21:30	7.2	0.31	0.04	1.08	61.8	4/22/2017 14:15	4/23/2017 9:30	19.3	2.03	2.17	140,982
4/23/2017 11:25	4/24/2017 6:15	18.8	0.49	0.03	0.60	16.5	4/23/2017 11:25	4/24/2017 18:10	30.8	2.85	4.18	316,704
4/25/2017 19:20	4/25/2017 21:00	1.7	0.03	0.02	0.12	39.3	4/25/2017 19:15	4/26/2017 8:55	13.8	1.92	1.92	95,040
4/26/2017 13:45	4/27/2017 6:30	16.8	0.89	0.05	1.08	57.8	4/26/2017 13:40	4/27/2017 18:30	28.9	3.08	4.73	320,328
4/29/2017 17:45	4/30/2017 19:50	26.1	0.44	0.02	0.24	65.8	4/29/2017 17:45	5/1/2017 7:50	38.2	2.02	2.27	277,471
5/1/2017 9:25	5/1/2017 14:20	4.9	0.12	0.02	0.12	20.2	5/1/2017 9:20	5/2/2017 2:15	17.0	1.97	2.08	120,570
5/2/2017 21:00	5/3/2017 9:00	12.0	0.32	0.03	0.24	33.0	5/2/2017 20:55	5/3/2017 20:55	24.1	2.20	2.92	190,869
5/4/2017 16:35	5/5/2017 12:25	19.8	1.02	0.05	1.32	35.4	5/4/2017 16:30	5/6/2017 0:20	31.9	4.40	8.84	505,516
5/11/2017 11:20	5/12/2017 23:40	36.3	0.35	0.01	0.36	151.0	5/11/2017 11:15	5/13/2017 11:40	48.5	2.18	2.70	380,201
5/13/2017 20:45	5/13/2017 22:30	1.8	0.03	0.02	0.12	33.1	5/13/2017 20:45	5/14/2017 10:25	13.8	2.06	2.08	101,877
5/15/2017 14:10	5/16/2017 23:50	33.7	1.32	0.04	0.96	41.4	5/15/2017 14:10	5/17/2017 11:50	45.8	2.90	5.03	477,275
5/31/2017 21:45	6/1/2017 8:50	11.1	0.16	0.01	0.12	359.5	5/31/2017 21:40	6/1/2017 20:45	23.2	1.53	1.89	127,194

Table D-2. Summary Statistics for Individual Storm Events at the EVAMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/1/2016 4:35	10/1/2016 18:55	14.3	0.08	0.01	0.12	0.0	10/1/2016 4:30	10/2/2016 6:55	26.5	0.22	0.26	20,709
10/3/2016 22:20	10/4/2016 23:40	25.3	0.17	0.01	0.12	56.2	10/3/2016 22:15	10/5/2016 11:35	37.4	0.22	0.31	30,006
10/6/2016 3:20	10/6/2016 5:15	1.9	0.05	0.03	0.12	36.7	10/6/2016 3:20	10/6/2016 17:10	13.9	0.19	0.21	9,513
10/6/2016 21:15	10/7/2016 6:05	8.8	0.25	0.03	0.36	17.6	10/6/2016 21:10	10/7/2016 18:00	20.9	0.28	0.53	21,429
10/7/2016 22:40	10/9/2016 3:10	28.5	1.00	0.04	0.84	22.2	10/7/2016 22:40	10/9/2016 15:10	40.6	0.57	2.31	83,028
10/9/2016 19:30	10/9/2016 23:15	3.8	0.18	0.05	0.12	18.2	10/9/2016 19:25	10/10/2016 11:10	15.8	0.42	0.53	23,823
10/13/2016 2:30	10/17/2016 12:00	105.5	3.75	0.04	0.60	76.5	10/13/2016 2:25	10/17/2016 23:55	117.6	1.12	2.81	474,868
10/18/2016 0:25	10/18/2016 6:40	6.3	0.15	0.02	0.12	17.8	10/18/2016 0:20	10/18/2016 18:40	18.4	0.59	0.72	39,420
10/19/2016 21:30	10/20/2016 18:35	21.1	1.38	0.07	0.48	39.6	10/19/2016 21:30	10/21/2016 6:30	33.1	1.96	4.11	233,445
10/21/2016 18:25	10/21/2016 19:00	0.6	0.11	0.19	0.48	32.0	10/21/2016 18:20	10/22/2016 7:00	12.8	0.76	0.83	34,722
10/23/2016 0:50	10/23/2016 5:10	4.3	0.16	0.04	0.24	30.2	10/23/2016 0:45	10/23/2016 17:10	16.5	0.66	0.83	38,967
10/24/2016 17:40	10/25/2016 1:05	7.4	0.17	0.02	0.24	38.1	10/24/2016 17:35	10/25/2016 13:05	19.6	0.59	0.72	41,640
10/26/2016 6:20	10/27/2016 0:30	18.2	1.52	0.08	0.48	35.0	10/26/2016 6:20	10/27/2016 12:30	30.3	1.75	3.22	190,353
10/27/2016 16:00	10/27/2016 20:10	4.2	0.05	0.01	0.24	16.7	10/27/2016 15:55	10/28/2016 8:10	16.3	0.59	0.83	34,545
10/29/2016 9:45	10/29/2016 12:45	3.0	0.11	0.04	0.12	38.6	10/29/2016 9:40	10/30/2016 0:40	15.1	0.53	0.62	28,530
10/30/2016 15:10	11/2/2016 5:05	61.9	1.60	0.03	0.48	28.1	10/30/2016 15:10	11/2/2016 8:00	64.9	1.29	2.95	302,442
11/2/2016 8:00	11/3/2016 9:30	25.5	0.31	0.01	0.12	13.2	11/2/2016 8:00	11/3/2016 21:30	37.6	0.96	1.10	130,386
11/5/2016 6:20	11/6/2016 5:00	22.7	1.14	0.05	0.36	54.1	11/5/2016 6:20	11/6/2016 17:00	35.8	2.24	3.36	288,123
11/9/2016 5:45	11/9/2016 10:40	4.9	0.28	0.06	0.36	73.2	11/9/2016 5:45	11/9/2016 22:40	17.0	1.18	1.43	71,973
11/12/2016 6:00	11/12/2016 8:20	2.3	0.06	0.03	0.12	67.6	11/12/2016 5:55	11/12/2016 20:15	14.4	0.82	0.83	42,813
11/13/2016 8:30	11/14/2016 6:20	21.8	0.48	0.02	0.12	26.2	11/13/2016 8:25	11/14/2016 18:20	34.0	1.07	1.43	131,178
11/14/2016 23:25	11/16/2016 2:00	26.6	1.72	0.06	0.84	18.1	11/14/2016 23:25	11/16/2016 14:00	38.7	2.79	4.43	388,075
11/16/2016 18:30	11/16/2016 20:55	2.4	0.04	0.02	0.12	18.8	11/16/2016 18:30	11/17/2016 8:55	14.5	1.44	1.62	74,991
11/19/2016 23:15	11/20/2016 14:40	15.4	0.14	0.01	0.12	76.8	11/19/2016 23:10	11/21/2016 1:05	26.0	0.83	0.96	77,805
11/21/2016 1:10	11/21/2016 2:35	1.4	0.03	0.02	0.12	14.4	11/21/2016 1:05	11/21/2016 14:35	13.6	0.81	0.83	39,531
11/22/2016 16:40	11/23/2016 13:50	21.2	0.44	0.02	0.24	50.0	11/22/2016 16:40	11/23/2016 20:00	27.4	1.09	1.62	107,388
11/23/2016 20:00	11/24/2016 23:45	27.8	1.08	0.04	0.12	18.2	11/23/2016 20:00	11/25/2016 11:45	39.8	1.65	2.81	235,995
11/25/2016 21:40	11/28/2016 5:40	56.0	0.82	0.01	0.24	22.2	11/25/2016 21:40	11/28/2016 16:50	67.3	1.23	2.31	298,347
11/28/2016 16:55	11/29/2016 3:20	10.4	0.18	0.02	0.36	22.0	11/28/2016 16:50	11/29/2016 15:20	22.6	0.90	1.10	72,993
11/30/2016 0:20	11/30/2016 2:25	2.1	0.10	0.05	0.12	28.5	11/30/2016 0:20	11/30/2016 14:25	14.2	0.87	1.10	44,406
11/30/2016 15:25	11/30/2016 15:45	0.3	0.06	0.18	0.24	13.9	11/30/2016 15:20	12/1/2016 3:40	12.4	1.12	1.62	49,917
12/1/2016 21:15	12/3/2016 3:45	30.5	0.39	0.01	0.12	29.7	12/1/2016 21:10	12/3/2016 15:40	42.6	0.98	1.43	149,883
12/3/2016 20:25	12/4/2016 15:05	18.7	0.48	0.03	0.24	17.4	12/3/2016 20:25	12/5/2016 3:00	30.7	1.36	2.31	150,003
12/5/2016 7:10	12/5/2016 12:35	5.4	0.18	0.03	0.24	16.9	12/5/2016 7:05	12/6/2016 0:30	17.5	1.19	1.43	75,204
12/10/2016 6:05	12/10/2016 19:30	13.4	0.59	0.04	0.36	113.8	12/10/2016 6:00	12/11/2016 7:25	25.5	1.33	1.83	121,854
12/11/2016 9:55	12/11/2016 20:30	10.6	0.09	0.01	0.12	17.5	12/11/2016 9:55	12/12/2016 8:10	22.3	1.04	1.26	83,922
12/12/2016 8:15	12/12/2016 13:00	4.8	0.05	0.01	0.12	18.8	12/12/2016 8:10	12/12/2016 23:35	15.5	0.95	0.96	52,788
12/12/2016 23:40	12/13/2016 1:50	2.2	0.03	0.01	0.12	13.0	12/12/2016 23:35	12/13/2016 13:50	14.3	0.85	0.96	43,959
12/19/2016 3:50	12/20/2016 3:00	23.2	0.43	0.02	0.24	158.8	12/19/2016 3:45	12/20/2016 14:55	35.3	1.17	1.83	148,359
12/22/2016 16:15	12/24/2016 12:05	43.8	1.07	0.02	0.24	64.4	12/22/2016 16:15	12/25/2016 0:00	55.8	1.93	2.56	387,243
12/26/2016 15:35	12/26/2016 22:40	7.1	0.23	0.03	0.12	51.8	12/26/2016 15:35	12/27/2016 10:40	19.2	1.37	2.06	94,662
12/29/2016 12:45	12/30/2016 9:10	20.4	0.69	0.03	0.24	62.4	12/29/2016 12:40	12/30/2016 21:10	32.6	1.58	2.56	184,911
12/31/2016 17:25	12/31/2016 20:50	3.4	0.10	0.03	0.24	35.2	12/31/2016 17:25	1/1/2017 8:45	15.4	1.06	1.26	58,998
1/2/2017 13:45	1/2/2017 15:40	1.9	0.06	0.03	0.12	43.0	1/2/2017 13:40	1/3/2017 3:40	14.1	0.67	0.72	33,954
1/5/2017 10:45	1/5/2017 15:10	4.4	0.05	0.01	0.12	68.8	1/5/2017 10:40	1/6/2017 3:10	16.6	0.58	0.62	34,854
1/6/2017 12:20	1/6/2017 14:10	1.8	0.03	0.02	0.12	23.4	1/6/2017 12:20	1/7/2017 2:10	13.9	0.57	0.62	28,713
1/8/2017 11:15	1/9/2017 0:40	13.4	0.40	0.03	0.12	68.1	1/8/2017 11:10	1/9/2017 12:40	25.6	0.76	0.96	70,095
1/9/2017 14:15	1/10/2017 9:35	19.3	0.12	0.01	0.12	16.6	1/9/2017 14:10	1/10/2017 21:30	31.4	0.65	0.72	73,632
1/17/2017 4:30	1/19/2017 0:10	43.7	1.99	0.05	0.48	164.7	1/17/2017 4:25	1/19/2017 11:55	55.6	1.96	3.36	391,929

Table D-2. Summary Statistics for Individual Storm Events at the EVAMS Station

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
1/19/2017 12:00	1/19/2017 16:15	4.3	0.11	0.03	0.12	13.0	1/19/2017 11:55	1/20/2017 4:15	16.4	1.32	1.48	78,108
1/29/2017 19:20	1/29/2017 20:05	0.8	0.03	0.04	0.12	244.0	1/29/2017 19:15	1/30/2017 8:00	12.8	0.56	0.56	25,872
2/3/2017 1:50	2/5/2017 16:55	63.1	1.70	0.03	0.24	346.5	2/3/2017 1:50	2/6/2017 4:50	75.1	1.41	2.47	381,942
2/6/2017 11:45	2/6/2017 22:55	11.2	0.49	0.04	0.24	19.6	2/6/2017 11:45	2/7/2017 10:50	23.2	1.34	1.62	111,600
2/7/2017 11:05	2/8/2017 2:20	15.3	0.06	0.00	0.24	13.9	2/7/2017 11:00	2/8/2017 10:30	23.6	1.04	1.10	88,686
2/8/2017 10:35	2/10/2017 11:50	49.3	2.54	0.05	0.48	17.9	2/8/2017 10:30	2/10/2017 23:45	61.3	2.86	12.51	631,811
2/14/2017 20:50	2/16/2017 5:55	33.1	2.32	0.07	0.36	114.8	2/14/2017 20:45	2/16/2017 17:55	45.3	2.70	5.24	439,109
2/18/2017 8:10	2/19/2017 16:50	32.7	0.29	0.01	0.12	50.5	2/18/2017 8:10	2/20/2017 3:30	43.4	0.91	0.94	141,568
2/20/2017 3:35	2/22/2017 3:20	47.8	0.61	0.01	0.12	12.9	2/20/2017 3:30	2/22/2017 15:20	59.9	1.03	1.62	221,814
2/25/2017 22:05	2/26/2017 18:40	20.6	0.49	0.02	0.12	93.8	2/25/2017 22:05	2/27/2017 6:40	32.7	0.86	1.22	101,313
2/27/2017 9:35	2/27/2017 15:40	6.1	0.29	0.05	0.72	23.8	2/27/2017 9:30	2/28/2017 3:40	18.3	1.05	1.22	69,231
2/28/2017 10:20	2/28/2017 12:45	2.4	0.23	0.10	0.36	20.0	2/28/2017 10:15	3/1/2017 0:40	14.5	0.91	1.10	47,361
3/2/2017 3:00	3/2/2017 20:15	17.3	0.11	0.01	0.12	38.3	3/2/2017 2:55	3/3/2017 8:10	29.3	0.73	0.79	77,232
3/3/2017 9:30	3/3/2017 21:05	11.6	0.36	0.03	0.36	16.0	3/3/2017 9:30	3/4/2017 9:00	23.6	0.95	1.22	80,673
3/4/2017 21:55	3/5/2017 3:20	5.4	0.13	0.02	0.24	25.5	3/4/2017 21:55	3/5/2017 15:20	17.5	0.79	0.94	49,986
3/7/2017 3:10	3/7/2017 18:20	15.2	0.37	0.02	0.12	48.2	3/7/2017 3:10	3/8/2017 6:20	27.3	0.85	1.10	82,914
3/8/2017 18:25	3/10/2017 9:00	38.6	0.55	0.01	0.12	27.2	3/8/2017 18:20	3/10/2017 20:55	50.7	0.92	1.48	167,109
3/11/2017 9:35	3/11/2017 20:15	10.7	0.31	0.03	0.24	37.8	3/11/2017 9:30	3/12/2017 8:10	21.8	0.97	1.22	75,789
3/13/2017 6:05	3/15/2017 15:10	57.1	1.55	0.03	0.12	37.1	3/13/2017 6:00	3/16/2017 3:10	69.3	1.39	2.67	347,369
3/17/2017 13:20	3/18/2017 12:35	23.3	1.33	0.06	0.24	48.8	3/17/2017 13:20	3/19/2017 0:35	35.3	1.92	3.33	244,224
3/20/2017 20:10	3/22/2017 0:40	28.5	0.21	0.01	0.12	56.2	3/20/2017 20:10	3/22/2017 12:00	39.9	1.03	1.10	147,799
3/22/2017 12:05	3/22/2017 15:00	2.9	0.05	0.02	0.12	15.6	3/22/2017 12:00	3/23/2017 2:55	15.0	0.94	0.94	50,760
3/23/2017 21:30	3/24/2017 19:20	21.8	0.55	0.03	0.24	33.2	3/23/2017 21:30	3/25/2017 7:20	33.9	1.12	1.22	136,872
3/26/2017 10:35	3/26/2017 23:50	13.3	0.31	0.02	0.12	40.0	3/26/2017 10:30	3/27/2017 11:45	25.3	1.01	1.35	91,824
3/27/2017 12:30	3/28/2017 13:50	25.3	0.23	0.01	0.12	13.9	3/27/2017 12:30	3/28/2017 22:50	34.4	0.96	1.22	118,809
3/28/2017 22:55	3/29/2017 13:05	14.2	0.45	0.03	0.12	18.1	3/28/2017 22:50	3/29/2017 22:50	24.1	1.24	1.48	107,406
3/29/2017 22:55	3/30/2017 14:05	15.2	0.41	0.03	0.36	14.1	3/29/2017 22:50	3/31/2017 2:00	27.3	1.26	1.62	123,816
4/1/2017 7:05	4/2/2017 20:40	37.6	0.38	0.01	0.24	51.7	4/1/2017 7:05	4/3/2017 8:35	49.6	0.93	1.22	165,210
4/4/2017 22:05	4/6/2017 14:25	40.3	0.71	0.02	0.24	60.1	4/4/2017 22:05	4/7/2017 1:50	51.8	1.00	1.35	186,132
4/7/2017 1:55	4/7/2017 9:30	7.6	0.09	0.01	0.12	16.1	4/7/2017 1:50	4/7/2017 19:30	17.8	0.90	1.10	57,564
4/7/2017 19:35	4/8/2017 1:50	6.3	0.18	0.03	0.12	15.7	4/7/2017 19:30	4/8/2017 13:50	18.4	0.90	1.10	59,745
4/10/2017 2:35	4/11/2017 8:25	29.8	0.40	0.01	0.48	50.0	4/10/2017 2:35	4/11/2017 20:25	41.9	0.90	1.35	135,472
4/12/2017 1:30	4/13/2017 13:50	36.3	1.00	0.03	0.24	29.5	4/12/2017 1:25	4/13/2017 17:25	40.1	1.30	1.94	187,733
4/13/2017 17:30	4/13/2017 19:10	1.7	0.07	0.04	0.24	15.0	4/13/2017 17:25	4/14/2017 7:05	13.8	1.12	1.22	55,314
4/17/2017 17:25	4/19/2017 1:15	31.8	0.34	0.01	0.36	95.8	4/17/2017 17:25	4/19/2017 10:40	41.3	0.75	1.10	111,687
4/19/2017 10:45	4/20/2017 1:35	14.8	0.66	0.04	0.36	15.1	4/19/2017 10:40	4/20/2017 13:30	26.9	1.15	1.94	110,952
4/22/2017 14:20	4/22/2017 21:30	7.2	0.31	0.04	1.08	61.8	4/22/2017 14:15	4/23/2017 9:30	19.3	0.73	0.94	50,826
4/23/2017 11:25	4/24/2017 6:15	18.8	0.49	0.03	0.60	16.5	4/23/2017 11:25	4/24/2017 18:10	30.8	1.02	1.48	112,701
4/25/2017 19:20	4/25/2017 21:00	1.7	0.03	0.02	0.12	39.3	4/25/2017 19:15	4/26/2017 8:55	13.8	0.68	0.79	33,453
4/26/2017 13:45	4/27/2017 6:30	16.8	0.89	0.05	1.08	57.8	4/26/2017 13:40	4/27/2017 18:30	28.9	1.34	2.29	139,047
4/29/2017 17:45	4/30/2017 19:50	26.1	0.44	0.02	0.24	65.8	4/29/2017 17:45	5/1/2017 7:50	38.2	0.78	0.96	106,698
5/1/2017 9:25	5/1/2017 14:20	4.9	0.12	0.02	0.12	20.2	5/1/2017 9:20	5/2/2017 2:15	17.0	0.75	0.83	46,011
5/2/2017 21:00	5/3/2017 9:00	12.0	0.32	0.03	0.24	33.0	5/2/2017 20:55	5/3/2017 20:55	24.1	0.89	1.35	76,863
5/4/2017 16:35	5/5/2017 12:25	19.8	1.02	0.05	1.32	35.4	5/4/2017 16:30	5/6/2017 0:20	31.9	1.66	3.82	190,320
5/11/2017 11:20	5/12/2017 23:40	36.3	0.35	0.01	0.36	151.0	5/11/2017 11:15	5/13/2017 11:40	48.5	0.85	1.10	149,228
5/13/2017 20:45	5/13/2017 22:30	1.8	0.03	0.02	0.12	33.1	5/13/2017 20:45	5/14/2017 10:25	13.8	0.82	0.83	40,392
5/15/2017 14:10	5/16/2017 23:50	33.7	1.32	0.04	0.96	41.4	5/15/2017 14:10	5/17/2017 11:50	45.8	1.09	1.94	178,870
5/31/2017 21:45	6/1/2017 8:50	11.1	0.16	0.01	0.12	359.5	5/31/2017 21:40	6/1/2017 20:45	23.2	0.42	0.44	34,890

Table D-3. Summary Statistics for Individual Storm Events at the MONM Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/1/2016 13:45	10/1/2016 18:25	4.7	0.04	0.01	0.12	0.0	10/1/2016 13:40	10/2/2016 6:20	16.8	0.23	0.28	13,845
10/3/2016 22:10	10/4/2016 21:45	23.6	0.14	0.01	0.48	56.4	10/3/2016 22:05	10/5/2016 9:40	35.7	0.21	0.28	26,400
10/6/2016 21:35	10/7/2016 5:05	7.5	0.25	0.03	0.36	56.0	10/6/2016 21:30	10/7/2016 17:00	19.6	0.44	0.84	31,365
10/7/2016 22:45	10/9/2016 2:25	27.7	1.01	0.04	1.56	21.2	10/7/2016 22:40	10/9/2016 14:25	39.8	0.98	3.40	140,631
10/9/2016 18:50	10/9/2016 22:00	3.2	0.46	0.15	1.20	18.3	10/9/2016 18:45	10/10/2016 10:00	15.3	1.61	2.55	88,809
10/13/2016 2:00	10/17/2016 11:55	105.9	3.93	0.04	0.60	76.5	10/13/2016 2:00	10/17/2016 23:55	118.0	3.13	12.45	1,328,484
10/18/2016 0:40	10/18/2016 6:15	5.6	0.13	0.02	0.12	18.8	10/18/2016 0:40	10/18/2016 18:10	17.6	1.54	1.73	97,311
10/19/2016 20:55	10/20/2016 11:15	14.3	1.49	0.10	0.96	38.9	10/19/2016 20:55	10/20/2016 23:10	26.3	4.82	12.80	456,552
10/21/2016 18:10	10/22/2016 0:55	6.8	0.14	0.02	1.20	31.2	10/21/2016 18:10	10/22/2016 12:55	18.8	1.79	2.40	121,389
10/23/2016 0:00	10/23/2016 4:15	4.3	0.19	0.04	0.24	29.7	10/22/2016 23:55	10/23/2016 16:15	16.4	1.31	1.73	77,547
10/24/2016 17:30	10/24/2016 20:50	3.3	0.19	0.06	0.36	37.4	10/24/2016 17:25	10/25/2016 8:50	15.5	0.94	1.18	52,299
10/26/2016 6:20	10/27/2016 0:00	17.7	1.60	0.09	0.60	35.2	10/26/2016 6:20	10/27/2016 12:00	29.8	4.54	9.09	485,792
10/27/2016 19:20	10/27/2016 22:40	3.3	0.04	0.01	0.12	20.0	10/27/2016 19:15	10/28/2016 10:40	15.5	2.37	2.87	132,492
10/29/2016 9:05	10/29/2016 12:25	3.3	0.14	0.04	0.12	57.8	10/29/2016 9:00	10/30/2016 0:20	15.4	1.41	1.73	78,189
10/30/2016 13:55	11/3/2016 0:35	82.7	1.99	0.02	0.84	27.0	10/30/2016 13:50	11/3/2016 12:30	94.8	2.92	6.08	994,316
11/5/2016 6:00	11/6/2016 4:30	22.5	1.10	0.05	1.08	53.8	11/5/2016 5:55	11/6/2016 16:25	35.6	3.29	5.32	421,644
11/9/2016 5:55	11/9/2016 16:35	10.7	0.26	0.02	0.48	75.7	11/9/2016 5:55	11/10/2016 4:30	22.7	1.33	1.98	108,573
11/12/2016 2:55	11/12/2016 10:00	7.1	0.10	0.01	0.24	64.7	11/12/2016 2:55	11/12/2016 21:55	19.1	0.71	0.84	48,552
11/13/2016 8:25	11/14/2016 9:50	25.4	0.43	0.02	0.12	24.3	11/13/2016 8:25	11/14/2016 21:45	37.4	1.22	1.85	163,785
11/14/2016 23:55	11/16/2016 9:05	33.2	1.35	0.04	0.84	18.5	11/14/2016 23:55	11/16/2016 18:40	42.8	4.16	8.11	641,622
11/16/2016 18:40	11/17/2016 6:25	11.8	0.08	0.01	0.36	19.9	11/16/2016 18:40	11/17/2016 18:20	23.8	2.35	3.04	200,703
11/19/2016 7:55	11/19/2016 13:20	5.4	0.04	0.01	0.12	61.2	11/19/2016 7:50	11/19/2016 23:00	15.3	1.08	1.18	59,166
11/19/2016 23:05	11/20/2016 12:25	13.3	0.14	0.01	0.12	15.2	11/19/2016 23:00	11/21/2016 0:20	25.4	1.08	1.28	98,676
11/22/2016 16:25	11/23/2016 1:45	9.3	0.50	0.05	0.24	54.9	11/22/2016 16:25	11/23/2016 13:40	21.3	1.96	3.59	150,447
11/23/2016 20:35	11/24/2016 23:40	27.1	1.27	0.05	0.24	20.0	11/23/2016 20:35	11/25/2016 11:35	39.1	4.03	9.09	567,146
11/25/2016 21:45	11/27/2016 8:20	34.6	0.58	0.02	0.12	22.2	11/25/2016 21:40	11/27/2016 13:15	39.7	3.18	4.40	453,714
11/27/2016 13:15	11/27/2016 20:30	7.3	0.31	0.04	0.24	13.6	11/27/2016 13:15	11/28/2016 8:25	19.3	3.16	4.40	219,174
11/28/2016 16:50	11/29/2016 2:20	9.5	0.11	0.01	0.24	22.0	11/28/2016 16:50	11/29/2016 14:15	21.5	2.23	2.87	172,740
11/29/2016 23:45	11/30/2016 2:25	2.7	0.14	0.05	0.24	28.2	11/29/2016 23:45	11/30/2016 14:25	14.8	1.58	1.85	83,685
11/30/2016 15:15	11/30/2016 15:30	0.3	0.06	0.24	0.24	13.7	11/30/2016 15:10	12/1/2016 3:30	12.4	1.43	1.73	63,915
12/2/2016 5:45	12/3/2016 3:30	21.8	0.27	0.01	0.12	38.4	12/2/2016 5:45	12/3/2016 15:30	33.8	1.20	1.39	146,364
12/3/2016 15:30	12/5/2016 2:20	34.8	0.46	0.01	0.24	14.4	12/3/2016 15:30	12/5/2016 4:25	37.0	1.61	2.71	214,821
12/5/2016 4:30	12/5/2016 13:40	9.2	0.20	0.02	0.12	13.2	12/5/2016 4:25	12/6/2016 1:40	21.3	1.67	2.26	128,034
12/9/2016 10:55	12/10/2016 0:10	13.3	0.33	0.02	0.72	97.1	12/9/2016 10:50	12/10/2016 12:10	25.4	1.64	2.40	150,492
12/10/2016 12:10	12/10/2016 15:45	3.6	0.22	0.06	0.24	14.5	12/10/2016 12:10	12/11/2016 3:40	15.6	2.05	3.04	115,227
12/11/2016 9:20	12/11/2016 21:00	11.7	0.09	0.01	0.12	19.2	12/11/2016 9:20	12/12/2016 8:55	23.7	1.32	1.61	112,233
12/12/2016 10:30	12/12/2016 12:10	1.7	0.04	0.02	0.12	20.9	12/12/2016 10:25	12/13/2016 0:10	13.8	1.06	1.18	52,875
12/19/2016 3:35	12/20/2016 2:25	22.8	0.44	0.02	0.24	161.1	12/19/2016 3:30	12/20/2016 14:25	35.0	1.16	2.12	146,085
12/22/2016 18:45	12/24/2016 6:40	35.9	1.04	0.03	0.12	67.0	12/22/2016 18:45	12/24/2016 18:40	48.0	2.43	3.98	419,643
12/26/2016 16:30	12/26/2016 22:25	5.9	0.22	0.04	0.12	65.0	12/26/2016 16:25	12/27/2016 10:25	18.1	1.38	1.85	89,769
12/29/2016 13:00	12/30/2016 6:15	17.3	0.56	0.03	0.24	63.2	12/29/2016 12:55	12/30/2016 18:10	29.3	1.87	2.87	197,694
12/31/2016 11:30	1/1/2017 0:00	12.5	0.22	0.02	0.36	29.5	12/31/2016 11:25	1/1/2017 11:15	23.9	1.56	2.26	134,481
1/1/2017 11:20	1/1/2017 13:10	1.8	0.10	0.05	0.12	15.2	1/1/2017 11:15	1/2/2017 1:05	13.9	1.38	1.61	69,051
1/8/2017 11:10	1/9/2017 0:35	13.4	0.43	0.03	0.12	166.8	1/8/2017 11:10	1/9/2017 12:30	25.4	1.49	2.26	136,212
1/9/2017 16:05	1/9/2017 19:50	3.8	0.10	0.03	0.12	19.0	1/9/2017 16:05	1/10/2017 7:50	15.8	1.28	1.73	72,735
1/10/2017 8:25	1/10/2017 15:10	6.8	0.07	0.01	0.36	14.8	1/10/2017 8:25	1/11/2017 3:10	18.8	1.10	1.49	74,853
1/17/2017 4:20	1/19/2017 8:45	52.4	2.37	0.05	0.60	163.5	1/17/2017 4:15	1/19/2017 14:00	57.8	5.01	12.80	1,043,452

Table D-3. Summary Statistics for Individual Storm Events at the MONM Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
1/19/2017 14:05	1/19/2017 16:40	2.6	0.12	0.05	0.12	14.5	1/19/2017 14:00	1/20/2017 4:40	14.8	3.72	4.62	197,781
2/3/2017 5:40	2/6/2017 0:30	66.8	1.77	0.03	0.24	350.2	2/3/2017 5:40	2/6/2017 11:35	78.0	2.64	5.08	742,141
2/6/2017 11:40	2/6/2017 23:20	11.7	0.51	0.04	0.24	17.0	2/6/2017 11:35	2/7/2017 11:15	23.8	2.46	3.04	210,618
2/7/2017 11:30	2/7/2017 17:00	5.5	0.21	0.04	0.12	13.7	2/7/2017 11:30	2/8/2017 5:00	17.6	1.98	2.26	125,430
2/8/2017 9:10	2/10/2017 8:00	46.8	2.46	0.05	0.84	16.9	2/8/2017 9:10	2/10/2017 20:00	58.9	9.55	37.76	2,025,417
2/14/2017 21:15	2/16/2017 6:15	33.0	2.79	0.08	0.96	116.1	2/14/2017 21:10	2/16/2017 18:10	45.1	10.03	26.78	1,628,428
2/18/2017 9:00	2/21/2017 9:00	72.0	0.61	0.01	0.12	52.2	2/18/2017 8:55	2/21/2017 21:00	84.2	2.51	3.40	759,021
2/21/2017 21:05	2/22/2017 3:00	5.9	0.07	0.01	0.12	28.5	2/21/2017 21:00	2/22/2017 14:55	18.0	1.88	1.98	121,752
2/22/2017 15:05	2/22/2017 15:45	0.7	0.11	0.17	0.24	16.8	2/22/2017 15:05	2/23/2017 3:40	12.7	2.25	2.55	102,738
2/23/2017 12:45	2/23/2017 14:10	1.4	0.06	0.04	0.12	21.2	2/23/2017 12:40	2/24/2017 2:10	13.6	1.78	2.26	87,249
2/25/2017 23:00	2/26/2017 10:20	11.3	0.52	0.05	0.24	58.1	2/25/2017 23:00	2/26/2017 22:15	23.3	2.37	3.40	199,341
2/27/2017 4:50	2/28/2017 10:00	29.2	0.55	0.02	0.24	20.1	2/27/2017 4:50	2/28/2017 22:00	41.3	2.61	3.78	387,993
3/2/2017 3:45	3/2/2017 19:50	16.1	0.09	0.01	0.12	42.4	3/2/2017 3:40	3/3/2017 7:50	28.3	1.37	1.61	139,431
3/3/2017 8:15	3/3/2017 21:10	12.9	0.52	0.04	0.36	14.8	3/3/2017 8:10	3/4/2017 9:10	25.1	2.45	3.78	221,046
3/4/2017 21:25	3/5/2017 3:20	5.9	0.20	0.03	0.36	25.0	3/4/2017 21:20	3/5/2017 15:20	18.1	2.08	2.71	135,294
3/7/2017 2:55	3/7/2017 17:40	14.8	0.41	0.03	0.12	47.9	3/7/2017 2:55	3/8/2017 5:35	26.8	1.91	3.04	183,597
3/8/2017 18:35	3/10/2017 3:20	32.8	0.57	0.02	0.24	27.2	3/8/2017 18:30	3/10/2017 15:20	44.9	2.18	4.19	352,287
3/11/2017 9:35	3/11/2017 13:30	3.9	0.24	0.06	0.12	38.7	3/11/2017 9:30	3/12/2017 1:25	16.0	2.09	2.87	120,303
3/13/2017 5:40	3/15/2017 19:15	61.6	1.55	0.03	0.24	41.2	3/13/2017 5:35	3/16/2017 7:15	73.8	3.44	7.79	912,967
3/17/2017 13:20	3/18/2017 12:25	23.1	1.37	0.06	0.24	48.2	3/17/2017 13:20	3/19/2017 0:20	35.1	5.70	11.45	720,490
3/21/2017 4:10	3/22/2017 4:55	24.8	0.21	0.01	0.12	64.7	3/21/2017 4:05	3/22/2017 16:50	36.8	2.11	2.71	279,653
3/23/2017 21:50	3/24/2017 20:50	23.0	0.76	0.03	0.60	49.3	3/23/2017 21:45	3/25/2017 8:45	35.1	2.66	4.62	335,559
3/26/2017 10:00	3/27/2017 6:30	20.5	0.27	0.01	0.12	38.9	3/26/2017 9:55	3/27/2017 18:30	32.7	1.94	2.71	228,683
3/27/2017 22:55	3/28/2017 13:40	14.8	0.21	0.01	0.12	24.2	3/27/2017 22:55	3/28/2017 23:45	24.9	1.83	2.40	163,974
3/28/2017 23:50	3/30/2017 4:15	28.4	0.92	0.03	0.24	19.4	3/28/2017 23:45	3/30/2017 16:15	40.6	3.46	5.57	506,016
4/1/2017 6:55	4/2/2017 9:30	26.6	0.31	0.01	0.36	51.1	4/1/2017 6:55	4/2/2017 19:25	36.6	1.87	2.40	246,584
4/2/2017 19:25	4/2/2017 20:25	1.0	0.03	0.03	0.12	16.8	4/2/2017 19:25	4/3/2017 8:25	13.1	1.50	1.61	70,749
4/4/2017 22:25	4/7/2017 2:25	52.0	0.75	0.01	0.24	60.9	4/4/2017 22:25	4/7/2017 2:35	52.3	2.20	3.22	413,943
4/7/2017 2:35	4/7/2017 9:00	6.4	0.11	0.02	0.12	12.4	4/7/2017 2:35	4/7/2017 19:15	16.8	1.99	2.40	120,294
4/7/2017 19:15	4/8/2017 1:10	5.9	0.16	0.03	0.24	15.2	4/7/2017 19:15	4/8/2017 13:05	17.9	1.94	2.40	125,409
4/10/2017 2:25	4/10/2017 12:40	10.3	0.31	0.03	0.36	50.6	4/10/2017 2:25	4/11/2017 0:40	22.3	2.00	3.22	160,473
4/12/2017 1:40	4/13/2017 13:10	35.5	1.12	0.03	0.24	45.2	4/12/2017 1:40	4/14/2017 1:05	47.5	3.31	5.32	566,532
4/17/2017 18:15	4/18/2017 19:35	25.3	0.28	0.01	0.72	103.1	4/17/2017 18:10	4/19/2017 7:30	37.4	1.46	2.12	196,281
4/19/2017 8:55	4/20/2017 1:40	16.8	0.59	0.04	0.36	13.4	4/19/2017 8:55	4/20/2017 13:40	28.8	2.73	5.57	283,749
4/22/2017 14:30	4/22/2017 15:05	0.6	0.06	0.10	0.12	62.2	4/22/2017 14:25	4/23/2017 3:00	12.7	1.28	1.39	58,314
4/23/2017 12:45	4/24/2017 5:55	17.2	0.35	0.02	0.36	21.9	4/23/2017 12:40	4/24/2017 17:55	29.3	1.75	2.40	184,836
4/26/2017 3:35	4/27/2017 0:00	20.4	0.83	0.04	0.48	53.1	4/26/2017 3:30	4/27/2017 12:00	32.6	2.73	7.49	320,055
4/28/2017 4:45	4/28/2017 11:35	6.8	0.13	0.02	0.48	29.1	4/28/2017 4:40	4/28/2017 23:35	19.0	1.86	2.26	127,026
4/29/2017 17:55	4/30/2017 15:50	21.9	0.31	0.01	0.36	36.8	4/29/2017 17:55	5/1/2017 3:45	33.9	1.62	2.12	197,850
5/1/2017 9:15	5/1/2017 14:40	5.4	0.11	0.02	0.12	22.3	5/1/2017 9:10	5/2/2017 2:35	17.5	1.48	1.73	93,021
5/2/2017 21:00	5/3/2017 8:55	11.9	0.31	0.03	0.36	33.3	5/2/2017 20:55	5/3/2017 20:55	24.1	1.79	2.71	155,448
5/4/2017 16:35	5/5/2017 6:00	13.4	1.23	0.09	1.44	35.6	5/4/2017 16:30	5/5/2017 17:55	25.5	5.17	14.49	474,272
5/11/2017 3:45	5/11/2017 19:30	15.8	0.21	0.01	0.24	143.5	5/11/2017 3:40	5/12/2017 7:25	27.8	0.92	1.18	92,544
5/12/2017 11:25	5/12/2017 23:35	12.2	0.04	0.00	0.12	16.4	5/12/2017 11:25	5/13/2017 11:35	24.3	0.73	0.84	63,882
5/13/2017 20:50	5/13/2017 23:10	2.3	0.12	0.05	0.24	49.8	5/13/2017 20:45	5/14/2017 11:10	14.5	0.94	1.18	49,128
5/15/2017 14:55	5/16/2017 22:35	31.7	1.18	0.04	0.48	40.5	5/15/2017 14:55	5/17/2017 10:30	43.7	2.67	5.82	418,968
5/31/2017 23:05	6/1/2017 8:35	9.5	0.11	0.01	0.48	361.1	5/31/2017 23:00	6/1/2017 20:35	21.7	0.53	0.70	41,601

Table D-3. Summary Statistics for Individual Storm Events at the MONM Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
6/8/2017 1:35	6/8/2017 11:50	10.3	0.27	0.03	0.12	161.1	6/8/2017 1:30	6/8/2017 23:45	22.3	0.53	0.70	42,786
6/15/2017 11:00	6/15/2017 23:15	12.3	0.57	0.05	0.24	169.6	6/15/2017 11:00	6/16/2017 11:10	24.3	1.18	2.26	103,083
6/18/2017 0:55	6/18/2017 12:10	11.3	0.12	0.01	0.12	50.5	6/18/2017 0:55	6/19/2017 0:10	23.3	0.46	0.57	38,388

Table D-4. Summary Statistics for Individual Storm Events at the MONMN Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/1/2016 13:45	10/1/2016 18:25	4.7	0.040	0.01	0.12	0.0	10/1/2016 13:40	10/2/2016 6:20	16.8	0.03	0.04	1,632
10/3/2016 22:10	10/4/2016 21:45	23.6	0.140	0.01	0.48	56.4	10/3/2016 22:05	10/5/2016 9:40	35.7	0.03	0.06	4,434
10/6/2016 21:35	10/7/2016 5:05	7.5	0.250	0.03	0.36	56.0	10/6/2016 21:30	10/7/2016 17:00	19.6	0.08	0.14	5,742
10/7/2016 22:45	10/9/2016 2:25	27.7	1.010	0.04	1.56	21.2	10/7/2016 22:40	10/9/2016 14:25	39.8	0.32	1.12	45,474
10/9/2016 18:50	10/9/2016 22:00	3.2	0.460	0.15	1.20	18.3	10/9/2016 18:45	10/10/2016 10:00	15.3	0.64	1.12	35,208
10/13/2016 2:00	10/17/2016 11:55	105.9	3.930	0.04	0.60	76.5	10/13/2016 2:00	10/17/2016 23:55	118.0	1.25	7.14	529,496
10/18/2016 0:40	10/18/2016 6:15	5.6	0.130	0.02	0.12	18.8	10/18/2016 0:40	10/18/2016 18:10	17.6	0.71	0.76	44,853
10/19/2016 20:55	10/20/2016 11:15	14.3	1.490	0.10	0.96	38.9	10/19/2016 20:55	10/20/2016 23:10	26.3	1.96	7.87	186,090
10/21/2016 18:10	10/22/2016 0:55	6.8	0.140	0.02	1.20	31.2	10/21/2016 18:10	10/22/2016 12:55	18.8	0.81	0.93	54,750
10/23/2016 0:00	10/23/2016 4:15	4.3	0.190	0.04	0.24	29.7	10/22/2016 23:55	10/23/2016 16:15	16.4	0.64	0.76	38,013
10/24/2016 17:30	10/24/2016 20:50	3.3	0.190	0.06	0.36	37.4	10/24/2016 17:25	10/25/2016 8:50	15.5	0.62	0.76	34,317
10/26/2016 6:20	10/27/2016 0:00	17.7	1.600	0.09	0.60	35.2	10/26/2016 6:20	10/27/2016 12:00	29.8	2.18	4.49	233,724
10/27/2016 19:20	10/27/2016 22:40	3.3	0.040	0.01	0.12	20.0	10/27/2016 19:15	10/28/2016 10:40	15.5	1.10	1.33	61,308
10/29/2016 9:05	10/29/2016 12:25	3.3	0.140	0.04	0.12	57.8	10/29/2016 9:00	10/30/2016 0:20	15.4	0.76	0.87	42,027
10/30/2016 13:55	11/3/2016 0:35	82.7	1.990	0.02	0.84	27.0	10/30/2016 13:50	11/3/2016 12:30	94.8	1.44	3.11	492,002
11/5/2016 6:00	11/6/2016 4:30	22.5	1.100	0.05	1.08	53.8	11/5/2016 5:55	11/6/2016 16:25	35.6	1.33	1.85	170,901
11/9/2016 5:55	11/9/2016 16:35	10.7	0.260	0.02	0.48	75.7	11/9/2016 5:55	11/10/2016 4:30	22.7	0.65	0.93	52,986
11/12/2016 2:55	11/12/2016 10:00	7.1	0.100	0.01	0.24	64.7	11/12/2016 2:55	11/12/2016 21:55	19.1	0.30	0.35	20,310
11/13/2016 8:25	11/14/2016 9:50	25.4	0.430	0.02	0.12	24.3	11/13/2016 8:25	11/14/2016 21:45	37.4	0.58	0.93	78,018
11/14/2016 23:55	11/16/2016 9:05	33.2	1.350	0.04	0.84	18.5	11/14/2016 23:55	11/16/2016 18:40	42.8	1.58	2.85	244,371
11/16/2016 18:40	11/17/2016 6:25	11.8	0.080	0.01	0.36	19.9	11/16/2016 18:40	11/17/2016 18:20	23.8	1.06	1.26	90,279
11/19/2016 7:55	11/19/2016 13:20	5.4	0.040	0.01	0.12	61.2	11/19/2016 7:50	11/19/2016 23:00	15.3	0.52	0.57	28,653
11/19/2016 23:05	11/20/2016 12:25	13.3	0.140	0.01	0.12	15.2	11/19/2016 23:00	11/21/2016 0:20	25.4	0.48	0.61	44,262
11/22/2016 16:25	11/23/2016 1:45	9.3	0.500	0.05	0.24	54.9	11/22/2016 16:25	11/23/2016 13:40	21.3	0.76	1.26	58,380
11/23/2016 20:35	11/24/2016 23:40	27.1	1.270	0.05	0.24	20.0	11/23/2016 20:35	11/25/2016 11:35	39.1	1.46	2.72	205,551
11/25/2016 21:45	11/27/2016 8:20	34.6	0.580	0.02	0.12	22.2	11/25/2016 21:40	11/27/2016 13:15	39.7	1.13	1.41	160,695
11/27/2016 13:15	11/27/2016 20:30	7.3	0.310	0.04	0.24	13.6	11/27/2016 13:15	11/28/2016 8:25	19.3	1.11	1.41	77,190
11/28/2016 16:50	11/29/2016 2:20	9.5	0.110	0.01	0.24	22.0	11/28/2016 16:50	11/29/2016 14:15	21.5	0.83	0.93	64,254
11/29/2016 23:45	11/30/2016 2:25	2.7	0.140	0.05	0.24	28.2	11/29/2016 23:45	11/30/2016 14:25	14.8	0.73	0.81	38,616
11/30/2016 15:15	11/30/2016 15:30	0.3	0.060	0.24	0.24	13.7	11/30/2016 15:10	12/1/2016 3:30	12.4	0.83	1.05	37,047
12/2/2016 5:45	12/3/2016 3:30	21.8	0.270	0.01	0.12	38.4	12/2/2016 5:45	12/3/2016 15:30	33.8	0.63	0.71	76,749
12/3/2016 15:30	12/5/2016 2:20	34.8	0.460	0.01	0.24	14.4	12/3/2016 15:30	12/5/2016 4:25	37.0	0.78	1.12	104,244
12/5/2016 4:30	12/5/2016 13:40	9.2	0.200	0.02	0.12	13.2	12/5/2016 4:25	12/6/2016 1:40	21.3	0.83	0.99	63,609
12/9/2016 10:55	12/10/2016 0:10	13.3	0.330	0.02	0.72	97.1	12/9/2016 10:50	12/10/2016 12:10	25.4	0.59	0.81	53,994
12/10/2016 12:10	12/10/2016 15:45	3.6	0.220	0.06	0.24	14.5	12/10/2016 12:10	12/11/2016 3:40	15.6	0.84	1.19	46,998
12/11/2016 9:20	12/11/2016 21:00	11.7	0.090	0.01	0.12	19.2	12/11/2016 9:20	12/12/2016 8:55	23.7	0.61	0.71	51,597
12/12/2016 10:30	12/12/2016 12:10	1.7	0.040	0.02	0.12	20.9	12/12/2016 10:25	12/13/2016 0:10	13.8	0.48	0.53	23,790
12/19/2016 3:35	12/20/2016 2:25	22.8	0.440	0.02	0.24	161.1	12/19/2016 3:30	12/20/2016 14:25	35.0	0.44	0.76	54,855
12/22/2016 18:45	12/24/2016 6:40	35.9	1.040	0.03	0.12	67.0	12/22/2016 18:45	12/24/2016 18:40	48.0	0.88	1.26	151,902
12/26/2016 16:30	12/26/2016 22:25	5.9	0.220	0.04	0.12	65.0	12/26/2016 16:25	12/27/2016 10:25	18.1	0.55	0.71	35,637
12/29/2016 13:00	12/30/2016 6:15	17.3	0.560	0.03	0.24	63.2	12/29/2016 12:55	12/30/2016 18:10	29.3	0.65	0.87	68,361
12/31/2016 11:30	1/1/2017 0:00	12.5	0.220	0.02	0.36	29.5	12/31/2016 11:25	1/1/2017 11:15	23.9	0.59	0.81	51,180
1/1/2017 11:20	1/1/2017 13:10	1.8	0.100	0.05	0.12	15.2	1/1/2017 11:15	1/2/2017 1:05	13.9	0.52	0.57	26,157
1/8/2017 11:10	1/9/2017 0:35	13.4	0.430	0.03	0.12	166.8	1/8/2017 11:10	1/9/2017 12:30	25.4	0.41	0.61	37,524
1/9/2017 16:05	1/9/2017 19:50	3.8	0.100	0.03	0.12	19.0	1/9/2017 16:05	1/10/2017 7:50	15.8	0.33	0.45	19,029
1/10/2017 8:25	1/10/2017 15:10	6.8	0.070	0.01	0.36	14.8	1/10/2017 8:25	1/11/2017 3:10	18.8	0.29	0.35	19,947
1/17/2017 4:20	1/19/2017 8:45	52.4	2.370	0.05	0.60	163.5	1/17/2017 4:15	1/19/2017 14:00	57.8	2.37	6.59	493,801
1/19/2017 14:05	1/19/2017 16:40	2.6	0.120	0.05	0.12	14.5	1/19/2017 14:00	1/20/2017 4:40	14.8	1.74	2.07	92,427
2/3/2017 5:40	2/6/2017 0:30	66.8	1.770	0.03	0.24	350.2	2/3/2017 5:40	2/6/2017 11:35	78.0	0.98	1.80	275,375

Table D-4. Summary Statistics for Individual Storm Events at the MONMN Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
2/6/2017 11:40	2/6/2017 23:20	11.7	0.510	0.04	0.24	17.0	2/6/2017 11:35	2/7/2017 11:15	23.8	1.02	1.16	87,342
2/7/2017 11:30	2/7/2017 17:00	5.5	0.210	0.04	0.12	13.7	2/7/2017 11:30	2/8/2017 5:00	17.6	0.80	0.91	50,658
2/8/2017 9:10	2/10/2017 8:00	46.8	2.460	0.05	0.84	16.9	2/8/2017 9:10	2/10/2017 20:00	58.9	4.40	16.67	932,828
2/14/2017 21:15	2/16/2017 6:15	33.0	2.790	0.08	0.96	116.1	2/14/2017 21:10	2/16/2017 18:10	45.1	5.04	12.96	818,737
2/18/2017 9:00	2/21/2017 9:00	72.0	0.610	0.01	0.12	52.2	2/18/2017 8:55	2/21/2017 21:00	84.2	0.92	1.35	279,541
2/21/2017 21:05	2/22/2017 3:00	5.9	0.070	0.01	0.12	28.5	2/21/2017 21:00	2/22/2017 14:55	18.0	0.63	0.73	40,593
2/22/2017 15:05	2/22/2017 15:45	0.7	0.110	0.17	0.24	16.8	2/22/2017 15:05	2/23/2017 3:40	12.7	0.64	0.80	29,064
2/23/2017 12:45	2/23/2017 14:10	1.4	0.060	0.04	0.12	21.2	2/23/2017 12:40	2/24/2017 2:10	13.6	0.52	0.59	25,632
2/25/2017 23:00	2/26/2017 10:20	11.3	0.520	0.05	0.24	58.1	2/25/2017 23:00	2/26/2017 22:15	23.3	0.88	1.47	74,235
2/27/2017 4:50	2/28/2017 10:00	29.2	0.550	0.02	0.24	20.1	2/27/2017 4:50	2/28/2017 22:00	41.3	1.04	1.85	154,239
3/2/2017 3:45	3/2/2017 19:50	16.1	0.090	0.01	0.12	42.4	3/2/2017 3:40	3/3/2017 7:50	28.3	0.43	0.48	43,896
3/3/2017 8:15	3/3/2017 21:10	12.9	0.520	0.04	0.36	14.8	3/3/2017 8:10	3/4/2017 9:10	25.1	1.00	1.71	90,219
3/4/2017 21:25	3/5/2017 3:20	5.9	0.200	0.03	0.36	25.0	3/4/2017 21:20	3/5/2017 15:20	18.1	0.85	1.15	55,377
3/7/2017 2:55	3/7/2017 17:40	14.8	0.410	0.03	0.12	47.9	3/7/2017 2:55	3/8/2017 5:35	26.8	0.78	1.47	74,790
3/8/2017 18:35	3/10/2017 3:20	32.8	0.570	0.02	0.24	27.2	3/8/2017 18:30	3/10/2017 15:20	44.9	0.95	2.14	152,829
3/11/2017 9:35	3/11/2017 13:30	3.9	0.240	0.06	0.12	38.7	3/11/2017 9:30	3/12/2017 1:25	16.0	0.94	1.59	53,976
3/13/2017 5:40	3/15/2017 19:15	61.6	1.550	0.03	0.24	41.2	3/13/2017 5:35	3/16/2017 7:15	73.8	1.48	3.50	393,986
3/17/2017 13:20	3/18/2017 12:25	23.1	1.370	0.06	0.24	48.2	3/17/2017 13:20	3/19/2017 0:20	35.1	2.91	8.30	366,904
3/21/2017 4:10	3/22/2017 4:55	24.8	0.210	0.01	0.12	64.7	3/21/2017 4:05	3/22/2017 16:50	36.8	0.55	0.80	73,203
3/23/2017 21:50	3/24/2017 20:50	23.0	0.760	0.03	0.60	49.3	3/23/2017 21:45	3/25/2017 8:45	35.1	0.85	2.14	107,946
3/26/2017 10:00	3/27/2017 6:30	20.5	0.270	0.01	0.12	38.9	3/26/2017 9:55	3/27/2017 18:30	32.7	0.48	0.80	56,349
3/27/2017 22:55	3/28/2017 13:40	14.8	0.210	0.01	0.12	24.2	3/27/2017 22:55	3/28/2017 23:45	24.9	0.43	0.66	38,583
3/28/2017 23:50	3/30/2017 4:15	28.4	0.920	0.03	0.24	19.4	3/28/2017 23:45	3/30/2017 16:15	40.6	1.34	2.46	195,455
4/1/2017 6:55	4/2/2017 9:30	26.6	0.310	0.01	0.36	51.1	4/1/2017 6:55	4/2/2017 19:25	36.6	0.43	0.66	57,132
4/2/2017 19:25	4/2/2017 20:25	1.0	0.030	0.03	0.12	16.8	4/2/2017 19:25	4/3/2017 8:25	13.1	0.31	0.34	14,382
4/4/2017 22:25	4/7/2017 2:25	52.0	0.750	0.01	0.24	60.9	4/4/2017 22:25	4/7/2017 2:35	52.3	0.52	0.80	98,214
4/7/2017 2:35	4/7/2017 9:00	6.4	0.110	0.02	0.12	12.4	4/7/2017 2:35	4/7/2017 19:15	16.8	0.48	0.66	29,193
4/7/2017 19:15	4/8/2017 1:10	5.9	0.160	0.03	0.24	15.2	4/7/2017 19:15	4/8/2017 13:05	17.9	0.41	0.53	26,655
4/10/2017 2:25	4/10/2017 12:40	10.3	0.310	0.03	0.36	50.6	4/10/2017 2:25	4/11/2017 0:40	22.3	0.40	0.96	32,379
4/12/2017 1:40	4/13/2017 13:10	35.5	1.120	0.03	0.24	45.2	4/12/2017 1:40	4/14/2017 1:05	47.5	1.09	1.99	185,706
4/17/2017 18:15	4/18/2017 19:35	25.3	0.280	0.01	0.72	103.1	4/17/2017 18:10	4/19/2017 7:30	37.4	0.25	0.59	33,420
4/19/2017 8:55	4/20/2017 1:40	16.8	0.590	0.04	0.36	13.4	4/19/2017 8:55	4/20/2017 13:40	28.8	0.76	2.14	78,546
4/22/2017 14:30	4/22/2017 15:05	0.6	0.060	0.10	0.12	62.2	4/22/2017 14:25	4/23/2017 3:00	12.7	0.21	0.26	9,786
4/23/2017 12:45	4/24/2017 5:55	17.2	0.350	0.02	0.36	21.9	4/23/2017 12:40	4/24/2017 17:55	29.3	0.31	0.48	32,991
4/26/2017 3:35	4/27/2017 0:00	20.4	0.830	0.04	0.48	53.1	4/26/2017 3:30	4/27/2017 12:00	32.6	0.74	3.00	86,763
4/28/2017 4:45	4/28/2017 11:35	6.8	0.130	0.02	0.48	29.1	4/28/2017 4:40	4/28/2017 23:35	19.0	0.42	0.53	28,629
4/29/2017 17:55	4/30/2017 15:50	21.9	0.310	0.01	0.36	36.8	4/29/2017 17:55	5/1/2017 3:45	33.9	0.29	0.38	34,917
5/1/2017 9:15	5/1/2017 14:40	5.4	0.110	0.02	0.12	22.3	5/1/2017 9:10	5/2/2017 2:35	17.5	0.26	0.34	16,305
5/2/2017 21:00	5/3/2017 8:55	11.9	0.310	0.03	0.36	33.3	5/2/2017 20:55	5/3/2017 20:55	24.1	0.37	0.73	32,361
5/4/2017 16:35	5/5/2017 6:00	13.4	1.230	0.09	1.44	35.6	5/4/2017 16:30	5/5/2017 17:55	25.5	1.72	7.12	158,229
5/11/2017 3:45	5/11/2017 19:30	15.8	0.210	0.01	0.24	143.5	5/11/2017 3:40	5/12/2017 7:25	27.8	0.18	0.26	18,348
5/12/2017 11:25	5/12/2017 23:35	12.2	0.040	0.00	0.12	16.4	5/12/2017 11:25	5/13/2017 11:35	24.3	0.14	0.15	12,063
5/13/2017 20:50	5/13/2017 23:10	2.3	0.120	0.05	0.24	49.8	5/13/2017 20:45	5/14/2017 11:10	14.5	0.23	0.34	11,985
5/15/2017 14:55	5/16/2017 22:35	31.7	1.180	0.04	0.48	40.5	5/15/2017 14:55	5/17/2017 10:30	43.7	1.04	2.63	164,238
5/31/2017 23:05	6/1/2017 8:35	9.5	0.110	0.01	0.48	361.1	5/31/2017 23:00	6/1/2017 20:35	21.7	0.07	0.09	5,070
6/8/2017 1:35	6/8/2017 11:50	10.3	0.270	0.03	0.12	161.1	6/8/2017 1:30	6/8/2017 23:45	22.3	0.07	0.11	5,469
6/15/2017 11:00	6/15/2017 23:15	12.3	0.570	0.05	0.24	169.6	6/15/2017 11:00	6/16/2017 11:10	24.3	0.66	1.59	57,477
6/18/2017 0:55	6/18/2017 12:10	11.3	0.120	0.01	0.12	50.5	6/18/2017 0:55	6/19/2017 0:10	23.3	0.25	0.30	20,670

Table D-5. Summary Statistics for Individual Storm Events at the MONMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/1/2016 13:45	10/1/2016 18:25	4.7	0.04	0.01	0.12	0.0	10/1/2016 13:40	10/2/2016 6:20	16.8	0.07	0.08	3,966
10/3/2016 22:10	10/4/2016 21:45	23.6	0.14	0.01	0.48	56.4	10/3/2016 22:05	10/5/2016 9:40	35.7	0.05	0.06	6,888
10/6/2016 21:35	10/7/2016 5:05	7.5	0.25	0.03	0.36	56.0	10/6/2016 21:30	10/7/2016 17:00	19.6	0.08	0.21	5,988
10/7/2016 22:45	10/9/2016 2:25	27.7	1.01	0.04	1.56	21.2	10/7/2016 22:40	10/9/2016 14:25	39.8	0.13	0.65	18,438
10/9/2016 18:50	10/9/2016 22:00	3.2	0.46	0.15	1.20	18.3	10/9/2016 18:45	10/10/2016 10:00	15.3	0.18	0.44	10,101
10/13/2016 2:00	10/17/2016 11:55	105.9	3.93	0.04	0.60	76.5	10/13/2016 2:00	10/17/2016 23:55	118.0	0.38	1.75	161,075
10/18/2016 0:40	10/18/2016 6:15	5.6	0.13	0.02	0.12	18.8	10/18/2016 0:40	10/18/2016 18:10	17.6	0.22	0.46	13,620
10/19/2016 20:55	10/20/2016 11:15	14.3	1.49	0.10	0.96	38.9	10/19/2016 20:55	10/20/2016 23:10	26.3	0.78	2.28	73,854
10/21/2016 18:10	10/22/2016 0:55	6.8	0.14	0.02	1.20	31.2	10/21/2016 18:10	10/22/2016 12:55	18.8	0.14	0.24	9,759
10/23/2016 0:00	10/23/2016 4:15	4.3	0.19	0.04	0.24	29.7	10/22/2016 23:55	10/23/2016 16:15	16.4	0.12	0.19	6,948
10/24/2016 17:30	10/24/2016 20:50	3.3	0.19	0.06	0.36	37.4	10/24/2016 17:25	10/25/2016 8:50	15.5	0.09	0.15	4,836
10/26/2016 6:20	10/27/2016 0:00	17.7	1.60	0.09	0.60	35.2	10/26/2016 6:20	10/27/2016 12:00	29.8	0.54	1.17	58,170
10/27/2016 19:20	10/27/2016 22:40	3.3	0.04	0.01	0.12	20.0	10/27/2016 19:15	10/28/2016 10:40	15.5	0.15	0.19	8,505
10/29/2016 9:05	10/29/2016 12:25	3.3	0.14	0.04	0.12	57.8	10/29/2016 9:00	10/30/2016 0:20	15.4	0.10	0.15	5,451
10/30/2016 13:55	11/3/2016 0:35	82.7	1.99	0.02	0.84	27.0	10/30/2016 13:50	11/3/2016 12:30	94.8	0.32	1.05	108,675
11/5/2016 6:00	11/6/2016 4:30	22.5	1.10	0.05	1.08	53.8	11/5/2016 5:55	11/6/2016 16:25	35.6	0.36	0.68	45,546
11/9/2016 5:55	11/9/2016 16:35	10.7	0.26	0.02	0.48	75.7	11/9/2016 5:55	11/10/2016 4:30	22.7	0.11	0.24	9,132
11/12/2016 2:55	11/12/2016 10:00	7.1	0.10	0.01	0.24	64.7	11/12/2016 2:55	11/12/2016 21:55	19.1	0.07	0.08	4,497
11/13/2016 8:25	11/14/2016 9:50	25.4	0.43	0.02	0.12	24.3	11/13/2016 8:25	11/14/2016 21:45	37.4	0.14	0.35	18,939
11/14/2016 23:55	11/16/2016 9:05	33.2	1.35	0.04	0.84	18.5	11/14/2016 23:55	11/16/2016 18:40	42.8	0.46	1.25	70,929
11/16/2016 18:40	11/17/2016 6:25	11.8	0.08	0.01	0.36	19.9	11/16/2016 18:40	11/17/2016 18:20	23.8	0.15	0.22	12,939
11/19/2016 7:55	11/19/2016 13:20	5.4	0.04	0.01	0.12	61.2	11/19/2016 7:50	11/19/2016 23:00	15.3	0.07	0.09	4,062
11/19/2016 23:05	11/20/2016 12:25	13.3	0.14	0.01	0.12	15.2	11/19/2016 23:00	11/21/2016 0:20	25.4	0.08	0.10	7,179
11/22/2016 16:25	11/23/2016 1:45	9.3	0.50	0.05	0.24	54.9	11/22/2016 16:25	11/23/2016 13:40	21.3	0.25	0.59	18,822
11/23/2016 20:35	11/24/2016 23:40	27.1	1.27	0.05	0.24	20.0	11/23/2016 20:35	11/25/2016 11:35	39.1	0.54	1.29	75,420
11/25/2016 21:45	11/27/2016 8:20	34.6	0.58	0.02	0.12	22.2	11/25/2016 21:40	11/27/2016 13:15	39.7	0.25	0.42	36,237
11/27/2016 13:15	11/27/2016 20:30	7.3	0.31	0.04	0.24	13.6	11/27/2016 13:15	11/28/2016 8:25	19.3	0.25	0.44	17,469
11/28/2016 16:50	11/29/2016 2:20	9.5	0.11	0.01	0.24	22.0	11/28/2016 16:50	11/29/2016 14:15	21.5	0.21	0.44	16,236
11/29/2016 23:45	11/30/2016 2:25	2.7	0.14	0.05	0.24	28.2	11/29/2016 23:45	11/30/2016 14:25	14.8	0.13	0.18	6,735
11/30/2016 15:15	11/30/2016 15:30	0.3	0.06	0.24	0.24	13.7	11/30/2016 15:10	12/1/2016 3:30	12.4	0.11	0.14	4,764
12/2/2016 5:45	12/3/2016 3:30	21.8	0.27	0.01	0.12	38.4	12/2/2016 5:45	12/3/2016 15:30	33.8	0.11	0.15	13,008
12/3/2016 15:30	12/5/2016 2:20	34.8	0.46	0.01	0.24	14.4	12/3/2016 15:30	12/5/2016 4:25	37.0	0.16	0.33	20,712
12/5/2016 4:30	12/5/2016 13:40	9.2	0.20	0.02	0.12	13.2	12/5/2016 4:25	12/6/2016 1:40	21.3	0.19	0.42	14,475
12/9/2016 10:55	12/10/2016 0:10	13.3	0.33	0.02	0.72	97.1	12/9/2016 10:50	12/10/2016 12:10	25.4	0.32	0.65	29,604
12/10/2016 12:10	12/10/2016 15:45	3.6	0.22	0.06	0.24	14.5	12/10/2016 12:10	12/11/2016 3:40	15.6	0.29	0.59	16,230
12/11/2016 9:20	12/11/2016 21:00	11.7	0.09	0.01	0.12	19.2	12/11/2016 9:20	12/12/2016 8:55	23.7	0.13	0.29	11,418
12/12/2016 10:30	12/12/2016 12:10	1.7	0.04	0.02	0.12	20.9	12/12/2016 10:25	12/13/2016 0:10	13.8	0.12	0.21	6,072
12/19/2016 3:35	12/20/2016 2:25	22.8	0.44	0.02	0.24	161.1	12/19/2016 3:30	12/20/2016 14:25	35.0	0.21	0.59	25,887
12/22/2016 18:45	12/24/2016 6:40	35.9	1.04	0.03	0.12	67.0	12/22/2016 18:45	12/24/2016 18:40	48.0	0.26	0.49	44,388
12/26/2016 16:30	12/26/2016 22:25	5.9	0.22	0.04	0.12	65.0	12/26/2016 16:25	12/27/2016 10:25	18.1	0.12	0.22	8,040
12/29/2016 13:00	12/30/2016 6:15	17.3	0.56	0.03	0.24	63.2	12/29/2016 12:55	12/30/2016 18:10	29.3	0.27	0.77	29,028
12/31/2016 11:30	1/1/2017 0:00	12.5	0.22	0.02	0.36	29.5	12/31/2016 11:25	1/1/2017 11:15	23.9	0.15	0.27	12,840
1/1/2017 11:20	1/1/2017 13:10	1.8	0.10	0.05	0.12	15.2	1/1/2017 11:15	1/2/2017 1:05	13.9	0.11	0.14	5,715
1/8/2017 11:10	1/9/2017 0:35	13.4	0.43	0.03	0.12	166.8	1/8/2017 11:10	1/9/2017 12:30	25.4	0.19	0.29	17,265
1/9/2017 16:05	1/9/2017 19:50	3.8	0.10	0.03	0.12	19.0	1/9/2017 16:05	1/10/2017 7:50	15.8	0.21	0.49	12,096

Table D-5. Summary Statistics for Individual Storm Events at the MONMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
1/10/2017 8:25	1/10/2017 15:10	6.8	0.07	0.01	0.36	14.8	1/10/2017 8:25	1/11/2017 3:10	18.8	0.15	0.35	10,377
1/17/2017 4:20	1/19/2017 8:45	52.4	2.37	0.05	0.60	163.5	1/17/2017 4:15	1/19/2017 14:00	57.8	0.62	1.60	128,958
1/19/2017 14:05	1/19/2017 16:40	2.6	0.12	0.05	0.12	14.5	1/19/2017 14:00	1/20/2017 4:40	14.8	0.44	0.77	23,598
2/3/2017 5:40	2/6/2017 0:30	66.8	1.77	0.03	0.24	350.2	2/3/2017 5:40	2/6/2017 11:35	78.0	0.35	1.05	98,412
2/6/2017 11:40	2/6/2017 23:20	11.7	0.51	0.04	0.24	17.0	2/6/2017 11:35	2/7/2017 11:15	23.8	0.21	0.26	17,670
2/7/2017 11:30	2/7/2017 17:00	5.5	0.21	0.04	0.12	13.7	2/7/2017 11:30	2/8/2017 5:00	17.6	0.15	0.16	9,444
2/8/2017 9:10	2/10/2017 8:00	46.8	2.46	0.05	0.84	16.9	2/8/2017 9:10	2/10/2017 20:00	58.9	1.02	4.20	215,917
2/14/2017 21:15	2/16/2017 6:15	33.0	2.79	0.08	0.96	116.1	2/14/2017 21:10	2/16/2017 18:10	45.1	1.25	3.30	203,676
2/18/2017 9:00	2/21/2017 9:00	72.0	0.61	0.01	0.12	52.2	2/18/2017 8:55	2/21/2017 21:00	84.2	0.19	0.35	58,545
2/21/2017 21:05	2/22/2017 3:00	5.9	0.07	0.01	0.12	28.5	2/21/2017 21:00	2/22/2017 14:55	18.0	0.24	0.46	15,327
2/22/2017 15:05	2/22/2017 15:45	0.7	0.11	0.17	0.24	16.8	2/22/2017 15:05	2/23/2017 3:40	12.7	0.51	0.62	23,298
2/23/2017 12:45	2/23/2017 14:10	1.4	0.06	0.04	0.12	21.2	2/23/2017 12:40	2/24/2017 2:10	13.6	0.29	0.51	14,379
2/25/2017 23:00	2/26/2017 10:20	11.3	0.52	0.05	0.24	58.1	2/25/2017 23:00	2/26/2017 22:15	23.3	0.25	0.39	21,273
2/27/2017 4:50	2/28/2017 10:00	29.2	0.55	0.02	0.24	20.1	2/27/2017 4:50	2/28/2017 22:00	41.3	0.34	0.59	50,853
3/2/2017 3:45	3/2/2017 19:50	16.1	0.09	0.01	0.12	42.4	3/2/2017 3:40	3/3/2017 7:50	28.3	0.16	0.35	15,981
3/3/2017 8:15	3/3/2017 21:10	12.9	0.52	0.04	0.36	14.8	3/3/2017 8:10	3/4/2017 9:10	25.1	0.25	0.46	22,566
3/4/2017 21:25	3/5/2017 3:20	5.9	0.20	0.03	0.36	25.0	3/4/2017 21:20	3/5/2017 15:20	18.1	0.18	0.26	11,817
3/7/2017 2:55	3/7/2017 17:40	14.8	0.41	0.03	0.12	47.9	3/7/2017 2:55	3/8/2017 5:35	26.8	0.20	0.37	19,436
3/8/2017 18:35	3/10/2017 3:20	32.8	0.57	0.02	0.24	27.2	3/8/2017 18:30	3/10/2017 15:20	44.9	0.31	0.74	49,869
3/11/2017 9:35	3/11/2017 13:30	3.9	0.24	0.06	0.12	38.7	3/11/2017 9:30	3/12/2017 1:25	16.0	0.21	0.31	11,928
3/13/2017 5:40	3/15/2017 19:15	61.6	1.55	0.03	0.24	41.2	3/13/2017 5:35	3/16/2017 7:15	73.8	0.47	1.37	125,700
3/17/2017 13:20	3/18/2017 12:25	23.1	1.37	0.06	0.24	48.2	3/17/2017 13:20	3/19/2017 0:20	35.1	0.65	1.25	81,903
3/21/2017 4:10	3/22/2017 4:55	24.8	0.21	0.01	0.12	64.7	3/21/2017 4:05	3/22/2017 16:50	36.8	0.26	0.46	34,884
3/23/2017 21:50	3/24/2017 20:50	23.0	0.76	0.03	0.60	49.3	3/23/2017 21:45	3/25/2017 8:45	35.1	0.28	0.59	35,235
3/26/2017 10:00	3/27/2017 6:30	20.5	0.27	0.01	0.12	38.9	3/26/2017 9:55	3/27/2017 18:30	32.7	0.19	0.29	22,092
3/27/2017 22:55	3/28/2017 13:40	14.8	0.21	0.01	0.12	24.2	3/27/2017 22:55	3/28/2017 23:45	24.9	0.17	0.27	15,630
3/28/2017 23:50	3/30/2017 4:15	28.4	0.92	0.03	0.24	19.4	3/28/2017 23:45	3/30/2017 16:15	40.6	0.36	0.62	52,155
4/1/2017 6:55	4/2/2017 9:30	26.6	0.31	0.01	0.36	51.1	4/1/2017 6:55	4/2/2017 19:25	36.6	0.17	0.22	22,449
4/2/2017 19:25	4/2/2017 20:25	1.0	0.03	0.03	0.12	16.8	4/2/2017 19:25	4/3/2017 8:25	13.1	0.15	0.15	6,834
4/4/2017 22:25	4/7/2017 2:25	52.0	0.75	0.01	0.24	60.9	4/4/2017 22:25	4/7/2017 2:35	52.3	0.32	0.68	60,903
4/7/2017 2:35	4/7/2017 9:00	6.4	0.11	0.02	0.12	12.4	4/7/2017 2:35	4/7/2017 19:15	16.8	0.18	0.27	10,632
4/7/2017 19:15	4/8/2017 1:10	5.9	0.16	0.03	0.24	15.2	4/7/2017 19:15	4/8/2017 13:05	17.9	0.15	0.21	9,699
4/10/2017 2:25	4/10/2017 12:40	10.3	0.31	0.03	0.36	50.6	4/10/2017 2:25	4/11/2017 0:40	22.3	0.14	0.29	11,385
4/12/2017 1:40	4/13/2017 13:10	35.5	1.12	0.03	0.24	45.2	4/12/2017 1:40	4/14/2017 1:05	47.5	0.29	0.57	48,960
4/17/2017 18:15	4/18/2017 19:35	25.3	0.28	0.01	0.72	103.1	4/17/2017 18:10	4/19/2017 7:30	37.4	0.10	0.15	14,028
4/19/2017 8:55	4/20/2017 1:40	16.8	0.59	0.04	0.36	13.4	4/19/2017 8:55	4/20/2017 13:40	28.8	0.22	0.57	22,893
4/22/2017 14:30	4/22/2017 15:05	0.6	0.06	0.10	0.12	62.2	4/22/2017 14:25	4/23/2017 3:00	12.7	0.10	0.11	4,431
4/23/2017 12:45	4/24/2017 5:55	17.2	0.35	0.02	0.36	21.9	4/23/2017 12:40	4/24/2017 17:55	29.3	0.17	0.24	17,904
4/26/2017 3:35	4/27/2017 0:00	20.4	0.83	0.04	0.48	53.1	4/26/2017 3:30	4/27/2017 12:00	32.6	0.26	0.80	29,940
4/28/2017 4:45	4/28/2017 11:35	6.8	0.13	0.02	0.48	29.1	4/28/2017 4:40	4/28/2017 23:35	19.0	0.14	0.19	9,855
4/29/2017 17:55	4/30/2017 15:50	21.9	0.31	0.01	0.36	36.8	4/29/2017 17:55	5/1/2017 3:45	33.9	0.13	0.19	16,245
5/1/2017 9:15	5/1/2017 14:40	5.4	0.11	0.02	0.12	22.3	5/1/2017 9:10	5/2/2017 2:35	17.5	0.11	0.14	6,702
5/2/2017 21:00	5/3/2017 8:55	11.9	0.31	0.03	0.36	33.3	5/2/2017 20:55	5/3/2017 20:55	24.1	0.13	0.24	11,415
5/4/2017 16:35	5/5/2017 6:00	13.4	1.23	0.09	1.44	35.6	5/4/2017 16:30	5/5/2017 17:55	25.5	0.58	2.40	53,487
5/11/2017 3:45	5/11/2017 19:30	15.8	0.21	0.01	0.24	143.5	5/11/2017 3:40	5/12/2017 7:25	27.8	0.10	0.14	10,374

Table D-5. Summary Statistics for Individual Storm Events at the MONMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
5/12/2017 11:25	5/12/2017 23:35	12.2	0.04	0.00	0.12	16.4	5/12/2017 11:25	5/13/2017 11:35	24.3	0.09	0.10	7,806
5/13/2017 20:50	5/13/2017 23:10	2.3	0.12	0.05	0.24	49.8	5/13/2017 20:45	5/14/2017 11:10	14.5	0.10	0.11	5,061
5/15/2017 14:55	5/16/2017 22:35	31.7	1.18	0.04	0.48	40.5	5/15/2017 14:55	5/17/2017 10:30	43.7	0.27	0.77	43,116
5/31/2017 23:05	6/1/2017 8:35	9.5	0.11	0.01	0.48	361.1	5/31/2017 23:00	6/1/2017 20:35	21.7	0.08	0.11	6,243
6/8/2017 1:35	6/8/2017 11:50	10.3	0.27	0.03	0.12	161.1	6/8/2017 1:30	6/8/2017 23:45	22.3	0.07	0.09	5,652
6/15/2017 11:00	6/15/2017 23:15	12.3	0.57	0.05	0.24	169.6	6/15/2017 11:00	6/16/2017 11:10	24.3	0.10	0.22	8,589
6/18/2017 0:55	6/18/2017 12:10	11.3	0.12	0.01	0.12	50.5	6/18/2017 0:55	6/19/2017 0:10	23.3	0.04	0.05	3,636

Table D-6. Summary Statistics for Individual Storm Events at the TOSMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/1/2016 2:50	10/1/2016 18:50	16.0	0.09	0.01	0.24	0.0	10/1/2016 2:45	10/2/2016 6:45	28.1	0.27	0.34	27,372
10/3/2016 22:20	10/4/2016 17:05	18.8	0.23	0.01	0.48	52.5	10/3/2016 22:20	10/5/2016 5:00	30.8	0.31	0.50	33,807
10/5/2016 17:20	10/6/2016 4:50	11.5	0.05	0.00	0.12	27.5	10/5/2016 17:15	10/6/2016 16:50	23.7	0.26	0.34	22,353
10/6/2016 21:20	10/7/2016 5:20	8.0	0.36	0.05	0.96	18.8	10/6/2016 21:20	10/7/2016 17:15	20.0	0.61	4.80	43,905
10/7/2016 22:20	10/9/2016 5:50	31.5	1.00	0.03	2.40	18.0	10/7/2016 22:20	10/9/2016 17:45	43.5	1.10	10.20	171,909
10/9/2016 19:20	10/9/2016 23:20	4.0	0.20	0.05	0.48	18.0	10/9/2016 19:15	10/10/2016 11:15	16.1	0.71	2.08	41,097
10/13/2016 2:20	10/18/2016 8:30	126.2	4.25	0.03	0.72	76.8	10/13/2016 2:15	10/18/2016 20:25	138.3	2.04	13.13	1,013,394
10/19/2016 21:30	10/20/2016 11:15	13.8	1.54	0.11	1.20	39.8	10/19/2016 21:30	10/20/2016 23:10	25.8	4.17	13.13	386,811
10/21/2016 18:05	10/21/2016 18:30	0.4	0.03	0.07	0.12	31.9	10/21/2016 18:00	10/22/2016 6:30	12.6	0.50	0.67	22,611
10/22/2016 23:50	10/23/2016 8:40	8.8	0.20	0.02	0.12	61.7	10/22/2016 23:50	10/23/2016 20:40	20.9	0.63	2.08	47,430
10/24/2016 17:30	10/24/2016 19:40	2.2	0.14	0.06	0.24	37.7	10/24/2016 17:25	10/25/2016 7:40	14.3	0.58	1.57	29,724
10/26/2016 6:05	10/27/2016 0:00	17.9	1.53	0.09	0.48	35.3	10/26/2016 6:00	10/27/2016 12:00	30.1	3.40	9.60	368,106
10/27/2016 16:40	10/27/2016 19:50	3.2	0.04	0.01	0.12	17.2	10/27/2016 16:40	10/28/2016 7:50	15.3	0.63	0.92	34,326
10/29/2016 8:55	10/29/2016 12:55	4.0	0.16	0.04	0.12	40.2	10/29/2016 8:55	10/30/2016 0:55	16.1	0.69	2.08	39,954
10/30/2016 14:05	11/3/2016 0:35	82.5	2.06	0.03	0.60	27.1	10/30/2016 14:00	11/3/2016 12:30	94.6	1.62	10.82	551,272
11/5/2016 5:55	11/6/2016 4:30	22.6	1.18	0.05	0.36	53.8	11/5/2016 5:55	11/6/2016 16:25	35.6	2.53	8.93	324,162
11/9/2016 5:45	11/9/2016 11:00	5.3	0.31	0.06	0.72	73.4	11/9/2016 5:45	11/9/2016 23:00	17.3	1.17	8.30	72,909
11/12/2016 2:20	11/12/2016 8:20	6.0	0.09	0.02	0.12	64.2	11/12/2016 2:20	11/12/2016 20:15	18.0	0.55	0.92	35,760
11/13/2016 8:20	11/14/2016 6:10	21.8	0.46	0.02	0.24	26.1	11/13/2016 8:20	11/14/2016 18:10	33.9	0.90	3.37	110,250
11/14/2016 23:30	11/16/2016 8:30	33.0	1.71	0.05	1.08	18.3	11/14/2016 23:25	11/16/2016 20:30	45.2	3.36	14.19	546,807
11/19/2016 4:55	11/19/2016 10:35	5.7	0.04	0.01	0.12	78.2	11/19/2016 4:50	11/19/2016 22:35	17.8	0.51	0.67	32,865
11/19/2016 23:30	11/20/2016 12:20	12.8	0.12	0.01	0.12	18.6	11/19/2016 23:25	11/21/2016 0:20	25.0	0.54	0.99	48,363
11/21/2016 0:50	11/21/2016 7:50	7.0	0.04	0.01	0.12	15.3	11/21/2016 0:50	11/21/2016 19:50	19.1	0.46	0.55	31,434
11/22/2016 15:55	11/23/2016 13:30	21.6	0.61	0.03	0.24	39.1	11/22/2016 15:55	11/23/2016 18:20	26.5	1.47	7.39	140,010
11/23/2016 18:20	11/25/2016 1:15	30.9	1.23	0.04	0.24	16.8	11/23/2016 18:20	11/25/2016 13:15	43.0	2.25	8.30	348,558
11/25/2016 21:55	11/27/2016 7:00	33.1	0.54	0.02	0.12	22.4	11/25/2016 21:55	11/27/2016 12:40	38.8	1.14	2.84	159,717
11/27/2016 12:45	11/27/2016 19:00	6.3	0.27	0.04	0.24	13.3	11/27/2016 12:40	11/28/2016 6:55	18.3	1.23	5.27	81,189
11/29/2016 23:45	11/30/2016 2:00	2.3	0.13	0.06	0.24	53.3	11/29/2016 23:45	11/30/2016 14:00	14.3	0.71	2.52	36,411
11/30/2016 15:30	11/30/2016 17:10	1.7	0.06	0.04	0.36	14.2	11/30/2016 15:30	12/1/2016 5:10	13.8	0.53	0.92	26,235
12/2/2016 6:00	12/3/2016 2:35	20.6	0.41	0.02	0.24	38.3	12/2/2016 5:55	12/3/2016 14:35	32.8	0.74	2.37	86,907
12/3/2016 20:05	12/4/2016 14:25	18.3	0.40	0.02	0.12	17.9	12/3/2016 20:00	12/5/2016 2:25	30.5	0.99	3.75	108,903
12/5/2016 6:45	12/5/2016 14:05	7.3	0.18	0.02	0.12	24.3	12/5/2016 6:40	12/6/2016 2:00	19.4	0.74	2.52	51,597
12/9/2016 12:20	12/10/2016 23:05	34.8	0.74	0.02	2.52	99.1	12/9/2016 12:20	12/11/2016 7:15	43.0	0.86	5.03	133,356
12/11/2016 7:20	12/11/2016 20:20	13.0	0.09	0.01	0.12	17.0	12/11/2016 7:15	12/12/2016 8:15	25.1	0.51	0.55	45,738
12/12/2016 10:35	12/12/2016 18:50	8.3	0.05	0.01	0.24	18.2	12/12/2016 10:30	12/13/2016 6:45	20.3	0.47	0.55	34,407
12/19/2016 3:35	12/20/2016 2:50	23.3	0.49	0.02	0.48	161.0	12/19/2016 3:30	12/20/2016 14:45	35.3	0.76	4.58	97,272
12/22/2016 17:05	12/24/2016 0:05	31.0	0.96	0.03	0.48	65.2	12/22/2016 17:00	12/24/2016 12:00	43.1	1.67	4.36	258,800
12/26/2016 16:35	12/26/2016 22:35	6.0	0.24	0.04	0.24	72.5	12/26/2016 16:35	12/27/2016 10:30	18.0	0.83	2.68	53,949
12/27/2016 11:35	12/27/2016 17:05	5.5	0.03	0.01	0.12	13.8	12/27/2016 11:35	12/28/2016 5:00	17.5	0.59	2.84	37,044
12/29/2016 12:35	12/30/2016 8:20	19.8	0.63	0.03	0.48	62.8	12/29/2016 12:30	12/30/2016 20:20	31.9	1.21	7.10	138,621
12/31/2016 17:35	12/31/2016 21:35	4.0	0.27	0.07	0.72	35.2	12/31/2016 17:35	1/1/2017 9:30	16.0	0.85	3.75	49,218
1/1/2017 11:05	1/1/2017 12:50	1.8	0.04	0.02	0.12	15.0	1/1/2017 11:00	1/2/2017 0:45	13.8	0.52	0.79	25,983
1/8/2017 11:35	1/9/2017 0:50	13.3	0.47	0.04	0.72	168.5	1/8/2017 11:35	1/9/2017 12:45	25.3	1.01	3.55	92,091
1/9/2017 15:35	1/10/2017 10:05	18.5	0.13	0.01	0.24	18.2	1/9/2017 15:30	1/10/2017 22:05	30.7	0.49	0.79	54,408
1/17/2017 4:20	1/19/2017 9:05	52.8	2.18	0.04	1.20	164.0	1/17/2017 4:15	1/19/2017 12:20	56.2	3.43	10.20	692,881

Table D-6. Summary Statistics for Individual Storm Events at the TOSMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
1/19/2017 12:20	1/19/2017 17:05	4.8	0.12	0.03	0.24	12.5	1/19/2017 12:20	1/20/2017 5:00	16.8	1.11	2.52	66,933
1/22/2017 1:05	1/22/2017 12:05	11.0	0.04	0.00	0.12	57.5	1/22/2017 1:05	1/23/2017 0:00	23.0	0.52	0.61	43,407
1/29/2017 19:05	1/29/2017 19:35	0.5	0.03	0.06	0.12	186.0	1/29/2017 19:05	1/30/2017 7:30	12.5	0.44	0.47	19,872
2/2/2017 17:50	2/6/2017 20:05	98.3	2.21	0.02	0.60	280.8	2/2/2017 17:45	2/7/2017 8:00	110.3	1.41	5.76	559,598
2/7/2017 11:20	2/7/2017 16:50	5.5	0.19	0.03	0.12	17.2	2/7/2017 11:15	2/8/2017 4:50	17.7	0.87	1.14	55,290
2/8/2017 9:50	2/10/2017 12:05	50.3	2.35	0.05	1.08	18.5	2/8/2017 9:45	2/11/2017 0:00	62.3	5.81	21.02	1,304,513
2/14/2017 22:10	2/16/2017 5:40	31.5	2.66	0.08	1.20	114.3	2/14/2017 22:10	2/16/2017 17:35	43.5	7.97	18.03	1,247,720
2/18/2017 8:55	2/22/2017 3:10	90.3	0.77	0.01	0.24	52.2	2/18/2017 8:55	2/22/2017 15:10	102.3	1.10	4.80	405,139
2/22/2017 16:05	2/22/2017 16:45	0.7	0.04	0.06	0.12	17.6	2/22/2017 16:05	2/23/2017 4:40	12.7	0.76	0.79	34,620
2/25/2017 22:50	2/26/2017 16:30	17.7	0.36	0.02	0.12	78.8	2/25/2017 22:50	2/27/2017 4:30	29.8	1.02	2.22	108,712
2/27/2017 4:40	2/28/2017 10:55	30.3	0.61	0.02	0.24	19.6	2/27/2017 4:40	2/28/2017 22:50	42.3	1.51	3.95	229,371
3/2/2017 5:30	3/3/2017 0:55	19.4	0.06	0.00	0.12	42.9	3/2/2017 5:30	3/3/2017 9:15	27.8	0.69	0.79	69,222
3/3/2017 9:15	3/4/2017 1:35	16.3	0.54	0.03	0.24	15.9	3/3/2017 9:15	3/4/2017 13:30	28.3	1.80	8.93	183,173
3/4/2017 21:55	3/5/2017 3:15	5.3	0.18	0.03	0.36	25.6	3/4/2017 21:55	3/5/2017 15:10	17.3	1.12	5.27	70,062
3/7/2017 3:00	3/7/2017 17:45	14.8	0.46	0.03	0.12	48.0	3/7/2017 2:55	3/8/2017 5:45	26.9	1.31	3.55	127,173
3/8/2017 15:45	3/10/2017 3:45	36.0	0.65	0.02	0.24	24.6	3/8/2017 15:40	3/10/2017 15:40	48.1	1.19	4.58	206,324
3/11/2017 9:25	3/11/2017 13:20	3.9	0.24	0.06	0.24	29.8	3/11/2017 9:20	3/12/2017 1:15	16.0	1.15	3.37	66,498
3/13/2017 5:35	3/16/2017 1:05	67.5	1.66	0.02	0.24	41.2	3/13/2017 5:35	3/16/2017 13:05	79.6	2.01	8.61	576,300
3/17/2017 13:25	3/18/2017 12:20	22.9	1.42	0.06	0.24	49.5	3/17/2017 13:25	3/19/2017 0:20	35.0	3.64	10.20	459,248
3/20/2017 19:55	3/22/2017 4:50	32.9	0.21	0.01	0.12	56.2	3/20/2017 19:50	3/22/2017 16:50	45.1	0.76	1.81	122,602
3/23/2017 21:50	3/24/2017 21:45	23.9	0.66	0.03	0.36	54.6	3/23/2017 21:45	3/25/2017 9:40	36.0	1.28	5.27	165,849
3/26/2017 9:10	3/26/2017 22:45	13.6	0.27	0.02	0.12	38.1	3/26/2017 9:10	3/27/2017 10:40	25.6	0.92	2.68	85,107
3/27/2017 15:10	3/30/2017 15:20	72.2	0.99	0.01	0.60	17.3	3/27/2017 15:10	3/31/2017 3:20	84.3	1.11	5.27	335,461
4/1/2017 7:25	4/2/2017 10:00	26.6	0.29	0.01	0.36	51.0	4/1/2017 7:25	4/2/2017 21:55	38.6	0.88	6.28	121,935
4/4/2017 22:25	4/6/2017 14:15	39.8	0.72	0.02	0.24	67.8	4/4/2017 22:25	4/7/2017 2:10	51.8	1.08	2.84	201,696
4/7/2017 2:30	4/7/2017 5:20	2.8	0.09	0.03	0.12	12.5	4/7/2017 2:30	4/7/2017 17:15	14.8	0.83	1.94	44,334
4/7/2017 19:20	4/8/2017 4:45	9.4	0.16	0.02	0.12	15.6	4/7/2017 19:15	4/8/2017 16:40	21.5	0.81	1.69	62,619
4/10/2017 2:00	4/10/2017 21:25	19.4	0.40	0.02	0.24	49.7	4/10/2017 2:00	4/11/2017 9:25	31.5	1.02	6.55	115,341
4/12/2017 1:45	4/13/2017 13:30	35.8	1.02	0.03	0.60	29.9	4/12/2017 1:40	4/14/2017 1:30	47.9	1.61	6.55	277,346
4/17/2017 17:10	4/18/2017 19:20	26.2	0.48	0.02	0.72	111.2	4/17/2017 17:10	4/19/2017 7:20	38.3	0.89	4.80	122,766
4/19/2017 8:55	4/20/2017 1:30	16.6	0.70	0.04	0.48	13.7	4/19/2017 8:55	4/20/2017 13:25	28.6	1.85	10.20	190,644
4/22/2017 13:05	4/22/2017 16:00	2.9	0.08	0.03	0.36	60.6	4/22/2017 13:05	4/23/2017 4:00	15.0	0.70	1.29	37,998
4/23/2017 12:30	4/24/2017 5:50	17.3	0.57	0.03	0.60	20.6	4/23/2017 12:30	4/24/2017 17:45	29.3	1.42	8.93	149,751
4/25/2017 19:10	4/26/2017 3:30	8.3	0.03	0.00	0.12	44.7	4/25/2017 19:05	4/26/2017 13:40	18.7	0.60	0.67	40,110
4/26/2017 13:45	4/27/2017 3:20	13.6	0.69	0.05	1.44	63.2	4/26/2017 13:40	4/27/2017 15:20	25.8	1.80	10.20	166,650
4/29/2017 18:15	4/30/2017 22:05	27.8	0.30	0.01	0.24	66.2	4/29/2017 18:10	5/1/2017 9:30	39.4	0.68	2.08	96,708
5/1/2017 9:35	5/1/2017 13:30	3.9	0.10	0.03	0.12	22.5	5/1/2017 9:30	5/2/2017 1:25	16.0	0.65	1.69	37,395
5/2/2017 20:20	5/3/2017 7:00	10.7	0.38	0.04	0.24	32.3	5/2/2017 20:15	5/3/2017 18:55	22.8	1.09	6.02	89,097
5/4/2017 16:05	5/5/2017 4:20	12.3	0.98	0.08	1.08	35.4	5/4/2017 16:05	5/5/2017 16:20	24.3	2.74	12.44	240,078
5/6/2017 0:45	5/6/2017 2:30	1.8	0.07	0.04	0.12	20.8	5/6/2017 0:40	5/6/2017 14:25	13.8	0.84	1.57	42,048
5/11/2017 3:40	5/11/2017 23:30	19.8	0.27	0.01	0.36	122.2	5/11/2017 3:40	5/12/2017 11:25	31.8	0.57	2.37	65,184
5/12/2017 11:25	5/12/2017 22:25	11.0	0.04	0.00	0.12	16.4	5/12/2017 11:25	5/13/2017 10:25	23.1	0.36	0.50	30,069
5/15/2017 14:00	5/16/2017 23:00	33.0	1.13	0.03	0.36	91.0	5/15/2017 14:00	5/17/2017 11:00	45.1	1.40	8.30	227,576
5/31/2017 22:20	6/1/2017 8:30	10.2	0.11	0.01	0.24	360.2	5/31/2017 22:15	6/1/2017 20:25	22.3	0.40	0.67	32,055
6/8/2017 0:55	6/8/2017 11:30	10.6	0.33	0.03	0.12	160.6	6/8/2017 0:55	6/8/2017 23:30	22.7	0.58	1.94	47,259

Table D-6. Summary Statistics for Individual Storm Events at the TOSMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
6/15/2017 10:05	6/15/2017 23:40	13.6	0.87	0.06	0.60	168.4	6/15/2017 10:05	6/16/2017 11:40	25.7	1.48	7.99	136,953
6/17/2017 19:05	6/18/2017 10:35	15.5	0.07	0.00	0.12	43.8	6/17/2017 19:05	6/18/2017 22:30	27.5	0.35	0.37	34,218
8/2/2017 11:30	8/2/2017 11:30	0.0	0.04	0.00	0.48	1090.8	8/2/2017 11:30	8/2/2017 23:25	12.0	0.23	0.26	9,756
8/13/2017 0:20	8/13/2017 8:40	8.3	0.04	0.00	0.12	252.8	8/13/2017 0:20	8/13/2017 20:35	20.3	0.26	0.37	19,386
8/31/2017 6:00	8/31/2017 10:00	4.0	0.03	0.01	0.12	437.7	8/31/2017 6:00	8/31/2017 22:00	16.1	0.30	0.67	17,325
9/17/2017 14:50	9/19/2017 22:10	55.3	1.42	0.03	1.32	854.5	9/17/2017 14:50	9/20/2017 10:10	67.4	0.75	12.11	182,181
9/21/2017 5:30	9/21/2017 17:25	11.9	0.03	0.00	0.12	32.4	9/21/2017 5:25	9/22/2017 5:25	24.1	0.23	0.43	20,070

Table D-7. Summary Statistics for Individual Storm Events at the TOSMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/1/2016 2:50	10/1/2016 18:50	16.0	0.09	0.01	0.24	0.0	10/1/2016 2:45	10/2/2016 6:45	28.1	0.16	0.28	16,050
10/3/2016 22:20	10/4/2016 17:05	18.8	0.23	0.01	0.48	52.5	10/3/2016 22:20	10/5/2016 5:00	30.8	0.22	0.72	24,303
10/5/2016 17:20	10/6/2016 4:50	11.5	0.05	0.00	0.12	27.5	10/5/2016 17:15	10/6/2016 16:50	23.7	0.15	0.28	12,396
10/6/2016 21:20	10/7/2016 5:20	8.0	0.36	0.05	0.96	18.8	10/6/2016 21:20	10/7/2016 17:15	20.0	0.60	5.05	43,059
10/7/2016 22:20	10/9/2016 5:50	31.5	1.00	0.03	2.40	18.0	10/7/2016 22:20	10/9/2016 17:45	43.5	0.96	8.64	150,333
10/9/2016 19:20	10/9/2016 23:20	4.0	0.20	0.05	0.48	18.0	10/9/2016 19:15	10/10/2016 11:15	16.1	0.50	1.90	29,166
10/13/2016 2:20	10/18/2016 8:30	126.2	4.25	0.03	0.72	76.8	10/13/2016 2:15	10/18/2016 20:25	138.3	1.70	9.86	845,743
10/19/2016 21:30	10/20/2016 11:15	13.8	1.54	0.11	1.20	39.8	10/19/2016 21:30	10/20/2016 23:10	25.8	3.13	9.86	289,791
10/21/2016 18:05	10/21/2016 18:30	0.4	0.03	0.07	0.12	31.9	10/21/2016 18:00	10/22/2016 6:30	12.6	0.30	0.49	13,749
10/22/2016 23:50	10/23/2016 8:40	8.8	0.20	0.02	0.12	61.7	10/22/2016 23:50	10/23/2016 20:40	20.9	0.51	1.90	38,538
10/24/2016 17:30	10/24/2016 19:40	2.2	0.14	0.06	0.24	37.7	10/24/2016 17:25	10/25/2016 7:40	14.3	0.49	1.90	25,329
10/26/2016 6:05	10/27/2016 0:00	17.9	1.53	0.09	0.48	35.3	10/26/2016 6:00	10/27/2016 12:00	30.1	2.52	6.83	273,333
10/27/2016 16:40	10/27/2016 19:50	3.2	0.04	0.01	0.12	17.2	10/27/2016 16:40	10/28/2016 7:50	15.3	0.39	0.80	21,447
10/29/2016 8:55	10/29/2016 12:55	4.0	0.16	0.04	0.12	40.2	10/29/2016 8:55	10/30/2016 0:55	16.1	0.52	1.90	29,952
10/30/2016 14:05	11/3/2016 0:35	82.5	2.06	0.03	0.60	27.1	10/30/2016 14:00	11/3/2016 12:30	94.6	1.23	8.17	420,202
11/5/2016 5:55	11/6/2016 4:30	22.6	1.18	0.05	0.36	53.8	11/5/2016 5:55	11/6/2016 16:25	35.6	1.88	6.00	241,086
11/9/2016 5:45	11/9/2016 11:00	5.3	0.31	0.06	0.72	73.4	11/9/2016 5:45	11/9/2016 23:00	17.3	0.87	6.20	54,171
11/12/2016 2:20	11/12/2016 8:20	6.0	0.09	0.02	0.12	64.2	11/12/2016 2:20	11/12/2016 20:15	18.0	0.39	0.80	25,329
11/13/2016 8:20	11/14/2016 6:10	21.8	0.46	0.02	0.24	26.1	11/13/2016 8:20	11/14/2016 18:10	33.9	0.72	2.60	87,594
11/14/2016 23:30	11/16/2016 8:30	33.0	1.71	0.05	1.08	18.3	11/14/2016 23:25	11/16/2016 20:30	45.2	2.30	9.86	373,589
11/19/2016 4:55	11/19/2016 10:35	5.7	0.04	0.01	0.12	78.2	11/19/2016 4:50	11/19/2016 22:35	17.8	0.28	0.49	18,243
11/19/2016 23:30	11/20/2016 12:20	12.8	0.12	0.01	0.12	18.6	11/19/2016 23:25	11/21/2016 0:20	25.0	0.35	0.89	31,932
11/21/2016 0:50	11/21/2016 7:50	7.0	0.04	0.01	0.12	15.3	11/21/2016 0:50	11/21/2016 19:50	19.1	0.27	0.43	18,501
11/22/2016 15:55	11/23/2016 13:30	21.6	0.61	0.03	0.24	39.1	11/22/2016 15:55	11/23/2016 18:20	26.5	1.16	5.05	110,976
11/23/2016 18:20	11/25/2016 1:15	30.9	1.23	0.04	0.24	16.8	11/23/2016 18:20	11/25/2016 13:15	43.0	1.41	4.76	218,778
11/25/2016 21:55	11/27/2016 7:00	33.1	0.54	0.02	0.12	22.4	11/25/2016 21:55	11/27/2016 12:40	38.8	0.75	2.06	104,271
11/27/2016 12:45	11/27/2016 19:00	6.3	0.27	0.04	0.24	13.3	11/27/2016 12:40	11/28/2016 6:55	18.3	0.80	3.23	52,854
11/29/2016 23:45	11/30/2016 2:00	2.3	0.13	0.06	0.24	53.3	11/29/2016 23:45	11/30/2016 14:00	14.3	0.42	1.90	21,642
11/30/2016 15:30	11/30/2016 17:10	1.7	0.06	0.04	0.36	14.2	11/30/2016 15:30	12/1/2016 5:10	13.8	0.26	0.64	12,801
12/2/2016 6:00	12/3/2016 2:35	20.6	0.41	0.02	0.24	38.3	12/2/2016 5:55	12/3/2016 14:35	32.8	0.39	1.47	45,978
12/3/2016 20:05	12/4/2016 14:25	18.3	0.40	0.02	0.12	17.9	12/3/2016 20:00	12/5/2016 2:25	30.5	0.57	2.41	62,703
12/5/2016 6:45	12/5/2016 14:05	7.3	0.18	0.02	0.12	24.3	12/5/2016 6:40	12/6/2016 2:00	19.4	0.39	1.60	27,585
12/9/2016 12:20	12/10/2016 23:05	34.8	0.74	0.02	2.52	99.1	12/9/2016 12:20	12/11/2016 7:15	43.0	0.58	3.23	90,507
12/11/2016 7:20	12/11/2016 20:20	13.0	0.09	0.01	0.12	17.0	12/11/2016 7:15	12/12/2016 8:15	25.1	0.32	0.43	29,166
12/12/2016 10:35	12/12/2016 18:50	8.3	0.05	0.01	0.24	18.2	12/12/2016 10:30	12/13/2016 6:45	20.3	0.29	0.43	21,141
12/19/2016 3:35	12/20/2016 2:50	23.3	0.49	0.02	0.48	161.0	12/19/2016 3:30	12/20/2016 14:45	35.3	0.53	3.23	67,602
12/22/2016 17:05	12/24/2016 0:05	31.0	0.96	0.03	0.48	65.2	12/22/2016 17:00	12/24/2016 12:00	43.1	1.14	2.80	176,127
12/26/2016 16:35	12/26/2016 22:35	6.0	0.24	0.04	0.24	72.5	12/26/2016 16:35	12/27/2016 10:30	18.0	0.58	1.90	37,884
12/27/2016 11:35	12/27/2016 17:05	5.5	0.03	0.01	0.12	13.8	12/27/2016 11:35	12/28/2016 5:00	17.5	0.35	2.23	22,356
12/29/2016 12:35	12/30/2016 8:20	19.8	0.63	0.03	0.48	62.8	12/29/2016 12:30	12/30/2016 20:20	31.9	0.85	4.20	98,229
12/31/2016 17:35	12/31/2016 21:35	4.0	0.27	0.07	0.72	35.2	12/31/2016 17:35	1/1/2017 9:30	16.0	0.67	2.80	38,598
1/1/2017 11:05	1/1/2017 12:50	1.8	0.04	0.02	0.12	15.0	1/1/2017 11:00	1/2/2017 0:45	13.8	0.37	0.64	18,588
1/8/2017 11:35	1/9/2017 0:50	13.3	0.47	0.04	0.72	168.5	1/8/2017 11:35	1/9/2017 12:45	25.3	0.79	2.60	71,742
1/9/2017 15:35	1/10/2017 10:05	18.5	0.13	0.01	0.24	18.2	1/9/2017 15:30	1/10/2017 22:05	30.7	0.35	0.64	38,460

Table D-7. Summary Statistics for Individual Storm Events at the TOSMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
1/17/2017 4:20	1/19/2017 9:05	52.8	2.18	0.04	1.20	164.0	1/17/2017 4:15	1/19/2017 12:20	56.2	2.45	7.27	494,861
1/19/2017 12:20	1/19/2017 17:05	4.8	0.12	0.03	0.24	12.5	1/19/2017 12:20	1/20/2017 5:00	16.8	0.93	2.06	55,992
1/22/2017 1:05	1/22/2017 12:05	11.0	0.04	0.00	0.12	57.5	1/22/2017 1:05	1/23/2017 0:00	23.0	0.35	0.49	29,235
1/29/2017 19:05	1/29/2017 19:35	0.5	0.03	0.06	0.12	186.0	1/29/2017 19:05	1/30/2017 7:30	12.5	0.20	0.23	9,144
2/2/2017 17:50	2/6/2017 20:05	98.3	2.21	0.02	0.60	280.8	2/2/2017 17:45	2/7/2017 8:00	110.3	1.02	3.46	405,907
2/7/2017 11:20	2/7/2017 16:50	5.5	0.19	0.03	0.12	17.2	2/7/2017 11:15	2/8/2017 4:50	17.7	0.81	0.99	51,819
2/8/2017 9:50	2/10/2017 12:05	50.3	2.35	0.05	1.08	18.5	2/8/2017 9:45	2/11/2017 0:00	62.3	3.52	15.42	789,321
2/14/2017 22:10	2/16/2017 5:40	31.5	2.66	0.08	1.20	114.3	2/14/2017 22:10	2/16/2017 17:35	43.5	4.38	12.51	685,767
2/18/2017 8:55	2/22/2017 3:10	90.3	0.77	0.01	0.24	52.2	2/18/2017 8:55	2/22/2017 15:10	102.3	0.59	2.60	218,486
2/22/2017 16:05	2/22/2017 16:45	0.7	0.04	0.06	0.12	17.6	2/22/2017 16:05	2/23/2017 4:40	12.7	0.37	0.37	16,872
2/25/2017 22:50	2/26/2017 16:30	17.7	0.36	0.02	0.12	78.8	2/25/2017 22:50	2/27/2017 4:30	29.8	0.63	1.34	67,956
2/27/2017 4:40	2/28/2017 10:55	30.3	0.61	0.02	0.24	19.6	2/27/2017 4:40	2/28/2017 22:50	42.3	0.97	2.23	147,609
3/2/2017 5:30	3/3/2017 0:55	19.4	0.06	0.00	0.12	42.9	3/2/2017 5:30	3/3/2017 9:15	27.8	0.43	0.49	42,924
3/3/2017 9:15	3/4/2017 1:35	16.3	0.54	0.03	0.24	15.9	3/3/2017 9:15	3/4/2017 13:30	28.3	1.00	5.05	101,799
3/4/2017 21:55	3/5/2017 3:15	5.3	0.18	0.03	0.36	25.6	3/4/2017 21:55	3/5/2017 15:10	17.3	0.62	2.60	38,559
3/7/2017 3:00	3/7/2017 17:45	14.8	0.46	0.03	0.12	48.0	3/7/2017 2:55	3/8/2017 5:45	26.9	0.72	1.75	70,164
3/8/2017 15:45	3/10/2017 3:45	36.0	0.65	0.02	0.24	24.6	3/8/2017 15:40	3/10/2017 15:40	48.1	0.61	2.80	104,925
3/11/2017 9:25	3/11/2017 13:20	3.9	0.24	0.06	0.24	29.8	3/11/2017 9:20	3/12/2017 1:15	16.0	0.59	1.90	34,194
3/13/2017 5:35	3/16/2017 1:05	67.5	1.66	0.02	0.24	41.2	3/13/2017 5:35	3/16/2017 13:05	79.6	1.13	5.05	323,453
3/17/2017 13:25	3/18/2017 12:20	22.9	1.42	0.06	0.24	49.5	3/17/2017 13:25	3/19/2017 0:20	35.0	2.03	6.20	255,396
3/20/2017 19:55	3/22/2017 4:50	32.9	0.21	0.01	0.12	56.2	3/20/2017 19:50	3/22/2017 16:50	45.1	0.36	1.10	59,172
3/23/2017 21:50	3/24/2017 21:45	23.9	0.66	0.03	0.36	54.6	3/23/2017 21:45	3/25/2017 9:40	36.0	0.72	3.69	93,480
3/26/2017 9:10	3/26/2017 22:45	13.6	0.27	0.02	0.12	38.1	3/26/2017 9:10	3/27/2017 10:40	25.6	0.50	1.60	46,341
3/27/2017 15:10	3/30/2017 15:20	72.2	0.99	0.01	0.60	17.3	3/27/2017 15:10	3/31/2017 3:20	84.3	0.67	3.46	201,830
4/1/2017 7:25	4/2/2017 10:00	26.6	0.29	0.01	0.36	51.0	4/1/2017 7:25	4/2/2017 21:55	38.6	0.45	4.20	62,376
4/4/2017 22:25	4/6/2017 14:15	39.8	0.72	0.02	0.24	67.8	4/4/2017 22:25	4/7/2017 2:10	51.8	0.67	1.90	124,212
4/7/2017 2:30	4/7/2017 5:20	2.8	0.09	0.03	0.12	12.5	4/7/2017 2:30	4/7/2017 17:15	14.8	0.50	1.47	26,487
4/7/2017 19:20	4/8/2017 4:45	9.4	0.16	0.02	0.12	15.6	4/7/2017 19:15	4/8/2017 16:40	21.5	0.45	1.10	34,770
4/10/2017 2:00	4/10/2017 21:25	19.4	0.40	0.02	0.24	49.7	4/10/2017 2:00	4/11/2017 9:25	31.5	0.55	4.47	62,535
4/12/2017 1:45	4/13/2017 13:30	35.8	1.02	0.03	0.60	29.9	4/12/2017 1:40	4/14/2017 1:30	47.9	0.97	4.47	167,448
4/17/2017 17:10	4/18/2017 19:20	26.2	0.48	0.02	0.72	111.2	4/17/2017 17:10	4/19/2017 7:20	38.3	0.57	3.69	78,267
4/19/2017 8:55	4/20/2017 1:30	16.6	0.70	0.04	0.48	13.7	4/19/2017 8:55	4/20/2017 13:25	28.6	1.34	6.83	138,357
4/22/2017 13:05	4/22/2017 16:00	2.9	0.08	0.03	0.36	60.6	4/22/2017 13:05	4/23/2017 4:00	15.0	0.44	0.99	23,514
4/23/2017 12:30	4/24/2017 5:50	17.3	0.57	0.03	0.60	20.6	4/23/2017 12:30	4/24/2017 17:45	29.3	0.88	6.62	92,463
4/25/2017 19:10	4/26/2017 3:30	8.3	0.03	0.00	0.12	44.7	4/25/2017 19:05	4/26/2017 13:40	18.7	0.38	0.43	25,206
4/26/2017 13:45	4/27/2017 3:20	13.6	0.69	0.05	1.44	63.2	4/26/2017 13:40	4/27/2017 15:20	25.8	1.12	8.64	103,641
4/29/2017 18:15	4/30/2017 22:05	27.8	0.30	0.01	0.24	66.2	4/29/2017 18:10	5/1/2017 9:30	39.4	0.49	1.75	69,276
5/1/2017 9:35	5/1/2017 13:30	3.9	0.10	0.03	0.12	22.5	5/1/2017 9:30	5/2/2017 1:25	16.0	0.45	1.34	25,962
5/2/2017 20:20	5/3/2017 7:00	10.7	0.38	0.04	0.24	32.3	5/2/2017 20:15	5/3/2017 18:55	22.8	0.86	4.76	70,311
5/4/2017 16:05	5/5/2017 4:20	12.3	0.98	0.08	1.08	35.4	5/4/2017 16:05	5/5/2017 16:20	24.3	1.98	9.61	173,025
5/6/2017 0:45	5/6/2017 2:30	1.8	0.07	0.04	0.12	20.8	5/6/2017 0:40	5/6/2017 14:25	13.8	0.57	1.21	28,485
5/11/2017 3:40	5/11/2017 23:30	19.8	0.27	0.01	0.36	122.2	5/11/2017 3:40	5/12/2017 11:25	31.8	0.40	1.75	45,855
5/12/2017 11:25	5/12/2017 22:25	11.0	0.04	0.00	0.12	16.4	5/12/2017 11:25	5/13/2017 10:25	23.1	0.28	0.37	23,154
5/15/2017 14:00	5/16/2017 23:00	33.0	1.13	0.03	0.36	91.0	5/15/2017 14:00	5/17/2017 11:00	45.1	0.95	6.41	153,801

Table D-7. Summary Statistics for Individual Storm Events at the TOSMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
5/31/2017 22:20	6/1/2017 8:30	10.2	0.11	0.01	0.24	360.2	5/31/2017 22:15	6/1/2017 20:25	22.3	0.31	0.78	24,504
6/8/2017 0:55	6/8/2017 11:30	10.6	0.33	0.03	0.12	160.6	6/8/2017 0:55	6/8/2017 23:30	22.7	0.58	2.38	47,586
6/15/2017 10:05	6/15/2017 23:40	13.6	0.87	0.06	0.60	168.4	6/15/2017 10:05	6/16/2017 11:40	25.7	1.58	8.40	145,890
6/17/2017 19:05	6/18/2017 10:35	15.5	0.07	0.00	0.12	43.8	6/17/2017 19:05	6/18/2017 22:30	27.5	0.19	0.31	18,336
8/2/2017 11:30	8/2/2017 11:30	0.0	0.04	0.00	0.48	1090.8	8/2/2017 11:30	8/2/2017 23:25	12.0	0.04	0.04	1,728
8/13/2017 0:20	8/13/2017 8:40	8.3	0.04	0.00	0.12	252.8	8/13/2017 0:20	8/13/2017 20:35	20.3	0.09	0.31	6,753
8/31/2017 6:00	8/31/2017 10:00	4.0	0.03	0.01	0.12	437.7	8/31/2017 6:00	8/31/2017 22:00	16.1	0.18	0.78	10,605
9/17/2017 14:50	9/19/2017 22:10	55.3	1.42	0.03	1.32	854.5	9/17/2017 14:50	9/20/2017 10:10	67.4	0.64	11.96	154,143
9/21/2017 5:30	9/21/2017 17:25	11.9	0.03	0.00	0.12	32.4	9/21/2017 5:25	9/22/2017 5:25	24.1	0.09	0.48	7,833

Table D-8. Summary Statistics for Individual Storm Events at the COLM Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/1/2016 3:05	10/1/2016 18:50	15.8	0.09	0.01	0.24	0.0			0.0	0.00	0.00	-
10/3/2016 22:35	10/4/2016 23:00	24.4	0.18	0.01	0.12	52.8			0.0	0.00	0.00	-
10/5/2016 15:20	10/6/2016 3:35	12.3	0.04	0.00	0.12	24.2			0.0	0.00	0.00	-
10/6/2016 21:05	10/7/2016 5:10	8.1	0.34	0.04	0.48	53.9	10/7/2016 9:25	10/7/2016 9:45	0.4	0.01	0.01	15
10/7/2016 23:20	10/9/2016 11:45	36.4	1.00	0.03	1.32	20.7	10/8/2016 16:35	10/9/2016 19:25	26.9	0.11	0.21	11,106
10/9/2016 19:30	10/9/2016 22:35	3.1	0.19	0.06	0.24	18.7	10/9/2016 19:25	10/10/2016 10:30	15.2	0.16	0.20	8,667
10/13/2016 1:50	10/17/2016 12:00	106.2	4.73	0.04	0.72	76.5	10/13/2016 1:50	10/17/2016 23:55	118.2	0.74	1.46	314,371
10/18/2016 1:00	10/18/2016 6:30	5.5	0.17	0.03	0.24	19.2	10/18/2016 0:55	10/18/2016 18:30	17.7	1.13	1.25	71,568
10/19/2016 21:05	10/20/2016 17:50	20.8	1.68	0.08	1.32	38.8	10/19/2016 21:00	10/21/2016 5:45	32.8	3.11	5.69	367,278
10/21/2016 18:25	10/22/2016 1:10	6.8	0.07	0.01	0.24	31.4	10/21/2016 18:20	10/22/2016 13:05	18.8	2.54	2.88	172,182
10/22/2016 23:55	10/23/2016 9:00	9.1	0.20	0.02	0.24	29.4	10/22/2016 23:55	10/23/2016 20:55	21.1	1.40	1.63	106,614
10/24/2016 17:40	10/24/2016 20:25	2.8	0.17	0.06	0.24	37.5	10/24/2016 17:35	10/25/2016 8:25	14.9	0.87	0.94	46,812
10/26/2016 6:10	10/27/2016 0:05	17.9	1.78	0.10	0.60	34.8	10/26/2016 6:10	10/27/2016 12:00	29.9	2.82	5.00	303,237
10/27/2016 16:00	10/27/2016 20:05	4.1	0.05	0.01	0.24	16.7	10/27/2016 15:55	10/28/2016 8:00	16.2	2.68	3.15	155,748
10/29/2016 9:15	10/29/2016 12:50	3.6	0.12	0.03	0.12	38.0	10/29/2016 9:10	10/30/2016 0:50	15.8	1.28	1.32	72,471
10/30/2016 14:10	11/3/2016 0:35	82.4	2.00	0.02	0.60	26.9	10/30/2016 14:10	11/3/2016 12:30	94.4	2.57	4.37	871,938
11/5/2016 6:10	11/6/2016 4:45	22.6	1.13	0.05	0.24	54.0	11/5/2016 6:10	11/6/2016 16:40	35.6	2.96	4.37	379,221
11/9/2016 5:15	11/9/2016 13:05	7.8	0.29	0.04	0.36	72.8	11/9/2016 5:10	11/10/2016 1:05	20.0	1.57	1.80	113,352
11/12/2016 1:50	11/12/2016 8:35	6.8	0.09	0.01	0.12	63.4	11/12/2016 1:50	11/12/2016 20:35	18.8	0.99	1.05	67,386
11/13/2016 8:25	11/14/2016 7:30	23.1	0.47	0.02	0.24	24.8	11/13/2016 8:25	11/14/2016 19:30	35.2	1.05	1.32	132,819
11/14/2016 23:40	11/16/2016 0:25	24.8	1.64	0.07	0.84	18.3	11/14/2016 23:40	11/16/2016 12:20	36.8	4.31	6.53	569,673
11/16/2016 18:55	11/16/2016 23:50	4.9	0.06	0.01	0.24	19.8	11/16/2016 18:55	11/17/2016 11:45	16.9	4.37	5.18	266,388
11/19/2016 4:55	11/19/2016 13:25	8.5	0.05	0.01	0.12	57.9	11/19/2016 4:50	11/19/2016 22:50	18.1	1.74	1.89	113,115
11/19/2016 22:55	11/20/2016 14:25	15.5	0.24	0.02	0.12	17.9	11/19/2016 22:50	11/21/2016 0:55	26.2	1.52	1.63	142,905
11/21/2016 1:00	11/21/2016 7:20	6.3	0.04	0.01	0.12	13.8	11/21/2016 0:55	11/21/2016 19:15	18.4	1.29	1.39	85,605
11/22/2016 14:45	11/23/2016 1:50	11.1	0.45	0.04	0.24	37.8	11/22/2016 14:45	11/23/2016 13:50	23.2	1.36	1.71	113,247
11/23/2016 17:35	11/24/2016 23:50	30.3	1.38	0.05	0.24	16.3	11/23/2016 17:35	11/25/2016 11:45	42.3	3.12	5.35	474,252
11/25/2016 21:35	11/28/2016 8:15	58.7	0.96	0.02	0.24	22.2	11/25/2016 21:30	11/28/2016 16:40	67.3	4.00	5.00	967,390
11/28/2016 16:40	11/29/2016 2:50	10.2	0.24	0.02	0.24	21.7	11/28/2016 16:40	11/29/2016 14:45	22.2	3.42	3.99	273,037
11/29/2016 23:50	11/30/2016 2:15	2.4	0.13	0.05	0.12	21.3	11/29/2016 23:45	11/30/2016 14:10	14.5	2.83	3.02	147,840
11/30/2016 15:15	11/30/2016 15:25	0.2	0.10	0.60	0.84	13.7	11/30/2016 15:10	12/1/2016 3:20	12.3	3.13	3.47	137,868
12/1/2016 10:15	12/1/2016 21:45	11.5	0.03	0.00	0.12	18.9	12/1/2016 10:15	12/2/2016 5:55	19.8	2.24	2.52	159,480
12/2/2016 5:55	12/3/2016 4:30	22.6	0.41	0.02	0.12	38.6	12/2/2016 5:55	12/3/2016 16:25	34.6	2.23	2.52	278,127
12/3/2016 20:30	12/4/2016 14:20	17.8	0.56	0.03	0.24	18.8	12/3/2016 20:30	12/5/2016 2:15	29.8	2.83	3.64	304,111
12/5/2016 3:35	12/5/2016 16:55	13.3	0.25	0.02	0.12	20.0	12/5/2016 3:30	12/6/2016 4:50	25.4	2.65	3.02	242,287
12/10/2016 13:30	12/10/2016 19:35	6.1	0.81	0.13	0.96	120.3	12/10/2016 13:25	12/11/2016 7:35	18.3	1.67	1.80	109,890
12/11/2016 9:10	12/11/2016 20:05	10.9	0.14	0.01	0.12	14.2	12/11/2016 9:10	12/12/2016 7:30	22.4	1.85	1.99	149,196
12/12/2016 7:35	12/12/2016 11:35	4.0	0.09	0.02	0.12	16.3	12/12/2016 7:30	12/12/2016 23:35	16.2	1.75	1.80	101,733
12/19/2016 3:35	12/20/2016 3:05	23.5	0.57	0.02	0.24	160.8	12/19/2016 3:30	12/20/2016 15:00	35.6	0.88	1.18	113,130
12/22/2016 16:10	12/24/2016 21:15	53.1	1.16	0.02	0.24	62.4	12/22/2016 16:05	12/25/2016 9:10	65.2	2.47	3.31	579,033
12/26/2016 16:10	12/27/2016 0:25	8.3	0.25	0.03	0.12	53.3	12/26/2016 16:05	12/27/2016 12:20	20.3	1.80	2.09	131,412
12/29/2016 12:50	12/30/2016 7:55	19.1	0.68	0.04	0.36	62.6	12/29/2016 12:45	12/30/2016 19:50	31.2	2.20	2.64	246,895
12/31/2016 17:35	1/1/2017 0:25	6.8	0.13	0.02	0.12	35.6	12/31/2016 17:35	1/1/2017 12:00	18.5	2.19	2.64	145,716
1/1/2017 12:05	1/1/2017 14:20	2.3	0.03	0.01	0.12	15.6	1/1/2017 12:00	1/2/2017 2:15	14.3	1.72	1.89	88,638

Table D-8. Summary Statistics for Individual Storm Events at the COLM Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
1/2/2017 12:10	1/2/2017 13:45	1.6	0.23	0.15	0.24	39.7	1/2/2017 12:10	1/3/2017 1:40	13.6	1.35	1.39	65,808
1/8/2017 8:50	1/9/2017 0:45	15.9	0.48	0.03	0.24	139.3	1/8/2017 8:45	1/9/2017 12:40	28.0	0.82	0.99	82,767
1/9/2017 15:25	1/9/2017 17:10	1.8	0.06	0.03	0.12	17.8	1/9/2017 15:25	1/10/2017 5:10	13.8	0.94	0.99	47,040
1/10/2017 10:45	1/10/2017 11:30	0.8	0.08	0.11	0.84	18.2	1/10/2017 10:40	1/10/2017 23:25	12.8	0.93	0.94	43,140
1/12/2017 13:00	1/12/2017 13:00	0.0	0.03	0.00	0.36	50.2	1/12/2017 12:55	1/13/2017 1:00	12.2	0.63	0.65	27,594
1/17/2017 4:30	1/19/2017 17:25	60.9	2.31	0.04	0.48	161.8	1/17/2017 4:25	1/20/2017 5:25	73.1	4.23	6.95	1,113,264
1/22/2017 0:40	1/22/2017 11:20	10.7	0.03	0.00	0.12	57.0	1/22/2017 0:40	1/22/2017 23:20	22.8	2.32	2.64	189,598
1/30/2017 23:25	1/31/2017 3:40	4.3	0.04	0.01	0.12	271.8	1/30/2017 23:25	1/31/2017 15:40	16.33	0.58	0.61	34,308
2/3/2017 11:05	2/6/2017 0:00	60.9	1.93	0.03	0.84	83.7	2/3/2017 11:00	2/6/2017 11:55	73.0	2.23	4.18	586,151
2/6/2017 14:35	2/6/2017 23:25	8.8	0.27	0.03	0.24	20.8	2/6/2017 14:35	2/7/2017 11:25	20.9	2.89	3.31	217,602
2/7/2017 11:35	2/7/2017 16:15	4.7	0.52	0.11	0.24	17.1	2/7/2017 11:35	2/8/2017 4:15	16.8	2.40	2.52	144,840
2/8/2017 11:15	2/10/2017 14:15	51.0	2.45	0.05	0.72	19.7	2/8/2017 11:10	2/11/2017 2:10	63.1	10.18	14.49	2,311,163
2/14/2017 21:20	2/16/2017 6:00	32.7	2.85	0.09	0.60	113.5	2/14/2017 21:20	2/16/2017 17:55	44.7	8.73	14.12	1,403,667
2/18/2017 7:45	2/21/2017 8:40	72.9	0.79	0.01	0.36	49.9	2/18/2017 7:40	2/21/2017 20:35	85.0	4.28	6.32	1,310,833
2/21/2017 21:15	2/22/2017 4:25	7.2	0.08	0.01	0.12	15.1	2/21/2017 21:10	2/22/2017 12:45	15.7	2.96	3.15	166,680
2/22/2017 12:50	2/22/2017 21:55	9.1	0.07	0.01	0.12	14.2	2/22/2017 12:45	2/23/2017 9:55	21.3	2.52	2.76	192,900
2/25/2017 22:05	2/26/2017 18:25	20.3	0.79	0.04	0.36	78.9	2/25/2017 22:05	2/27/2017 6:20	32.3	2.37	2.76	276,217
2/27/2017 11:45	2/27/2017 23:20	11.6	0.32	0.03	0.24	23.9	2/27/2017 11:45	2/28/2017 9:20	21.7	3.24	3.64	252,361
2/28/2017 9:25	2/28/2017 11:30	2.1	0.17	0.08	0.24	19.3	2/28/2017 9:20	2/28/2017 23:25	14.2	3.00	3.02	153,138
3/2/2017 3:40	3/3/2017 3:45	24.1	0.17	0.01	0.24	40.3	3/2/2017 3:40	3/3/2017 9:10	29.6	2.61	3.31	278,413
3/3/2017 9:10	3/4/2017 0:30	15.3	0.45	0.03	0.48	14.8	3/3/2017 9:10	3/4/2017 12:30	27.4	2.88	3.31	284,353
3/4/2017 21:55	3/5/2017 17:15	19.3	0.24	0.01	0.48	24.9	3/4/2017 21:55	3/6/2017 5:10	31.3	2.44	2.76	274,719
3/7/2017 3:10	3/7/2017 19:25	16.3	0.48	0.03	0.24	48.0	3/7/2017 3:10	3/8/2017 7:25	28.3	1.91	2.19	194,445
3/8/2017 18:25	3/10/2017 4:10	33.8	0.65	0.02	0.24	27.1	3/8/2017 18:20	3/10/2017 16:10	45.9	2.31	2.88	381,148
3/11/2017 9:40	3/11/2017 18:40	9.0	0.30	0.03	0.24	30.1	3/11/2017 9:40	3/12/2017 6:40	20.1	2.47	2.76	178,617
3/13/2017 6:00	3/15/2017 16:00	58.0	1.71	0.03	0.24	41.1	3/13/2017 5:55	3/16/2017 3:55	70.1	4.60	7.87	1,160,963
3/17/2017 13:25	3/18/2017 14:25	25.0	1.56	0.06	0.24	47.9	3/17/2017 13:25	3/19/2017 2:25	37.1	6.96	10.23	929,620
3/20/2017 19:30	3/21/2017 20:50	25.3	0.27	0.01	0.12	55.1	3/20/2017 19:25	3/22/2017 8:45	37.4	3.40	3.99	457,840
3/22/2017 12:10	3/22/2017 15:05	2.9	0.05	0.02	0.12	20.2	3/22/2017 12:10	3/23/2017 3:00	14.9	2.50	2.76	134,298
3/23/2017 21:45	3/25/2017 3:20	29.6	0.79	0.03	0.48	33.4	3/23/2017 21:40	3/25/2017 15:20	41.8	2.62	3.31	393,760
3/26/2017 10:15	3/27/2017 11:20	25.1	0.35	0.01	0.12	39.0	3/26/2017 10:15	3/27/2017 15:40	29.5	1.91	2.09	203,028
3/27/2017 15:40	3/30/2017 15:40	72.0	1.47	0.02	0.48	17.2	3/27/2017 15:40	3/31/2017 3:40	84.1	3.02	5.54	913,639
4/1/2017 4:50	4/2/2017 20:15	39.4	0.42	0.01	0.36	39.0	4/1/2017 4:50	4/3/2017 8:10	51.4	2.19	2.52	405,372
4/4/2017 22:00	4/8/2017 1:45	75.8	1.20	0.02	0.48	59.9	4/4/2017 21:55	4/8/2017 13:40	87.8	1.79	2.19	565,894
4/10/2017 2:30	4/10/2017 21:35	19.1	0.44	0.02	0.48	49.9	4/10/2017 2:25	4/11/2017 9:30	31.2	1.38	1.63	154,741
4/12/2017 1:35	4/14/2017 0:40	47.1	1.18	0.03	0.36	29.5	4/12/2017 1:30	4/14/2017 12:40	59.3	2.33	3.31	496,250
4/17/2017 16:30	4/18/2017 19:45	27.3	0.53	0.02	0.72	98.9	4/17/2017 16:25	4/19/2017 7:40	39.3	1.15	1.25	163,214
4/19/2017 10:20	4/20/2017 8:45	22.4	0.68	0.03	0.36	14.8	4/19/2017 10:15	4/20/2017 20:45	34.6	1.53	2.29	190,863
4/22/2017 14:15	4/23/2017 6:10	15.9	0.16	0.01	0.36	61.4	4/22/2017 14:10	4/23/2017 11:35	21.5	0.97	1.11	75,408
4/23/2017 11:40	4/24/2017 5:40	18.0	0.58	0.03	0.48	19.6	4/23/2017 11:35	4/24/2017 17:35	30.1	1.51	1.99	163,572
4/25/2017 19:20	4/27/2017 2:50	31.5	1.15	0.04	0.48	44.5	4/25/2017 19:15	4/27/2017 14:45	43.6	2.37	5.73	371,662
4/28/2017 5:05	4/28/2017 6:20	1.3	0.06	0.05	0.12	29.1	4/28/2017 5:00	4/28/2017 18:20	13.4	2.52	2.76	121,704
4/29/2017 18:00	4/30/2017 19:30	25.5	0.52	0.02	0.36	36.2	4/29/2017 17:55	5/1/2017 7:25	37.6	1.50	1.71	203,463
5/1/2017 9:20	5/1/2017 13:50	4.5	0.13	0.03	0.12	18.2	5/1/2017 9:20	5/2/2017 1:50	16.6	1.35	1.46	80,484

Table D-8. Summary Statistics for Individual Storm Events at the COLM Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
5/2/2017 20:45	5/3/2017 9:00	12.3	0.33	0.03	0.36	32.8	5/2/2017 20:45	5/3/2017 21:00	24.3	1.26	1.46	110,022
5/4/2017 13:35	5/5/2017 6:40	17.1	1.18	0.07	1.68	32.1	5/4/2017 13:30	5/5/2017 18:40	29.3	2.99	5.73	314,445
5/11/2017 11:40	5/12/2017 22:05	34.4	0.31	0.01	0.60	151.2	42866.48264	42868.42014	46.6	0.57	0.65	95,979
5/13/2017 21:00	5/13/2017 23:05	2.1	0.23	0.11	0.24	49.3	5/13/2017 21:00	5/14/2017 11:00	14.1	0.55	0.61	27,669
5/15/2017 15:10	5/17/2017 6:15	39.1	1.44	0.04	0.60	40.5	5/15/2017 15:10	5/17/2017 18:10	51.1	1.70	2.88	312,697
5/31/2017 22:35	6/1/2017 9:00	10.4	0.17	0.02	0.12	360.2	5/31/2017 22:30	6/1/2017 20:55	22.5	0.17	0.18	13,872
6/8/2017 1:30	6/8/2017 11:45	10.3	0.37	0.04	0.12	160.8	6/8/2017 1:25	6/8/2017 23:45	22.4	0.14	0.15	11,694
6/13/2017 7:15	6/13/2017 8:55	1.7	0.03	0.02	0.12	116.9	6/13/2017 7:15	6/13/2017 20:55	13.8	0.10	0.10	4,725
6/13/2017 21:40	6/13/2017 23:35	1.9	0.05	0.03	0.36	131.3	6/13/2017 21:40	6/14/2017 11:35	14.0	0.10	0.10	4,797

Table D-9. Summary Statistics for Individual Storm Events at the SEIMN Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/1/2016 3:05	10/1/2016 18:50	15.8	0.09	0.01	0.24	0.0	10/1/2016 3:00	10/2/2016 6:45	28.0	0.01	0.02	1,431
10/3/2016 22:35	10/4/2016 23:00	24.4	0.18	0.01	0.12	52.8	10/3/2016 22:30	10/5/2016 11:00	36.8	0.01	0.02	1,575
10/5/2016 15:20	10/6/2016 3:35	12.3	0.04	0.00	0.12	24.2	10/5/2016 15:15	10/6/2016 15:30	24.5	0.01	0.02	1,170
10/6/2016 21:05	10/7/2016 5:10	8.1	0.34	0.04	0.48	53.9	10/6/2016 21:00	10/7/2016 17:00	20.3	0.01	0.05	1,053
10/7/2016 23:20	10/9/2016 11:45	36.4	1.00	0.03	1.32	20.7	10/7/2016 23:15	10/9/2016 19:15	44.3	0.03	0.47	5,184
10/9/2016 19:30	10/9/2016 22:35	3.1	0.19	0.06	0.24	18.7	10/9/2016 19:15	10/10/2016 10:30	15.5	0.03	0.10	1,521
10/13/2016 1:50	10/17/2016 12:00	106.2	4.73	0.04	0.72	76.5	10/13/2016 1:45	10/17/2016 23:45	118.3	0.41	1.35	175,806
10/18/2016 1:00	10/18/2016 6:30	5.5	0.17	0.03	0.24	19.2	10/18/2016 1:00	10/18/2016 18:30	17.8	0.29	0.33	18,603
10/19/2016 21:05	10/20/2016 17:50	20.8	1.68	0.08	1.32	38.8	10/19/2016 21:00	10/21/2016 5:45	33.0	1.22	2.43	144,576
10/21/2016 18:25	10/22/2016 1:10	6.8	0.07	0.01	0.24	31.4	10/21/2016 18:15	10/22/2016 12:55	56.3	0.44	0.52	88,119
10/22/2016 23:55	10/23/2016 9:00	9.1	0.20	0.02	0.24	29.4	10/22/2016 23:45	10/23/2016 21:00	64.0	0.34	0.38	78,921
10/24/2016 17:40	10/24/2016 20:25	2.8	0.17	0.06	0.24	37.5	10/24/2016 17:30	10/25/2016 8:10	44.3	0.27	0.33	43,677
10/26/2016 6:10	10/27/2016 0:05	17.9	1.78	0.10	0.60	34.8	10/26/2016 6:00	10/27/2016 11:50	89.8	1.15	2.00	370,611
10/27/2016 16:00	10/27/2016 20:05	4.1	0.05	0.01	0.24	16.7	10/27/2016 15:50	10/28/2016 7:50	48.3	0.81	1.11	141,534
10/29/2016 9:15	10/29/2016 12:50	3.6	0.12	0.03	0.12	38.0	10/29/2016 9:00	10/30/2016 0:50	47.8	0.38	0.42	65,907
10/30/2016 14:10	11/3/2016 0:35	82.4	2.00	0.02	0.60	26.9	10/30/2016 14:10	11/3/2016 12:30	283.3	1.16	2.00	1,185,704
11/5/2016 6:10	11/6/2016 4:45	22.6	1.13	0.05	0.24	54.0	11/5/2016 6:10	11/6/2016 16:40	106.8	1.29	1.80	496,205
11/9/2016 5:15	11/9/2016 13:05	7.8	0.29	0.04	0.36	72.8	11/9/2016 5:10	11/10/2016 0:55	59.5	0.63	0.76	134,388
11/12/2016 1:50	11/12/2016 8:35	6.8	0.09	0.01	0.12	63.4	11/12/2016 1:40	11/12/2016 20:25	56.5	0.40	0.42	82,116
11/13/2016 8:25	11/14/2016 7:30	23.1	0.47	0.02	0.24	24.8	11/13/2016 8:10	11/14/2016 19:15	105.5	0.47	0.58	178,200
11/14/2016 23:40	11/16/2016 0:25	24.8	1.64	0.07	0.84	18.3	11/14/2016 23:40	11/16/2016 12:10	109.8	1.63	2.52	645,561
11/16/2016 18:55	11/16/2016 23:50	4.9	0.06	0.01	0.24	19.8	11/16/2016 18:50	11/17/2016 11:45	51.0	1.14	1.41	208,386
11/19/2016 4:55	11/19/2016 13:25	8.5	0.05	0.01	0.12	57.9	11/19/2016 4:50	11/19/2016 22:40	53.8	0.55	0.58	106,245
11/19/2016 22:55	11/20/2016 14:25	15.5	0.24	0.02	0.12	17.9	11/19/2016 22:40	11/21/2016 0:50	78.8	0.51	0.53	145,035
11/21/2016 1:00	11/21/2016 7:20	6.3	0.04	0.01	0.12	13.8	11/21/2016 0:50	11/21/2016 19:20	55.8	0.45	0.48	90,612
11/22/2016 14:45	11/23/2016 1:50	11.1	0.45	0.04	0.24	37.8	11/22/2016 14:35	11/23/2016 13:40	69.5	0.51	0.64	128,457
11/23/2016 17:35	11/24/2016 23:50	30.3	1.38	0.05	0.24	16.3	11/23/2016 17:30	11/25/2016 11:40	126.8	1.13	2.07	514,890
11/25/2016 21:35	11/28/2016 8:15	58.7	0.96	0.02	0.24	22.2	11/25/2016 21:20	11/28/2016 16:35	202.0	1.18	1.41	858,405
11/28/2016 16:40	11/29/2016 2:50	10.2	0.24	0.02	0.24	21.7	11/28/2016 16:35	11/29/2016 14:40	66.5	0.95	1.09	226,665
11/29/2016 23:50	11/30/2016 2:15	2.4	0.13	0.05	0.12	21.3	11/29/2016 23:50	11/30/2016 14:10	43.3	0.77	0.83	119,646
11/30/2016 15:15	11/30/2016 15:25	0.2	0.10	0.60	0.84	13.7	11/30/2016 15:10	12/1/2016 3:10	36.3	0.73	0.89	95,769
12/1/2016 10:15	12/1/2016 21:45	11.5	0.03	0.00	0.12	18.9	12/1/2016 10:15	12/2/2016 5:45	58.8	0.60	0.66	126,405
12/2/2016 5:55	12/3/2016 4:30	22.6	0.41	0.02	0.12	38.6	12/2/2016 5:45	12/3/2016 16:15	103.8	0.65	0.72	243,685
12/3/2016 20:30	12/4/2016 14:20	17.8	0.56	0.03	0.24	18.8	12/3/2016 20:15	12/5/2016 2:05	89.8	0.89	1.02	287,785
12/5/2016 3:35	12/5/2016 16:55	13.3	0.25	0.02	0.12	20.0	12/5/2016 3:30	12/6/2016 4:40	75.8	0.77	0.83	209,745
12/10/2016 13:30	12/10/2016 19:35	6.1	0.81	0.13	0.96	120.3	12/10/2016 13:30	12/11/2016 7:20	53.8	0.62	0.66	119,880
12/11/2016 9:10	12/11/2016 20:05	10.9	0.14	0.01	0.12	14.2	12/11/2016 9:00	12/12/2016 7:30	67.8	0.63	0.66	154,719
12/12/2016 7:35	12/12/2016 11:35	4.0	0.09	0.02	0.12	16.3	12/12/2016 7:30	12/12/2016 23:25	48.0	0.55	0.56	95,553
12/19/2016 3:35	12/20/2016 3:05	23.5	0.57	0.02	0.24	160.8	12/19/2016 3:20	12/20/2016 14:50	106.8	0.43	0.56	167,094
12/22/2016 16:10	12/24/2016 21:15	53.1	1.16	0.02	0.24	62.4	12/22/2016 15:55	12/25/2016 9:00	195.5	0.90	1.31	636,753
12/26/2016 16:10	12/27/2016 0:25	8.3	0.25	0.03	0.12	53.3	12/26/2016 15:55	12/27/2016 12:20	61.5	0.65	0.72	143,074
12/29/2016 12:50	12/30/2016 7:55	19.1	0.68	0.04	0.36	62.6	12/29/2016 12:35	12/30/2016 19:50	94.0	0.78	0.89	262,863
12/31/2016 17:35	1/1/2017 0:25	6.8	0.13	0.02	0.12	35.6	12/31/2016 17:25	1/1/2017 11:50	55.5	0.70	0.72	139,374

Table D-9. Summary Statistics for Individual Storm Events at the SEIMN Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
1/1/2017 12:05	1/1/2017 14:20	2.3	0.03	0.01	0.12	15.6	1/1/2017 11:50	1/2/2017 2:10	43.3	0.62	0.66	96,417
1/2/2017 12:10	1/2/2017 13:45	1.6	0.23	0.15	0.24	39.7	1/2/2017 11:55	1/3/2017 1:30	41.0	0.52	0.56	76,464
1/8/2017 8:50	1/9/2017 0:45	15.9	0.48	0.03	0.24	139.3	1/8/2017 8:35	1/9/2017 12:30	84.0	0.45	0.51	134,739
1/9/2017 15:25	1/9/2017 17:10	1.8	0.06	0.03	0.12	17.8	1/9/2017 15:20	1/10/2017 5:10	41.8	0.47	0.51	70,677
1/10/2017 10:45	1/10/2017 11:30	0.8	0.08	0.11	0.84	18.2	1/10/2017 10:30	1/10/2017 23:15	38.5	0.45	0.47	62,487
1/12/2017 13:00	1/12/2017 13:00	0.0	0.03	0.00	0.36	50.2	1/12/2017 12:45	1/13/2017 1:00	37.0	0.32	0.34	42,885
1/17/2017 4:30	1/19/2017 17:25	60.9	2.31	0.04	0.48	161.8	1/17/2017 4:30	1/20/2017 5:20	218.8	1.48	2.73	1,168,471
1/22/2017 0:40	1/22/2017 11:20	10.7	0.03	0.00	0.12	57.0	1/22/2017 0:30	1/22/2017 23:05	68.0	0.63	0.66	153,018
1/30/2017 23:25	1/31/2017 3:40	4.3	0.04	0.01	0.12	271.8	1/30/2017 23:25	1/31/2017 15:30	48.5	0.31	0.31	54,126
2/3/2017 11:05	2/6/2017 0:00	60.9	1.93	0.03	0.84	83.7	2/3/2017 11:00	2/6/2017 12:00	219.3	0.91	1.31	721,069
2/6/2017 14:35	2/6/2017 23:25	8.8	0.27	0.03	0.24	20.8	2/6/2017 14:30	2/7/2017 11:10	62.3	0.91	1.02	204,129
2/7/2017 11:35	2/7/2017 16:15	4.7	0.52	0.11	0.24	17.1	2/7/2017 11:30	2/8/2017 4:05	50.0	0.79	0.83	141,885
2/8/2017 11:15	2/10/2017 14:15	51.0	2.45	0.05	0.72	19.7	2/8/2017 11:10	2/11/2017 2:15	189.5	3.26	8.20	2,220,758
2/14/2017 21:20	2/16/2017 6:00	32.7	2.85	0.09	0.60	113.5	2/14/2017 21:10	2/16/2017 17:50	134.3	2.73	5.71	1,319,743
2/18/2017 7:45	2/21/2017 8:40	72.9	0.79	0.01	0.36	49.9	2/18/2017 7:30	2/21/2017 20:25	255.0	1.11	1.31	1,021,673
2/21/2017 21:15	2/22/2017 4:25	7.2	0.08	0.01	0.12	15.1	2/21/2017 21:00	2/22/2017 12:50	47.8	0.92	1.02	158,877
2/22/2017 12:50	2/22/2017 21:55	9.1	0.07	0.01	0.12	14.2	2/22/2017 12:50	2/23/2017 9:50	63.3	0.83	0.89	188,559
2/25/2017 22:05	2/26/2017 18:25	20.3	0.79	0.04	0.36	78.9	2/25/2017 21:55	2/27/2017 6:10	97.0	0.83	0.96	290,232
2/27/2017 11:45	2/27/2017 23:20	11.6	0.32	0.03	0.24	23.9	2/27/2017 11:35	2/28/2017 9:10	65.0	0.92	1.02	215,955
2/28/2017 9:25	2/28/2017 11:30	2.1	0.17	0.08	0.24	19.3	2/28/2017 9:10	2/28/2017 23:15	42.5	0.92	0.96	140,094
3/2/2017 3:40	3/3/2017 3:45	24.1	0.17	0.01	0.24	40.3	3/2/2017 3:30	3/3/2017 9:10	89.3	0.69	0.72	220,807
3/3/2017 9:10	3/4/2017 0:30	15.3	0.45	0.03	0.48	14.8	3/3/2017 9:10	3/4/2017 12:30	82.3	0.82	0.96	242,451
3/4/2017 21:55	3/5/2017 17:15	19.3	0.24	0.01	0.48	24.9	3/4/2017 21:40	3/6/2017 5:00	94.3	0.75	0.83	253,305
3/7/2017 3:10	3/7/2017 19:25	16.3	0.48	0.03	0.24	48.0	3/7/2017 3:00	3/8/2017 7:15	85.0	0.76	0.89	232,623
3/8/2017 18:25	3/10/2017 4:10	33.8	0.65	0.02	0.24	27.1	3/8/2017 18:10	3/10/2017 16:10	138.3	0.85	1.09	424,845
3/11/2017 9:40	3/11/2017 18:40	9.0	0.30	0.03	0.24	30.1	3/11/2017 9:40	3/12/2017 6:40	60.3	0.91	0.96	197,127
3/13/2017 6:00	3/15/2017 16:00	58.0	1.71	0.03	0.24	41.1	3/13/2017 5:45	3/16/2017 4:00	211.0	1.29	2.18	983,395
3/17/2017 13:25	3/18/2017 14:25	25.0	1.56	0.06	0.24	47.9	3/17/2017 13:15	3/19/2017 2:10	111.0	1.92	3.00	767,925
3/20/2017 19:30	3/21/2017 20:50	25.3	0.27	0.01	0.12	55.1	3/20/2017 19:30	3/22/2017 8:35	111.5	0.99	1.09	397,791
3/22/2017 12:10	3/22/2017 15:05	2.9	0.05	0.02	0.12	20.2	3/22/2017 12:00	3/23/2017 2:50	44.8	0.84	0.89	135,657
3/23/2017 21:45	3/25/2017 3:20	29.6	0.79	0.03	0.48	33.4	3/23/2017 21:30	3/25/2017 15:10	125.3	0.94	1.16	423,459
3/26/2017 10:15	3/27/2017 11:20	25.1	0.35	0.01	0.12	39.0	3/26/2017 10:05	3/27/2017 15:40	89.0	0.79	0.89	254,133
3/27/2017 15:40	3/30/2017 15:40	72.0	1.47	0.02	0.48	17.2	3/27/2017 15:40	3/31/2017 3:30	251.8	1.02	1.46	923,592
4/1/2017 4:50	4/2/2017 20:15	39.4	0.42	0.01	0.36	39.0	4/1/2017 4:50	4/3/2017 8:10	154.3	0.93	1.02	517,249
4/4/2017 22:00	4/8/2017 1:45	75.8	1.20	0.02	0.48	59.9	4/4/2017 21:45	4/8/2017 13:30	263.5	0.91	1.23	866,618
4/10/2017 2:30	4/10/2017 21:35	19.1	0.44	0.02	0.48	49.9	4/10/2017 2:20	4/11/2017 9:20	93.3	0.98	1.31	328,898
4/12/2017 1:35	4/14/2017 0:40	47.1	1.18	0.03	0.36	29.5	4/12/2017 1:30	4/14/2017 12:30	177.3	1.24	1.72	791,155
4/17/2017 16:30	4/18/2017 19:45	27.3	0.53	0.02	0.72	98.9	4/17/2017 16:30	4/19/2017 7:30	117.3	0.64	0.77	271,629
4/19/2017 10:20	4/20/2017 8:45	22.4	0.68	0.03	0.36	14.8	4/19/2017 10:05	4/20/2017 20:35	103.8	0.89	1.23	332,055
4/22/2017 14:15	4/23/2017 6:10	15.9	0.16	0.01	0.36	61.4	4/22/2017 14:00	4/23/2017 11:30	64.8	0.65	0.72	151,659
4/23/2017 11:40	4/24/2017 5:40	18.0	0.58	0.03	0.48	19.6	4/23/2017 11:30	4/24/2017 17:25	90.0	0.84	1.09	271,107
4/25/2017 19:20	4/27/2017 2:50	31.5	1.15	0.04	0.48	44.5	4/25/2017 19:20	4/27/2017 14:35	130.0	1.04	1.90	487,512
4/28/2017 5:05	4/28/2017 6:20	1.3	0.06	0.05	0.12	29.1	4/28/2017 4:50	4/28/2017 18:15	40.5	0.79	0.89	115,740

Table D-9. Summary Statistics for Individual Storm Events at the SEIMN Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
4/29/2017 18:00	4/30/2017 19:30	25.5	0.52	0.02	0.36	36.2	4/29/2017 17:50	5/1/2017 7:20	112.8	0.72	0.77	290,260
5/1/2017 9:20	5/1/2017 13:50	4.5	0.13	0.03	0.12	18.2	5/1/2017 9:10	5/2/2017 1:50	50.3	0.74	0.77	133,938
5/2/2017 20:45	5/3/2017 9:00	12.3	0.33	0.03	0.36	32.8	5/2/2017 20:35	5/3/2017 21:00	73.5	0.73	0.77	192,915
5/4/2017 13:35	5/5/2017 6:40	17.1	1.18	0.07	1.68	32.1	5/4/2017 13:20	5/5/2017 18:40	88.3	1.32	2.18	419,256
5/11/2017 11:40	5/12/2017 22:05	34.4	0.31	0.01	0.60	151.2	5/11/2017 11:40	5/13/2017 9:55	139.0	0.59	0.66	293,409
5/13/2017 21:00	5/13/2017 23:05	2.1	0.23	0.11	0.24	49.3	5/13/2017 21:00	5/14/2017 11:00	42.3	0.57	0.66	86,526
5/15/2017 15:10	5/17/2017 6:15	39.1	1.44	0.04	0.60	40.5	5/15/2017 15:10	5/17/2017 18:00	152.8	0.96	1.46	530,380
5/31/2017 22:35	6/1/2017 9:00	10.4	0.17	0.02	0.12	360.2	5/31/2017 22:20	6/1/2017 20:45	67.5	0.34	0.47	83,700
6/8/2017 1:30	6/8/2017 11:45	10.3	0.37	0.04	0.12	160.8	6/8/2017 1:15	6/8/2017 23:40	67.5	0.20	0.25	48,231
6/13/2017 7:15	6/13/2017 8:55	1.7	0.03	0.02	0.12	116.9	6/13/2017 7:05	6/13/2017 20:45	41.3	0.15	0.15	22,275
6/13/2017 21:40	6/13/2017 23:35	1.9	0.05	0.03	0.36	131.3	6/13/2017 21:40	6/14/2017 11:30	41.8	0.17	0.20	25,920

Table D-10. Summary Statistics for Individual Storm Events at the SEIMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/1/2016 3:05	10/1/2016 18:50	15.8	0.09	0.01	0.24	0.0	10/1/2016 3:00	10/2/2016 6:45	27.8	0.28	0.33	27,906
10/3/2016 22:35	10/4/2016 23:00	24.4	0.18	0.01	0.12	52.8	10/3/2016 22:30	10/5/2016 11:00	36.6	0.29	0.33	38,409
10/5/2016 15:20	10/6/2016 3:35	12.3	0.04	0.00	0.12	24.2	10/5/2016 15:20	10/6/2016 15:30	24.3	0.27	0.29	23,781
10/6/2016 21:05	10/7/2016 5:10	8.1	0.34	0.04	0.48	53.9	10/6/2016 21:00	10/7/2016 17:10	20.3	0.32	0.55	23,238
10/7/2016 23:20	10/9/2016 11:45	36.4	1.00	0.03	1.32	20.7	10/7/2016 23:15	10/9/2016 19:25	44.3	0.45	2.04	72,468
10/9/2016 19:30	10/9/2016 22:35	3.1	0.19	0.06	0.24	18.7	10/9/2016 19:25	10/10/2016 10:30	15.2	0.45	0.87	24,711
10/13/2016 1:50	10/17/2016 12:00	106.2	4.73	0.04	0.72	76.5	10/13/2016 1:50	10/17/2016 23:55	118.2	0.70	2.29	296,032
10/18/2016 1:00	10/18/2016 6:30	5.5	0.17	0.03	0.24	19.2	10/18/2016 0:55	10/18/2016 18:30	17.7	0.36	0.45	22,872
10/19/2016 21:05	10/20/2016 17:50	20.8	1.68	0.08	1.32	38.8	10/19/2016 21:00	10/21/2016 5:45	32.8	1.05	3.41	124,470
10/21/2016 18:25	10/22/2016 1:10	6.8	0.07	0.01	0.24	31.4	10/21/2016 18:20	10/22/2016 13:05	18.8	0.33	0.37	22,170
10/22/2016 23:55	10/23/2016 9:00	9.1	0.20	0.02	0.24	29.4	10/22/2016 23:55	10/23/2016 20:55	21.1	0.34	0.41	25,803
10/24/2016 17:40	10/24/2016 20:25	2.8	0.17	0.06	0.24	37.5	10/24/2016 17:35	10/25/2016 8:25	14.9	0.33	0.41	17,973
10/26/2016 6:10	10/27/2016 0:05	17.9	1.78	0.10	0.60	34.8	10/26/2016 6:10	10/27/2016 12:00	29.9	1.08	1.93	116,388
10/27/2016 16:00	10/27/2016 20:05	4.1	0.05	0.01	0.24	16.7	10/27/2016 15:55	10/28/2016 8:00	16.2	0.42	0.45	24,270
10/29/2016 9:15	10/29/2016 12:50	3.6	0.12	0.03	0.12	38.0	10/29/2016 9:10	10/30/2016 0:50	15.8	0.36	0.45	20,619
10/30/2016 14:10	11/3/2016 0:35	82.4	2.00	0.02	0.60	26.9	10/30/2016 14:10	11/3/2016 12:30	94.4	0.67	2.16	227,529
11/5/2016 6:10	11/6/2016 4:45	22.6	1.13	0.05	0.24	54.0	11/5/2016 6:10	11/6/2016 16:40	35.6	0.87	1.60	111,420
11/9/2016 5:15	11/9/2016 13:05	7.8	0.29	0.04	0.36	72.8	11/9/2016 5:10	11/10/2016 1:05	20.0	0.47	0.80	34,047
11/12/2016 1:50	11/12/2016 8:35	6.8	0.09	0.01	0.12	63.4	11/12/2016 1:50	11/12/2016 20:35	18.8	0.35	0.37	23,502
11/13/2016 8:25	11/14/2016 7:30	23.1	0.47	0.02	0.24	24.8	11/13/2016 8:25	11/14/2016 19:30	35.2	0.43	0.67	54,630
11/14/2016 23:40	11/16/2016 0:25	24.8	1.64	0.07	0.84	18.3	11/14/2016 23:40	11/16/2016 12:20	36.8	1.29	2.96	170,457
11/16/2016 18:55	11/16/2016 23:50	4.9	0.06	0.01	0.24	19.8	11/16/2016 18:55	11/17/2016 11:45	16.9	0.68	0.80	41,367
11/19/2016 4:55	11/19/2016 13:25	8.5	0.05	0.01	0.12	57.9	11/19/2016 4:50	11/19/2016 22:50	18.1	0.42	0.45	27,039
11/19/2016 22:55	11/20/2016 14:25	15.5	0.24	0.02	0.12	17.9	11/19/2016 22:50	11/21/2016 0:55	26.2	0.42	0.45	39,858
11/21/2016 1:00	11/21/2016 7:20	6.3	0.04	0.01	0.12	13.8	11/21/2016 0:55	11/21/2016 19:15	18.4	0.39	0.41	25,863
11/22/2016 14:45	11/23/2016 1:50	11.1	0.45	0.04	0.24	37.8	11/22/2016 14:45	11/23/2016 13:50	23.2	0.51	0.94	42,171
11/23/2016 17:35	11/24/2016 23:50	30.3	1.38	0.05	0.24	16.3	11/23/2016 17:35	11/25/2016 11:45	42.3	0.86	1.81	130,992
11/25/2016 21:35	11/28/2016 8:15	58.7	0.96	0.02	0.24	22.2	11/25/2016 21:30	11/28/2016 16:40	67.3	0.75	1.25	182,427
11/28/2016 16:40	11/29/2016 2:50	10.2	0.24	0.02	0.24	21.7	11/28/2016 16:40	11/29/2016 14:45	22.2	0.60	0.73	47,793
11/29/2016 23:50	11/30/2016 2:15	2.4	0.13	0.05	0.12	21.3	11/29/2016 23:45	11/30/2016 14:10	14.5	0.55	0.67	28,521
11/30/2016 15:15	11/30/2016 15:25	0.2	0.10	0.60	0.84	13.7	11/30/2016 15:10	12/1/2016 3:20	12.3	0.51	0.61	22,344
12/1/2016 10:15	12/1/2016 21:45	11.5	0.03	0.00	0.12	18.9	12/1/2016 10:15	12/2/2016 5:55	19.8	0.42	0.45	30,099
12/2/2016 5:55	12/3/2016 4:30	22.6	0.41	0.02	0.12	38.6	12/2/2016 5:55	12/3/2016 16:25	34.6	0.50	0.61	62,082
12/3/2016 20:30	12/4/2016 14:20	17.8	0.56	0.03	0.24	18.8	12/3/2016 20:30	12/5/2016 2:15	29.8	0.63	1.01	68,049
12/5/2016 3:35	12/5/2016 16:55	13.3	0.25	0.02	0.12	20.0	12/5/2016 3:30	12/6/2016 4:50	25.4	0.57	0.73	52,155
12/10/2016 13:30	12/10/2016 19:35	6.1	0.81	0.13	0.96	120.3	12/10/2016 13:25	12/11/2016 7:35	18.3	0.64	1.09	42,135
12/11/2016 9:10	12/11/2016 20:05	10.9	0.14	0.01	0.12	14.2	12/11/2016 9:10	12/12/2016 7:30	22.4	0.49	0.55	39,255
12/12/2016 7:35	12/12/2016 11:35	4.0	0.09	0.02	0.12	16.3	12/12/2016 7:30	12/12/2016 23:35	16.2	0.45	0.50	26,379
12/19/2016 3:35	12/20/2016 3:05	23.5	0.57	0.02	0.24	160.8	12/19/2016 3:30	12/20/2016 15:00	35.6	0.45	0.80	58,233
12/22/2016 16:10	12/24/2016 21:15	53.1	1.16	0.02	0.24	62.4	12/22/2016 16:05	12/25/2016 9:10	65.2	0.69	1.09	161,724
12/26/2016 16:10	12/27/2016 0:25	8.3	0.25	0.03	0.12	53.3	12/26/2016 16:05	12/27/2016 12:20	20.3	0.53	0.73	38,847
12/29/2016 12:50	12/30/2016 7:55	19.1	0.68	0.04	0.36	62.6	12/29/2016 12:45	12/30/2016 19:50	31.2	0.67	1.17	75,078
12/31/2016 17:35	1/1/2017 0:25	6.8	0.13	0.02	0.12	35.6	12/31/2016 17:35	1/1/2017 12:00	18.5	0.58	0.73	38,808
1/1/2017 12:05	1/1/2017 14:20	2.3	0.03	0.01	0.12	15.6	1/1/2017 12:00	1/2/2017 2:15	14.3	0.48	0.50	24,750

Table D-10. Summary Statistics for Individual Storm Events at the SEIMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
1/2/2017 12:10	1/2/2017 13:45	1.6	0.23	0.15	0.24	39.7	1/2/2017 12:10	1/3/2017 1:40	13.6	0.42	0.45	20,589
1/8/2017 8:50	1/9/2017 0:45	15.9	0.48	0.03	0.24	139.3	1/8/2017 8:45	1/9/2017 12:40	28.0	0.50	0.73	50,745
1/9/2017 15:25	1/9/2017 17:10	1.8	0.06	0.03	0.12	17.8	1/9/2017 15:25	1/10/2017 5:10	13.8	0.42	0.45	21,126
1/10/2017 10:45	1/10/2017 11:30	0.8	0.08	0.11	0.84	18.2	1/10/2017 10:40	1/10/2017 23:25	12.8	0.41	0.45	19,038
1/12/2017 13:00	1/12/2017 13:00	0.0	0.03	0.00	0.36	50.2	1/12/2017 12:55	1/13/2017 1:00	12.2	0.33	0.33	14,454
1/17/2017 4:30	1/19/2017 17:25	60.9	2.31	0.04	0.48	161.8	1/17/2017 4:25	1/20/2017 5:25	73.1	1.34	2.68	351,890
1/22/2017 0:40	1/22/2017 11:20	10.7	0.03	0.00	0.12	57.0	1/22/2017 0:40	1/22/2017 23:20	22.8	0.53	0.55	43,380
1/30/2017 23:25	1/31/2017 3:40	4.3	0.04	0.01	0.12	271.8	1/30/2017 23:25	1/31/2017 15:40	16.3	0.35	0.37	20,808
2/3/2017 11:05	2/6/2017 0:00	60.9	1.93	0.03	0.84	83.7	2/3/2017 11:00	2/6/2017 11:55	73.0	0.71	1.33	185,669
2/6/2017 14:35	2/6/2017 23:25	8.8	0.27	0.03	0.24	20.8	2/6/2017 14:35	2/7/2017 11:25	20.9	0.60	0.67	45,534
2/7/2017 11:35	2/7/2017 16:15	4.7	0.52	0.11	0.24	17.1	2/7/2017 11:35	2/8/2017 4:15	16.8	0.48	0.55	29,205
2/8/2017 11:15	2/10/2017 14:15	51.0	2.45	0.05	0.72	19.7	2/8/2017 11:10	2/11/2017 2:10	63.1	2.71	8.74	614,923
2/14/2017 21:20	2/16/2017 6:00	32.7	2.85	0.09	0.60	113.5	2/14/2017 21:20	2/16/2017 17:55	44.7	2.54	5.35	408,670
2/18/2017 7:45	2/21/2017 8:40	72.9	0.79	0.01	0.36	49.9	2/18/2017 7:40	2/21/2017 20:35	85.0	0.84	1.25	256,805
2/21/2017 21:15	2/22/2017 4:25	7.2	0.08	0.01	0.12	15.1	2/21/2017 21:10	2/22/2017 12:45	15.7	0.72	0.80	40,422
2/22/2017 12:50	2/22/2017 21:55	9.1	0.07	0.01	0.12	14.2	2/22/2017 12:45	2/23/2017 9:55	21.3	0.64	0.67	48,879
2/25/2017 22:05	2/26/2017 18:25	20.3	0.79	0.04	0.36	78.9	2/25/2017 22:05	2/27/2017 6:20	32.3	0.86	1.33	100,602
2/27/2017 11:45	2/27/2017 23:20	11.6	0.32	0.03	0.24	23.9	2/27/2017 11:45	2/28/2017 9:20	21.7	0.94	1.17	73,098
2/28/2017 9:25	2/28/2017 11:30	2.1	0.17	0.08	0.24	19.3	2/28/2017 9:20	2/28/2017 23:25	14.2	0.83	0.87	42,438
3/2/2017 3:40	3/3/2017 3:45	24.1	0.17	0.01	0.24	40.3	3/2/2017 3:40	3/3/2017 9:10	29.6	0.64	0.73	68,259
3/3/2017 9:10	3/4/2017 0:30	15.3	0.45	0.03	0.48	14.8	3/3/2017 9:10	3/4/2017 12:30	27.4	0.81	1.25	80,118
3/4/2017 21:55	3/5/2017 17:15	19.3	0.24	0.01	0.48	24.9	3/4/2017 21:55	3/6/2017 5:10	31.3	0.67	0.87	75,804
3/7/2017 3:10	3/7/2017 19:25	16.3	0.48	0.03	0.24	48.0	3/7/2017 3:10	3/8/2017 7:25	28.3	0.78	1.09	79,407
3/8/2017 18:25	3/10/2017 4:10	33.8	0.65	0.02	0.24	27.1	3/8/2017 18:20	3/10/2017 16:10	45.9	0.83	1.33	136,539
3/11/2017 9:40	3/11/2017 18:40	9.0	0.30	0.03	0.24	30.1	3/11/2017 9:40	3/12/2017 6:40	20.1	0.84	1.17	60,579
3/13/2017 6:00	3/15/2017 16:00	58.0	1.71	0.03	0.24	41.1	3/13/2017 5:55	3/16/2017 3:55	70.1	1.22	2.42	307,659
3/17/2017 13:25	3/18/2017 14:25	25.0	1.56	0.06	0.24	47.9	3/17/2017 13:25	3/19/2017 2:25	37.1	1.84	3.41	245,043
3/20/2017 19:30	3/21/2017 20:50	25.3	0.27	0.01	0.12	55.1	3/20/2017 19:25	3/22/2017 8:45	37.4	0.86	0.94	115,887
3/22/2017 12:10	3/22/2017 15:05	2.9	0.05	0.02	0.12	20.2	3/22/2017 12:10	3/23/2017 3:00	14.9	0.70	0.73	37,851
3/23/2017 21:45	3/25/2017 3:20	29.6	0.79	0.03	0.48	33.4	3/23/2017 21:40	3/25/2017 15:20	41.8	0.89	1.42	133,551
3/26/2017 10:15	3/27/2017 11:20	25.1	0.35	0.01	0.12	39.0	3/26/2017 10:15	3/27/2017 15:40	29.5	0.75	1.01	79,800
3/27/2017 15:40	3/30/2017 15:40	72.0	1.47	0.02	0.48	17.2	3/27/2017 15:40	3/31/2017 3:40	84.1	1.03	2.16	312,274
4/1/2017 4:50	4/2/2017 20:15	39.4	0.42	0.01	0.36	39.0	4/1/2017 4:50	4/3/2017 8:10	51.4	0.90	1.25	165,746
4/4/2017 22:00	4/8/2017 1:45	75.8	1.20	0.02	0.48	59.9	4/4/2017 21:55	4/8/2017 13:40	87.8	0.93	1.51	294,030
4/10/2017 2:30	4/10/2017 21:35	19.1	0.44	0.02	0.48	49.9	4/10/2017 2:25	4/11/2017 9:30	31.2	0.88	1.71	98,934
4/12/2017 1:35	4/14/2017 0:40	47.1	1.18	0.03	0.36	29.5	4/12/2017 1:30	4/14/2017 12:40	59.3	1.16	2.04	246,631
4/17/2017 16:30	4/18/2017 19:45	27.3	0.53	0.02	0.72	98.9	4/17/2017 16:25	4/19/2017 7:40	39.3	0.77	1.01	109,533
4/19/2017 10:20	4/20/2017 8:45	22.4	0.68	0.03	0.36	14.8	4/19/2017 10:15	4/20/2017 20:45	34.6	1.08	2.29	133,956
4/22/2017 14:15	4/23/2017 6:10	15.9	0.16	0.01	0.36	61.4	4/22/2017 14:10	4/23/2017 11:35	21.5	0.76	0.94	58,770
4/23/2017 11:40	4/24/2017 5:40	18.0	0.58	0.03	0.48	19.6	4/23/2017 11:35	4/24/2017 17:35	30.1	1.02	1.93	110,703
4/25/2017 19:20	4/27/2017 2:50	31.5	1.15	0.04	0.48	44.5	4/25/2017 19:15	4/27/2017 14:45	43.6	1.18	3.11	184,929
4/28/2017 5:05	4/28/2017 6:20	1.3	0.06	0.05	0.12	29.1	4/28/2017 5:00	4/28/2017 18:20	13.4	0.92	1.01	44,247
4/29/2017 18:00	4/30/2017 19:30	25.5	0.52	0.02	0.36	36.2	4/29/2017 17:55	5/1/2017 7:25	37.6	0.87	1.17	117,885
5/1/2017 9:20	5/1/2017 13:50	4.5	0.13	0.03	0.12	18.2	5/1/2017 9:20	5/2/2017 1:50	16.6	0.84	0.94	50,112

Table D-10. Summary Statistics for Individual Storm Events at the SEIMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
5/2/2017 20:45	5/3/2017 9:00	12.3	0.33	0.03	0.36	32.8	5/2/2017 20:45	5/3/2017 21:00	24.3	0.88	1.33	76,740
5/4/2017 13:35	5/5/2017 6:40	17.1	1.18	0.07	1.68	32.1	5/4/2017 13:30	5/5/2017 18:40	29.3	1.50	3.89	158,166
5/11/2017 11:40	5/12/2017 22:05	34.4	0.31	0.01	0.60	151.2	5/11/2017 11:35	5/13/2017 10:05	46.6	0.65	0.87	109,001
5/13/2017 21:00	5/13/2017 23:05	2.1	0.23	0.11	0.24	49.3	5/13/2017 21:00	5/14/2017 11:00	14.1	0.66	0.80	33,231
5/15/2017 15:10	5/17/2017 6:15	39.1	1.44	0.04	0.60	40.5	5/15/2017 15:10	5/17/2017 18:10	51.1	1.04	2.04	190,940
5/31/2017 22:35	6/1/2017 9:00	10.4	0.17	0.02	0.12	360.2	5/31/2017 22:30	6/1/2017 20:55	22.5	0.52	0.67	42,339
6/8/2017 1:30	6/8/2017 11:45	10.3	0.37	0.04	0.12	160.8	6/8/2017 1:25	6/8/2017 23:45	22.4	0.51	0.61	41,454
6/13/2017 7:15	6/13/2017 8:55	1.7	0.03	0.02	0.12	116.9	6/13/2017 7:15	6/13/2017 20:55	13.8	0.43	0.45	21,519
6/13/2017 21:40	6/13/2017 23:35	1.9	0.05	0.03	0.36	131.3	6/13/2017 21:40	6/14/2017 11:35	14.0	0.44	0.45	22,356

Table D-11. Summary Statistics for Individual Storm Events at the COUMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/1/2016 2:50	10/1/2016 18:50	16.0	0.09	0.01	0.24	0.0	10/1/2016 2:45	10/2/2016 6:45	28.1	0.16	0.29	16,599
10/3/2016 22:20	10/4/2016 17:05	18.8	0.23	0.01	0.48	52.5	10/3/2016 22:20	10/5/2016 5:00	30.8	0.20	0.45	22,113
10/5/2016 17:20	10/6/2016 4:50	11.5	0.05	0.00	0.12	27.5	10/5/2016 17:15	10/6/2016 16:50	23.7	0.13	0.24	11,472
10/6/2016 21:20	10/7/2016 5:20	8.0	0.36	0.05	0.96	18.8	10/6/2016 21:20	10/7/2016 17:15	20.0	0.26	3.28	18,693
10/7/2016 22:20	10/9/2016 5:50	31.5	1.00	0.03	2.40	18.0	10/7/2016 22:20	10/9/2016 17:45	43.5	0.57	10.88	88,716
10/9/2016 19:20	10/9/2016 23:20	4.0	0.20	0.05	0.48	18.0	10/9/2016 19:15	10/10/2016 11:15	16.1	0.32	1.04	18,480
10/13/2016 2:20	10/18/2016 8:30	126.2	4.25	0.03	0.72	76.8	10/13/2016 2:15	10/18/2016 20:25	138.3	1.12	9.22	557,119
10/19/2016 21:30	10/20/2016 11:15	13.8	1.54	0.11	1.20	39.8	10/19/2016 21:30	10/20/2016 23:10	25.8	2.45	10.88	227,466
10/21/2016 18:05	10/21/2016 18:30	0.4	0.03	0.07	0.12	31.9	10/21/2016 18:00	10/22/2016 6:30	12.6	0.47	0.57	21,159
10/22/2016 23:50	10/23/2016 8:40	8.8	0.20	0.02	0.12	61.7	10/22/2016 23:50	10/23/2016 20:40	20.9	0.44	1.33	33,498
10/24/2016 17:30	10/24/2016 19:40	2.2	0.14	0.06	0.24	37.7	10/24/2016 17:25	10/25/2016 7:40	14.3	0.44	0.87	22,761
10/26/2016 6:05	10/27/2016 0:00	17.9	1.53	0.09	0.48	35.3	10/26/2016 6:00	10/27/2016 12:00	30.1	2.55	6.76	276,615
10/27/2016 16:40	10/27/2016 19:50	3.2	0.04	0.01	0.12	17.2	10/27/2016 16:40	10/28/2016 7:50	15.3	0.62	0.79	34,050
10/29/2016 8:55	10/29/2016 12:55	4.0	0.16	0.04	0.12	40.2	10/29/2016 8:55	10/30/2016 0:55	16.1	0.51	1.04	29,508
10/30/2016 14:05	11/3/2016 0:35	82.5	2.06	0.03	0.60	27.1	10/30/2016 14:00	11/3/2016 12:30	94.6	1.10	7.22	374,172
11/5/2016 5:55	11/6/2016 4:30	22.6	1.18	0.05	0.36	53.8	11/5/2016 5:55	11/6/2016 16:25	35.6	1.60	4.12	204,342
11/9/2016 5:45	11/9/2016 11:00	5.3	0.31	0.06	0.72	73.4	11/9/2016 5:45	11/9/2016 23:00	17.3	0.68	5.26	42,717
11/12/2016 2:20	11/12/2016 8:20	6.0	0.09	0.02	0.12	64.2	11/12/2016 2:20	11/12/2016 20:15	18.0	0.49	0.87	31,890
11/13/2016 8:20	11/14/2016 6:10	21.8	0.46	0.02	0.24	26.1	11/13/2016 8:20	11/14/2016 18:10	33.9	0.88	2.54	107,601
11/14/2016 23:30	11/16/2016 8:30	33.0	1.71	0.05	1.08	18.3	11/14/2016 23:25	11/16/2016 20:30	45.2	2.25	11.76	366,519
11/19/2016 4:55	11/19/2016 10:35	5.7	0.04	0.01	0.12	78.2	11/19/2016 4:50	11/19/2016 22:35	17.8	0.35	0.46	22,644
11/19/2016 23:30	11/20/2016 12:20	12.8	0.12	0.01	0.12	18.6	11/19/2016 23:25	11/21/2016 0:20	25.0	0.36	0.65	32,115
11/21/2016 0:50	11/21/2016 7:50	7.0	0.04	0.01	0.12	15.3	11/21/2016 0:50	11/21/2016 19:50	19.1	0.28	0.36	19,554
11/22/2016 15:55	11/23/2016 13:30	21.6	0.61	0.03	0.24	39.1	11/22/2016 15:55	11/23/2016 18:20	26.5	0.87	3.20	83,355
11/23/2016 18:20	11/25/2016 1:15	30.9	1.23	0.04	0.24	16.8	11/23/2016 18:20	11/25/2016 13:15	43.0	1.33	3.68	205,971
11/25/2016 21:55	11/27/2016 7:00	33.1	0.54	0.02	0.12	22.4	11/25/2016 21:55	11/27/2016 12:40	38.8	0.88	1.61	123,054
11/27/2016 12:45	11/27/2016 19:00	6.3	0.27	0.04	0.24	13.3	11/27/2016 12:40	11/28/2016 6:55	18.3	0.92	2.47	60,966
11/29/2016 23:45	11/30/2016 2:00	2.3	0.13	0.06	0.24	53.3	11/29/2016 23:45	11/30/2016 14:00	14.3	0.52	1.20	26,871
11/30/2016 15:30	11/30/2016 17:10	1.7	0.06	0.04	0.36	14.2	11/30/2016 15:30	12/1/2016 5:10	13.8	0.39	0.72	19,410
12/2/2016 6:00	12/3/2016 2:35	20.6	0.41	0.02	0.24	38.3	12/2/2016 5:55	12/3/2016 14:35	32.8	0.48	0.93	56,175
12/3/2016 20:05	12/4/2016 14:25	18.3	0.40	0.02	0.12	17.9	12/3/2016 20:00	12/5/2016 2:25	30.5	0.62	1.40	67,614
12/5/2016 6:45	12/5/2016 14:05	7.3	0.18	0.02	0.12	24.3	12/5/2016 6:40	12/6/2016 2:00	19.4	0.53	1.14	36,906
12/9/2016 12:20	12/10/2016 23:05	34.8	0.74	0.02	2.52	99.1	12/9/2016 12:20	12/11/2016 7:15	43.0	0.58	1.73	90,402
12/11/2016 7:20	12/11/2016 20:20	13.0	0.09	0.01	0.12	17.0	12/11/2016 7:15	12/12/2016 8:15	25.1	0.42	0.51	38,082
12/12/2016 10:35	12/12/2016 18:50	8.3	0.05	0.01	0.24	18.2	12/12/2016 10:30	12/13/2016 6:45	20.3	0.35	0.46	25,860
12/19/2016 3:35	12/20/2016 2:50	23.3	0.49	0.02	0.48	161.0	12/19/2016 3:30	12/20/2016 14:45	35.3	0.49	1.73	61,800
12/22/2016 17:05	12/24/2016 0:05	31.0	0.96	0.03	0.48	65.2	12/22/2016 17:00	12/24/2016 12:00	43.1	1.01	1.84	156,051
12/26/2016 16:35	12/26/2016 22:35	6.0	0.24	0.04	0.24	72.5	12/26/2016 16:35	12/27/2016 10:30	18.0	0.66	1.14	42,801
12/27/2016 11:35	12/27/2016 17:05	5.5	0.03	0.01	0.12	13.8	12/27/2016 11:35	12/28/2016 5:00	17.5	0.56	2.09	35,397
12/29/2016 12:35	12/30/2016 8:20	19.8	0.63	0.03	0.48	62.8	12/29/2016 12:30	12/30/2016 20:20	31.9	1.00	3.55	115,128
12/31/2016 17:35	12/31/2016 21:35	4.0	0.27	0.07	0.72	35.2	12/31/2016 17:35	1/1/2017 9:30	16.0	0.86	2.49	49,656
1/1/2017 11:05	1/1/2017 12:50	1.8	0.04	0.02	0.12	15.0	1/1/2017 11:00	1/2/2017 0:45	13.8	0.58	0.66	28,713
1/8/2017 11:35	1/9/2017 0:50	13.3	0.47	0.04	0.72	168.5	1/8/2017 11:35	1/9/2017 12:45	25.3	0.68	1.50	62,205
1/9/2017 15:35	1/10/2017 10:05	18.5	0.13	0.01	0.24	18.2	1/9/2017 15:30	1/10/2017 22:05	30.7	0.47	0.66	51,357

Table D-11. Summary Statistics for Individual Storm Events at the COUMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
1/17/2017 4:20	1/19/2017 9:05	52.8	2.18	0.04	1.20	164.0	1/17/2017 4:15	1/19/2017 12:20	56.2	1.93	7.13	390,938
1/19/2017 12:20	1/19/2017 17:05	4.8	0.12	0.03	0.24	12.5	1/19/2017 12:20	1/20/2017 5:00	16.8	1.06	1.61	63,957
1/22/2017 1:05	1/22/2017 12:05	11.0	0.04	0.00	0.12	57.5	1/22/2017 1:05	1/23/2017 0:00	23.0	0.54	0.61	45,078
1/29/2017 19:05	1/29/2017 19:35	0.5	0.03	0.06	0.12	186.0	1/29/2017 19:05	1/30/2017 7:30	12.5	0.33	0.37	14,790
2/2/2017 17:50	2/6/2017 20:05	98.3	2.21	0.02	0.60	280.8	2/2/2017 17:45	2/7/2017 8:00	110.3	1.10	3.22	436,548
2/7/2017 11:20	2/7/2017 16:50	5.5	0.19	0.03	0.12	17.2	2/7/2017 11:15	2/8/2017 4:50	17.7	0.89	1.03	56,688
2/8/2017 9:50	2/10/2017 12:05	50.3	2.35	0.05	1.08	18.5	2/8/2017 9:45	2/11/2017 0:00	62.3	3.68	19.25	826,192
2/14/2017 22:10	2/16/2017 5:40	31.5	2.66	0.08	1.20	114.3	2/14/2017 22:10	2/16/2017 17:35	43.5	3.83	12.46	599,380
2/18/2017 8:55	2/22/2017 3:10	90.3	0.77	0.01	0.24	52.2	2/18/2017 8:55	2/22/2017 15:10	102.3	0.87	1.92	322,309
2/22/2017 16:05	2/22/2017 16:45	0.7	0.04	0.06	0.12	17.6	2/22/2017 16:05	2/23/2017 4:40	12.7	0.71	0.88	32,403
2/25/2017 22:50	2/26/2017 16:30	17.7	0.36	0.02	0.12	78.8	2/25/2017 22:50	2/27/2017 4:30	29.8	0.73	1.20	78,267
2/27/2017 4:40	2/28/2017 10:55	30.3	0.61	0.02	0.24	19.6	2/27/2017 4:40	2/28/2017 22:50	42.3	0.99	1.69	150,273
3/2/2017 5:30	3/3/2017 0:55	19.4	0.06	0.00	0.12	42.9	3/2/2017 5:30	3/3/2017 9:15	27.8	0.45	0.49	45,438
3/3/2017 9:15	3/4/2017 1:35	16.3	0.54	0.03	0.24	15.9	3/3/2017 9:15	3/4/2017 13:30	28.3	0.93	2.97	95,289
3/4/2017 21:55	3/5/2017 3:15	5.3	0.18	0.03	0.36	25.6	3/4/2017 21:55	3/5/2017 15:10	17.3	0.72	2.03	44,796
3/7/2017 3:00	3/7/2017 17:45	14.8	0.46	0.03	0.12	48.0	3/7/2017 2:55	3/8/2017 5:45	26.9	0.81	1.39	78,840
3/8/2017 15:45	3/10/2017 3:45	36.0	0.65	0.02	0.24	24.6	3/8/2017 15:40	3/10/2017 15:40	48.1	0.86	2.41	149,325
3/11/2017 9:25	3/11/2017 13:20	3.9	0.24	0.06	0.24	29.8	3/11/2017 9:20	3/12/2017 1:15	16.0	0.85	1.80	48,696
3/13/2017 5:35	3/16/2017 1:05	67.5	1.66	0.02	0.24	41.2	3/13/2017 5:35	3/16/2017 13:05	79.6	1.39	3.76	399,218
3/17/2017 13:25	3/18/2017 12:20	22.9	1.42	0.06	0.24	49.5	3/17/2017 13:25	3/19/2017 0:20	35.0	2.12	4.66	267,054
3/20/2017 19:55	3/22/2017 4:50	32.9	0.21	0.01	0.12	56.2	3/20/2017 19:50	3/22/2017 16:50	45.1	0.66	1.12	107,624
3/23/2017 21:50	3/24/2017 21:45	23.9	0.66	0.03	0.36	54.6	3/23/2017 21:45	3/25/2017 9:40	36.0	0.89	2.82	115,128
3/26/2017 9:10	3/26/2017 22:45	13.6	0.27	0.02	0.12	38.1	3/26/2017 9:10	3/27/2017 10:40	25.6	0.69	1.39	63,942
3/27/2017 15:10	3/30/2017 15:20	72.2	0.99	0.01	0.60	17.3	3/27/2017 15:10	3/31/2017 3:20	84.3	0.80	2.16	242,063
4/1/2017 7:25	4/2/2017 10:00	26.6	0.29	0.01	0.36	51.0	4/1/2017 7:25	4/2/2017 21:55	38.6	0.65	2.82	89,817
4/4/2017 22:25	4/6/2017 14:15	39.8	0.72	0.02	0.24	67.8	4/4/2017 22:25	4/7/2017 2:10	51.8	0.78	1.49	145,458
4/7/2017 2:30	4/7/2017 5:20	2.8	0.09	0.03	0.12	12.5	4/7/2017 2:30	4/7/2017 17:15	14.8	0.67	1.12	35,760
4/7/2017 19:20	4/8/2017 4:45	9.4	0.16	0.02	0.12	15.6	4/7/2017 19:15	4/8/2017 16:40	21.5	0.68	1.20	52,389
4/10/2017 2:00	4/10/2017 21:25	19.4	0.40	0.02	0.24	49.7	4/10/2017 2:00	4/11/2017 9:25	31.5	0.74	2.82	84,009
4/12/2017 1:45	4/13/2017 13:30	35.8	1.02	0.03	0.60	29.9	4/12/2017 1:40	4/14/2017 1:30	47.9	1.24	3.93	213,939
4/17/2017 17:10	4/18/2017 19:20	26.2	0.48	0.02	0.72	111.2	4/17/2017 17:10	4/19/2017 7:20	38.3	0.64	2.16	87,582
4/19/2017 8:55	4/20/2017 1:30	16.6	0.70	0.04	0.48	13.7	4/19/2017 8:55	4/20/2017 13:25	28.6	1.28	5.46	131,463
4/22/2017 13:05	4/22/2017 16:00	2.9	0.08	0.03	0.36	60.6	4/22/2017 13:05	4/23/2017 4:00	15.0	0.57	1.80	30,954
4/23/2017 12:30	4/24/2017 5:50	17.3	0.57	0.03	0.60	20.6	4/23/2017 12:30	4/24/2017 17:45	29.3	1.01	5.46	106,974
4/25/2017 19:10	4/26/2017 3:30	8.3	0.03	0.00	0.12	44.7	4/25/2017 19:05	4/26/2017 13:40	18.7	0.51	0.55	34,110
4/26/2017 13:45	4/27/2017 3:20	13.6	0.69	0.05	1.44	63.2	4/26/2017 13:40	4/27/2017 15:20	25.8	1.33	8.03	123,612
4/29/2017 18:15	4/30/2017 22:05	27.8	0.30	0.01	0.24	66.2	4/29/2017 18:10	5/1/2017 9:30	39.4	0.72	1.49	101,873
5/1/2017 9:35	5/1/2017 13:30	3.9	0.10	0.03	0.12	22.5	5/1/2017 9:30	5/2/2017 1:25	16.0	0.69	1.12	39,492
5/2/2017 20:20	5/3/2017 7:00	10.7	0.38	0.04	0.24	32.3	5/2/2017 20:15	5/3/2017 18:55	22.8	0.93	3.12	76,326
5/4/2017 16:05	5/5/2017 4:20	12.3	0.98	0.08	1.08	35.4	5/4/2017 16:05	5/5/2017 16:20	24.3	2.74	19.25	240,402
5/6/2017 0:45	5/6/2017 2:30	1.8	0.07	0.04	0.12	20.8	5/6/2017 0:40	5/6/2017 14:25	13.8	1.08	1.31	53,592
5/11/2017 3:40	5/11/2017 23:30	19.8	0.27	0.01	0.36	122.2	5/11/2017 3:40	5/12/2017 11:25	31.8	0.50	1.41	57,819
5/12/2017 11:25	5/12/2017 22:25	11.0	0.04	0.00	0.12	16.4	5/12/2017 11:25	5/13/2017 10:25	23.1	0.35	0.51	28,779
5/15/2017 14:00	5/16/2017 23:00	33.0	1.13	0.03	0.36	91.0	5/15/2017 14:00	5/17/2017 11:00	45.1	1.04	4.33	168,738

Table D-11. Summary Statistics for Individual Storm Events at the COUMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
5/31/2017 22:20	6/1/2017 8:30	10.2	0.11	0.01	0.24	360.2	5/31/2017 22:15	6/1/2017 20:25	22.3	0.27	0.97	21,771
6/8/2017 0:55	6/8/2017 11:30	10.6	0.33	0.03	0.12	160.6	6/8/2017 0:55	6/8/2017 23:30	22.7	0.43	1.22	35,226
6/15/2017 10:05	6/15/2017 23:40	13.6	0.87	0.06	0.60	168.4	6/15/2017 10:05	6/16/2017 11:40	25.7	0.98	5.09	90,120
6/17/2017 19:05	6/18/2017 10:35	15.5	0.07	0.00	0.12	43.8	6/17/2017 19:05	6/18/2017 22:30	27.5	0.27	0.27	26,730
8/2/2017 11:30	8/2/2017 11:30	0.0	0.04	0.00	0.48	1090.8	8/2/2017 11:30	8/2/2017 23:25	12.0	0.12	0.19	5,382
8/13/2017 0:20	8/13/2017 8:40	8.3	0.04	0.00	0.12	252.8	8/13/2017 0:20	8/13/2017 20:35	20.3	0.19	0.27	13,986
8/31/2017 6:00	8/31/2017 10:00	4.0	0.03	0.01	0.12	437.7	8/31/2017 6:00	8/31/2017 22:00	16.1	0.18	0.19	10,677
9/17/2017 14:50	9/19/2017 22:10	55.3	1.42	0.03	1.32	854.5	9/17/2017 14:50	9/20/2017 10:10	67.4	0.51	11.54	124,695
9/21/2017 5:30	9/21/2017 17:25	11.9	0.03	0.00	0.12	32.4	9/21/2017 5:25	9/22/2017 5:25	24.1	0.22	1.51	19,245

Table D-12. Summary Statistics for Individual Storm Events at the COUMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/1/2016 2:50	10/1/2016 18:50	16.0	0.09	0.01	0.24	0.0	10/1/2016 2:45	10/2/2016 6:45	28.1	0.05	0.08	5,085
10/3/2016 22:20	10/4/2016 17:05	18.8	0.23	0.01	0.48	52.5	10/3/2016 22:20	10/5/2016 5:00	30.8	0.05	0.09	5,691
10/5/2016 17:20	10/6/2016 4:50	11.5	0.05	0.00	0.12	27.5	10/5/2016 17:15	10/6/2016 16:50	23.7	0.05	0.08	4,182
10/6/2016 21:20	10/7/2016 5:20	8.0	0.36	0.05	0.96	18.8	10/6/2016 21:20	10/7/2016 17:15	20.0	0.06	0.30	4,398
10/7/2016 22:20	10/9/2016 5:50	31.5	1.00	0.03	2.40	18.0	10/7/2016 22:20	10/9/2016 17:45	43.5	0.10	0.70	16,089
10/9/2016 19:20	10/9/2016 23:20	4.0	0.20	0.05	0.48	18.0	10/9/2016 19:15	10/10/2016 11:15	16.1	0.08	0.19	4,809
10/13/2016 2:20	10/18/2016 8:30	126.2	4.25	0.03	0.72	76.8	10/13/2016 2:15	10/18/2016 20:25	138.3	0.23	1.11	115,953
10/19/2016 21:30	10/20/2016 11:15	13.8	1.54	0.11	1.20	39.8	10/19/2016 21:30	10/20/2016 23:10	25.8	0.41	0.99	37,824
10/21/2016 18:05	10/21/2016 18:30	0.4	0.03	0.07	0.12	31.9	10/21/2016 18:00	10/22/2016 6:30	12.6	0.12	0.15	5,397
10/22/2016 23:50	10/23/2016 8:40	8.8	0.20	0.02	0.12	61.7	10/22/2016 23:50	10/23/2016 20:40	20.9	0.11	0.25	8,484
10/24/2016 17:30	10/24/2016 19:40	2.2	0.14	0.06	0.24	37.7	10/24/2016 17:25	10/25/2016 7:40	14.3	0.09	0.19	4,740
10/26/2016 6:05	10/27/2016 0:00	17.9	1.53	0.09	0.48	35.3	10/26/2016 6:00	10/27/2016 12:00	30.1	0.42	0.89	45,246
10/27/2016 16:40	10/27/2016 19:50	3.2	0.04	0.01	0.12	17.2	10/27/2016 16:40	10/28/2016 7:50	15.3	0.16	0.21	8,715
10/29/2016 8:55	10/29/2016 12:55	4.0	0.16	0.04	0.12	40.2	10/29/2016 8:55	10/30/2016 0:55	16.1	0.13	0.21	7,437
10/30/2016 14:05	11/3/2016 0:35	82.5	2.06	0.03	0.60	27.1	10/30/2016 14:00	11/3/2016 12:30	94.6	0.25	0.89	84,555
11/5/2016 5:55	11/6/2016 4:30	22.6	1.18	0.05	0.36	53.8	11/5/2016 5:55	11/6/2016 16:25	35.6	0.33	0.99	41,763
11/9/2016 5:45	11/9/2016 11:00	5.3	0.31	0.06	0.72	73.4	11/9/2016 5:45	11/9/2016 23:00	17.3	0.13	1.50	8,043
11/12/2016 2:20	11/12/2016 8:20	6.0	0.09	0.02	0.12	64.2	11/12/2016 2:20	11/12/2016 20:15	18.0	0.07	0.12	4,305
11/13/2016 8:20	11/14/2016 6:10	21.8	0.46	0.02	0.24	26.1	11/13/2016 8:20	11/14/2016 18:10	33.9	0.13	0.35	16,002
11/14/2016 23:30	11/16/2016 8:30	33.0	1.71	0.05	1.08	18.3	11/14/2016 23:25	11/16/2016 20:30	45.2	0.49	1.65	79,280
11/19/2016 4:55	11/19/2016 10:35	5.7	0.04	0.01	0.12	78.2	11/19/2016 4:50	11/19/2016 22:35	17.8	0.07	0.10	4,731
11/19/2016 23:30	11/20/2016 12:20	12.8	0.12	0.01	0.12	18.6	11/19/2016 23:25	11/21/2016 0:20	25.0	0.06	0.10	5,589
11/21/2016 0:50	11/21/2016 7:50	7.0	0.04	0.01	0.12	15.3	11/21/2016 0:50	11/21/2016 19:50	19.1	0.05	0.07	3,341
11/22/2016 15:55	11/23/2016 13:30	21.6	0.61	0.03	0.24	39.1	11/22/2016 15:55	11/23/2016 18:20	26.5	0.18	0.89	17,631
11/23/2016 18:20	11/25/2016 1:15	30.9	1.23	0.04	0.24	16.8	11/23/2016 18:20	11/25/2016 13:15	43.0	0.33	1.11	50,643
11/25/2016 21:55	11/27/2016 7:00	33.1	0.54	0.02	0.12	22.4	11/25/2016 21:55	11/27/2016 12:40	38.8	0.22	0.35	30,233
11/27/2016 12:45	11/27/2016 19:00	6.3	0.27	0.04	0.24	13.3	11/27/2016 12:40	11/28/2016 6:55	18.3	0.24	0.62	16,099
11/29/2016 23:45	11/30/2016 2:00	2.3	0.13	0.06	0.24	53.3	11/29/2016 23:45	11/30/2016 14:00	14.3	0.14	0.35	7,479
11/30/2016 15:30	11/30/2016 17:10	1.7	0.06	0.04	0.36	14.2	11/30/2016 15:30	12/1/2016 5:10	13.8	0.11	0.12	5,220
12/2/2016 6:00	12/3/2016 2:35	20.6	0.41	0.02	0.24	38.3	12/2/2016 5:55	12/3/2016 14:35	32.8	0.11	0.24	12,976
12/3/2016 20:05	12/4/2016 14:25	18.3	0.40	0.02	0.12	17.9	12/3/2016 20:00	12/5/2016 2:25	30.5	0.16	0.35	17,280
12/5/2016 6:45	12/5/2016 14:05	7.3	0.18	0.02	0.12	24.3	12/5/2016 6:40	12/6/2016 2:00	19.4	0.14	0.35	9,999
12/9/2016 12:20	12/10/2016 23:05	34.8	0.74	0.02	2.52	99.1	12/9/2016 12:20	12/11/2016 7:15	43.0	0.14	0.47	21,456
12/11/2016 7:20	12/11/2016 20:20	13.0	0.09	0.01	0.12	17.0	12/11/2016 7:15	12/12/2016 8:15	25.1	0.10	0.12	8,586
12/12/2016 10:35	12/12/2016 18:50	8.3	0.05	0.01	0.24	18.2	12/12/2016 10:30	12/13/2016 6:45	20.3	0.07	0.10	5,418
12/19/2016 3:35	12/20/2016 2:50	23.3	0.49	0.02	0.48	161.0	12/19/2016 3:30	12/20/2016 14:45	35.3	0.10	0.30	12,096
12/22/2016 17:05	12/24/2016 0:05	31.0	0.96	0.03	0.48	65.2	12/22/2016 17:00	12/24/2016 12:00	43.1	0.22	0.47	34,416
12/26/2016 16:35	12/26/2016 22:35	6.0	0.24	0.04	0.24	72.5	12/26/2016 16:35	12/27/2016 10:30	18.0	0.12	0.24	7,578
12/27/2016 11:35	12/27/2016 17:05	5.5	0.03	0.01	0.12	13.8	12/27/2016 11:35	12/28/2016 5:00	17.5	0.11	0.41	6,909
12/29/2016 12:35	12/30/2016 8:20	19.8	0.63	0.03	0.48	62.8	12/29/2016 12:30	12/30/2016 20:20	31.9	0.22	0.89	25,255
12/31/2016 17:35	12/31/2016 21:35	4.0	0.27	0.07	0.72	35.2	12/31/2016 17:35	1/1/2017 9:30	16.0	0.21	0.62	11,844
1/1/2017 11:05	1/1/2017 12:50	1.8	0.04	0.02	0.12	15.0	1/1/2017 11:00	1/2/2017 0:45	13.8	0.15	0.17	7,452
1/8/2017 11:35	1/9/2017 0:50	13.3	0.47	0.04	0.72	168.5	1/8/2017 11:35	1/9/2017 12:45	25.3	0.17	0.30	15,117
1/9/2017 15:35	1/10/2017 10:05	18.5	0.13	0.01	0.24	18.2	1/9/2017 15:30	1/10/2017 22:05	30.7	0.11	0.15	12,358

Table D-12. Summary Statistics for Individual Storm Events at the COUMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
1/17/2017 4:20	1/19/2017 9:05	52.8	2.18	0.04	1.20	164.0	1/17/2017 4:15	1/19/2017 12:20	56.2	0.72	1.81	144,694
1/19/2017 12:20	1/19/2017 17:05	4.8	0.12	0.03	0.24	12.5	1/19/2017 12:20	1/20/2017 5:00	16.8	0.37	0.62	22,113
1/22/2017 1:05	1/22/2017 12:05	11.0	0.04	0.00	0.12	57.5	1/22/2017 1:05	1/23/2017 0:00	23.0	0.22	0.28	17,910
1/29/2017 19:05	1/29/2017 19:35	0.5	0.03	0.06	0.12	186.0	1/29/2017 19:05	1/30/2017 7:30	12.5	0.18	0.22	8,250
2/2/2017 17:50	2/6/2017 20:05	98.3	2.21	0.02	0.60	280.8	2/2/2017 17:45	2/7/2017 8:00	110.3	0.54	1.65	216,090
2/7/2017 11:20	2/7/2017 16:50	5.5	0.19	0.03	0.12	17.2	2/7/2017 11:15	2/8/2017 4:50	17.7	0.60	0.79	38,436
2/8/2017 9:50	2/10/2017 12:05	50.3	2.35	0.05	1.08	18.5	2/8/2017 9:45	2/11/2017 0:00	62.3	1.39	10.57	311,984
2/14/2017 22:10	2/16/2017 5:40	31.5	2.66	0.08	1.20	114.3	2/14/2017 22:10	2/16/2017 17:35	43.5	1.15	3.03	180,438
2/18/2017 8:55	2/22/2017 3:10	90.3	0.77	0.01	0.24	52.2	2/18/2017 8:55	2/22/2017 15:10	102.3	0.20	0.47	74,639
2/22/2017 16:05	2/22/2017 16:45	0.7	0.04	0.06	0.12	17.6	2/22/2017 16:05	2/23/2017 4:40	12.7	0.16	0.20	7,422
2/25/2017 22:50	2/26/2017 16:30	17.7	0.36	0.02	0.12	78.8	2/25/2017 22:50	2/27/2017 4:30	29.8	0.15	0.22	16,113
2/27/2017 4:40	2/28/2017 10:55	30.3	0.61	0.02	0.24	19.6	2/27/2017 4:40	2/28/2017 22:50	42.3	0.20	0.30	30,726
3/2/2017 5:30	3/3/2017 0:55	19.4	0.06	0.00	0.12	42.9	3/2/2017 5:30	3/3/2017 9:15	27.8	0.13	0.14	12,528
3/3/2017 9:15	3/4/2017 1:35	16.3	0.54	0.03	0.24	15.9	3/3/2017 9:15	3/4/2017 13:30	28.3	0.22	0.70	22,347
3/4/2017 21:55	3/5/2017 3:15	5.3	0.18	0.03	0.36	25.6	3/4/2017 21:55	3/5/2017 15:10	17.3	0.18	0.54	11,340
3/7/2017 3:00	3/7/2017 17:45	14.8	0.46	0.03	0.12	48.0	3/7/2017 2:55	3/8/2017 5:45	26.9	0.19	0.28	18,714
3/8/2017 15:45	3/10/2017 3:45	36.0	0.65	0.02	0.24	24.6	3/8/2017 15:40	3/10/2017 15:40	48.1	0.23	0.47	39,102
3/11/2017 9:25	3/11/2017 13:20	3.9	0.24	0.06	0.24	29.8	3/11/2017 9:20	3/12/2017 1:15	16.0	0.24	0.47	13,989
3/13/2017 5:35	3/16/2017 1:05	67.5	1.66	0.02	0.24	41.2	3/13/2017 5:35	3/16/2017 13:05	79.6	0.41	1.23	118,536
3/17/2017 13:25	3/18/2017 12:20	22.9	1.42	0.06	0.24	49.5	3/17/2017 13:25	3/19/2017 0:20	35.0	0.59	1.65	74,166
3/20/2017 19:55	3/22/2017 4:50	32.9	0.21	0.01	0.12	56.2	3/20/2017 19:50	3/22/2017 16:50	45.1	0.19	0.26	30,456
3/23/2017 21:50	3/24/2017 21:45	23.9	0.66	0.03	0.36	54.6	3/23/2017 21:45	3/25/2017 9:40	36.0	0.21	0.79	27,054
3/26/2017 9:10	3/26/2017 22:45	13.6	0.27	0.02	0.12	38.1	3/26/2017 9:10	3/27/2017 10:40	25.6	0.18	0.28	16,236
3/27/2017 15:10	3/30/2017 15:20	72.2	0.99	0.01	0.60	17.3	3/27/2017 15:10	3/31/2017 3:20	84.3	0.19	0.70	58,089
4/1/2017 7:25	4/2/2017 10:00	26.6	0.29	0.01	0.36	51.0	4/1/2017 7:25	4/2/2017 21:55	38.6	0.17	0.99	23,733
4/4/2017 22:25	4/6/2017 14:15	39.8	0.72	0.02	0.24	67.8	4/4/2017 22:25	4/7/2017 2:10	51.8	0.16	0.28	29,652
4/7/2017 2:30	4/7/2017 5:20	2.8	0.09	0.03	0.12	12.5	4/7/2017 2:30	4/7/2017 17:15	14.8	0.16	0.22	8,286
4/7/2017 19:20	4/8/2017 4:45	9.4	0.16	0.02	0.12	15.6	4/7/2017 19:15	4/8/2017 16:40	21.5	0.16	0.26	12,162
4/10/2017 2:00	4/10/2017 21:25	19.4	0.40	0.02	0.24	49.7	4/10/2017 2:00	4/11/2017 9:25	31.5	0.16	0.70	18,267
4/12/2017 1:45	4/13/2017 13:30	35.8	1.02	0.03	0.60	29.9	4/12/2017 1:40	4/14/2017 1:30	47.9	0.26	1.23	43,992
4/17/2017 17:10	4/18/2017 19:20	26.2	0.48	0.02	0.72	111.2	4/17/2017 17:10	4/19/2017 7:20	38.3	0.13	0.62	17,529
4/19/2017 8:55	4/20/2017 1:30	16.6	0.70	0.04	0.48	13.7	4/19/2017 8:55	4/20/2017 13:25	28.6	0.26	1.50	26,940
4/22/2017 13:05	4/22/2017 16:00	2.9	0.08	0.03	0.36	60.6	4/22/2017 13:05	4/23/2017 4:00	15.0	0.14	0.70	7,371
4/23/2017 12:30	4/24/2017 5:50	17.3	0.57	0.03	0.60	20.6	4/23/2017 12:30	4/24/2017 17:45	29.3	0.20	1.36	21,264
4/25/2017 19:10	4/26/2017 3:30	8.3	0.03	0.00	0.12	44.7	4/25/2017 19:05	4/26/2017 13:40	18.7	0.11	0.14	7,659
4/26/2017 13:45	4/27/2017 3:20	13.6	0.69	0.05	1.44	63.2	4/26/2017 13:40	4/27/2017 15:20	25.8	0.24	1.23	22,308
4/29/2017 18:15	4/30/2017 22:05	27.8	0.30	0.01	0.24	66.2	4/29/2017 18:10	5/1/2017 9:30	39.4	0.13	0.26	19,035
5/1/2017 9:35	5/1/2017 13:30	3.9	0.10	0.03	0.12	22.5	5/1/2017 9:30	5/2/2017 1:25	16.0	0.13	0.20	7,341
5/2/2017 20:20	5/3/2017 7:00	10.7	0.38	0.04	0.24	32.3	5/2/2017 20:15	5/3/2017 18:55	22.8	0.18	0.62	14,487
5/4/2017 16:05	5/5/2017 4:20	12.3	0.98	0.08	1.08	35.4	5/4/2017 16:05	5/5/2017 16:20	24.3	0.46	2.16	40,170
5/6/2017 0:45	5/6/2017 2:30	1.8	0.07	0.04	0.12	20.8	5/6/2017 0:40	5/6/2017 14:25	13.8	0.23	0.30	11,646
5/11/2017 3:40	5/11/2017 23:30	19.8	0.27	0.01	0.36	122.2	5/11/2017 3:40	5/12/2017 11:25	31.8	0.13	0.30	14,583
5/12/2017 11:25	5/12/2017 22:25	11.0	0.04	0.00	0.12	16.4	5/12/2017 11:25	5/13/2017 10:25	23.1	0.11	0.14	9,111
5/15/2017 14:00	5/16/2017 23:00	33.0	1.13	0.03	0.36	91.0	5/15/2017 14:00	5/17/2017 11:00	45.1	0.22	1.23	35,667

Table D-12. Summary Statistics for Individual Storm Events at the COUMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
5/31/2017 22:20	6/1/2017 8:30	10.2	0.11	0.01	0.24	360.2	5/31/2017 22:15	6/1/2017 20:25	22.3	0.11	0.24	9,189
6/8/2017 0:55	6/8/2017 11:30	10.6	0.33	0.03	0.12	160.6	6/8/2017 0:55	6/8/2017 23:30	22.7	0.13	0.24	10,689
6/15/2017 10:05	6/15/2017 23:40	13.6	0.87	0.06	0.60	168.4	6/15/2017 10:05	6/16/2017 11:40	25.7	0.22	1.11	20,565
6/17/2017 19:05	6/18/2017 10:35	15.5	0.07	0.00	0.12	43.8	6/17/2017 19:05	6/18/2017 22:30	27.5	0.08	0.09	8,262
8/2/2017 11:30	8/2/2017 11:30	0.0	0.04	0.00	0.48	1090.8	8/2/2017 11:30	8/2/2017 23:25	12.0	0.05	0.06	2,229
8/13/2017 0:20	8/13/2017 8:40	8.3	0.04	0.00	0.12	252.8	8/13/2017 0:20	8/13/2017 20:35	20.3	0.05	0.05	3,660
8/31/2017 6:00	8/31/2017 10:00	4.0	0.03	0.01	0.12	437.7	8/31/2017 6:00	8/31/2017 22:00	16.1	0.05	0.05	2,895
9/17/2017 14:50	9/19/2017 22:10	55.3	1.42	0.03	1.32	854.5	9/17/2017 14:50	9/20/2017 10:10	67.4	0.08	0.70	18,825
9/21/2017 5:30	9/21/2017 17:25	11.9	0.03	0.00	0.12	32.4	9/21/2017 5:25	9/22/2017 5:25	24.1	0.06	0.18	4,971

Table D-13. Summary Statistics for Individual Storm Events at the TYLMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/1/2016 13:45	10/1/2016 18:25	4.7	0.04	0.01	0.12	0.0	10/1/2016 13:30	10/2/2016 6:15	17.0	0.13	0.77	7,929
10/3/2016 22:10	10/4/2016 21:45	23.6	0.14	0.01	0.48	56.4	10/3/2016 22:00	10/5/2016 9:30	35.8	0.18	2.52	23,760
10/6/2016 21:35	10/7/2016 5:05	7.5	0.25	0.03	0.36	56.0	10/6/2016 21:30	10/7/2016 17:00	19.8	0.55	4.93	39,015
10/7/2016 22:45	10/9/2016 2:25	27.7	1.01	0.04	1.56	21.2	10/7/2016 22:30	10/9/2016 14:15	40.0	1.07	8.99	154,458
10/9/2016 18:50	10/9/2016 22:00	3.2	0.46	0.15	1.20	18.3	10/9/2016 18:45	10/10/2016 9:45	15.3	1.31	5.61	72,153
10/13/2016 2:00	10/17/2016 11:55	105.9	3.93	0.04	0.60	76.5	10/13/2016 2:00	10/17/2016 23:45	118.0	2.55	11.61	1,081,405
10/18/2016 0:40	10/18/2016 6:15	5.6	0.13	0.02	0.12	18.8	10/18/2016 0:30	10/18/2016 18:00	17.8	0.82	2.16	52,605
10/19/2016 20:55	10/20/2016 11:15	14.3	1.49	0.10	0.96	38.9	10/19/2016 20:45	10/20/2016 23:00	26.5	3.51	13.38	334,449
10/21/2016 18:10	10/22/2016 0:55	6.8	0.14	0.02	1.20	31.2	10/21/2016 18:00	10/22/2016 12:45	19.0	0.95	4.60	64,809
10/23/2016 0:00	10/23/2016 4:15	4.3	0.19	0.04	0.24	29.7	10/23/2016 0:00	10/23/2016 16:15	16.5	0.73	2.16	43,236
10/24/2016 17:30	10/24/2016 20:50	3.3	0.19	0.06	0.36	37.4	10/24/2016 17:15	10/25/2016 8:45	15.8	0.67	3.31	37,944
10/26/2016 6:20	10/27/2016 0:00	17.7	1.60	0.09	0.60	35.2	10/26/2016 6:10	10/27/2016 11:45	88.8	3.04	8.50	971,648
10/27/2016 19:20	10/27/2016 22:40	3.3	0.04	0.01	0.12	20.0	10/27/2016 19:05	10/28/2016 10:35	46.8	1.02	1.60	172,035
10/29/2016 9:05	10/29/2016 12:25	3.3	0.14	0.04	0.12	57.8	10/29/2016 9:00	10/30/2016 0:20	46.3	0.60	1.80	99,828
10/30/2016 13:55	11/3/2016 0:35	82.7	1.99	0.02	0.84	27.0	10/30/2016 13:40	11/3/2016 12:25	284.3	1.89	10.00	1,932,528
11/5/2016 6:00	11/6/2016 4:30	22.5	1.10	0.05	1.08	53.8	11/5/2016 5:45	11/6/2016 16:15	106.8	1.51	4.83	580,643
11/9/2016 5:55	11/9/2016 16:35	10.7	0.26	0.02	0.48	75.7	11/9/2016 5:55	11/10/2016 4:20	67.5	0.44	3.42	105,768
11/12/2016 2:55	11/12/2016 10:00	7.1	0.10	0.01	0.24	64.7	11/12/2016 2:45	11/12/2016 21:55	57.8	0.22	0.69	45,747
11/13/2016 8:25	11/14/2016 9:50	25.4	0.43	0.02	0.12	24.3	11/13/2016 8:10	11/14/2016 21:35	112.5	0.48	1.78	192,402
11/14/2016 23:55	11/16/2016 9:05	33.2	1.35	0.04	0.84	18.5	11/14/2016 23:55	11/16/2016 18:30	128.0	1.67	5.36	770,229
11/16/2016 18:40	11/17/2016 6:25	11.8	0.08	0.01	0.36	19.9	11/16/2016 18:30	11/17/2016 18:10	71.3	0.58	1.23	149,094
11/19/2016 7:55	11/19/2016 13:20	5.4	0.04	0.01	0.12	61.2	11/19/2016 7:45	11/19/2016 23:05	46.3	0.19	0.33	32,445
11/19/2016 23:05	11/20/2016 12:25	13.3	0.14	0.01	0.12	15.2	11/19/2016 23:05	11/21/2016 0:10	75.5	0.27	0.53	72,252
11/22/2016 16:25	11/23/2016 1:45	9.3	0.50	0.05	0.24	54.9	11/22/2016 16:25	11/23/2016 13:45	64.3	0.76	2.62	175,095
11/23/2016 20:35	11/24/2016 23:40	27.1	1.27	0.05	0.24	20.0	11/23/2016 20:25	11/25/2016 11:35	117.8	1.48	4.58	627,155
11/25/2016 21:45	11/27/2016 8:20	34.6	0.58	0.02	0.12	22.2	11/25/2016 21:45	11/27/2016 13:05	118.3	0.91	1.93	386,955
11/27/2016 13:15	11/27/2016 20:30	7.3	0.31	0.04	0.24	13.6	11/27/2016 13:05	11/28/2016 8:15	57.8	0.93	2.81	192,339
11/28/2016 16:50	11/29/2016 2:20	9.5	0.11	0.01	0.24	22.0	11/28/2016 16:40	11/29/2016 14:15	65.0	0.47	1.35	110,700
11/29/2016 23:45	11/30/2016 2:25	2.7	0.14	0.05	0.24	28.2	11/29/2016 23:35	11/30/2016 14:15	44.3	0.46	1.63	73,791
11/30/2016 15:15	11/30/2016 15:30	0.3	0.06	0.24	0.24	13.7	11/30/2016 15:15	12/1/2016 3:25	36.8	0.38	1.49	50,778
12/2/2016 5:45	12/3/2016 3:30	21.8	0.27	0.01	0.12	38.4	12/2/2016 5:35	12/3/2016 15:20	101.5	0.39	1.11	142,335
12/3/2016 15:30	12/5/2016 2:20	34.8	0.46	0.01	0.24	14.4	12/3/2016 15:20	12/5/2016 4:15	111.0	0.65	2.44	259,650
12/5/2016 4:30	12/5/2016 13:40	9.2	0.20	0.02	0.12	13.2	12/5/2016 4:15	12/6/2016 1:35	64.3	0.57	1.23	131,004
12/9/2016 10:55	12/10/2016 0:10	13.3	0.33	0.02	0.72	97.1	12/9/2016 10:40	12/10/2016 12:05	76.5	0.52	1.63	142,488
12/10/2016 12:10	12/10/2016 15:45	3.6	0.22	0.06	0.24	14.5	12/10/2016 12:05	12/11/2016 3:45	47.3	0.67	2.62	114,291
12/11/2016 9:20	12/11/2016 21:00	11.7	0.09	0.01	0.12	19.2	12/11/2016 9:10	12/12/2016 8:55	71.5	0.35	0.60	90,009
12/12/2016 10:30	12/12/2016 12:10	1.7	0.04	0.02	0.12	20.9	12/12/2016 10:25	12/12/2016 23:55	40.8	0.28	0.53	40,932
12/19/2016 3:35	12/20/2016 2:25	22.8	0.44	0.02	0.24	161.1	12/19/2016 3:25	12/20/2016 14:25	105.3	0.43	2.26	161,658
12/22/2016 18:45	12/24/2016 6:40	35.9	1.04	0.03	0.12	67.0	12/22/2016 18:30	12/24/2016 18:30	144.3	1.00	2.09	517,455
12/26/2016 16:30	12/26/2016 22:25	5.9	0.22	0.04	0.12	65.0	12/26/2016 16:15	12/27/2016 10:25	54.8	0.51	1.35	100,989
12/29/2016 13:00	12/30/2016 6:15	17.3	0.56	0.03	0.24	63.2	12/29/2016 12:55	12/30/2016 18:00	87.5	0.80	2.81	252,333
12/31/2016 11:30	1/1/2017 0:00	12.5	0.22	0.02	0.36	29.5	12/31/2016 11:15	1/1/2017 11:05	71.8	0.56	2.44	145,692
1/1/2017 11:20	1/1/2017 13:10	1.8	0.10	0.05	0.12	15.2	1/1/2017 11:05	1/2/2017 0:55	41.8	0.39	0.53	58,860
1/8/2017 11:10	1/9/2017 0:35	13.4	0.43	0.03	0.12	166.8	1/8/2017 11:05	1/9/2017 12:35	76.8	0.57	1.49	158,742

Table D-13. Summary Statistics for Individual Storm Events at the TYLMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
1/9/2017 16:05	1/9/2017 19:50	3.8	0.10	0.03	0.12	19.0	1/9/2017 16:05	1/10/2017 7:40	47.0	0.35	0.69	59,148
1/10/2017 8:25	1/10/2017 15:10	6.8	0.07	0.01	0.36	14.8	1/10/2017 8:25	1/11/2017 2:55	55.8	0.30	0.60	60,552
1/17/2017 4:20	1/19/2017 8:45	52.4	2.37	0.05	0.60	163.5	1/17/2017 4:05	1/19/2017 14:05	174.3	1.93	6.21	1,211,211
1/19/2017 14:05	1/19/2017 16:40	2.6	0.12	0.05	0.12	14.5	1/19/2017 14:05	1/20/2017 4:25	43.3	1.08	2.09	168,120
2/3/2017 5:40	2/6/2017 0:30	66.8	1.77	0.03	0.24	350.2	2/3/2017 5:25	2/6/2017 11:25	234.3	1.12	3.01	942,892
2/6/2017 11:40	2/6/2017 23:20	11.7	0.51	0.04	0.24	17.0	2/6/2017 11:25	2/7/2017 11:05	71.3	0.80	1.11	204,993
2/7/2017 11:30	2/7/2017 17:00	5.5	0.21	0.04	0.12	13.7	2/7/2017 11:15	2/8/2017 4:55	53.3	0.64	0.88	122,652
2/8/2017 9:10	2/10/2017 8:00	46.8	2.46	0.05	0.84	16.9	2/8/2017 9:05	2/10/2017 19:50	176.5	3.73	16.87	2,371,271
2/14/2017 21:15	2/16/2017 6:15	33.0	2.79	0.08	0.96	116.1	2/14/2017 21:00	2/16/2017 18:00	135.3	4.28	13.13	2,084,213
2/18/2017 9:00	2/21/2017 9:00	72.0	0.61	0.01	0.12	52.2	2/18/2017 8:55	2/21/2017 20:45	251.8	0.77	2.26	700,197
2/21/2017 21:05	2/22/2017 3:00	5.9	0.07	0.01	0.12	28.5	2/21/2017 21:05	2/22/2017 14:55	53.8	0.74	1.23	143,379
2/22/2017 15:05	2/22/2017 15:45	0.7	0.11	0.17	0.24	16.8	2/22/2017 14:55	2/23/2017 3:35	38.3	0.78	2.26	107,262
2/23/2017 12:45	2/23/2017 14:10	1.4	0.06	0.04	0.12	21.2	2/23/2017 12:45	2/24/2017 2:00	40.0	0.53	1.11	75,690
2/25/2017 23:00	2/26/2017 10:20	11.3	0.52	0.05	0.24	58.1	2/25/2017 22:50	2/26/2017 22:10	70.3	0.92	2.09	232,227
2/27/2017 4:50	2/28/2017 10:00	29.2	0.55	0.02	0.24	20.1	2/27/2017 4:45	2/28/2017 21:45	123.3	1.02	3.21	451,062
3/2/2017 3:45	3/2/2017 19:50	16.1	0.09	0.01	0.12	42.4	3/2/2017 3:35	3/3/2017 7:40	84.5	0.35	0.46	104,994
3/3/2017 8:15	3/3/2017 21:10	12.9	0.52	0.04	0.36	14.8	3/3/2017 8:05	3/4/2017 9:05	75.3	1.09	4.09	295,488
3/4/2017 21:25	3/5/2017 3:20	5.9	0.20	0.03	0.36	25.0	3/4/2017 21:15	3/5/2017 15:10	54.0	0.71	3.21	137,988
3/7/2017 2:55	3/7/2017 17:40	14.8	0.41	0.03	0.12	47.9	3/7/2017 2:55	3/8/2017 5:25	79.8	0.91	3.86	261,739
3/8/2017 18:35	3/10/2017 3:20	32.8	0.57	0.02	0.24	27.2	3/8/2017 18:30	3/10/2017 15:10	134.3	0.92	3.21	442,728
3/11/2017 9:35	3/11/2017 13:30	3.9	0.24	0.06	0.12	38.7	3/11/2017 9:20	3/12/2017 1:25	48.5	0.94	2.62	164,790
3/13/2017 5:40	3/15/2017 19:15	61.6	1.55	0.03	0.24	41.2	3/13/2017 5:30	3/16/2017 7:05	221.0	1.58	4.58	1,255,060
3/17/2017 13:20	3/18/2017 12:25	23.1	1.37	0.06	0.24	48.2	3/17/2017 13:15	3/19/2017 0:10	105.0	2.46	5.09	930,224
3/21/2017 4:10	3/22/2017 4:55	24.8	0.21	0.01	0.12	64.7	3/21/2017 3:55	3/22/2017 16:40	110.5	0.56	1.23	221,256
3/23/2017 21:50	3/24/2017 20:50	23.0	0.76	0.03	0.60	49.3	3/23/2017 21:35	3/25/2017 8:45	105.8	1.16	5.09	441,819
3/26/2017 10:00	3/27/2017 6:30	20.5	0.27	0.01	0.12	38.9	3/26/2017 9:45	3/27/2017 18:20	98.0	0.67	2.09	235,422
3/27/2017 22:55	3/28/2017 13:40	14.8	0.21	0.01	0.12	24.2	3/27/2017 22:55	3/28/2017 23:35	74.3	0.67	1.63	178,614
3/28/2017 23:50	3/30/2017 4:15	28.4	0.92	0.03	0.24	19.4	3/28/2017 23:35	3/30/2017 16:05	121.8	1.43	4.09	626,785
4/1/2017 6:55	4/2/2017 9:30	26.6	0.31	0.01	0.36	51.1	4/1/2017 6:55	4/2/2017 19:25	109.8	0.59	2.62	232,209
4/2/2017 19:25	4/2/2017 20:25	1.0	0.03	0.03	0.12	16.8	4/2/2017 19:25	4/3/2017 8:15	38.8	0.40	0.60	56,259
4/4/2017 22:25	4/7/2017 2:25	52.0	0.75	0.01	0.24	60.9	4/4/2017 22:25	4/7/2017 2:25	156.3	0.89	2.44	503,289
4/7/2017 2:35	4/7/2017 9:00	6.4	0.11	0.02	0.12	12.4	4/7/2017 2:25	4/7/2017 19:05	50.3	0.74	1.93	133,146
4/7/2017 19:15	4/8/2017 1:10	5.9	0.16	0.03	0.24	15.2	4/7/2017 19:05	4/8/2017 12:55	53.8	0.72	1.63	139,266
4/10/2017 2:25	4/10/2017 12:40	10.3	0.31	0.03	0.36	50.6	4/10/2017 2:15	4/11/2017 0:30	67.0	0.77	3.86	185,679
4/12/2017 1:40	4/13/2017 13:10	35.5	1.12	0.03	0.24	45.2	4/12/2017 1:25	4/14/2017 0:55	142.8	1.35	3.42	693,639
4/17/2017 18:15	4/18/2017 19:35	25.3	0.28	0.01	0.72	103.1	4/17/2017 18:00	4/19/2017 7:20	112.3	0.57	4.33	230,481
4/19/2017 8:55	4/20/2017 1:40	16.8	0.59	0.04	0.36	13.4	4/19/2017 8:45	4/20/2017 13:35	86.8	1.27	5.09	395,550
4/22/2017 14:30	4/22/2017 15:05	0.6	0.06	0.10	0.12	62.2	4/22/2017 14:15	4/23/2017 2:55	38.3	0.37	1.23	51,282
4/23/2017 12:45	4/24/2017 5:55	17.2	0.35	0.02	0.36	21.9	4/23/2017 12:35	4/24/2017 17:45	87.8	0.82	3.86	257,931
4/26/2017 3:35	4/27/2017 0:00	20.4	0.83	0.04	0.48	53.1	4/26/2017 3:20	4/27/2017 11:45	97.5	1.34	5.64	471,141
4/28/2017 4:45	4/28/2017 11:35	6.8	0.13	0.02	0.48	29.1	4/28/2017 4:35	4/28/2017 23:25	56.8	0.60	3.21	123,174
4/29/2017 17:55	4/30/2017 15:50	21.9	0.31	0.01	0.36	36.8	4/29/2017 17:45	5/1/2017 3:35	101.8	0.66	3.42	242,082
5/1/2017 9:15	5/1/2017 14:40	5.4	0.11	0.02	0.12	22.3	5/1/2017 9:00	5/2/2017 2:25	52.5	0.52	1.23	99,117
5/2/2017 21:00	5/3/2017 8:55	11.9	0.31	0.03	0.36	33.3	5/2/2017 20:45	5/3/2017 20:45	72.3	0.78	3.86	203,301

Table D-13. Summary Statistics for Individual Storm Events at the TYLMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
5/4/2017 16:35	5/5/2017 6:00	13.4	1.23	0.09	1.44	35.6	5/4/2017 16:25	5/5/2017 17:45	76.3	2.99	13.57	819,396
5/11/2017 3:45	5/11/2017 19:30	15.8	0.21	0.01	0.24	143.5	5/11/2017 3:35	5/12/2017 7:15	83.3	0.28	0.99	83,880
5/12/2017 11:25	5/12/2017 23:35	12.2	0.04	0.00	0.12	16.4	5/12/2017 11:15	5/13/2017 11:35	73.3	0.18	0.39	46,215
5/13/2017 20:50	5/13/2017 23:10	2.3	0.12	0.05	0.24	49.8	5/13/2017 20:45	5/14/2017 11:05	43.3	0.24	0.88	38,133
5/15/2017 14:55	5/16/2017 22:35	31.7	1.18	0.04	0.48	40.5	5/15/2017 14:45	5/17/2017 10:25	131.3	1.23	5.64	582,111
5/31/2017 23:05	6/1/2017 8:35	9.5	0.11	0.01	0.48	361.1	5/31/2017 22:50	6/1/2017 20:35	65.5	0.10	0.53	24,669
6/8/2017 1:35	6/8/2017 11:50	10.3	0.27	0.03	0.12	161.1	6/8/2017 1:20	6/8/2017 23:45	67.5	0.31	1.35	74,880
6/15/2017 11:00	6/15/2017 23:15	12.3	0.57	0.05	0.24	169.6	6/15/2017 10:55	6/16/2017 11:00	72.5	0.84	3.21	220,347
6/18/2017 0:55	6/18/2017 12:10	11.3	0.12	0.01	0.12	50.5	6/18/2017 0:40	6/19/2017 0:00	70.3	0.22	0.60	54,855

Table D-14. Summary Statistics for Individual Storm Events at the TYLMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/1/2016 13:45	10/1/2016 18:25	4.7	0.04	0.01	0.12	0.0	10/1/2016 15:40	10/2/2016 6:20	13.7	0.02	0.02	768
10/3/2016 22:10	10/4/2016 21:45	23.6	0.14	0.01	0.48	56.4	10/3/2016 22:30	10/5/2016 9:40	35.3	0.03	0.06	4,347
10/6/2016 21:35	10/7/2016 5:05	7.5	0.25	0.03	0.36	56.0	10/6/2016 21:30	10/7/2016 17:00	19.6	0.12	0.19	8,487
10/7/2016 22:45	10/9/2016 2:25	27.7	1.01	0.04	1.56	21.2	10/7/2016 22:40	10/9/2016 14:25	39.8	0.22	0.54	31,902
10/9/2016 18:50	10/9/2016 22:00	3.2	0.46	0.15	1.20	18.3	10/9/2016 18:45	10/10/2016 10:00	15.3	0.40	0.47	21,999
10/13/2016 2:00	10/17/2016 11:55	105.9	3.93	0.04	0.60	76.5	10/13/2016 2:00	10/17/2016 23:55	118.0	0.72	1.90	307,479
10/18/2016 0:40	10/18/2016 6:15	5.6	0.13	0.02	0.12	18.8	10/18/2016 0:40	10/18/2016 18:10	17.6	0.21	0.27	13,533
10/19/2016 20:55	10/20/2016 11:15	14.3	1.49	0.10	0.96	38.9	10/19/2016 20:55	10/20/2016 23:10	26.3	0.94	2.64	88,890
10/21/2016 18:10	10/22/2016 0:55	6.8	0.14	0.02	1.20	31.2	10/21/2016 18:10	10/22/2016 12:55	18.8	0.36	0.47	24,279
10/23/2016 0:00	10/23/2016 4:15	4.3	0.19	0.04	0.24	29.7	10/22/2016 23:55	10/23/2016 16:15	16.4	0.19	0.27	11,394
10/24/2016 17:30	10/24/2016 20:50	3.3	0.19	0.06	0.36	37.4	10/24/2016 17:25	10/25/2016 8:50	15.5	0.16	0.19	9,015
10/26/2016 6:20	10/27/2016 0:00	17.7	1.60	0.09	0.60	35.2	10/26/2016 6:20	10/27/2016 12:00	29.8	0.96	2.04	102,840
10/27/2016 19:20	10/27/2016 22:40	3.3	0.04	0.01	0.12	20.0	10/27/2016 19:15	10/28/2016 10:40	15.5	0.46	0.60	25,827
10/29/2016 9:05	10/29/2016 12:25	3.3	0.14	0.04	0.12	57.8	10/29/2016 9:00	10/30/2016 0:20	15.4	0.16	0.19	9,105
10/30/2016 13:55	11/3/2016 0:35	82.7	1.99	0.02	0.84	27.0	10/30/2016 13:50	11/3/2016 12:30	94.8	0.61	1.41	207,004
11/5/2016 6:00	11/6/2016 4:30	22.5	1.10	0.05	1.08	53.8	11/5/2016 5:55	11/6/2016 16:25	35.6	0.73	1.41	93,033
11/9/2016 5:55	11/9/2016 16:35	10.7	0.26	0.02	0.48	75.7	11/9/2016 5:55	11/10/2016 4:30	22.7	0.17	0.27	14,028
11/12/2016 2:55	11/12/2016 10:00	7.1	0.10	0.01	0.24	64.7	11/12/2016 2:55	11/12/2016 21:55	19.1	0.08	0.10	5,220
11/13/2016 8:25	11/14/2016 9:50	25.4	0.43	0.02	0.12	24.3	11/13/2016 8:25	11/14/2016 21:45	37.4	0.20	0.36	26,517
11/14/2016 23:55	11/16/2016 9:05	33.2	1.35	0.04	0.84	18.5	11/14/2016 23:55	11/16/2016 18:40	42.8	0.84	1.77	130,242
11/16/2016 18:40	11/17/2016 6:25	11.8	0.08	0.01	0.36	19.9	11/16/2016 18:40	11/17/2016 18:20	23.8	0.37	0.53	32,052
11/19/2016 7:55	11/19/2016 13:20	5.4	0.04	0.01	0.12	61.2	11/19/2016 7:50	11/19/2016 23:00	15.3	0.08	0.08	4,230
11/19/2016 23:05	11/20/2016 12:25	13.3	0.14	0.01	0.12	15.2	11/19/2016 23:00	11/21/2016 0:20	25.4	0.10	0.13	9,081
11/22/2016 16:25	11/23/2016 1:45	9.3	0.50	0.05	0.24	54.9	11/22/2016 16:25	11/23/2016 13:40	21.3	0.31	0.53	23,934
11/23/2016 20:35	11/24/2016 23:40	27.1	1.27	0.05	0.24	20.0	11/23/2016 20:35	11/25/2016 11:35	39.1	0.75	1.77	105,159
11/25/2016 21:45	11/27/2016 8:20	34.6	0.58	0.02	0.12	22.2	11/25/2016 21:40	11/27/2016 13:15	39.7	0.52	0.75	74,838
11/27/2016 13:15	11/27/2016 20:30	7.3	0.31	0.04	0.24	13.6	11/27/2016 13:15	11/28/2016 8:25	19.3	0.49	0.75	33,756
11/28/2016 16:50	11/29/2016 2:20	9.5	0.11	0.01	0.24	22.0	11/28/2016 16:50	11/29/2016 14:15	21.5	0.24	0.31	18,330
11/29/2016 23:45	11/30/2016 2:25	2.7	0.14	0.05	0.24	28.2	11/29/2016 23:45	11/30/2016 14:25	14.8	0.20	0.23	10,557
11/30/2016 15:15	11/30/2016 15:30	0.3	0.06	0.24	0.24	13.7	11/30/2016 15:10	12/1/2016 3:30	12.4	0.19	0.21	8,406
12/2/2016 5:45	12/3/2016 3:30	21.8	0.27	0.01	0.12	38.4	12/2/2016 5:45	12/3/2016 15:30	33.8	0.17	0.21	21,258
12/3/2016 15:30	12/5/2016 2:20	34.8	0.46	0.01	0.24	14.4	12/3/2016 15:30	12/5/2016 4:25	37.0	0.28	0.46	37,785
12/5/2016 4:30	12/5/2016 13:40	9.2	0.20	0.02	0.12	13.2	12/5/2016 4:25	12/6/2016 1:40	21.3	0.29	0.36	21,939
12/9/2016 10:55	12/10/2016 0:10	13.3	0.33	0.02	0.72	97.1	12/9/2016 10:50	12/10/2016 12:10	25.4	0.21	0.28	19,488
12/10/2016 12:10	12/10/2016 15:45	3.6	0.22	0.06	0.24	14.5	12/10/2016 12:10	12/11/2016 3:40	15.6	0.33	0.41	18,384
12/11/2016 9:20	12/11/2016 21:00	11.7	0.09	0.01	0.12	19.2	12/11/2016 9:20	12/12/2016 8:55	23.7	0.19	0.21	15,894
12/12/2016 10:30	12/12/2016 12:10	1.7	0.04	0.02	0.12	20.9	12/12/2016 10:25	12/13/2016 0:10	13.8	0.13	0.15	6,435
12/19/2016 3:35	12/20/2016 2:25	22.8	0.44	0.02	0.24	161.1	12/19/2016 3:30	12/20/2016 14:25	35.0	0.18	0.32	22,419
12/22/2016 18:45	12/24/2016 6:40	35.9	1.04	0.03	0.12	67.0	12/22/2016 18:45	12/24/2016 18:40	48.0	0.48	0.75	83,028
12/26/2016 16:30	12/26/2016 22:25	5.9	0.22	0.04	0.12	65.0	12/26/2016 16:25	12/27/2016 10:25	18.1	0.20	0.28	13,086
12/29/2016 13:00	12/30/2016 6:15	17.3	0.56	0.03	0.24	63.2	12/29/2016 12:55	12/30/2016 18:10	29.3	0.34	0.46	35,724
12/31/2016 11:30	1/1/2017 0:00	12.5	0.22	0.02	0.36	29.5	12/31/2016 11:25	1/1/2017 11:15	23.9	0.25	0.36	21,678
1/1/2017 11:20	1/1/2017 13:10	1.8	0.10	0.05	0.12	15.2	1/1/2017 11:15	1/2/2017 1:05	13.9	0.21	0.24	10,512
1/8/2017 11:10	1/9/2017 0:35	13.4	0.43	0.03	0.12	166.8	1/8/2017 11:10	1/9/2017 12:30	25.4	0.23	0.36	21,399

Table D-14. Summary Statistics for Individual Storm Events at the TYLMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
1/9/2017 16:05	1/9/2017 19:50	3.8	0.10	0.03	0.12	19.0	1/9/2017 16:05	1/10/2017 7:50	15.8	0.19	0.21	10,818
1/10/2017 8:25	1/10/2017 15:10	6.8	0.07	0.01	0.36	14.8	1/10/2017 8:25	1/11/2017 3:10	18.8	0.16	0.18	10,533
1/17/2017 4:20	1/19/2017 8:45	52.4	2.37	0.05	0.60	163.5	1/17/2017 4:15	1/19/2017 14:00	57.8	0.93	1.99	193,515
1/19/2017 14:05	1/19/2017 16:40	2.6	0.12	0.05	0.12	14.5	1/19/2017 14:00	1/20/2017 4:40	14.8	0.71	0.81	37,449
2/3/2017 5:40	2/6/2017 0:30	66.8	1.77	0.03	0.24	350.2	2/3/2017 5:40	2/6/2017 11:35	78.0	0.45	0.87	126,866
2/6/2017 11:40	2/6/2017 23:20	11.7	0.51	0.04	0.24	17.0	2/6/2017 11:35	2/7/2017 11:15	23.8	0.37	0.46	31,473
2/7/2017 11:30	2/7/2017 17:00	5.5	0.21	0.04	0.12	13.7	2/7/2017 11:30	2/8/2017 5:00	17.6	0.26	0.28	16,149
2/8/2017 9:10	2/10/2017 8:00	46.8	2.46	0.05	0.84	16.9	2/8/2017 9:10	2/10/2017 20:00	58.9	1.26	4.02	267,913
2/14/2017 21:15	2/16/2017 6:15	33.0	2.79	0.08	0.96	116.1	2/14/2017 21:10	2/16/2017 18:10	45.1	1.43	3.09	232,461
2/18/2017 9:00	2/21/2017 9:00	72.0	0.61	0.01	0.12	52.2	2/18/2017 8:55	2/21/2017 21:00	84.2	0.16	0.33	48,111
2/21/2017 21:05	2/22/2017 3:00	5.9	0.07	0.01	0.12	28.5	2/21/2017 21:00	2/22/2017 14:55	18.0	0.23	0.33	14,802
2/22/2017 15:05	2/22/2017 15:45	0.7	0.11	0.17	0.24	16.8	2/22/2017 15:05	2/23/2017 3:40	12.7	0.27	0.28	12,423
2/23/2017 12:45	2/23/2017 14:10	1.4	0.06	0.04	0.12	21.2	2/23/2017 12:40	2/24/2017 2:10	13.6	0.17	0.19	8,139
2/25/2017 23:00	2/26/2017 10:20	11.3	0.52	0.05	0.24	58.1	2/25/2017 23:00	2/26/2017 22:15	23.3	0.24	0.33	19,869
2/27/2017 4:50	2/28/2017 10:00	29.2	0.55	0.02	0.24	20.1	2/27/2017 4:50	2/28/2017 22:00	41.3	0.31	0.64	45,963
3/2/2017 3:45	3/2/2017 19:50	16.1	0.09	0.01	0.12	42.4	3/2/2017 3:40	3/3/2017 7:50	28.3	0.10	0.10	10,170
3/3/2017 8:15	3/3/2017 21:10	12.9	0.52	0.04	0.36	14.8	3/3/2017 8:10	3/4/2017 9:10	25.1	0.27	0.47	23,988
3/4/2017 21:25	3/5/2017 3:20	5.9	0.20	0.03	0.36	25.0	3/4/2017 21:20	3/5/2017 15:20	18.1	0.17	0.23	11,109
3/7/2017 2:55	3/7/2017 17:40	14.8	0.41	0.03	0.12	47.9	3/7/2017 2:55	3/8/2017 5:35	26.8	0.20	0.40	19,479
3/8/2017 18:35	3/10/2017 3:20	32.8	0.57	0.02	0.24	27.2	3/8/2017 18:30	3/10/2017 15:20	44.9	0.28	0.75	45,381
3/11/2017 9:35	3/11/2017 13:30	3.9	0.24	0.06	0.12	38.7	3/11/2017 9:30	3/12/2017 1:25	16.0	0.24	0.33	13,599
3/13/2017 5:40	3/15/2017 19:15	61.6	1.55	0.03	0.24	41.2	3/13/2017 5:35	3/16/2017 7:15	73.8	0.55	1.45	145,827
3/17/2017 13:20	3/18/2017 12:25	23.1	1.37	0.06	0.24	48.2	3/17/2017 13:20	3/19/2017 0:20	35.1	0.91	1.71	115,011
3/21/2017 4:10	3/22/2017 4:55	24.8	0.21	0.01	0.12	64.7	3/21/2017 4:05	3/22/2017 16:50	36.8	0.16	0.19	21,210
3/23/2017 21:50	3/24/2017 20:50	23.0	0.76	0.03	0.60	49.3	3/23/2017 21:45	3/25/2017 8:45	35.1	0.41	0.75	51,546
3/26/2017 10:00	3/27/2017 6:30	20.5	0.27	0.01	0.12	38.9	3/26/2017 9:55	3/27/2017 18:30	32.7	0.19	0.33	22,857
3/27/2017 22:55	3/28/2017 13:40	14.8	0.21	0.01	0.12	24.2	3/27/2017 22:55	3/28/2017 23:45	24.9	0.19	0.28	17,421
3/28/2017 23:50	3/30/2017 4:15	28.4	0.92	0.03	0.24	19.4	3/28/2017 23:45	3/30/2017 16:15	40.6	0.60	0.87	87,855
4/1/2017 6:55	4/2/2017 9:30	26.6	0.31	0.01	0.36	51.1	4/1/2017 6:55	4/2/2017 19:25	36.6	0.17	0.23	21,951
4/2/2017 19:25	4/2/2017 20:25	1.0	0.03	0.03	0.12	16.8	4/2/2017 19:25	4/3/2017 8:25	13.1	0.13	0.15	6,093
4/4/2017 22:25	4/7/2017 2:25	52.0	0.75	0.01	0.24	60.9	4/4/2017 22:25	4/7/2017 2:35	52.3	0.29	0.47	53,826
4/7/2017 2:35	4/7/2017 9:00	6.4	0.11	0.02	0.12	12.4	4/7/2017 2:35	4/7/2017 19:15	16.8	0.23	0.28	13,938
4/7/2017 19:15	4/8/2017 1:10	5.9	0.16	0.03	0.24	15.2	4/7/2017 19:15	4/8/2017 13:05	17.9	0.20	0.28	12,930
4/10/2017 2:25	4/10/2017 12:40	10.3	0.31	0.03	0.36	50.6	4/10/2017 2:25	4/11/2017 0:40	22.3	0.24	0.33	19,110
4/12/2017 1:40	4/13/2017 13:10	35.5	1.12	0.03	0.24	45.2	4/12/2017 1:40	4/14/2017 1:05	47.5	0.55	0.93	93,261
4/17/2017 18:15	4/18/2017 19:35	25.3	0.28	0.01	0.72	103.1	4/17/2017 18:10	4/19/2017 7:30	37.4	0.15	0.23	20,337
4/19/2017 8:55	4/20/2017 1:40	16.8	0.59	0.04	0.36	13.4	4/19/2017 8:55	4/20/2017 13:40	28.8	0.46	1.00	48,177
4/22/2017 14:30	4/22/2017 15:05	0.6	0.06	0.10	0.12	62.2	4/22/2017 14:25	4/23/2017 3:00	12.7	0.11	0.12	4,830
4/23/2017 12:45	4/24/2017 5:55	17.2	0.35	0.02	0.36	21.9	4/23/2017 12:40	4/24/2017 17:55	29.3	0.22	0.33	23,016
4/26/2017 3:35	4/27/2017 0:00	20.4	0.83	0.04	0.48	53.1	4/26/2017 3:30	4/27/2017 12:00	32.6	0.46	1.29	53,526
4/28/2017 4:45	4/28/2017 11:35	6.8	0.13	0.02	0.48	29.1	4/28/2017 4:40	4/28/2017 23:35	19.0	0.19	0.23	12,819
4/29/2017 17:55	4/30/2017 15:50	21.9	0.31	0.01	0.36	36.8	4/29/2017 17:55	5/1/2017 3:45	33.9	0.19	0.28	22,926
5/1/2017 9:15	5/1/2017 14:40	5.4	0.11	0.02	0.12	22.3	5/1/2017 9:10	5/2/2017 2:35	17.5	0.12	0.19	7,860
5/2/2017 21:00	5/3/2017 8:55	11.9	0.31	0.03	0.36	33.3	5/2/2017 20:55	5/3/2017 20:55	24.1	0.17	0.28	14,757

Table D-14. Summary Statistics for Individual Storm Events at the TYLMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
5/4/2017 16:35	5/5/2017 6:00	13.4	1.23	0.09	1.44	35.6	5/4/2017 16:30	5/5/2017 17:55	25.5	1.00	3.21	91,743
5/11/2017 3:45	5/11/2017 19:30	15.8	0.21	0.01	0.24	143.5	5/11/2017 3:40	5/12/2017 7:25	27.8	0.08	0.12	8,277
5/12/2017 11:25	5/12/2017 23:35	12.2	0.04	0.00	0.12	16.4	5/12/2017 11:25	5/13/2017 11:35	24.3	0.06	0.07	5,391
5/13/2017 20:50	5/13/2017 23:10	2.3	0.12	0.05	0.24	49.8	5/13/2017 20:45	5/14/2017 11:10	14.5	0.07	0.07	3,447
5/15/2017 14:55	5/16/2017 22:35	31.7	1.18	0.04	0.48	40.5	5/15/2017 14:55	5/17/2017 10:30	43.7	0.49	1.07	76,878
5/31/2017 23:05	6/1/2017 8:35	9.5	0.11	0.01	0.48	361.1	5/31/2017 23:00	6/1/2017 20:35	21.7	0.03	0.04	2,430
6/8/2017 1:35	6/8/2017 11:50	10.3	0.27	0.03	0.12	161.1	6/8/2017 1:30	6/8/2017 23:45	22.3	0.06	0.09	4,449
6/15/2017 11:00	6/15/2017 23:15	12.3	0.57	0.05	0.24	169.6	6/15/2017 11:00	6/16/2017 11:10	24.3	0.11	0.15	9,606
6/18/2017 0:55	6/18/2017 12:10	11.3	0.12	0.01	0.12	50.5	6/18/2017 0:55	6/19/2017 0:10	23.3	0.04	0.05	3,495

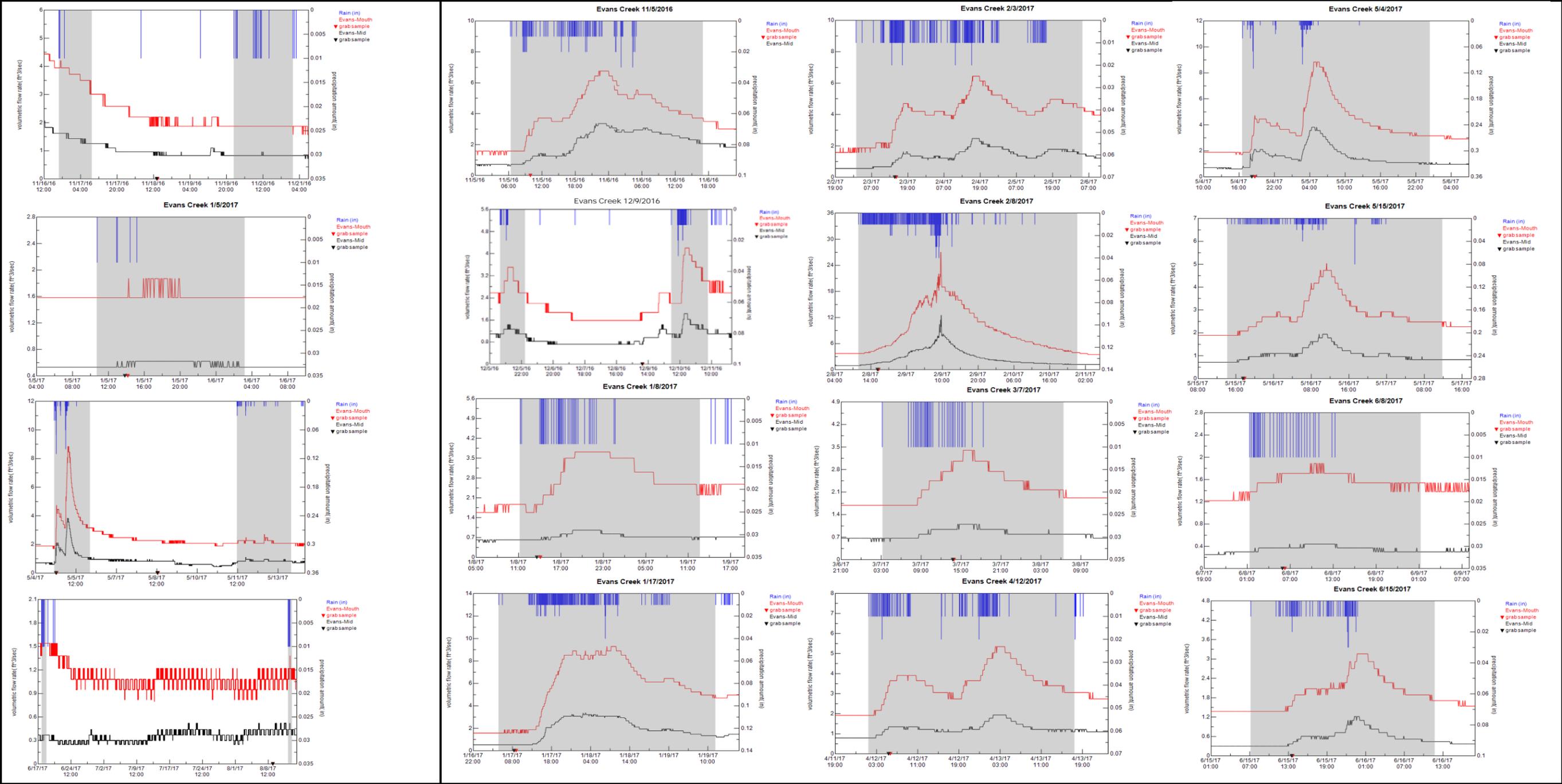
APPENDIX E

Line Plots Showing Sampling Times Relative to the Storm Event Hydrograph

Evans – Application Watershed – Sampled Hydrographs

Base Flow

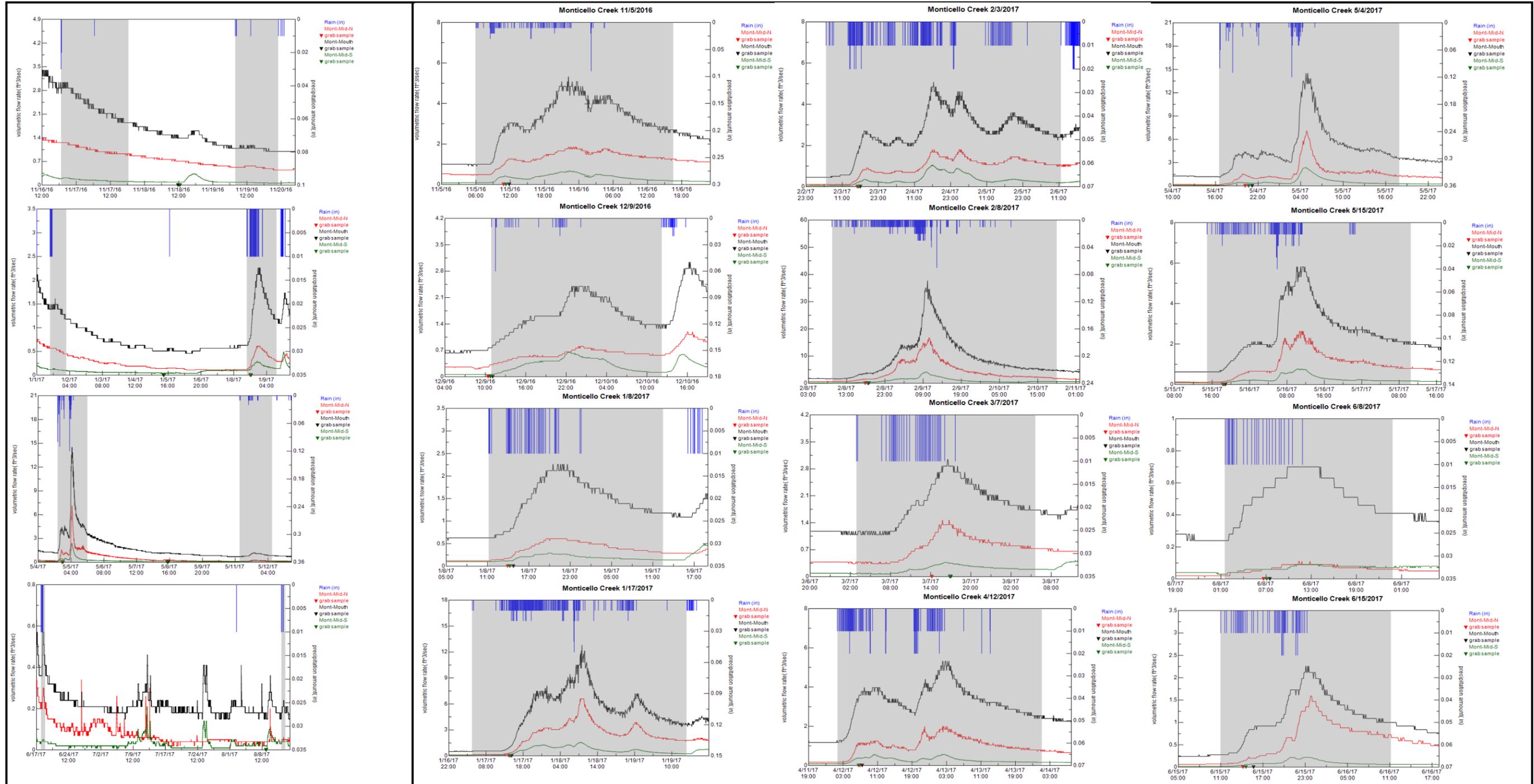
Storm Flow



Monticello – Application Watershed – Sampled Hydrographs

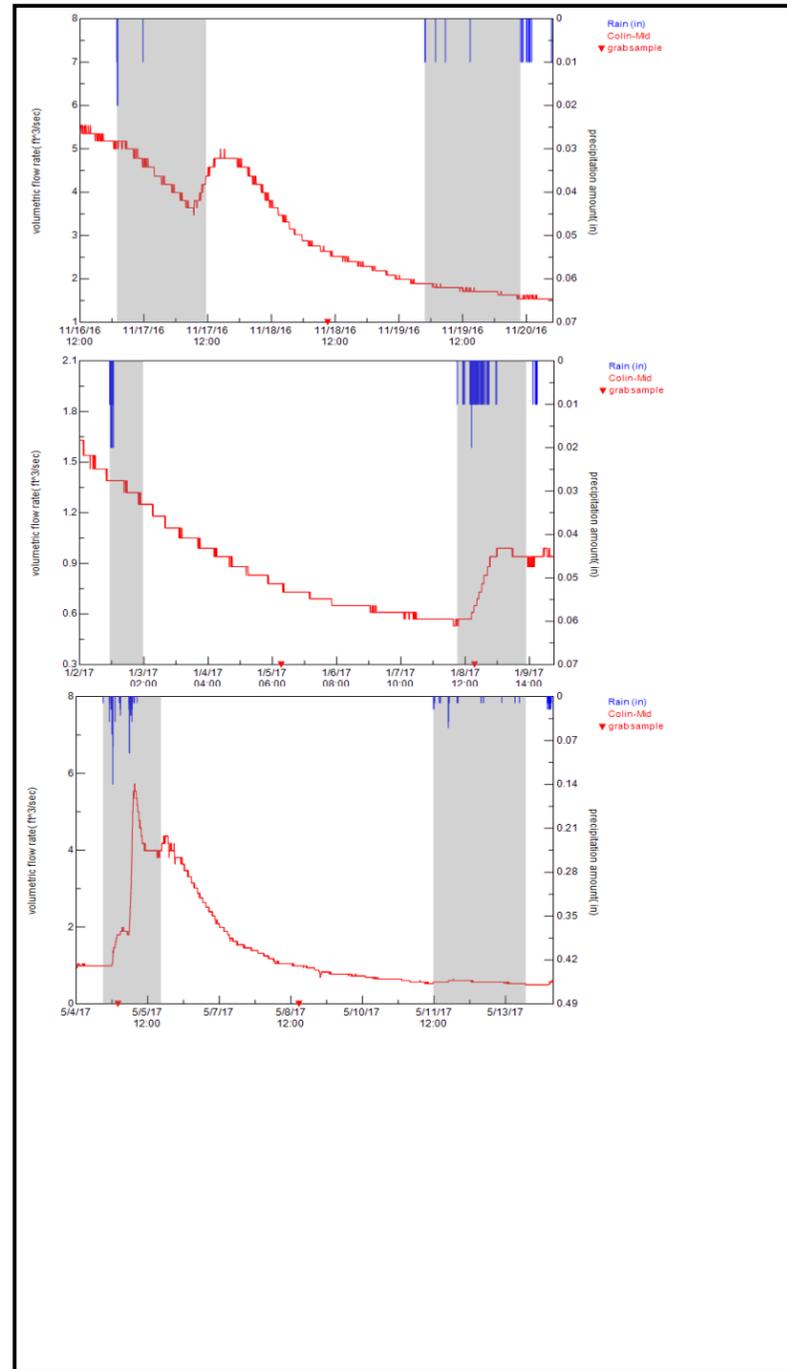
Base Flow

Storm Flow

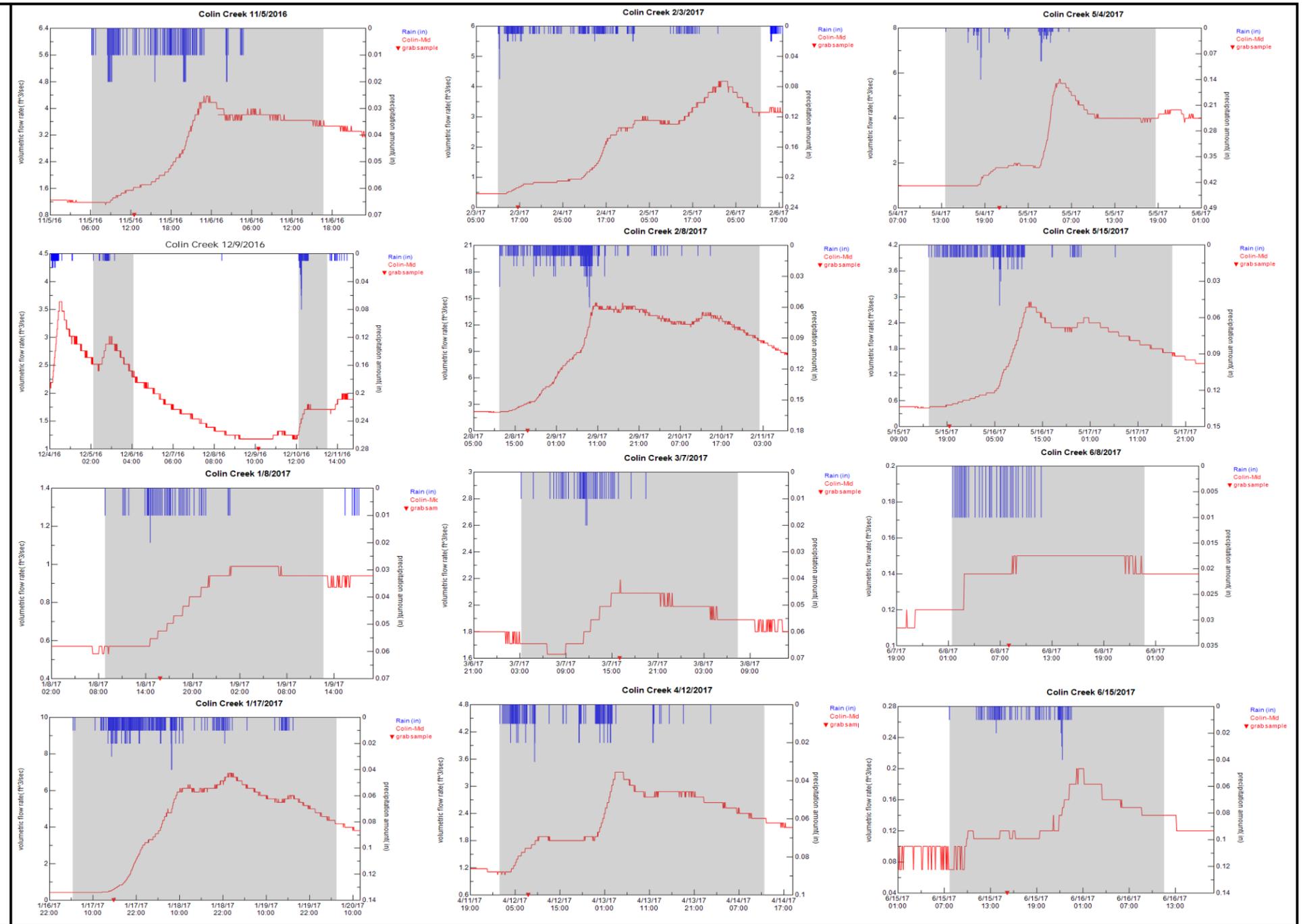


Colin – Reference Watershed – Sampled Hydrographs

Base Flow



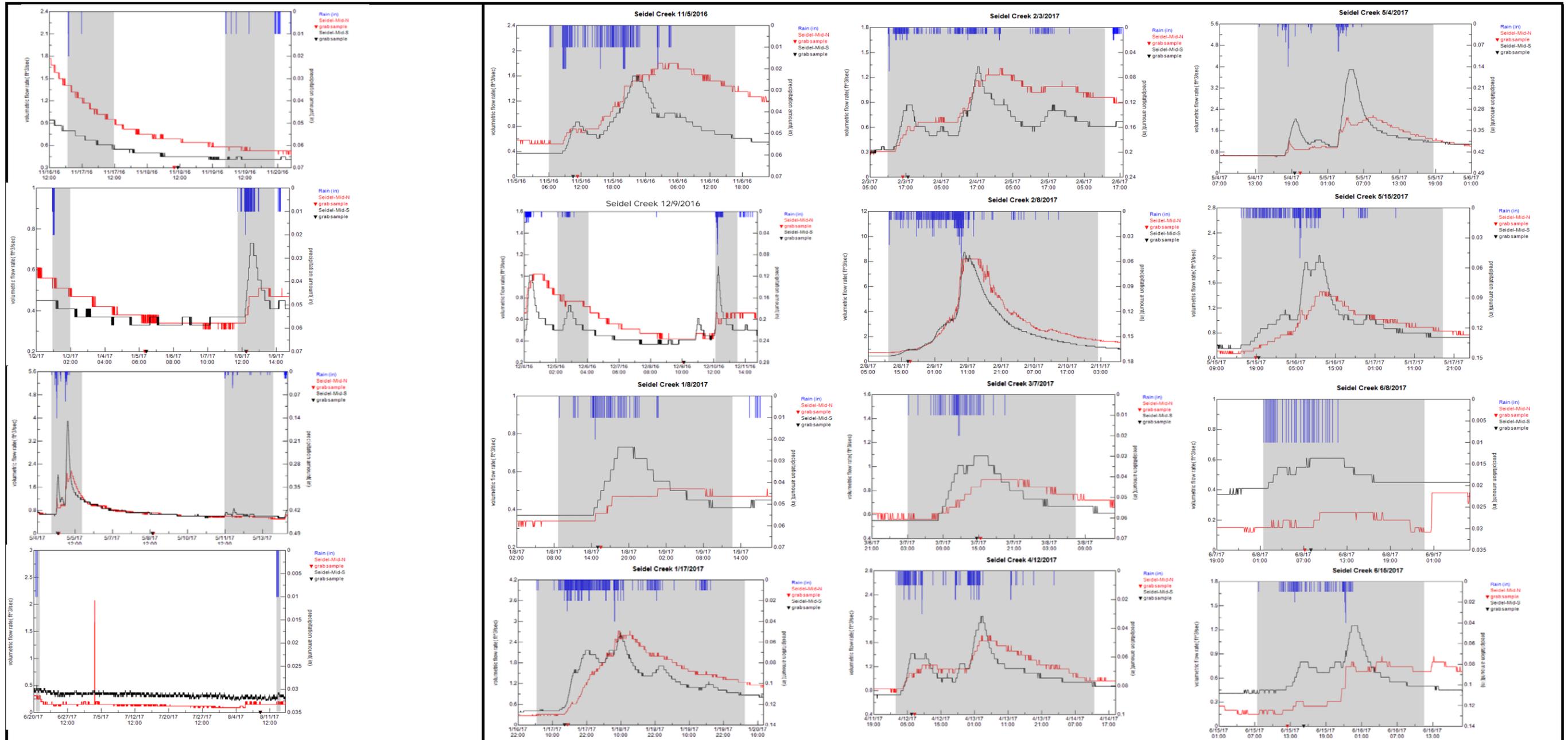
Storm Flow



Seidel – Reference Watershed – Sampled Hydrographs

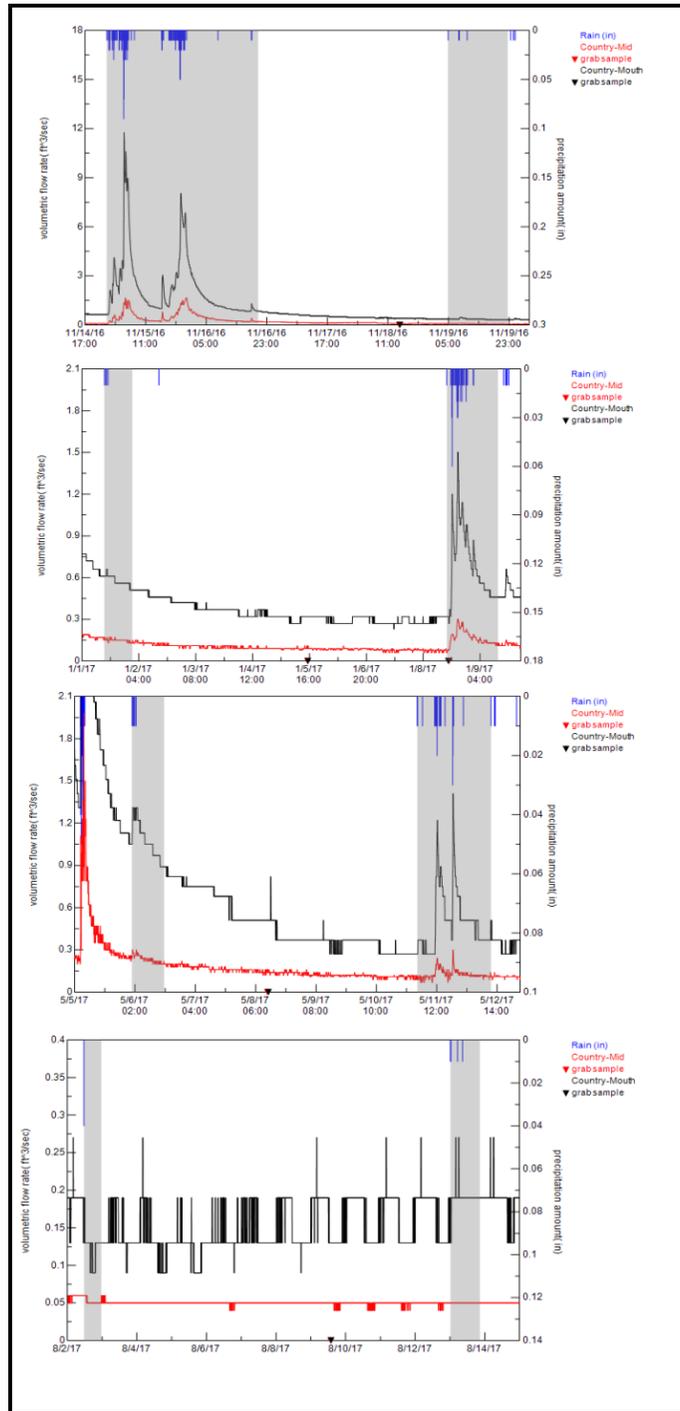
Base Flow

Storm Flow

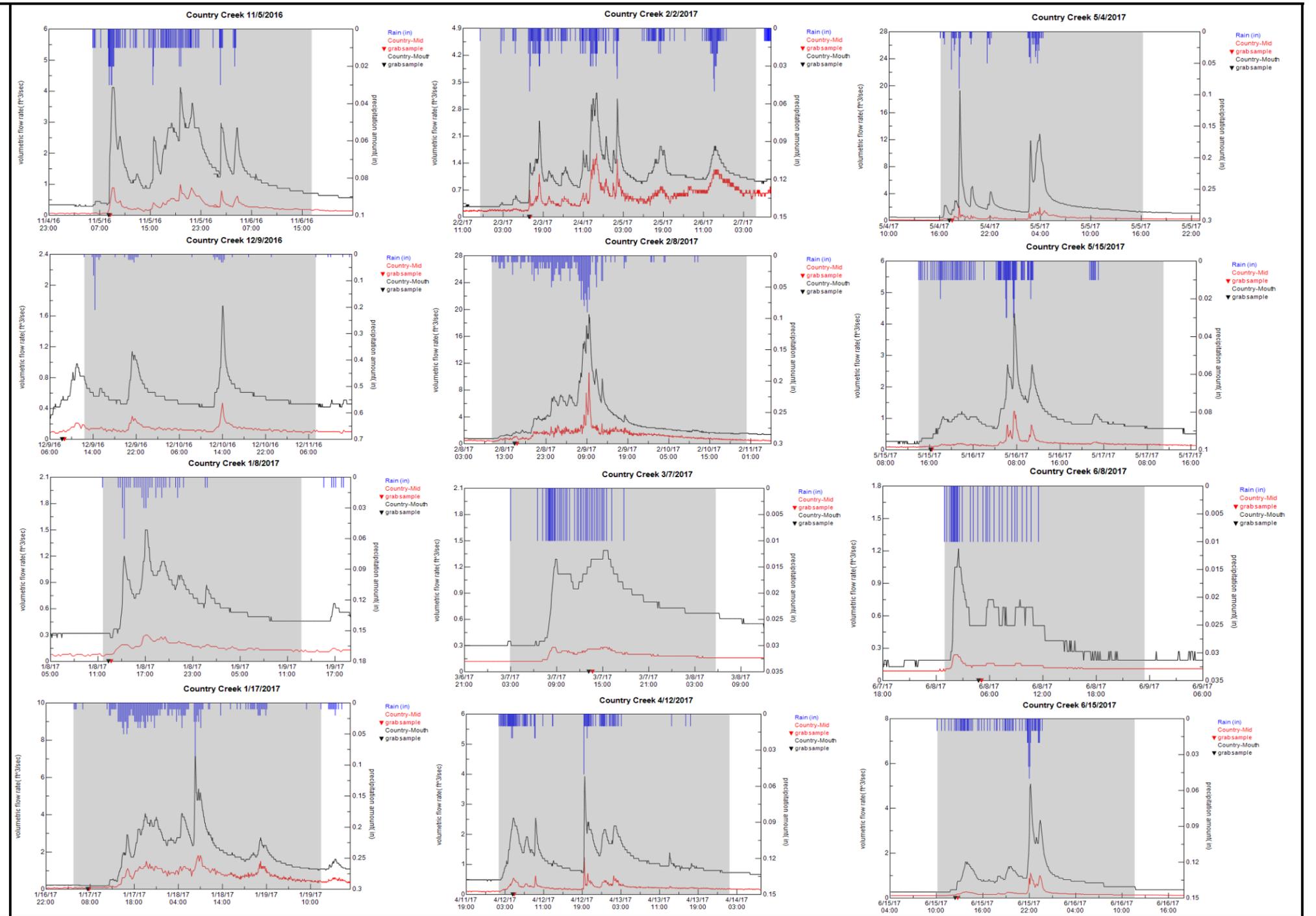


Country – Control Watershed – Sampled Hydrographs

Base Flow

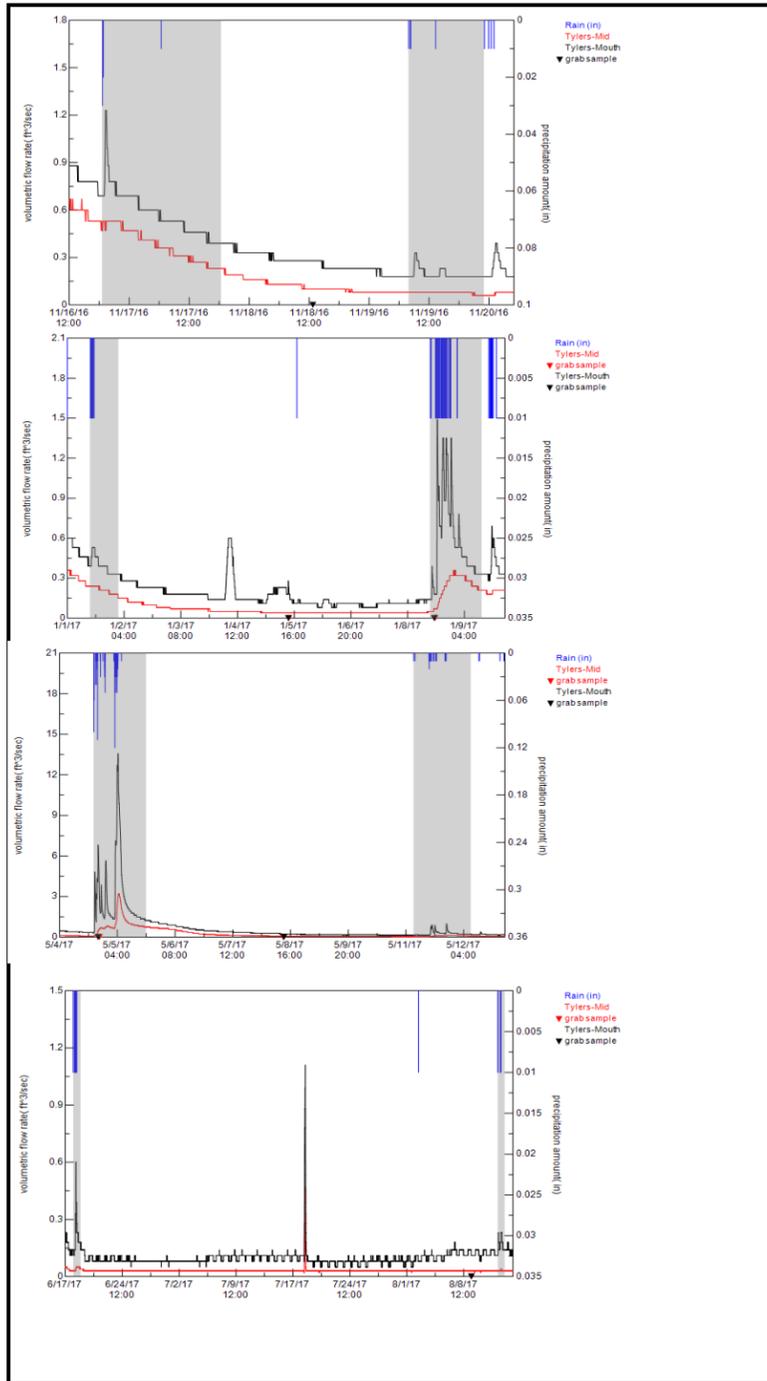


Storm Flow

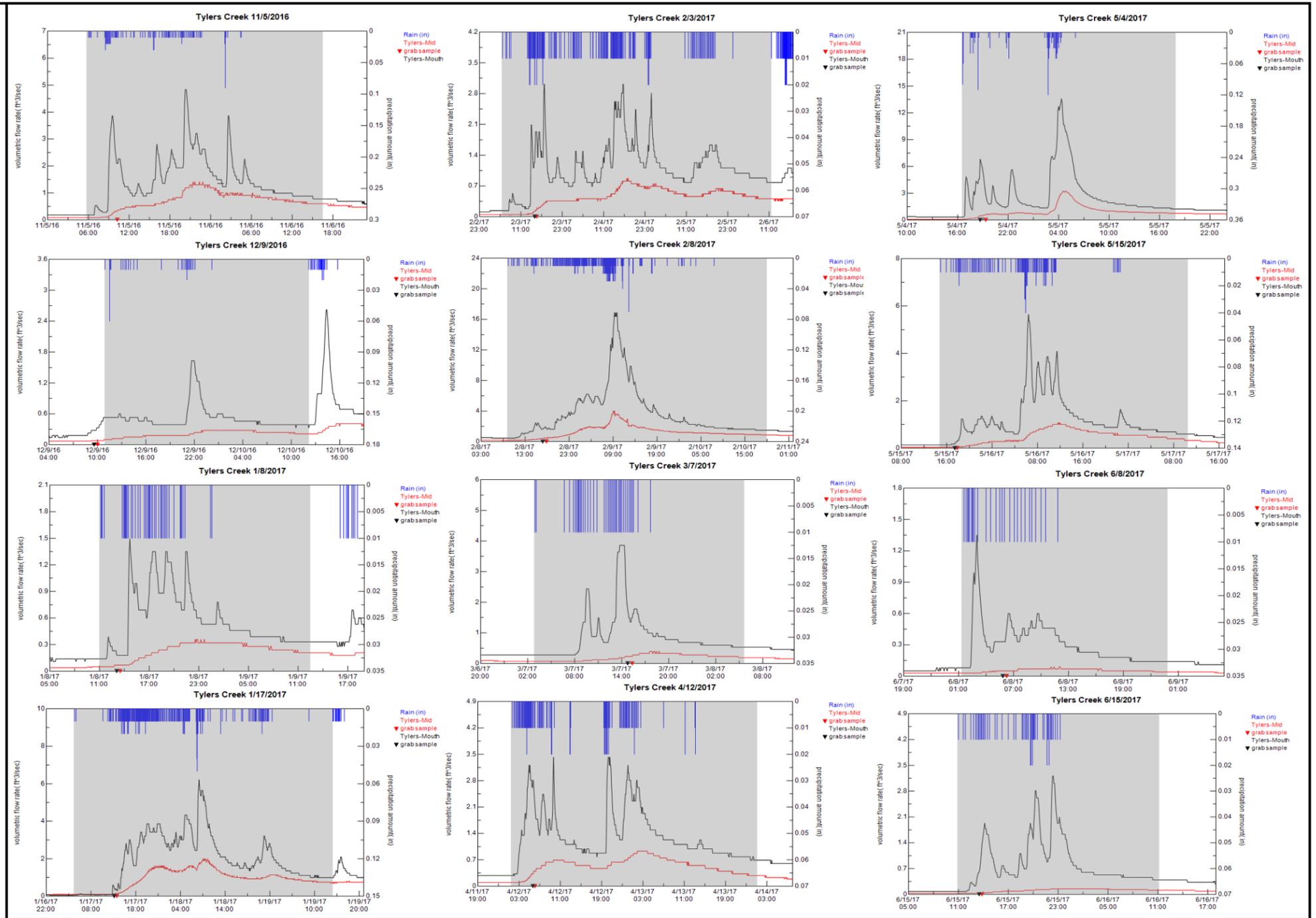


Tyler's – Control Watershed – Sampled Hydrographs

Base Flow



Storm Flow



APPENDIX F

Laboratory Reports, Field Forms, and Data Quality Assurance Audit Forms for Water Quality Monitoring



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

December 6, 2016

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1611-198

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on November 18, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular flourish.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: December 6, 2016
Samples Submitted: November 18, 2016
Laboratory Reference: 1611-198
Project: 14-05806-000

Case Narrative

Samples were collected on November 18, 2016 and received by the laboratory on November 18, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20161118					
Laboratory ID:	11-198-01					
Total Suspended Solids	1.4	1.0	SM 2540D	11-21-16	11-22-16	

Client ID:	COUMI-20161118					
Laboratory ID:	11-198-02					
Total Suspended Solids	6.2	1.0	SM 2540D	11-21-16	11-22-16	

Client ID:	COUMO-20161118					
Laboratory ID:	11-198-03					
Total Suspended Solids	3.4	1.0	SM 2540D	11-21-16	11-22-16	

Client ID:	EVAMS-20161118					
Laboratory ID:	11-198-04					
Total Suspended Solids	2.6	1.0	SM 2540D	11-21-16	11-22-16	

Client ID:	EVALSS-20161118					
Laboratory ID:	11-198-05					
Total Suspended Solids	3.2	1.0	SM 2540D	11-21-16	11-22-16	

Client ID:	MONMN-20161118					
Laboratory ID:	11-198-06					
Total Suspended Solids	1.6	1.0	SM 2540D	11-21-16	11-22-16	

Client ID:	MONMS-20161118					
Laboratory ID:	11-198-07					
Total Suspended Solids	1.4	1.0	SM 2540D	11-21-16	11-22-16	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20161118					
Laboratory ID:	11-198-08					
Total Suspended Solids	2.8	1.0	SM 2540D	11-21-16	11-22-16	

Client ID:	SEIMN-20161118					
Laboratory ID:	11-198-09					
Total Suspended Solids	6.2	1.0	SM 2540D	11-21-16	11-22-16	

Client ID:	SEIMS-20161118					
Laboratory ID:	11-198-10					
Total Suspended Solids	3.0	1.0	SM 2540D	11-21-16	11-22-16	

Client ID:	TOSMI-20161118					
Laboratory ID:	11-198-11					
Total Suspended Solids	3.4	1.0	SM 2540D	11-21-16	11-22-16	

Client ID:	TOSMO-20161118					
Laboratory ID:	11-198-12					
Total Suspended Solids	2.4	1.0	SM 2540D	11-21-16	11-22-16	

Client ID:	TYLMI-20161118					
Laboratory ID:	11-198-13					
Total Suspended Solids	4.2	1.0	SM 2540D	11-21-16	11-22-16	

Client ID:	TYLMO-20161118					
Laboratory ID:	11-198-14					
Total Suspended Solids	1.4	1.0	SM 2540D	11-21-16	11-22-16	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA15-20161118					
Laboratory ID:	11-198-16					
Total Suspended Solids	ND	1.0	SM 2540D	11-21-16	11-22-16	

Client ID:	QA16-20161118					
Laboratory ID:	11-198-17					
Total Suspended Solids	1.8	1.0	SM 2540D	11-21-16	11-22-16	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1121W1					
Total Suspended Solids	ND	1.0	SM 2540D	11-21-16	11-22-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	11-198-12							
	ORIG	DUP						
Total Suspended Solids	2.40	2.20	NA	NA	NA	9	20	

SPIKE BLANK								
Laboratory ID:	SB1121W1							
	SB	SB		SB				
Total Suspended Solids	94.0	100	NA	94	78-113	NA	NA	



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 Samples Submitted: November 18, 2016
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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20161118					
Laboratory ID:	11-198-01					
Turbidity	1.2	0.10	EPA 180.1	11-18-16	11-18-16	

Client ID:	COUMI-20161118					
Laboratory ID:	11-198-02					
Turbidity	2.6	0.10	EPA 180.1	11-18-16	11-18-16	

Client ID:	COUMO-20161118					
Laboratory ID:	11-198-03					
Turbidity	1.7	0.10	EPA 180.1	11-18-16	11-18-16	

Client ID:	EVAMS-20161118					
Laboratory ID:	11-198-04					
Turbidity	0.91	0.10	EPA 180.1	11-18-16	11-18-16	

Client ID:	EVALSS-20161118					
Laboratory ID:	11-198-05					
Turbidity	1.1	0.10	EPA 180.1	11-18-16	11-18-16	

Client ID:	MONMN-20161118					
Laboratory ID:	11-198-06					
Turbidity	1.4	0.10	EPA 180.1	11-18-16	11-18-16	

Client ID:	MONMS-20161118					
Laboratory ID:	11-198-07					
Turbidity	1.7	0.10	EPA 180.1	11-18-16	11-18-16	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
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 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20161118					
Laboratory ID:	11-198-08					
Turbidity	1.7	0.10	EPA 180.1	11-18-16	11-18-16	

Client ID:	SEIMN-20161118					
Laboratory ID:	11-198-09					
Turbidity	2.2	0.10	EPA 180.1	11-18-16	11-18-16	

Client ID:	SEIMS-20161118					
Laboratory ID:	11-198-10					
Turbidity	1.4	0.10	EPA 180.1	11-18-16	11-18-16	

Client ID:	TOSMI-20161118					
Laboratory ID:	11-198-11					
Turbidity	1.7	0.10	EPA 180.1	11-18-16	11-18-16	

Client ID:	TOSMO-20161118					
Laboratory ID:	11-198-12					
Turbidity	1.6	0.10	EPA 180.1	11-18-16	11-18-16	

Client ID:	TYLMI-20161118					
Laboratory ID:	11-198-13					
Turbidity	2.5	0.10	EPA 180.1	11-18-16	11-18-16	

Client ID:	TYLMO-20161118					
Laboratory ID:	11-198-14					
Turbidity	1.8	0.10	EPA 180.1	11-16-16	11-16-16	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA15-20161118					
Laboratory ID:	11-198-16					
Turbidity	0.20	0.10	EPA 180.1	11-18-16	11-18-16	

Client ID:	QA16-20161118					
Laboratory ID:	11-198-17					
Turbidity	1.0	0.10	EPA 180.1	11-18-16	11-18-16	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1116W1					
Turbidity	ND	0.10	EPA 180.1	11-18-16	11-18-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	11-198-01							
	ORIG	DUP						
Turbidity	1.18	1.17	NA	NA	NA	NA	1	15



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20161118					
Laboratory ID:	11-198-01					
Hardness	12	1.0	200.7/SM 2340B	11-28-16	11-30-16	

Client ID:	COUMI-20161118					
Laboratory ID:	11-198-02					
Hardness	110	1.0	200.7/SM 2340B	11-28-16	11-30-16	

Client ID:	COUMO-20161118					
Laboratory ID:	11-198-03					
Hardness	99	1.0	200.7/SM 2340B	11-28-16	11-30-16	

Client ID:	EVAMS-20161118					
Laboratory ID:	11-198-04					
Hardness	84	1.0	200.7/SM 2340B	11-28-16	11-30-16	

Client ID:	EVALSS-20161118					
Laboratory ID:	11-198-05					
Hardness	81	1.0	200.7/SM 2340B	11-28-16	11-30-16	

Client ID:	MONMN-20161118					
Laboratory ID:	11-198-06					
Hardness	50	1.0	200.7/SM 2340B	11-28-16	11-30-16	

Client ID:	MONMS-20161118					
Laboratory ID:	11-198-07					
Hardness	110	1.0	200.7/SM 2340B	11-28-16	11-30-16	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20161118					
Laboratory ID:	11-198-08					
Hardness	65	1.0	200.7/SM 2340B	11-28-16	11-30-16	

Client ID:	SEIMN-20161118					
Laboratory ID:	11-198-09					
Hardness	25	1.0	200.7/SM 2340B	11-28-16	11-30-16	

Client ID:	SEIMS-20161118					
Laboratory ID:	11-198-10					
Hardness	42	1.0	200.7/SM 2340B	11-28-16	11-30-16	

Client ID:	TOSMI-20161118					
Laboratory ID:	11-198-11					
Hardness	130	1.0	200.7/SM 2340B	11-28-16	11-30-16	

Client ID:	TOSMO-20161118					
Laboratory ID:	11-198-12					
Hardness	110	1.0	200.7/SM 2340B	11-28-16	11-30-16	

Client ID:	TYLMI-20161118					
Laboratory ID:	11-198-13					
Hardness	64	1.0	200.7/SM 2340B	11-28-16	11-30-16	

Client ID:	TYLMO-20161118					
Laboratory ID:	11-198-14					
Hardness	67	1.0	200.7/SM 2340B	11-28-16	11-30-16	



Date of Report: December 6, 2016
Samples Submitted: November 18, 2016
Laboratory Reference: 1611-198
Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA15-20161118					
Laboratory ID:	11-198-16					
Hardness	ND	1.0	200.7/SM 2340B	11-28-16	11-30-16	

Client ID:	QA16-20161118					
Laboratory ID:	11-198-17					
Hardness	78	1.0	200.7/SM 2340B	11-28-16	11-30-16	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1128WH2					
Hardness	ND	1.0	200.7/SM 2340B	11-28-16	11-30-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	11-198-01							
	ORIG	DUP						
Hardness	12.4	12.1	NA	NA	NA	2	20	

MATRIX SPIKES

Laboratory ID:	11-198-01									
	MS	MSD	MS	MSD		MS	MSD			
Hardness	155	148	132	132	12.4	108	103	75-125	5	20

SPIKE BLANK

Laboratory ID:	SB1128WH2									
	SB		SB			SB				
Hardness	136		132		NA	103		80-120	NA	NA



Date of Report: December 6, 2016
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 Laboratory Reference: 1611-198
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20161118					
Laboratory ID:	11-198-01					
Dissolved Organic Carbon	17	1.0	SM 5310B	11-28-16	11-28-16	
Client ID:	COUMI-20161118					
Laboratory ID:	11-198-02					
Dissolved Organic Carbon	4.8	1.0	SM 5310B	11-28-16	11-28-16	
Client ID:	COUMO-20161118					
Laboratory ID:	11-198-03					
Dissolved Organic Carbon	4.9	1.0	SM 5310B	11-28-16	11-28-16	
Client ID:	EVAMS-20161118					
Laboratory ID:	11-198-04					
Dissolved Organic Carbon	6.6	1.0	SM 5310B	11-28-16	11-28-16	
Client ID:	EVALSS-20161118					
Laboratory ID:	11-198-05					
Dissolved Organic Carbon	6.6	1.0	SM 5310B	11-28-16	11-28-16	
Client ID:	MONMN-20161118					
Laboratory ID:	11-198-06					
Dissolved Organic Carbon	5.2	1.0	SM 5310B	11-28-16	11-28-16	
Client ID:	MONMS-20161118					
Laboratory ID:	11-198-07					
Dissolved Organic Carbon	7.4	1.0	SM 5310B	11-28-16	11-28-16	



Date of Report: December 6, 2016
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 Laboratory Reference: 1611-198
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20161118					
Laboratory ID:	11-198-08					
Dissolved Organic Carbon	5.1	1.0	SM 5310B	11-28-16	11-28-16	
Client ID:	SEIMN-20161118					
Laboratory ID:	11-198-09					
Dissolved Organic Carbon	9.0	1.0	SM 5310B	11-28-16	11-28-16	
Client ID:	SEIMS-20161118					
Laboratory ID:	11-198-10					
Dissolved Organic Carbon	6.1	1.0	SM 5310B	11-28-16	11-28-16	
Client ID:	TOSMI-20161118					
Laboratory ID:	11-198-11					
Dissolved Organic Carbon	5.5	1.0	SM 5310B	11-28-16	11-28-16	
Client ID:	TOSMO-20161118					
Laboratory ID:	11-198-12					
Dissolved Organic Carbon	4.8	1.0	SM 5310B	11-28-16	11-28-16	
Client ID:	TYLMI-20161118					
Laboratory ID:	11-198-13					
Dissolved Organic Carbon	7.2	1.0	SM 5310B	11-28-16	11-28-16	
Client ID:	TYLMO-20161118					
Laboratory ID:	11-198-14					
Dissolved Organic Carbon	5.1	1.0	SM 5310B	11-28-16	11-28-16	



Date of Report: December 6, 2016
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 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA14-20161118					
Laboratory ID:	11-198-15					
Dissolved Organic Carbon	ND	1.0	SM 5310B	11-28-16	11-28-16	
Client ID:	QA15-20161118					
Laboratory ID:	11-198-16					
Dissolved Organic Carbon	1.0	1.0	SM 5310B	11-28-16	11-28-16	
Client ID:	QA16-20161118					
Laboratory ID:	11-198-17					
Dissolved Organic Carbon	6.6	1.0	SM 5310B	11-28-16	11-28-16	



Date of Report: December 6, 2016
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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1128D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	11-28-16	11-28-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	11-198-01							
	ORIG	DUP						
Dissolved Organic Carbon	17.4	17.4	NA	NA	NA	0	20	

MATRIX SPIKE

Laboratory ID:	11-198-01							
	MS	MS		MS				
Dissolved Organic Carbon	27.2	10.0	17.4	98	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB1128D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.8	10.0	NA	108	75-125	NA	NA	



Date of Report: December 6, 2016
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 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20161118					
Laboratory ID:	11-198-01					
Total Phosphorus	0.016	0.010	EPA 365.1	11-23-16	11-23-16	

Client ID:	COUMI-20161118					
Laboratory ID:	11-198-02					
Total Phosphorus	0.071	0.010	EPA 365.1	11-23-16	11-23-16	

Client ID:	COUMO-20161118					
Laboratory ID:	11-198-03					
Total Phosphorus	0.047	0.010	EPA 365.1	11-23-16	11-23-16	

Client ID:	EVAMS-20161118					
Laboratory ID:	11-198-04					
Total Phosphorus	0.013	0.010	EPA 365.1	11-23-16	11-23-16	

Client ID:	EVALSS-20161118					
Laboratory ID:	11-198-05					
Total Phosphorus	0.022	0.010	EPA 365.1	11-23-16	11-23-16	

Client ID:	MONMN-20161118					
Laboratory ID:	11-198-06					
Total Phosphorus	0.019	0.010	EPA 365.1	11-23-16	11-23-16	

Client ID:	MONMS-20161118					
Laboratory ID:	11-198-07					
Total Phosphorus	0.020	0.010	EPA 365.1	11-23-16	11-23-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20161118					
Laboratory ID:	11-198-08					
Total Phosphorus	0.025	0.010	EPA 365.1	11-23-16	11-23-16	

Client ID:	SEIMN-20161118					
Laboratory ID:	11-198-09					
Total Phosphorus	0.029	0.010	EPA 365.1	11-23-16	11-23-16	

Client ID:	SEIMS-20161118					
Laboratory ID:	11-198-10					
Total Phosphorus	0.026	0.010	EPA 365.1	11-23-16	11-23-16	

Client ID:	TOSMI-20161118					
Laboratory ID:	11-198-11					
Total Phosphorus	0.052	0.010	EPA 365.1	11-23-16	11-23-16	

Client ID:	TOSMO-20161118					
Laboratory ID:	11-198-12					
Total Phosphorus	0.053	0.010	EPA 365.1	11-23-16	11-23-16	

Client ID:	TYLMI-20161118					
Laboratory ID:	11-198-13					
Total Phosphorus	0.026	0.010	EPA 365.1	11-23-16	11-23-16	

Client ID:	TYLMO-20161118					
Laboratory ID:	11-198-14					
Total Phosphorus	0.026	0.010	EPA 365.1	11-23-16	11-23-16	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
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 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA15-20161118					
Laboratory ID:	11-198-16					
Total Phosphorus	ND	0.010	EPA 365.1	11-23-16	11-23-16	

Client ID:	QA16-20161118					
Laboratory ID:	11-198-17					
Total Phosphorus	0.014	0.010	EPA 365.1	11-23-16	11-23-16	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1123W1					
Total Phosphorus	ND	0.010	EPA 365.1	11-23-16	11-23-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	11-198-01							
	ORIG	DUP						
Total Phosphorus	0.0161	0.0156	NA	NA	NA	NA	3	11

MATRIX SPIKE								
Laboratory ID:	11-198-01							
	MS	MS		MS				
Total Phosphorus	0.282	0.250	0.0161	106	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB1123W1							
	SB	SB		SB				
Total Phosphorus	0.272	0.250	NA	109	86-111	NA	NA	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 11-198-01						
Client ID: COLM-20161118						
Copper	ND	1.0	200.8	11-28-16	11-28-16	
Zinc	ND	5.0	200.8	11-28-16	11-28-16	
Lab ID: 11-198-02						
Client ID: COUMI-20161118						
Copper	1.2	1.0	200.8	11-28-16	11-28-16	
Zinc	11	5.0	200.8	11-28-16	11-28-16	
Lab ID: 11-198-03						
Client ID: COUMO-20161118						
Copper	ND	1.0	200.8	11-28-16	11-28-16	
Zinc	8.6	5.0	200.8	11-28-16	11-28-16	
Lab ID: 11-198-04						
Client ID: EVAMS-20161118						
Copper	ND	1.0	200.8	11-28-16	11-28-16	
Zinc	ND	5.0	200.8	11-28-16	11-28-16	
Lab ID: 11-198-05						
Client ID: EVALSS-20161118						
Copper	ND	1.0	200.8	11-28-16	11-28-16	
Zinc	ND	5.0	200.8	11-28-16	11-28-16	
Lab ID: 11-198-06						
Client ID: MONMN-20161118						
Copper	ND	1.0	200.8	11-28-16	11-28-16	
Zinc	ND	5.0	200.8	11-28-16	11-28-16	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	11-198-07					
Client ID:	MONMS-20161118					
Copper	1.1	1.0	200.8	11-28-16	11-28-16	
Zinc	6.7	5.0	200.8	11-28-16	11-28-16	
Lab ID:	11-198-08					
Client ID:	MONM-20161118					
Copper	ND	1.0	200.8	11-28-16	11-28-16	
Zinc	19	5.0	200.8	11-28-16	11-28-16	
Lab ID:	11-198-09					
Client ID:	SEIMN-20161118					
Copper	ND	1.0	200.8	11-28-16	11-28-16	
Zinc	ND	5.0	200.8	11-28-16	11-28-16	
Lab ID:	11-198-10					
Client ID:	SEIMS-20161118					
Copper	ND	1.0	200.8	11-28-16	11-28-16	
Zinc	ND	5.0	200.8	11-28-16	11-28-16	
Lab ID:	11-198-11					
Client ID:	TOSMI-20161118					
Copper	1.6	1.0	200.8	11-28-16	11-28-16	
Zinc	12	5.0	200.8	11-28-16	11-28-16	
Lab ID:	11-198-12					
Client ID:	TOSMO-20161118					
Copper	1.0	1.0	200.8	11-28-16	11-28-16	
Zinc	11	5.0	200.8	11-28-16	11-28-16	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
<hr/>						
Lab ID:	11-198-13					
Client ID:	TYLMI-20161118					
Copper	2.5	1.0	200.8	11-28-16	11-28-16	
Zinc	5.6	5.0	200.8	11-28-16	11-28-16	
<hr/>						
<hr/>						
Lab ID:	11-198-14					
Client ID:	TYLMO-20161118					
Copper	1.4	1.0	200.8	11-28-16	11-28-16	
Zinc	12	5.0	200.8	11-28-16	11-28-16	
<hr/>						
<hr/>						
Lab ID:	11-198-16					
Client ID:	QA15-20161118					
Copper	1.3	1.0	200.8	11-28-16	11-28-16	
Zinc	ND	5.0	200.8	11-28-16	11-28-16	
<hr/>						
<hr/>						
Lab ID:	11-198-17					
Client ID:	QA16-20161118					
Copper	ND	1.0	200.8	11-28-16	11-28-16	
Zinc	ND	5.0	200.8	11-28-16	11-28-16	
<hr/>						



Date of Report: December 6, 2016
Samples Submitted: November 18, 2016
Laboratory Reference: 1611-198
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**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 11-28-16
Date Analyzed: 11-28-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB1128WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: December 6, 2016
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Laboratory Reference: 1611-198
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**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 11-28-16
Date Analyzed: 11-28-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 11-198-03

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	8.56	8.53	0	5.0	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 11-28-16

Date Analyzed: 11-28-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 11-198-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	105	105	112	112	6	
Zinc	100	116	108	124	115	6	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
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**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 11-198-01						
Client ID: COLM-20161118						
Copper	ND	1.0	200.8		11-28-16	
Zinc	ND	5.0	200.8		11-28-16	
Lab ID: 11-198-02						
Client ID: COUMI-20161118						
Copper	ND	1.0	200.8		11-28-16	
Zinc	7.1	5.0	200.8		11-28-16	
Lab ID: 11-198-03						
Client ID: COUMO-20161118						
Copper	ND	1.0	200.8		11-28-16	
Zinc	7.5	5.0	200.8		11-28-16	
Lab ID: 11-198-04						
Client ID: EVAMS-20161118						
Copper	ND	1.0	200.8		11-28-16	
Zinc	ND	5.0	200.8		11-28-16	
Lab ID: 11-198-05						
Client ID: EVALSS-20161118						
Copper	ND	1.0	200.8		11-28-16	
Zinc	ND	5.0	200.8		11-28-16	
Lab ID: 11-198-06						
Client ID: MONMN-20161118						
Copper	ND	1.0	200.8		11-28-16	
Zinc	ND	5.0	200.8		11-28-16	



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	11-198-07					
Client ID:	MONMS-20161118					
Copper	ND	1.0	200.8		11-28-16	
Zinc	ND	5.0	200.8		11-28-16	
Lab ID:	11-198-08					
Client ID:	MONM-20161118					
Copper	ND	1.0	200.8		11-28-16	
Zinc	12	5.0	200.8		11-28-16	
Lab ID:	11-198-09					
Client ID:	SEIMN-20161118					
Copper	ND	1.0	200.8		11-28-16	
Zinc	ND	5.0	200.8		11-28-16	
Lab ID:	11-198-10					
Client ID:	SEIMS-20161118					
Copper	ND	1.0	200.8		11-28-16	
Zinc	ND	5.0	200.8		11-28-16	
Lab ID:	11-198-11					
Client ID:	TOSMI-20161118					
Copper	1.3	1.0	200.8		11-28-16	
Zinc	12	5.0	200.8		11-28-16	
Lab ID:	11-198-12					
Client ID:	TOSMO-20161118					
Copper	ND	1.0	200.8		11-28-16	
Zinc	7.2	5.0	200.8		11-28-16	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	11-198-13					
Client ID:	TYLMI-20161118					
Copper	2.2	1.0	200.8		11-28-16	
Zinc	ND	5.0	200.8		11-28-16	
Lab ID:	11-198-14					
Client ID:	TYLMO-20161118					
Copper	ND	1.0	200.8		11-28-16	
Zinc	9.4	5.0	200.8		11-28-16	
Lab ID:	11-198-15					
Client ID:	QA14-20161118					
Copper	ND	1.0	200.8		11-28-16	
Zinc	ND	5.0	200.8		11-28-16	
Lab ID:	11-198-16					
Client ID:	QA15-20161118					
Copper	16	1.0	200.8		11-28-16	
Zinc	ND	5.0	200.8		11-28-16	
Lab ID:	11-198-17					
Client ID:	QA16-20161118					
Copper	ND	1.0	200.8		11-28-16	
Zinc	ND	5.0	200.8		11-28-16	



Date of Report: December 6, 2016
Samples Submitted: November 18, 2016
Laboratory Reference: 1611-198
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 11-28-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB1128D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: December 6, 2016
Samples Submitted: November 18, 2016
Laboratory Reference: 1611-198
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 11-28-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 11-198-17

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: December 6, 2016
 Samples Submitted: November 18, 2016
 Laboratory Reference: 1611-198
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 11-28-16

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 11-198-17

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	72.0	90	71.7	90	0	
Zinc	80.0	79.4	99	79.2	99	0	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

Dec 6 2016
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDYA project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20161118	Water	16-A029180	Micro, NUT
COUMI-20161118	Water	16-A029181	Micro, NUT
COUMO-20161118	Water	16-A029182	Micro, NUT
EVAMS-20161118	Water	16-A029183	Micro, NUT
EVALSS-20161118	Water	16-A029184	Micro, NUT
MONMN-20161118	Water	16-A029185	Micro, NUT
MONMS-20161118	Water	16-A029186	Micro, NUT
MONM-20161118	Water	16-A029187	Micro, NUT
SEIMN-20161118	Water	16-A029188	Micro, NUT
SEIMS-20161118	Water	16-A029189	Micro, NUT
TOSMI-20161118	Water	16-A029190	Micro, NUT
TOSMO-20161118	Water	16-A029191	Micro, NUT
TYLMI-20161118	Water	16-A029192	Micro, NUT
TYLMO-20161118	Water	16-A029193	Micro, NUT
QA15-20161118	Water	16-A029194	Micro, NUT
QA16-20161118	Water	16-A029195	Micro, NUT

Your samples were received on Friday, November 18, 2016. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

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Dec 6 2016
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 11-198

BACT = Bacteriological
CONV = Conventionals

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
 13600 NE 126TH PL
 Suite C
 Kirkland, WA 98034
 (425) 885-1664
 www.amtestlab.com



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 Services

ANALYSIS REPORT

On-Site Environmental
 14648 NE 95th ST
 Redmond, WA 98052
 Attention: David Baumeister
 Project Name: REDMOND PAIRED WATERSHED STUDYA
 Project #: 14-05806-000
 PO Number: 11-198
 All results reported on an as received basis.

Date Received: 11/18/16
 Date Reported: 12/ 6/16

AMTEST Identification Number 16-A029180
 Client Identification COLM-20161118
 Sampling Date 11/18/16, 10:35

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	< 10	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	1.04	mg/l		0.1			
Total Nitrogen (TKN)	0.973	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	0.065	mg/l		0.01	EPA 353.2	SW	12/03/16

AMTEST Identification Number **16-A029181**
Client Identification **COUMI-20161118**
Sampling Date **11/18/16, 14:25**

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	330	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	1.02	mg/l		0.1			
Total Nitrogen (TKN)	0.532	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	0.49	mg/l		0.01	EPA 353.2	SW	12/02/16

AMTEST Identification Number 16-A029182
Client Identification COUMO-20161118
Sampling Date 11/18/16, 14:35

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	340	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	1.06	mg/l		0.1			
Total Nitrogen (TKN)	0.422	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	0.64	mg/l		0.01	EPA 353.2	SW	12/02/16

AMTEST Identification Number 16-A029183
Client Identification EVAMS-20161118
Sampling Date 11/18/16, 13:25

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	< 10	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	2.06	mg/l		0.1			
Total Nitrogen (TKN)	0.561	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	1.5	mg/l		0.01	EPA 353.2	SW	12/03/16

AMTEST Identification Number 16-A029184
Client Identification EVALSS-20161118
Sampling Date 11/18/16, 13:45

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	30.	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	2.06	mg/l		0.1			
Total Nitrogen (TKN)	0.560	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	1.5	mg/l		0.01	EPA 353.2	SW	12/03/16

AMTEST Identification Number **16-A029185**
Client Identification **MONMN-20161118**
Sampling Date **11/18/16, 12:15**

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	40.	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	0.88	mg/l		0.1			
Total Nitrogen (TKN)	0.410	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	0.47	mg/l		0.01	EPA 353.2	SW	12/02/16

AMTEST Identification Number 16-A029186
Client Identification MONMS-20161118
Sampling Date 11/18/16, 12:30

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	10.	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	1.07	mg/l		0.1			
Total Nitrogen (TKN)	0.739	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	0.33	mg/l		0.01	EPA 353.2	SW	12/02/16

AMTEST Identification Number 16-A029187
Client Identification MONM-20161118
Sampling Date 11/18/16, 11:45

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	80.	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	0.84	mg/l		0.1			
Total Nitrogen (TKN)	0.460	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	0.38	mg/l		0.01	EPA 353.2	SW	12/02/16

AMTEST Identification Number **16-A029188**
Client Identification **SEIMN-20161118**
Sampling Date **11/18/16, 09:55**

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	30.	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	0.98	mg/l		0.1			
Total Nitrogen (TKN)	0.546	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	0.43	mg/l		0.01	EPA 353.2	SW	12/03/16

AMTEST Identification Number **16-A029189**
Client Identification **SEIMS-20161118**
Sampling Date **11/18/16, 11:15**

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	< 10	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	0.80	mg/l		0.1			
Total Nitrogen (TKN)	0.459	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	0.34	mg/l		0.01	EPA 353.2	SW	12/03/16

AMTEST Identification Number **16-A029190**
Client Identification **TOSMI-20161118**
Sampling Date **11/18/16, 14:10**

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	290	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	1.29	mg/l		0.1			
Total Nitrogen (TKN)	0.453	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	0.84	mg/l		0.01	EPA 353.2	SW	12/03/16

AMTEST Identification Number 16-A029191
Client Identification TOSMO-20161118
Sampling Date 11/18/16, 14:50

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	160	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	1.00	mg/l		0.1			
Total Nitrogen (TKN)	0.414	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	0.59	mg/l		0.01	EPA 353.2	SW	12/03/16

AMTEST Identification Number **16-A029192**
Client Identification **TYLMI-20161118**
Sampling Date **11/18/16, 13:05**

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	30.	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	1.06	mg/l		0.1			
Total Nitrogen (TKN)	0.657	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	0.40	mg/l		0.01	EPA 353.2	SW	12/03/16

AMTEST Identification Number 16-A029193
Client Identification TYLMO-20161118
Sampling Date 11/18/16, 12:45

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	< 10	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	0.85	mg/l		0.1			
Total Nitrogen (TKN)	0.442	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	0.41	mg/l		0.01	EPA 353.2	SW	12/03/16

AMTEST Identification Number **16-A029194**
Client Identification **QA15-20161118**
Sampling Date **11/18/16, 08:45**

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	< 10	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	0.28	mg/l		0.1			
Total Nitrogen (TKN)	0.173	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	0.11	mg/l		0.01	EPA 353.2	SW	12/03/16

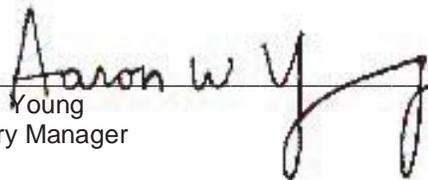
AMTEST Identification Number 16-A029195
Client Identification QA16-20161118
Sampling Date 11/18/16, 13:35

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliform	20.	CFU/100 ml		10	SM 9222D	JM	11/18/16 16:45

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Nitrogen (NOX&TKN)	2.14	mg/l		0.1			
Total Nitrogen (TKN)	0.545	mg/l		0.1	EPA 351.2	JC	11/28/16
Nitrate + Nitrite	1.6	mg/l		0.01	EPA 353.2	SW	12/03/16



Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 16-A029180 to 16-A029195

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
16-A029182	Fecal Coliform	CFU/100 ml	340	500	38.
16-A029194	Fecal Coliform	CFU/100 ml	< 10	< 10	
16-A028547	Total Nitrogen (TKN)	mg/l	0.423	0.523	21.
16-A029095	Total Nitrogen (TKN)	mg/l	4.08	3.42	18.
16-A029180	Total Nitrogen (TKN)	mg/l	0.973	0.807	19.
16-A029190	Total Nitrogen (TKN)	mg/l	0.453	0.469	3.5
16-A028662	Nitrate + Nitrite	mg/l	2.6	2.8	7.4
16-A028981	Nitrate + Nitrite	mg/l	0.88	0.86	2.3
16-A029050	Nitrate + Nitrite	mg/l	1.0	1.0	0.00
16-A029094	Nitrate + Nitrite	mg/l	3.9	3.8	2.6
16-A029187	Nitrate + Nitrite	mg/l	0.38	0.36	5.4
16-A028655	Nitrate + Nitrite	mg/l	24.	19.	23.
16-A029142	Nitrate + Nitrite	mg/l	1.9	1.8	5.4
16-A029252	Nitrate + Nitrite	mg/l	0.030	0.046	42.
16-A029294	Nitrate + Nitrite	mg/l	0.29	0.31	6.7
16-A029346	Nitrate + Nitrite	mg/l	1.9	2.0	5.1
16-A029361	Nitrate + Nitrite	mg/l	1.6	1.7	6.1
16-A029568	Nitrate + Nitrite	mg/l	0.18	0.18	0.00
16-A029652	Nitrate + Nitrite	mg/l	1.7	1.6	6.1
16-A029713	Nitrate + Nitrite	mg/l	2.5	2.4	4.1
16-A029793	Nitrate + Nitrite	mg/l	0.58	0.60	3.4

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
16-A028547	Total Nitrogen (TKN)	mg/l	0.423	2.68	2.00	112.85 %
16-A029095	Total Nitrogen (TKN)	mg/l	4.08	6.06	2.00	99.00 %
16-A029180	Total Nitrogen (TKN)	mg/l	0.973	2.90	2.00	96.35 %
16-A029190	Total Nitrogen (TKN)	mg/l	0.453	2.45	2.00	99.85 %
16-A028662	Nitrate + Nitrite	mg/l	2.6	6.9	5.0	86.00 %
16-A028981	Nitrate + Nitrite	mg/l	0.88	1.3	0.50	84.00 %
16-A029050	Nitrate + Nitrite	mg/l	1.0	1.4	0.50	80.00 %
16-A029094	Nitrate + Nitrite	mg/l	3.9	8.4	5.0	90.00 %
16-A029187	Nitrate + Nitrite	mg/l	0.38	0.80	0.50	84.00 %
16-A028655	Nitrate + Nitrite	mg/l	24.	50.	25.	104.00 %
16-A029142	Nitrate + Nitrite	mg/l	1.9	2.7	1.0	80.00 %
16-A029252	Nitrate + Nitrite	mg/l	0.030	0.41	0.50	76.00 %
16-A029294	Nitrate + Nitrite	mg/l	0.29	0.67	0.50	76.00 %
16-A029346	Nitrate + Nitrite	mg/l	1.9	4.3	2.5	96.00 %
16-A029361	Nitrate + Nitrite	mg/l	1.6	2.0	0.50	80.00 %
16-A029568	Nitrate + Nitrite	mg/l	0.18	0.57	0.50	78.00 %

QC Summary for sample numbers: 16-A029180 to 16-A029195...

MATRIX SPIKES continued....

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
16-A029652	Nitrate + Nitrite	mg/l	1.7	2.5	1.0	80.00 %
16-A029713	Nitrate + Nitrite	mg/l	2.5	5.4	2.5	116.00 %
16-A029793	Nitrate + Nitrite	mg/l	0.58	0.96	0.50	76.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	1.00	1.03	103. %
Total Nitrogen (TKN)	mg/l	1.00	1.01	101. %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 11-198

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20161118 <i>29180</i>	11/18/16	10:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20161118 <i>81</i>	11/18/16	14:25	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20161118 <i>82</i>	11/18/16	14:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20161118 <i>83</i>	11/18/16	13:25	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20161118 <i>84</i>	11/18/16	13:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20161118 <i>85</i>	11/18/16	12:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20161118 <i>86</i>	11/18/16	12:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20161118 <i>87</i>	11/18/16	11:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20161118 <i>88</i>	11/18/16	9:55	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20161118 <i>89</i>	11/18/16	11:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company		Date	Time	Comments/Special Instructions
Relinquished by: <i>[Signature]</i>		<i>AmTest</i>		<i>11/18/16</i>	<i>1545</i>	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:						
Relinquished by: <i>RM</i>		<i>AmTest</i>		<i>11/18/16</i>	<i>1545</i>	
Received by:						
Relinquished by:						
Received by:						



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3381

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 11-198

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
11	TOSMI-20161118 <i>291990</i>	11/18/16	14:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
12	TOSMO-20161118 <i>91</i>	11/18/16	14:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
13	TYLMI-20161118 <i>92</i>	11/18/16	13:05	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
14	TYLMO-20161118 <i>93</i>	11/18/16	12:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
15	QA14-20161118	11/18/16	8:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
16	QA15-20161118 <i>94</i>	11/18/16	8:45	Water	2	Fecal Coliform SM 9222D; Total Nitrogen SM 4500-N
17	QA16-20161118 <i>95</i>	11/18/16	13:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N

Signature	Company	Date	Time	Comments/Special Instructions
<i>[Signature]</i>	<i>OnSite Env</i>	<i>11/18/16</i>	<i>1545</i>	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Relinquished by:				
Received by:				
<i>RM</i>	<i>AmTest</i>	<i>11/18/16</i>	<i>1545</i>	
Relinquished by:				
Received by:				



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

CHAIN OF CUSTODY

11-198

Page 1 of 2

Turnaround Requested:
 1 Day
 2 Day
 3 Day
 Standard

Laboratory No.	
Requested Analyses	
Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)
Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *
Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)
Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)
Dissolved Cu and Zn (EPA 200.8) *	

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2016 1118	11-18-16	10:35	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 1118	11-18-16	14:25	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 1118	11-18-16	14:35	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 1118	11-18-16	13:25	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 1118	11-18-16	13:45	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2016 1118	11-18-16	12:15	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 1118	11-18-16	12:30	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 1118	11-18-16	11:45	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 1118	11-18-16	9:55	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 1118	11-18-16	11:15	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 1118	11-18-16	14:10	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 1118	11-18-16	14:50	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 1118	11-18-16	13:05	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 1118	11-18-16	12:45	Water	7	X	X	X	X	X	X	X	X	X
15	QA 14-2016 1118	11-18-16	08:30	Water	12	X	X	X	X	X	X	X	X	X
16	QA 15-2016 1118	11-18-16	08:45	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by Miriam Herrera Date 11-18-16 Received by [Signature] Date 11/18/16
 Firm Herrera Time 15:10 Firm [Signature] Time 15:10

Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

CHAIN OF CUSTODY

11-198

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No.

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
-----------------------------------	-----------------------	---------------------------------	-------------------------------------	---------------------------	------------------------------	------------------------------	-----------------------------	-----------------------------------

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
	COLM-2016			Water	7	X	X	X	X	X	X	X	X	X
	COUMI-2016			Water	7	X	X	X	X	X	X	X	X	X
	COUMO-2016			Water	7	X	X	X	X	X	X	X	X	X
	EVAMS-2016			Water	7	X	X	X	X	X	X	X	X	X
	EVALSS-2016			Water	7	X	X	X	X	X	X	X	X	X
	MONMN-2016			Water	7	X	X	X	X	X	X	X	X	X
	MONMS-2016			Water	7	X	X	X	X	X	X	X	X	X
	MONM-2016			Water	7	X	X	X	X	X	X	X	X	X
	SEIMN-2016			Water	7	X	X	X	X	X	X	X	X	X
	SEIMS-2016			Water	7	X	X	X	X	X	X	X	X	X
	TOSMI-2016			Water	7	X	X	X	X	X	X	X	X	X
	TOSMO-2016			Water	7	X	X	X	X	X	X	X	X	X
	TYLMI-2016			Water	7	X	X	X	X	X	X	X	X	X
	TYLMO-2016			Water	7	X	X	X	X	X	X	X	X	X
17	QA 16-20161118	11-18-16	13:35	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by Miriam Herrera Date 11-18-16 Received by [Signature] Date 11/18/16
 Firm Herrera Time 15:10 Firm [Signature] Time 15:10

Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Itner

CHAIN OF CUSTODY

11-198

Page 1 of 2

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No.

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
-----------------------------------	-----------------------	---------------------------------	-------------------------------------	---------------------------	------------------------------	------------------------------	-----------------------------	-----------------------------------

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2016 1118	11-18-16	10:35	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 1118	11-18-16	11:25	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 1118	11-18-16	14:35	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 1118	11-18-16	13:25	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 1118	11-18-16	13:45	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2016 1118	11-18-16	12:15	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 1118	11-18-16	12:30	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 1118	11-18-16	11:45	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 1118	11-18-16	9:55	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 1118	11-18-16	11:15	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 1118	11-18-16	14:10	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 1118	11-18-16	14:50	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 1118	11-18-16	13:05	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 1118	11-18-16	12:45	Water	7	X	X	X	X	X	X	X	X	X
15	QA 14-2016 1118	11-18-16	08:30	Water	7	X	X	X	X	X	X	X	X	X
16	QA 15-2016 1118	11-18-16	08:45	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by [Signature] Date 11-18-16 Received by [Signature] Date 11/18/16
 Firm Herrera Time 15:10 Firm [Signature] Time 15:00
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants
 Project No.: 14-05806-000
 Project Name: Redmond Paired Watershed Study
 Project Manager: George Ittner

CHAIN OF CUSTODY

11-198

Turnaround Requested:

_____ 1 Day

_____ 2 Day

_____ 3 Day

Standard

Laboratory No. _____

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
-----------------------------------	-----------------------	---------------------------------	-------------------------------------	---------------------------	------------------------------	------------------------------	-----------------------------	-----------------------------------

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
	COLM-2016			Water	7	X	X	X	X	X	X	X	X	X
	COUMI-2016			Water	7	X	X	X	X	X	X	X	X	X
	COUMO-2016			Water	7	X	X	X	X	X	X	X	X	X
	EVAMS-2016			Water	7	X	X	X	X	X	X	X	X	X
	EVALSS-2016			Water	7	X	X	X	X	X	X	X	X	X
	MONMN-2016			Water	7	X	X	X	X	X	X	X	X	X
	MONMS-2016			Water	7	X	X	X	X	X	X	X	X	X
	MONM-2016			Water	7	X	X	X	X	X	X	X	X	X
	SEIMN-2016			Water	7	X	X	X	X	X	X	X	X	X
	SEIMS-2016			Water	7	X	X	X	X	X	X	X	X	X
	TOSMI-2016			Water	7	X	X	X	X	X	X	X	X	X
	TOSMO-2016			Water	7	X	X	X	X	X	X	X	X	X
	TYLMI-2016			Water	7	X	X	X	X	X	X	X	X	X
	TYLMO-2016			Water	7	X	X	X	X	X	X	X	X	X
17	QA 16-20161118	11-18-16	13:35	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by Miriam Herrera Date 11/18/16 Received by [Signature] Date 11/18/16

Firm Herrera Time 1510 Firm [Signature] Time 1510

Relinquished by _____ Date _____ Received by _____ Date _____

Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number: 14-05806-000
Personnel Performing Calibration: Bhanna Blaud
Meter: YSI DSS #2
Date/Time: 11/18/16 08:24
Barometric Pressure Start of Day: mm Hg: 310.0 **Time:** 08:24
Barometric Pressure End of Day: Inches Hg: **Time:**

Calibration Procedures:
Rinse Multimter Sonde Between Each Operation
 Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.



- Conductivity Calibration Notes:**
1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
 2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
 3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
 4. Make sure there are no bubbles in the cell; wait 2 minutes.
 5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
 6. Check conductivity using 100 µS/cm standard.

PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	11.2	0	21.0	
Conductivity (µS/cm)	1002	1,000	20.9	
Conductivity (µS/cm) 101.1	99.7	100	20.9	
DO % Saturation	99.6	100	19.7	

- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	4.1	0	14.9	
Conductivity (µS/cm)	99.0	100	14.9 20.3	
DO % Saturation	100.2	100	14.9	

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & VW
 Sample Date: 11-18-16 Sample Time: 10:35 PDT
 Base Flow or Storm Event? base Field Filtered Time: 10:35 PST
(Must filter within 15 minutes of collection)

SITE ID: COLM
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: COLM-20161118

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>Y</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: lots of tannin - yellow/orange
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Colin Lamb Signature: [Signature]
 Date Checked: 12-13-16 Time: 1:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: Windy & 50°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI PRO DSS # 2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): NA
 Reference Point (description): NA

Water Quality Measurements

Temperature (°C) 7.5
 Conductivity (µs/cm) 31.2
 Dissolved Oxygen (mg/L) 10.98

lots of bubbles/foam

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & VW
 Sample Date: 11-13-16 Sample Time: 14:25 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 14:25 PST:
(Must filter within 15 minutes of collection)

SITE ID: COUM1
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: COUM1-20161118

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leath Signature: [Signature]
 Date Checked: 12-13-16 Time: 17:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: cloudy 53°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro DSS #2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.70
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 9.7
 Conductivity (µs/cm) 215.4
 Dissolved Oxygen (mg/L) 11.01

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & VW
 Sample Date: 11-18-16 Sample Time: 14:35 PDT: X
 Base Flow or Storm Event? BASE Field Filtered Time: 14:35 PST:
(Must filter within 15 minutes of collection)

SITE ID: COUMO
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: cloudy 85.3°F

Water Quality Sampling

Sample ID: COUMO-20161118

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	<u>Y</u>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<u>Y</u>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<u>Y</u>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<u>Y</u>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<u>Y</u>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>Y</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: light yellow
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leuth Signature: [Signature]
 Date Checked: 12-13-16 Time: 17:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro DSS #2X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.24
 Reference Point (description): SL

Water Quality Measurements

Temperature (°C) 10.2
 Conductivity (µs/cm) 217.4
 Dissolved Oxygen (mg/L) 10.82

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



HERRERA

Field Personnel: BB & YW

Sample Date: 11-18-16

Sample Time: 13:25

PDT: X

SITE ID: EVAMS

Base Flow or Storm Event? 13:25 BASE

Field Filtered Time: 13:25
(Must filter within 15 minutes of collection)

PST:

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: cloudy & 53°F

Water Quality Sampling

Sample ID: EVAMS - 20161118

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	Y
DOC *	HDPE	250 ml	1	HCL	Y
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	Y
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	Y
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	Y
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	Y
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QA16 - 20161118

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]

Date Checked: 12-13-16 Time: 17:00

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS #2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.88

Reference Point (description): SC4

Water Quality Measurements

Temperature (°C) 9.2

Conductivity (µs/cm) 179.2

Dissolved Oxygen (mg/L) 11.02

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & VW
 Sample Date: 11-17-16 Sample Time: 13:45
 Base Flow or Storm Event? Base Field Filtered Time: 13:45
(Must filter within 15 minutes of collection)

SITE ID: EVALSS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: cloudy 53°F

Water Quality Sampling

Sample ID: EVALSS - 20161118

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: ~~None~~ light yellow
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leath Signature: [Signature]
 Date Checked: 12-13-16 Time: 17:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
Y61 Pro DSS #2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.35
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 9.0
 Conductivity (µs/cm) 167.5
 Dissolved Oxygen (mg/L) 11.44

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB BVW
 Sample Date: 11-13-16 Sample Time: 12:15 PDT
 Base Flow or Storm Event? Base Field Filtered Time: 12:15 PST:
(Must filter within 15 minutes of collection)

SITE ID: MONMN
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: MONMN-2016118

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: cloudy & 53°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro DSS #2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 0.25
 Reference Point (description): top of pin ↑ (120 SG)

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: none
 Sheen: none
 Floatables:

LABORATORY DELIVERY

Date: _____ Time: _____

Water Quality Measurements

Temperature (°C) 8.8
 Conductivity (µs/cm) 118.4
 Dissolved Oxygen (mg/L) 11.05

Quality Assurance

Checked By: [Signature] Signature: [Signature]
 Date Checked: 12-13-16 Time: 7:00
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



HERRERA

Field Personnel: BB B VW

Sample Date: 11-18-16

Sample Time: 11:45

PDT: X

SITE ID: MONM

Base Flow or Storm Event? Base

Field Filtered Time: 11:45

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: cloudy 51°F

Water Quality Sampling

Sample ID: MONM-20161118

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	↓
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	↓
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	↓
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	↓
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCa 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: NONE CLEAR
 Color: NONE
 Odor: NONE
 Sheen: NONE
 Floatables: NONE

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: [Signature] Signature: [Signature]

Date Checked: 12-13-16 Time: 15:00

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI PRO DSS #2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.32

Reference Point (description): top of culvert ↓

Water Quality Measurements

Temperature (°C) 8.7

Conductivity (µs/cm) 143.5

Dissolved Oxygen (mg/L) 1.54

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & VW

Sample Date: 11-12-16

Sample Time: 9:55

PDT:

SITE ID: SEIMN

Base Flow or Storm Event? Base

Field Filtered Time: 9:55

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: cloudy & 48°F

Water Quality Sampling

Sample ID: SEIMN-20161118

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 μm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: QA 14 - 20161118

Transfer blank sample ID: QA 15 - 20161118

Visual and Olfactory Conditions:

Clarity: clear
 Color: light yellow
 Odor: none
 Sheen: none
 Floatables: none

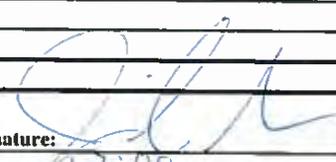
LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: Schun Lenth

Signature: 

Date Checked: 12-13-16

Time: 17:00

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI PRO DSS#2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.61

Reference Point (description): bottom of bank to top of water

Water Quality Measurements

Temperature (°C) 8.3

Conductivity (μs/cm) 48.7

Dissolved Oxygen (mg/L) 11.57

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & VW
 Sample Date: 11-12-16 Sample Time: 11:15 PDT: X
 Base Flow or Storm Event? Base Field Filtered Time: 11:15 PST:
(Must filter within 15 minutes of collection)

SITE ID: SEIMS
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: SEIMS-20161118

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none none
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lehto Signature: _____
 Date Checked: 12-13-16 Time: 17:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: cloudy & 51°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro Plus #2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.74 (0.86 sec)

Reference Point (description): bolt to H₂O

Water Quality Measurements

Temperature (°C) 8.2

Conductivity (µs/cm) 94.8

Dissolved Oxygen (mg/L) 11.01

Some bubbles/foam

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BBB VW

Sample Date: 11-18-16

Sample Time: 14:10

PDT: X

SITE ID: TOSMI

Base Flow or Storm Event? Base

Field Filtered Time: 14:10

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: cloudy 53°F

Water Quality Sampling

Sample ID: TOSMI-20161118

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>0</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leuth Signature: _____

Date Checked: 12-13-16 Time: 17:00

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS #2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.710

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 10.0

Conductivity (µs/cm) 210.3

Dissolved Oxygen (mg/L) 10.77

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & VW
 Sample Date: 11-18-16 Sample Time: 14:50 PDT: X
 Base Flow or Storm Event? Base Field Filtered Time: 14:50 PST:
 (Must filter within 15 minutes of collection)

SITE ID: 8 TOSMO
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: cloudy 85°F

Water Quality Sampling

Sample ID: TOSMO-20161118

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	✓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 12-13-16 Time: 17:00
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI ProSS #2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 0.05
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 9.3
 Conductivity (µs/cm) 234.4
 Dissolved Oxygen (mg/L) 11.30

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB BJVW
 Sample Date: 11-18-16 Sample Time: 13:05
 Base Flow or Storm Event? base Field Filtered Time: 13:05
(Must filter within 15 minutes of collection)

SITE ID: TYLMI
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: cloudy @ 53°F

Water Quality Sampling

Sample ID: TYLMI-20161118

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leuth Signature: _____
 Date Checked: 12-13-16 Time: 14:00
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro DSS #2 x

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.55

Reference Point (description): top of culvert ↓

Water Quality Measurements

Temperature (°C) 9.4

Conductivity (µs/cm) 136.2

Dissolved Oxygen (mg/L) 10.51

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & VW
 Sample Date: 11.18.10 Sample Time: 12:45 PDT: X
 Base Flow or Storm Event? BASE Field Filtered Time: 12:45 PST:
(Must filter within 15 minutes of collection)

SITE ID: TYLMO
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Cloudy & 53°F

Water Quality Sampling

Sample ID: TYLMO.20101118

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:
 Clarity: Clear
 Color: None
 Odor: None
 Sheen: None
 Floatables:

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Sarah Lentz Signature: _____
 Date Checked: 12.13.10 Time: 17:00
 Data Entered into Database? YES / NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro DSS #2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 2.82
 Reference Point (description): top of culvert ↓

Water Quality Measurements

Temperature (°C) 8.9
 Conductivity (µs/cm) 139.5
 Dissolved Oxygen (mg/L) 4.29



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 12/19/2016 Page 1 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 11/18/2016 / All sites, 1 FD (QA16) at EVAMS, 1 fb (QA14), 1 tb (QA15)

date 12/22/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	4	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	94	±20	9	≤25	D=1.8	≤25	OK / TB = ND	NONE
Turbidity	OK / EPA 180.1	NA	NA	2	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	1	≤25	9.4	≤25	OK / TB=0.20	“J” EVAMS DUE TO TB, ALL OTHER RESULTS >5X TB.
Hardness	OK / SM 2340B	NA	NA	12	≤180	≤1.0 mg/L 1.0 mg/L	108,103	±25	103	±15	2	≤20	7.4	≤20	OK / TB=ND	NONE
DOC	OK / SM 5310B	<15	≤15	10	≤28	≤1.0 mg/L 1.0 mg/L	98	±25	108	±15	0	≤20	0	≤20	OK / TB=1.0, FB=ND	“J” COUMI, COUMO, AND TOSMO DUE TO TB.
Total Phosphorus	OK / EPA 365.1	NA	NA	5	≤28	≤0.01 mg/L 0.01 mg/L	106	±25	109	±20	3	≤20	D=0.001	≤20	OK / TB = ND	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	10-15	≤28	≤0.1 mg/L 0.1 mg/L	96,100	±25	98-103	±20	19,3.5, 5.4	≤20	3.8	≤20	OK / TB=0.28	“J” COLM, COUMI, COUMO, MONMN, MONMS, MONM, SEIMN, SEIMS, TOSMI, TOSMO, TYLMI, TYLMO DUE TO TB.

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.

JL [https://herrerainc.sharepoint.com/sites/14-05806-000/data/water quality monitoring/vq_data_qa_worksheets/paired watershed data_qa_11-18-16.docx](https://herrerainc.sharepoint.com/sites/14-05806-000/data/water%20quality%20monitoring/vq_data_qa_worksheets/paired_watershed_data_qa_11-18-16.docx)



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 12/19/2016 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 11/18/2016 / All sites, 1 FD (QA16) at EVAMS, 1 fb (QA14), 1 tb (QA15)

date 12/22/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (days)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	10	≤180	≤1.0 µg/L 1.0 µg/L	105,112	±25	NR	±15	NC	≤20	NC	≤20	OK / TB=1.3	“J” COUMI, MONMS, TOSMI, TOSMO, TYLMI, TYLMO DUE TO TB.
Total Zinc	OK/ EPA 200.8	NA	NA	10	≤180	≤5.0 µg/L 5.0 µg/L	108,115	±25	NR	±15	0	≤20	NC	≤20	OK / TB=ND	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	10	≤180	≤1.0 µg/L 1.0 µg/L	90,90	±25	NR	±15	NC	≤20	NC	≤20	OK / FB= ND, TB=16	“J” TOSMI, TYLMI DUE TO TRANSFER BLANK EXCEEDANCE. ALL OTHER SAMPLES ND
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	10	≤180	≤5.0 µg/L 5.0 µg/L	99,99	±25	NR	±15	NC	≤20	NC	≤20	OK / FB=ND, TB=ND	NONE
Fecal Coliform	OK / SM 9222D	NA	NA	<1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	38,NC	≤35	NC	≤50	OK	“J”COUMO DUE TO LAB DUPLICATE RPD EXCEEDANCE.

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

January 3, 2017

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1612-083

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on December 9, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular scribble.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: January 3, 2017
Samples Submitted: December 9, 2016
Laboratory Reference: 1612-083
Project: 14-05806-000

Case Narrative

Samples were collected on December 9, 2016 and received by the laboratory on December 9, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: January 3, 2017
 Samples Submitted: December 9, 2016
 Laboratory Reference: 1612-083
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20161209					
Laboratory ID:	12-083-01					
Total Suspended Solids	1.0	1.0	SM 2540D	12-14-16	12-15-16	

Client ID:	COUMI-20161209					
Laboratory ID:	12-083-02					
Total Suspended Solids	11	1.0	SM 2540D	12-14-16	12-15-16	

Client ID:	COUMO-20161209					
Laboratory ID:	12-083-03					
Total Suspended Solids	11	1.0	SM 2540D	12-14-16	12-15-16	

Client ID:	EVAMS-20161209					
Laboratory ID:	12-083-04					
Total Suspended Solids	9.4	1.0	SM 2540D	12-14-16	12-15-16	

Client ID:	EVALSS-20161209					
Laboratory ID:	12-083-05					
Total Suspended Solids	3.0	1.0	SM 2540D	12-14-16	12-15-16	

Client ID:	MONMN-20161209					
Laboratory ID:	12-083-06					
Total Suspended Solids	1.6	1.0	SM 2540D	12-14-16	12-15-16	

Client ID:	MONMS-20161209					
Laboratory ID:	12-083-07					
Total Suspended Solids	9.0	1.0	SM 2540D	12-14-16	12-15-16	



Date of Report: January 3, 2017
 Samples Submitted: December 9, 2016
 Laboratory Reference: 1612-083
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20161209					
Laboratory ID:	12-083-08					
Total Suspended Solids	3.6	1.0	SM 2540D	12-14-16	12-15-16	

Client ID:	SEIMN-20161209					
Laboratory ID:	12-083-09					
Total Suspended Solids	4.8	1.0	SM 2540D	12-14-16	12-15-16	

Client ID:	SEIMS-20161209					
Laboratory ID:	12-083-10					
Total Suspended Solids	5.6	1.0	SM 2540D	12-14-16	12-15-16	

Client ID:	TOSMI-20161209					
Laboratory ID:	12-083-11					
Total Suspended Solids	18	1.0	SM 2540D	12-14-16	12-15-16	

Client ID:	TOSMO-20161209					
Laboratory ID:	12-083-12					
Total Suspended Solids	8.4	1.0	SM 2540D	12-14-16	12-15-16	

Client ID:	TYLMI-20161209					
Laboratory ID:	12-083-13					
Total Suspended Solids	3.0	1.0	SM 2540D	12-14-16	12-15-16	

Client ID:	TYLMO-20161209					
Laboratory ID:	12-083-14					
Total Suspended Solids	7.8	1.0	SM 2540D	12-14-16	12-15-16	



Date of Report: January 3, 2017
Samples Submitted: December 9, 2016
Laboratory Reference: 1612-083
Project: 14-05806-000

TOTAL SUSPENDED SOLIDS
SM 2540D

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA17-20161209					
Laboratory ID:	12-083-15					
Total Suspended Solids	9.6	1.0	SM 2540D	12-14-16	12-15-16	



Date of Report: January 3, 2017
 Samples Submitted: December 9, 2016
 Laboratory Reference: 1612-083
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1214W1					
Total Suspended Solids	ND	1.0	SM 2540D	12-14-16	12-15-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	12-083-12							
	ORIG	DUP						
Total Suspended Solids	8.40	8.80	NA	NA	NA	NA	5	20

SPIKE BLANK								
Laboratory ID:	SB1214W1							
	SB	SB		SB				
Total Suspended Solids	94.0	100	NA	94	78-113	NA	NA	



Date of Report: January 3, 2017
 Samples Submitted: December 9, 2016
 Laboratory Reference: 1612-083
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20161209					
Laboratory ID:	12-083-01					
Turbidity	0.89	0.10	EPA 180.1	12-9-16	12-9-16	

Client ID:	COUMI-20161209					
Laboratory ID:	12-083-02					
Turbidity	6.1	0.10	EPA 180.1	12-9-16	12-9-16	

Client ID:	COUMO-20161209					
Laboratory ID:	12-083-03					
Turbidity	6.6	0.10	EPA 180.1	12-9-16	12-9-16	

Client ID:	EVAMS-20161209					
Laboratory ID:	12-083-04					
Turbidity	2.5	0.10	EPA 180.1	12-9-16	12-9-16	

Client ID:	EVALSS-20161209					
Laboratory ID:	12-083-05					
Turbidity	1.6	0.10	EPA 180.1	12-9-16	12-9-16	

Client ID:	MONMN-20161209					
Laboratory ID:	12-083-06					
Turbidity	1.6	0.10	EPA 180.1	12-9-16	12-9-16	

Client ID:	MONMS-20161209					
Laboratory ID:	12-083-07					
Turbidity	2.5	0.10	EPA 180.1	12-9-16	12-9-16	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20161209					
Laboratory ID:	12-083-08					
Turbidity	2.9	0.10	EPA 180.1	12-9-16	12-9-16	

Client ID:	SEIMN-20161209					
Laboratory ID:	12-083-09					
Turbidity	2.9	0.10	EPA 180.1	12-9-16	12-9-16	

Client ID:	SEIMS-20161209					
Laboratory ID:	12-083-10					
Turbidity	2.0	0.10	EPA 180.1	12-9-16	12-9-16	

Client ID:	TOSMI-20161209					
Laboratory ID:	12-083-11					
Turbidity	8.2	0.10	EPA 180.1	12-9-16	12-9-16	

Client ID:	TOSMO-20161209					
Laboratory ID:	12-083-12					
Turbidity	3.5	0.10	EPA 180.1	12-9-16	12-9-16	

Client ID:	TYLMI-20161209					
Laboratory ID:	12-083-13					
Turbidity	3.2	0.10	EPA 180.1	12-9-16	12-9-16	

Client ID:	TYLMO-20161209					
Laboratory ID:	12-083-14					
Turbidity	4.5	0.10	EPA 180.1	12-9-16	12-9-16	



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TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA17-20161209					
Laboratory ID:	12-083-15					
Turbidity	6.1	0.10	EPA 180.1	12-9-16	12-9-16	



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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1209W1					
Turbidity	ND	0.10	EPA 180.1	12-9-16	12-9-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	12-083-01							
	ORIG	DUP						
Turbidity	0.890	0.900	NA	NA	NA	NA	1	15



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20161209					
Laboratory ID:	12-083-01					
Hardness	9.3	1.0	200.7/SM 2340B	12-13-16	12-13-16	

Client ID:	COUMI-20161209					
Laboratory ID:	12-083-02					
Hardness	100	1.0	200.7/SM 2340B	12-13-16	12-13-16	

Client ID:	COUMO-20161209					
Laboratory ID:	12-083-03					
Hardness	110	1.0	200.7/SM 2340B	12-13-16	12-13-16	

Client ID:	EVAMS-20161209					
Laboratory ID:	12-083-04					
Hardness	74	1.0	200.7/SM 2340B	12-13-16	12-13-16	

Client ID:	EVALSS-20161209					
Laboratory ID:	12-083-05					
Hardness	71	1.0	200.7/SM 2340B	12-13-16	12-13-16	

Client ID:	MONMN-20161209					
Laboratory ID:	12-083-06					
Hardness	49	1.0	200.7/SM 2340B	12-13-16	12-13-16	

Client ID:	MONMS-20161209					
Laboratory ID:	12-083-07					
Hardness	110	1.0	200.7/SM 2340B	12-13-16	12-13-16	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20161209					
Laboratory ID:	12-083-08					
Hardness	71	1.0	200.7/SM 2340B	12-13-16	12-13-16	

Client ID:	SEIMN-20161209					
Laboratory ID:	12-083-09					
Hardness	21	1.0	200.7/SM 2340B	12-13-16	12-13-16	

Client ID:	SEIMS-20161209					
Laboratory ID:	12-083-10					
Hardness	38	1.0	200.7/SM 2340B	12-13-16	12-13-16	

Client ID:	TOSMI-20161209					
Laboratory ID:	12-083-11					
Hardness	110	1.0	200.7/SM 2340B	12-13-16	12-13-16	

Client ID:	TOSMO-20161209					
Laboratory ID:	12-083-12					
Hardness	100	1.0	200.7/SM 2340B	12-13-16	12-13-16	

Client ID:	TYLMI-20161209					
Laboratory ID:	12-083-13					
Hardness	70	1.0	200.7/SM 2340B	12-13-16	12-13-16	

Client ID:	TYLMO-20161209					
Laboratory ID:	12-083-14					
Hardness	85	1.0	200.7/SM 2340B	12-13-16	12-13-16	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA17-20161209					
Laboratory ID:	12-083-15					
Hardness	110	1.0	200.7/SM 2340B	12-13-16	12-13-16	



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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1213WH2					
Hardness	ND	1.0	200.7/SM 2340B	12-13-16	12-13-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	12-083-01							
	ORIG	DUP						
Hardness	9.29	9.25	NA	NA	NA	0	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	12-083-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	138	137	132	132	9.29	98	97	75-125	1	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags	
SPIKE BLANK									
Laboratory ID:	SB1213WH2								
	SB		SB		SB				
Hardness	129		132		98		80-120	NA	NA



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20161209					
Laboratory ID:	12-083-01					
Dissolved Organic Carbon	14	1.0	SM 5310B	12-14-16	12-14-16	
Client ID:	COUMI-20161209					
Laboratory ID:	12-083-02					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	12-14-16	12-14-16	
Client ID:	COUMO-20161209					
Laboratory ID:	12-083-03					
Dissolved Organic Carbon	4.7	1.0	SM 5310B	12-14-16	12-14-16	
Client ID:	EVAMS-20161209					
Laboratory ID:	12-083-04					
Dissolved Organic Carbon	4.5	1.0	SM 5310B	12-14-16	12-14-16	
Client ID:	EVALSS-20161209					
Laboratory ID:	12-083-05					
Dissolved Organic Carbon	4.1	1.0	SM 5310B	12-14-16	12-14-16	
Client ID:	MONMN-20161209					
Laboratory ID:	12-083-06					
Dissolved Organic Carbon	4.3	1.0	SM 5310B	12-14-16	12-14-16	
Client ID:	MONMS-20161209					
Laboratory ID:	12-083-07					
Dissolved Organic Carbon	6.8	1.0	SM 5310B	12-14-16	12-14-16	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20161209					
Laboratory ID:	12-083-08					
Dissolved Organic Carbon	4.2	1.0	SM 5310B	12-14-16	12-14-16	
Client ID:	SEIMN-20161209					
Laboratory ID:	12-083-09					
Dissolved Organic Carbon	6.8	1.0	SM 5310B	12-14-16	12-14-16	
Client ID:	SEIMS-20161209					
Laboratory ID:	12-083-10					
Dissolved Organic Carbon	4.4	1.0	SM 5310B	12-14-16	12-14-16	
Client ID:	TOSMI-20161209					
Laboratory ID:	12-083-11					
Dissolved Organic Carbon	4.2	1.0	SM 5310B	12-14-16	12-14-16	
Client ID:	TOSMO-20161209					
Laboratory ID:	12-083-12					
Dissolved Organic Carbon	3.4	1.0	SM 5310B	12-14-16	12-14-16	
Client ID:	TYLMI-20161209					
Laboratory ID:	12-083-13					
Dissolved Organic Carbon	6.7	1.0	SM 5310B	12-14-16	12-14-16	
Client ID:	TYLMO-20161209					
Laboratory ID:	12-083-14					
Dissolved Organic Carbon	4.9	1.0	SM 5310B	12-14-16	12-14-16	



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**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA17-20161209					
Laboratory ID:	12-083-15					
Dissolved Organic Carbon	3.8	1.0	SM 5310B	12-14-16	12-14-16	



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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1214D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	12-14-16	12-14-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	12-083-01							
	ORIG	DUP						
Dissolved Organic Carbon	14.2	14.2	NA	NA	NA	0	20	

MATRIX SPIKE

Laboratory ID:	12-083-01							
	MS	MS		MS				
Dissolved Organic Carbon	23.6	10.0	14.2	94	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB1214D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.7	10.0	NA	107	75-125	NA	NA	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20161209					
Laboratory ID:	12-083-01					
Total Phosphorus	0.011	0.010	EPA 365.1	12-15-16	12-15-16	

Client ID:	COUMI-20161209					
Laboratory ID:	12-083-02					
Total Phosphorus	0.077	0.010	EPA 365.1	12-15-16	12-15-16	

Client ID:	COUMO-20161209					
Laboratory ID:	12-083-03					
Total Phosphorus	0.056	0.010	EPA 365.1	12-15-16	12-15-16	

Client ID:	EVAMS-20161209					
Laboratory ID:	12-083-04					
Total Phosphorus	0.013	0.010	EPA 365.1	12-15-16	12-15-16	

Client ID:	EVALSS-20161209					
Laboratory ID:	12-083-05					
Total Phosphorus	0.019	0.010	EPA 365.1	12-15-16	12-15-16	

Client ID:	MONMN-20161209					
Laboratory ID:	12-083-06					
Total Phosphorus	0.024	0.010	EPA 365.1	12-15-16	12-15-16	

Client ID:	MONMS-20161209					
Laboratory ID:	12-083-07					
Total Phosphorus	0.058	0.010	EPA 365.1	12-15-16	12-15-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20161209					
Laboratory ID:	12-083-08					
Total Phosphorus	0.030	0.010	EPA 365.1	12-15-16	12-15-16	

Client ID:	SEIMN-20161209					
Laboratory ID:	12-083-09					
Total Phosphorus	0.027	0.010	EPA 365.1	12-15-16	12-15-16	

Client ID:	SEIMS-20161209					
Laboratory ID:	12-083-10					
Total Phosphorus	0.032	0.010	EPA 365.1	12-15-16	12-15-16	

Client ID:	TOSMI-20161209					
Laboratory ID:	12-083-11					
Total Phosphorus	0.072	0.010	EPA 365.1	12-15-16	12-15-16	

Client ID:	TOSMO-20161209					
Laboratory ID:	12-083-12					
Total Phosphorus	0.060	0.010	EPA 365.1	12-15-16	12-15-16	

Client ID:	TYLMI-20161209					
Laboratory ID:	12-083-13					
Total Phosphorus	0.026	0.010	EPA 365.1	12-15-16	12-15-16	

Client ID:	TYLMO-20161209					
Laboratory ID:	12-083-14					
Total Phosphorus	0.040	0.010	EPA 365.1	12-15-16	12-15-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA17-20161209					
Laboratory ID:	12-083-15					
Total Phosphorus	0.082	0.010	EPA 365.1	12-15-16	12-15-16	



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**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1215W1					
Total Phosphorus	ND	0.010	EPA 365.1	12-15-16	12-15-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	12-083-01							
	ORIG	DUP						
Total Phosphorus	0.0114	0.0105	NA	NA	NA	8	11	

MATRIX SPIKE								
Laboratory ID:	12-083-01							
	MS	MS		MS				
Total Phosphorus	0.259	0.250	0.0114	99	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB1215W1							
	SB	SB		SB				
Total Phosphorus	0.257	0.250	NA	103	86-111	NA	NA	



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**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 12-083-01						
Client ID: COLM-20161209						
Copper	ND	1.0	200.8	12-13-16	12-13-16	
Zinc	ND	5.0	200.8	12-13-16	12-13-16	
Lab ID: 12-083-02						
Client ID: COUMI-20161209						
Copper	1.3	1.0	200.8	12-13-16	12-13-16	
Zinc	8.0	5.0	200.8	12-13-16	12-13-16	
Lab ID: 12-083-03						
Client ID: COUMO-20161209						
Copper	4.3	1.0	200.8	12-13-16	12-13-16	
Zinc	52	5.0	200.8	12-13-16	12-13-16	
Lab ID: 12-083-04						
Client ID: EVAMS-20161209						
Copper	ND	1.0	200.8	12-13-16	12-13-16	
Zinc	ND	5.0	200.8	12-13-16	12-13-16	
Lab ID: 12-083-05						
Client ID: EVALSS-20161209						
Copper	ND	1.0	200.8	12-13-16	12-13-16	
Zinc	ND	5.0	200.8	12-13-16	12-13-16	
Lab ID: 12-083-06						
Client ID: MONMN-20161209						
Copper	ND	1.0	200.8	12-13-16	12-13-16	
Zinc	ND	5.0	200.8	12-13-16	12-13-16	



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**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	12-083-07					
Client ID:	MONMS-20161209					
Copper	2.1	1.0	200.8	12-13-16	12-13-16	
Zinc	15	5.0	200.8	12-13-16	12-13-16	
Lab ID:	12-083-08					
Client ID:	MONM-20161209					
Copper	ND	1.0	200.8	12-13-16	12-13-16	
Zinc	11	5.0	200.8	12-13-16	12-13-16	
Lab ID:	12-083-09					
Client ID:	SEIMN-20161209					
Copper	ND	1.0	200.8	12-13-16	12-13-16	
Zinc	ND	5.0	200.8	12-13-16	12-13-16	
Lab ID:	12-083-10					
Client ID:	SEIMS-20161209					
Copper	ND	1.0	200.8	12-13-16	12-13-16	
Zinc	ND	5.0	200.8	12-13-16	12-13-16	
Lab ID:	12-083-11					
Client ID:	TOSMI-20161209					
Copper	3.1	1.0	200.8	12-13-16	12-13-16	
Zinc	30	5.0	200.8	12-13-16	12-13-16	
Lab ID:	12-083-12					
Client ID:	TOSMO-20161209					
Copper	1.5	1.0	200.8	12-13-16	12-13-16	
Zinc	12	5.0	200.8	12-13-16	12-13-16	



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**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	12-083-13					
Client ID:	TYLMI-20161209					
Copper	2.5	1.0	200.8	12-13-16	12-13-16	
Zinc	10	5.0	200.8	12-13-16	12-13-16	

Lab ID:	12-083-14					
Client ID:	TYLMO-20161209					
Copper	2.1	1.0	200.8	12-13-16	12-13-16	
Zinc	9.5	5.0	200.8	12-13-16	12-13-16	

Lab ID:	12-083-15					
Client ID:	QA17-20161209					
Copper	1.3	1.0	200.8	12-13-16	12-13-16	
Zinc	7.2	5.0	200.8	12-13-16	12-13-16	



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**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 12-13-16
Date Analyzed: 12-13-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB1213WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



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**TOTAL METALS
 EPA 200.8
 DUPLICATE QUALITY CONTROL**

Date Extracted: 12-13-16

Date Analyzed: 12-13-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 12-083-06

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	5.21	NA	5.0	



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**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 12-13-16

Date Analyzed: 12-13-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 12-083-06

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	98.6	99	101	101	2	
Zinc	100	106	106	106	106	0	



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**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 12-083-01						
Client ID: COLM-20161209						
Copper	ND	1.0	200.8		12-13-16	
Zinc	ND	5.0	200.8		12-13-16	
Lab ID: 12-083-02						
Client ID: COUMI-20161209						
Copper	ND	1.0	200.8		12-13-16	
Zinc	ND	5.0	200.8		12-13-16	
Lab ID: 12-083-03						
Client ID: COUMO-20161209						
Copper	1.8	1.0	200.8		12-13-16	
Zinc	36	5.0	200.8		12-13-16	
Lab ID: 12-083-04						
Client ID: EVAMS-20161209						
Copper	ND	1.0	200.8		12-13-16	
Zinc	ND	5.0	200.8		12-13-16	
Lab ID: 12-083-05						
Client ID: EVALSS-20161209						
Copper	ND	1.0	200.8		12-13-16	
Zinc	ND	5.0	200.8		12-13-16	
Lab ID: 12-083-06						
Client ID: MONMN-20161209						
Copper	ND	1.0	200.8		12-13-16	
Zinc	ND	5.0	200.8		12-13-16	



Date of Report: January 3, 2017
 Samples Submitted: December 9, 2016
 Laboratory Reference: 1612-083
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 12-083-07						
Client ID: MONMS-20161209						
Copper	ND	1.0	200.8		12-13-16	
Zinc	5.7	5.0	200.8		12-13-16	
Lab ID: 12-083-08						
Client ID: MONM-20161209						
Copper	ND	1.0	200.8		12-13-16	
Zinc	8.8	5.0	200.8		12-13-16	
Lab ID: 12-083-09						
Client ID: SEIMN-20161209						
Copper	ND	1.0	200.8		12-13-16	
Zinc	ND	5.0	200.8		12-13-16	
Lab ID: 12-083-10						
Client ID: SEIMS-20161209						
Copper	ND	1.0	200.8		12-13-16	
Zinc	ND	5.0	200.8		12-13-16	
Lab ID: 12-083-11						
Client ID: TOSMI-20161209						
Copper	1.6	1.0	200.8		12-13-16	
Zinc	17	5.0	200.8		12-13-16	
Lab ID: 12-083-12						
Client ID: TOSMO-20161209						
Copper	ND	1.0	200.8		12-13-16	
Zinc	6.4	5.0	200.8		12-13-16	



Date of Report: January 3, 2017
 Samples Submitted: December 9, 2016
 Laboratory Reference: 1612-083
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	12-083-13					
Client ID:	TYLMI-20161209					
Copper	ND	1.0	200.8		12-13-16	
Zinc	7.8	5.0	200.8		12-13-16	
Lab ID:	12-083-14					
Client ID:	TYLMO-20161209					
Copper	ND	1.0	200.8		12-13-16	
Zinc	6.1	5.0	200.8		12-13-16	
Lab ID:	12-083-15					
Client ID:	QA17-20161209					
Copper	ND	1.0	200.8		12-13-16	
Zinc	ND	5.0	200.8		12-13-16	



Date of Report: January 3, 2017
Samples Submitted: December 9, 2016
Laboratory Reference: 1612-083
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 12-13-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB1213D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: January 3, 2017
Samples Submitted: December 9, 2016
Laboratory Reference: 1612-083
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 12-13-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 12-083-15

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: January 3, 2017
 Samples Submitted: December 9, 2016
 Laboratory Reference: 1612-083
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 12-13-16

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 12-083-15

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	69.8	87	71.3	89	2	
Zinc	80.0	75.0	94	79.2	99	5	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

Jan 3 2017
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20161209	Water	16-A030243	Micro, NUT
COUMI-20161209	Water	16-A030244	Micro, NUT
COUMO-20161209	Water	16-A030245	Micro, NUT
EVAMS-20161209	Water	16-A030246	Micro, NUT
EVALSS-20161209	Water	16-A030247	Micro, NUT
MONMN-20161209	Water	16-A030248	Micro, NUT
MONMS-20161209	Water	16-A030249	Micro, NUT
MONM-20161209	Water	16-A030250	Micro, NUT
SEIMN-20161209	Water	16-A030251	Micro, NUT
SEIMS-20161209	Water	16-A030252	Micro, NUT
TOSMI-20161209	Water	16-A030253	Micro, NUT
TOSMO-20161209	Water	16-A030254	Micro, NUT
TYLMI-20161209	Water	16-A030255	Micro, NUT
TYLMO-20161209	Water	16-A030256	Micro, NUT
QA-20161209	Water	16-A030257	Micro, NUT

Your samples were received on Friday, December 9, 2016. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

Jan 3 2017
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 12-083

BACT = Bacteriological
CONV = Conventionals

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



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Services*

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
PO Number: 12-083
All results reported on an as received basis.

Date Received: 12/09/16
Date Reported: 1/ 3/17

AMTEST Identification Number 16-A030243
Client Identification COLM-20161209
Sampling Date 12/09/16, 12:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	32.	CFU/100 ml		1	SM 9222D	JM	12/09/16
Total Nitrogen (NOX&TKN)	0.67	mg/l		0.1			
Total Nitrogen (TKN)	0.669	mg/l		0.1	SM4500N	JC	12/13/16
Nitrate + Nitrite	< 0.01	mg/l		0.01	SM4500NO3	JC	12/19/16

AMTEST Identification Number 16-A030244
Client Identification COUMI-20161209
Sampling Date 12/09/16, 08:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	70.	CFU/100 ml		1	SM 9222D	JM	12/09/16
Total Nitrogen (NOX&TKN)	0.36	mg/l		0.1			
Total Nitrogen (TKN)	0.334	mg/l		0.1	SM4500N	JC	12/13/16
Nitrate + Nitrite	0.029	mg/l		0.01	SM4500NO3	JC	12/19/16

AMTEST Identification Number 16-A030245
Client Identification COUMO-20161209
Sampling Date 12/09/16, 08:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	56.	CFU/100 ml		1	SM 9222D	JM	12/09/16
Total Nitrogen (NOX&TKN)	0.83	mg/l		0.1			
Total Nitrogen (TKN)	0.792	mg/l		0.1	SM4500N	JC	12/13/16
Nitrate + Nitrite	0.040	mg/l		0.01	SM4500NO3	JC	12/19/16

AMTEST Identification Number 16-A030246
Client Identification EVAMS-20161209
Sampling Date 12/09/16, 09:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	24.	CFU/100 ml		1	SM 9222D	JM	12/09/16
Total Nitrogen (NOX&TKN)	2.19	mg/l		0.1			
Total Nitrogen (TKN)	0.489	mg/l		0.1	SM4500N	JC	12/13/16
Nitrate + Nitrite	1.7	mg/l		0.01	SM4500NO3	JC	12/20/16

AMTEST Identification Number 16-A030247
Client Identification EVALSS-20161209
Sampling Date 12/09/16, 10:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	110	CFU/100 ml		1	SM 9222D	JM	12/09/16
Total Nitrogen (NOX&TKN)	1.93	mg/l		0.1			
Total Nitrogen (TKN)	0.533	mg/l		0.1	SM4500N	JC	12/13/16
Nitrate + Nitrite	1.4	mg/l		0.01	SM4500NO3	JC	12/20/16

AMTEST Identification Number 16-A030248
Client Identification MONMN-20161209
Sampling Date 12/09/16, 10:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	10.	CFU/100 ml		1	SM 9222D	JM	12/09/16
Total Nitrogen (NOX&TKN)	0.77	mg/l		0.1			
Total Nitrogen (TKN)	0.387	mg/l		0.1	SM4500N	JC	12/13/16
Nitrate + Nitrite	0.38	mg/l		0.01	SM4500NO3	JC	12/20/16

AMTEST Identification Number 16-A030249
Client Identification MONMS-20161209
Sampling Date 12/09/16, 10:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	96.	CFU/100 ml		1	SM 9222D	JM	12/09/16
Total Nitrogen (NOX&TKN)	1.36	mg/l		0.1			
Total Nitrogen (TKN)	0.828	mg/l		0.1	SM4500N	JC	12/13/16
Nitrate + Nitrite	0.53	mg/l		0.01	SM4500NO3	JC	12/20/16

AMTEST Identification Number **16-A030250**
Client Identification **MONM-20161209**
Sampling Date **12/09/16, 11:05**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	110	CFU/100 ml		1	SM 9222D	JM	12/09/16
Total Nitrogen (NOX&TKN)	0.93	mg/l		0.1			
Total Nitrogen (TKN)	0.437	mg/l		0.1	SM4500N	JC	12/13/16
Nitrate + Nitrite	0.49	mg/l		0.01	SM4500NO3	JC	12/20/16

AMTEST Identification Number **16-A030251**
Client Identification **SEIMN-20161209**
Sampling Date **12/09/16, 11:00**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	42.	CFU/100 ml		1	SM 9222D	JM	12/09/16
Total Nitrogen (NOX&TKN)	1.03	mg/l		0.1			
Total Nitrogen (TKN)	0.502	mg/l		0.1	SM4500N	JC	12/13/16
Nitrate + Nitrite	0.53	mg/l		0.01	SM4500NO3	JC	12/20/16

AMTEST Identification Number 16-A030252
Client Identification SEIMS-20161209
Sampling Date 12/09/16, 11:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	4.	CFU/100 ml		1	SM 9222D	JM	12/09/16
Total Nitrogen (NOX&TKN)	0.80	mg/l		0.1			
Total Nitrogen (TKN)	0.435	mg/l		0.1	SM4500N	JC	12/13/16
Nitrate + Nitrite	0.37	mg/l		0.01	SM4500NO3	JC	12/20/16

AMTEST Identification Number 16-A030253
Client Identification TOSMI-20161209
Sampling Date 12/09/16, 08:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	530	CFU/100 ml		1	SM 9222D	JM	12/09/16
Total Nitrogen (NOX&TKN)	1.43	mg/l		0.1			
Total Nitrogen (TKN)	0.509	mg/l		0.1	SM4500N	JC	12/13/16
Nitrate + Nitrite	0.92	mg/l		0.01	SM4500NO3	JC	12/20/16

AMTEST Identification Number 16-A030254
Client Identification TOSMO-20161209
Sampling Date 12/09/16, 09:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	140	CFU/100 ml		1	SM 9222D	JM	12/09/16
Total Nitrogen (NOX&TKN)	0.69	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	SW	12/23/16
Nitrate + Nitrite	0.69	mg/l		0.01	SM4500NO3	JC	12/20/16

AMTEST Identification Number 16-A030255
Client Identification TYLMI-20161209
Sampling Date 12/09/16, 10:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	6.	CFU/100 ml		1	SM 9222D	JM	12/09/16
Total Nitrogen (NOX&TKN)	1.11	mg/l		0.1			
Total Nitrogen (TKN)	0.339	mg/l		0.1	SM4500N	SW	12/23/16
Nitrate + Nitrite	0.77	mg/l		0.01	SM4500NO3	JC	12/20/16

AMTEST Identification Number 16-A030256
Client Identification TYLMO-20161209
Sampling Date 12/09/16, 09:35

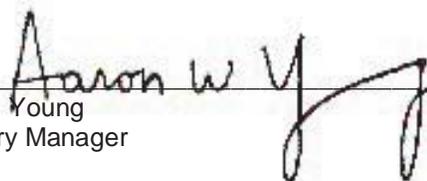
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	470	CFU/100 ml		1	SM 9222D	JM	12/09/16
Total Nitrogen (NOX&TKN)	0.91	mg/l		0.1			
Total Nitrogen (TKN)	0.101	mg/l		0.1	SM4500N	SW	12/23/16
Nitrate + Nitrite	0.81	mg/l		0.01	SM4500NO3	JC	12/20/16

AMTEST Identification Number 16-A030257
Client Identification QA-20161209
Sampling Date 12/09/16, 08:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	100	CFU/100 ml		1	SM 9222D	JM	12/09/16
Total Nitrogen (NOX&TKN)	1.51	mg/l		0.1			
Total Nitrogen (TKN)	1.10	mg/l		0.1	SM4500N	SW	12/23/16
Nitrate + Nitrite	0.41	mg/l		0.01	SM4500NO3	JC	12/20/16


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 16-A030243 to 16-A030257

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
16-A030247	Fecal Coliform	CFU/100 ml	110	110	0.00
16-A030252	Fecal Coliform	CFU/100 ml	4.	6.	40.
16-A029713	Total Nitrogen (TKN)	mg/l	1.86	1.42	27.
16-A030082	Total Nitrogen (TKN)	mg/l	0.818	0.887	8.1
16-A030211	Total Nitrogen (TKN)	mg/l	64.4	64.4	0.00
16-A030249	Total Nitrogen (TKN)	mg/l	0.828	0.643	25.
16-A030253	Total Nitrogen (TKN)	mg/l	0.509	0.461	9.9
16-A030338	Total Nitrogen (TKN)	mg/l	0.193	0.191	1.0
16-A030418	Total Nitrogen (TKN)	mg/l	0.522	0.549	5.0
16-A030563	Total Nitrogen (TKN)	mg/l	1.70	1.65	3.0
16-A030599	Total Nitrogen (TKN)	mg/l	0.525	0.500	4.9
16-A030102	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	
16-A030245	Nitrate + Nitrite	mg/l	0.040	0.039	2.5
16-A030255	Nitrate + Nitrite	mg/l	0.77	0.78	1.3
16-A030383	Nitrate + Nitrite	mg/l	2.3	2.3	0.00
16-A030424	Nitrate + Nitrite	mg/l	0.71	0.67	5.8
16-A030449	Nitrate + Nitrite	mg/l	0.83	0.83	0.00
16-A030599	Nitrate + Nitrite	mg/l	0.35	0.35	0.00
16-A030609	Nitrate + Nitrite	mg/l	0.41	0.41	0.00
16-A030612	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
16-A029713	Total Nitrogen (TKN)	mg/l	1.86	3.82	2.00	98.00 %
16-A030082	Total Nitrogen (TKN)	mg/l	0.818	3.03	2.00	110.60 %
16-A030249	Total Nitrogen (TKN)	mg/l	0.828	2.94	2.00	105.60 %
16-A030253	Total Nitrogen (TKN)	mg/l	0.509	2.68	2.00	108.55 %
16-A030338	Total Nitrogen (TKN)	mg/l	0.193	2.18	2.00	99.35 %
16-A030418	Total Nitrogen (TKN)	mg/l	0.522	2.50	2.00	98.90 %
16-A030563	Total Nitrogen (TKN)	mg/l	1.70	3.70	2.00	100.00 %
16-A030599	Total Nitrogen (TKN)	mg/l	0.525	2.49	2.00	98.25 %
16-A030102	Nitrate + Nitrite	mg/l	< 0.01	0.46	0.50	92.00 %
16-A030245	Nitrate + Nitrite	mg/l	0.040	0.51	0.50	94.00 %
16-A030255	Nitrate + Nitrite	mg/l	0.77	1.0	0.25	92.00 %
16-A030424	Nitrate + Nitrite	mg/l	0.71	1.1	0.50	78.00 %
16-A030449	Nitrate + Nitrite	mg/l	0.83	1.3	0.50	94.00 %
16-A030599	Nitrate + Nitrite	mg/l	0.35	0.80	0.50	90.00 %
16-A030609	Nitrate + Nitrite	mg/l	0.41	0.85	0.50	88.00 %
16-A030612	Nitrate + Nitrite	mg/l	< 0.01	0.46	0.50	92.00 %

QC Summary for sample numbers: 16-A030243 to 16-A030257...

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	1.00	1.01	101. %
Total Nitrogen (TKN)	mg/l	1.00	1.01	101. %
Total Nitrogen (TKN)	mg/l	1.00	0.969	96.9 %
Total Nitrogen (TKN)	mg/l	1.00	0.946	94.6 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.48	96.0 %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th Pl Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

4.3°C

Laboratory Reference #: 12-083

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20161209 <u>30243</u>	12/9/16	12:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20161209 <u>44</u>	12/9/16	8:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20161209 <u>45</u>	12/9/16	8:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20161209 <u>46</u>	12/9/16	9:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20161209 <u>47</u>	12/9/16	10:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20161209 <u>48</u>	12/9/16	10:25	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20161209 <u>49</u>	12/9/16	10:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20161209 <u>50</u>	12/9/16	11:05	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20161209 <u>51</u>	12/9/16	11:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20161209 <u>52</u>	12/9/16	11:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company		Date	Time	Comments/Special Instructions
<u>[Signature]</u>		<u>OnSite</u>		<u>12/9/16</u>	<u>13:15</u>	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Relinquished by:		<u>AmTest E.O.2</u>		<u>12/9/16</u>	<u>1:15</u>	
Received by:						
Relinquished by:						
Received by:						



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

CHAIN OF CUSTODY

12-083 Page 1 of 1

Turnaround Requested:
 1 Day
 2 Day
 3 Day
 Standard

Laboratory No.	
Requested Analyses	
Total Suspended Solids (SM 2540D)	<input type="checkbox"/>
Turbidity (EPA 181.1)	<input type="checkbox"/>
Hardness (EPA 200.7 / SM 2340B)	<input type="checkbox"/>
Dissolved Organ Carbon (SM 5310B) *	<input type="checkbox"/>
Fecal Coliform (SM 9222D)	<input type="checkbox"/>
Total Phosphorus (EPA 365.1)	<input type="checkbox"/>
Total Nitrogen (SM 4500 N-B)	<input type="checkbox"/>
Total Cu and Zn (EPA 200.8)	<input type="checkbox"/>
Dissolved Cu and Zn (EPA 200.8) *	<input type="checkbox"/>

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2016 1209	12-9-16	12:00	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 1209	12-9-16	8:40	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 1209	12-9-16	8:15	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 1209	12-9-16	9:50	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 1209	12-9-16	10:10	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2016 1209	12-9-16	10:25	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 1209	12-9-16	10:45	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 1209	12-9-16	11:05	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 1209	12-9-16	11:00	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 1209	12-9-16	11:30	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 1209	12-9-16	8:30	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 1209	12-9-16	9:15	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 1209	12-9-16	10:00	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 1209	12-9-16	9:35	Water	7	X	X	X	X	X	X	X	X	X
15	QA 17-2016 1209	12-9-16	8:50	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by [Signature] Date 12-9-16 Received by [Signature] Date 12/9/16
 Firm Herrera Time 12:55 Firm [Signature] Time 12:55
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
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Project Name: Redmond Paired Watershed Study
Project Manager: George Itner

CHAIN OF CUSTODY

12-083 Page 1 of 1

Turnaround Requested:

_____ 1 Day

_____ 2 Day

_____ 3 Day

Standard

Laboratory No. _____

Requested Analyses _____

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
-----------------------------------	-----------------------	---------------------------------	-------------------------------------	--------------------------	------------------------------	------------------------------	-----------------------------	-----------------------------------

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2016 1209	12.9.16	12:00	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 1209	12.9.16	8:40	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 1209	12.9.16	8:15	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 1209	12.9.16	9:50	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 1209	12.9.16	10:10	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2016 1209	12.9.16	10:25	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 1209	12.9.16	10:45	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 1209	12.9.16	11:05	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 1209	12.9.16	11:00	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 1209	12.9.16	11:30	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 1209	12.9.16	8:30	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 1209	12.9.16	9:15	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 1209	12.9.16	10:00	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 1209	12.9.16	9:35	Water	7	X	X	X	X	X	X	X	X	X
15	QA 17-2016 1209	12.9.16	8:50	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by M. Herrera Date 12.9.16 Received by [Signature] Date 12/9/16

Firm Herrera Time 12:55 Firm [Signature] Time 12:55

Relinquished by _____ Date _____ Received by _____ Date _____

Firm _____ Time _____ Firm _____ Time _____

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number: 14-05806-000
Personnel Performing Calibration: C. I. Herrera
Meter: YST PRO PLUS
Date/Time: 12/9/16 06:45
Barometric Pressure Start of Day: mm Hg: 29.97 Time: 06:45
Barometric Pressure End of Day: mm Hg: Time:

Calibration Procedures:

Rinse Multimeter Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water. ✓
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS). ✓
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	10.3	0	17.5	✓
Conductivity (µS/cm)	1012	1,000	18.2	✓
Conductivity (µS/cm)	106.2	100	15.2	✓
DO % Saturation	101.4	100	17.9	
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	23.7	0	17.8	
Conductivity (µS/cm)	86.3	100	17.5	
DO % Saturation	98.8	100		

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	C. Ifemer		
Meter:	YSI Pro DSS		
Date/Time:	12/9/16 06:45		
Barometric Pressure Start of Day:	mm Hg:	mm Hg:	Time:
Barometric Pressure End of Day:	mm Hg:	mm Hg:	Time:

Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	7.3	0	17.5	✓
Conductivity (µS/cm)	1000	1,000	18.3	✓
Conductivity (µS/cm)	120.4	100	17.9	
DO % Saturation	98.9	100	17.9	
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	6.7	0	17.6	
Conductivity (µS/cm)	49.7	100	18.1	
DO % Saturation	101.4	100		

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
 2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
 3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
 4. Make sure there are no bubbles in the cell; wait 2 minutes.
 5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
 6. Check conductivity using 100 µS/cm standard.
- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. J. Fisher, J. M. Mager

SITE ID: COLM

Sample Date: 12-9-16 Sample Time: 12:00

PDT:

Base Flow or Storm Event? Storm Field Filtered Time: 12:10

PST:

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: EULM 20161209

Current Weather and Temp: 33° rain/show

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>NA</u>
DOC *	HDPE	250 ml	1	HCL	<u>NA</u>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<u>NA</u>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<u>NA</u>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<u>NA</u>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<u>NA</u>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>NA</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: lt. brown
 Odor: None
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: _____

Date Checked: 12-13-16 Time: 17:45

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): No Staff gauge

Reference Point (description): _____

Water Quality Measurements

Temperature (°C) 2.1

Conductivity (µs/cm) 29.6

Dissolved Oxygen (mg/L) 12.74

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

 Field Personnel: MB

 Sample Date: 12-9-16

 Sample Time: 8:40

 PDT: X

SITE ID:

COUM1

 Base Flow or Storm Event? storm

 Field Filtered Time: 8:40

PST:

 Project Number: 14-05806-000

(Must filter within 15 minutes of collection)


 Project Name: Redmond Paired Watershed Study

 Current Weather and Temp: Rain & 34°F

Water Quality Sampling

 Sample ID: COUM1-20161209

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	Y
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

 Duplicate sample ID: QA17-20161209

 Filter blank sample ID: NA

 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

 Clarity: Clear
 Color: None
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

 Checked By: John Leath

 Signature: [Signature]

 Date Checked: 12-13-16

 Time: 13:45

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro DSS#1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

 Stream Stage (ft): ~~2.68~~ 2.68

 Reference Point (description): SG

Water Quality Measurements

 Temperature (°C) 5.6

 Conductivity (µs/cm) 250.1 222 250.1

 Dissolved Oxygen (mg/L) 12.22 250.1 12.23

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: EB

Sample Date: 12-9-16

Sample Time: 8:15

PDT

SITE

ID:

LOUMO

Base Flow or Storm Event? Storm

Field Filtered Time: 8:15

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain @ 34°

Water Quality Sampling

Sample ID: LOUMO-20161209

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>↓</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear

Color: none

Odor: none

Sheen: none

Floatables: none

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Leuth

Signature: [Signature]

Date Checked: 12-13-16

Time: 17:45

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI PRO DSS #1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): ~~1.00~~ 1.25

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 5.6

Conductivity (µs/cm) 319.5

Dissolved Oxygen (mg/L) 12.22

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. E. Fisher, J. M. Mangan
 Sample Date: 12-9-16 Sample Time: 09:50 PWT:
 Base Flow or Storm Event? Storm Field Filtered Time: 16:00 PST:
(Must filter within 15 minutes of collection)

SITE ID: EVAMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: rainy, 34°F

Water Quality Sampling

Sample ID: EVAMS 20161209

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NA
DOC *	HDPE	250 ml	1	HCL	NA
Focal Col. Bact.	HDPE	250 ml	1	EDTA	1
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	1
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	1
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	1
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	1

* - field filtered with Nalgene 250 ml SFCA 0.45 μm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: N/A
 Sheen: N/A
 Floatables: N/A

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. M. Mangan Signature: [Signature]
 Date Checked: 12-13-16 Time: 17:45
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 3.84
 Reference Point (description): Stream gage

Water Quality Measurements

Temperature (°C) 4.2
 Conductivity (μs/cm) 192.1
 Dissolved Oxygen (mg/L) 12.59

Light show 1 1/2" on ground

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Hfner, J. Munger

Sample Date: 12/7/16

Sample Time: 10:10

PDT:

SITE

ID: EVALLSS

Base Flow or Storm Event? Storm

Field Filtered Time: 10:20

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: rain/snow 33°F

Water Quality Sampling

Sample ID: EVALLSS2016/209

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NA
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: NA
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. L. Lenth Signature: [Signature]

Date Checked: 12-13-16 Time: 17:45

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.36

Reference Point (description): stream gage

Water Quality Measurements

Temperature (°C) 4.1

Conductivity (µs/cm) 177.5

Dissolved Oxygen (mg/L) 13.04

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BM

Sample Date: 12-9-10

Sample Time: 10:25

PDT

SITE ID: MONMN

Base Flow or Storm Event? Storm

Field Filtered Time: 10:25

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SNOW @ 32°F

Water Quality Sampling

Sample ID: MONMN-201101209

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input checked="" type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input checked="" type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input checked="" type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: is clear

Color: none

Odor:

Sheen:

Floatables:

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Lenth

Signature: [Signature]

Date Checked: 12-15-10

Time: 17:45

Data Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS #1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 9.11

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 4.3

Conductivity (µs/cm) 127.8

Dissolved Oxygen (mg/L) 12.31

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BM

Sample Date: 12.9.16

Sample Time: 10:45

PDT:

SITE ID:

MONMS

Base Flow or Storm Event? Storm

Field Filtered Time: 10:45

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SNOW 32°F

Water Quality Sampling

Sample ID:

MONMS - 20161209

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	<u>NA</u>
Filter blank sample ID:	<u>NA</u>
Transfer blank sample ID:	<u>NA</u>

Visual and Olfactory Conditions:

Clarity:	<u>cloudy</u>
Color:	<u>light tan</u>
Odor:	<u>none</u>
Sheen:	<u>none</u>
Floatables:	<u>sediment & plant debris</u>

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Lenth

Signature: [Signature]

Date Checked: 12-13-16

Time: 17:45

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS #1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 6.78

Reference Point (description): vault

Water Quality Measurements

Temperature (°C) 3.6

Conductivity (µs/cm) 351.9

Dissolved Oxygen (mg/L) 9.81

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 12.9.16 Sample Time: 11:05 PDT
 Base Flow or Storm Event? Storm Field Filtered Time: 11:05 PST
(Must filter within 15 minutes of collection)

SITE ID: MONM
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: ANIZAL 33°F

Water Quality Sampling

Sample ID: MONM-20161209

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: non
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Salm Lenth Signature: [Signature]
 Date Checked: 12-13-16 Time: 17:45
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro DSS #1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.43
 Reference Point (description): top of culvert 4

Water Quality Measurements

Temperature (°C) 5.0
 Conductivity (µs/cm) 307.5
 Dissolved Oxygen (mg/L) 12.57

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Iftner, J. Munger

Sample Date: 12-9-16 Sample Time: 11:00

Base Flow or Storm Event? storm Field Filtered Time: 11:10
(Must filter within 15 minutes of collection)

SITE ID: SEIMN

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 33° rain/snow

Water Quality Sampling

Sample ID: SEIMN20161209

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NA
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: Very lt. brown
 Odor: NA
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Sohn Leuth Signature: _____
 Date Checked: 12-15-16 Time: 17:45
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 8.25"

Reference Point (description): Down from top of bolt.

Water Quality Measurements

Temperature (°C) 3.8

Conductivity (µs/cm) 60.6

Dissolved Oxygen (mg/L) 13.12

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

 Field Personnel: PKB

 Sample Date: 12.9.16

 Sample Time: 11:30

 PDT:

SITE ID:

SEIMS

 Base Flow or Storm Event? STORM

 Field Filtered Time: 11:30

PST:

 Project Number: 14-05806-000

(Must filter within 15 minutes of collection)


 Project Name: Redmond Paired Watershed Study

 Current Weather and Temp: SNOW & 32°F

Water Quality Sampling

 Sample ID: SEIMS-20161209

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

 Duplicate sample ID: NA

 Filter blank sample ID: NA

 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

 Clarity: clear

 Color: none

 Odor: ↓

 Sheen: ↓

 Floatables: ↓

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

 Checked By: Tobin Lamb

 Signature: [Signature]

 Date Checked: 12.13.16

 Time: 17:45

Data Entered into Database?

 YES

 NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI ProDSS # 1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

 Stream Stage (ft): 0.70

 Reference Point (description): SG

Water Quality Measurements

 Temperature (°C) 3.5

 Conductivity (µs/cm) 98.3

 Dissolved Oxygen (mg/L) 12.51

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Iffner, J. Murgan

Sample Date: 12-09-16 Sample Time: 8:30

Base Flow or Storm Event? Storm Field Filtered Time: 8:40
(Must filter within 15 minutes of collection)

SITE ID: TOSMI

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: lt. rain, 33°

Water Quality Sampling

Sample ID: TOSMI-20161209

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NA
DOC *	HDPE	250 ml	1	HCL	↓
Focal Col. Bact.	HDPE	250 ml	1	EDTA	↓
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	↓
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	↓
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	↓
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: Colorless
 Odor: NA
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. Murgan Signature: _____
 Date Checked: 12-15-16 Time: 17:45
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

~~YSI 556 (05M1466)~~
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2 7/8"

Reference Point (description): Bolt (measured down from bolt to water)

Water Quality Measurements

Temperature (°C) 6.0

Conductivity (µs/cm) 504

Dissolved Oxygen (mg/L) 12.13

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

 Field Personnel: HB

 Sample Date: 12.9.16

 Sample Time: 9:15

 PDT: X

SITE ID:

TOSMO

 Base Flow or Storm Event? storm

 Field Filtered Time: 9:15

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)


HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

 Sample ID: TOSMO-20161209

 Current Weather and Temp: showers @ 34°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

 Duplicate sample ID: NA

 Filter blank sample ID: NA

 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

 Clarity: clear
 Color: none
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date:

Time:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI ProDSS#1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

 Stream Stage (ft): 0.108

 Reference Point (description): SG

Water Quality Measurements

 Temperature (°C) 4.9

 Conductivity (µs/cm) 290.9

 Dissolved Oxygen (mg/L) 12.100

Quality Assurance

 Checked By: John Lent

 Signature: [Signature]

 Date Checked: 12-13-16

 Time: 17:45

Data Entered into Database?

 YES / NO / initials:

Date Entered:

Time:

Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: P/B

Sample Date: 12-9-16

Sample Time: 10:00

PDT

SITE ID: TYLMI

Base Flow or Storm Event? storm

Field Filtered Time: 10:00

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: snow/rain @ 32°F

Water Quality Sampling

Sample ID: TYLMI-20161209

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	<u>NA</u>
Filter blank sample ID:	<u>NA</u>
Transfer blank sample ID:	<u>NA</u>

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor:
 Sheen:
 Floatables:
 ↓

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: [Signature] Signature: [Signature]
 Date Checked: 12-13-16 Time: 17:45
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro DSS #1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.54
 Reference Point (description): top of culvert ↓

Water Quality Measurements

Temperature (°C) 5.3
 Conductivity (µs/cm) 171.9
 Dissolved Oxygen (mg/L) 11.65

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB

Sample Date: 12-9-16

Sample Time: 9:35

PDT:

SITE

ID: TYLMO

Base Flow or Storm Event? storm

Field Filtered Time: 9:35

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: rainy & 34°F

Water Quality Sampling

Sample ID: TYLMO-20161209

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Lenter Signature: [Signature]

Date Checked: 12-13-16 Time: 7:45

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS # 1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.83

Reference Point (description): top of culvert ↓

Water Quality Measurements

Temperature (°C) 4.7

Conductivity (µs/cm) 366.5

Dissolved Oxygen (mg/L) 12.52



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 1/10/2017 Page 1 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 12/09/2016 / All sites, 1 FD (QA17) at COUMI

date 2/21/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	6	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	94	±20	5	≤25	14	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	<1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	1	≤25	0	≤25	OK	NONE
Hardness	OK / SM 2340B	NA	NA	4	≤180	≤1.0 mg/L 1.0 mg/L	98,97	±25	98	±15	0	≤20	9.5	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	5	≤28	≤1.0 mg/L 1.0 mg/L	94	±25	107	±15	0	≤20	D=0.1	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	6	≤28	≤0.01 mg/L 0.01 mg/L	99	±25	103	±20	8	≤20	6.3	≤20	OK	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	4-10	≤28	≤0.1 mg/L 0.1 mg/L	106,109	±25	96-100	±20	25,9.9	≤20	D=1.15	≤20	OK	“J” COUMI DUE TO FIELD DUP RPD AND “J” MONMS DUE TO LAB DUP RPD

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 1/10/2017 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 12/09/2016 / All sites, 1 FD (QA17) at COUMI

date 2/21/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	4	≤180	≤1.0 µg/L 1.0 µg/L	101	±25	NR	±15	NC	≤20	D=0	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	4	≤180	≤5.0 µg/L 5.0 µg/L	106	±25	NR	±15	NC	≤20	D=0.8	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	4	≤180	≤1.0 µg/L 1.0 µg/L	87,89	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	4	≤180	≤5.0 µg/L 5.0 µg/L	94,99	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Fecal Coliform	OK / SM 9222D	NA	NA	<1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	0, D=2	≤35	35	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

January 31, 2017

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1701-013

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on January 5, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular flourish.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: January 31, 2017
Samples Submitted: January 5, 2017
Laboratory Reference: 1701-013
Project: 14-05806-000

Case Narrative

Samples were collected on January 5, 2017 and received by the laboratory on January 5, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: January 31, 2017
 Samples Submitted: January 5, 2017
 Laboratory Reference: 1701-013
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170105					
Laboratory ID:	01-013-01					
Total Suspended Solids	ND	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	COUMI-20170105					
Laboratory ID:	01-013-02					
Total Suspended Solids	3.2	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	COUMO-20170105					
Laboratory ID:	01-013-03					
Total Suspended Solids	2.8	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	EVAMS-20170105					
Laboratory ID:	01-013-04					
Total Suspended Solids	2.6	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	EVALSS-20170105					
Laboratory ID:	01-013-05					
Total Suspended Solids	6.4	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	MONMN-20170105					
Laboratory ID:	01-013-06					
Total Suspended Solids	2.0	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	MONMS-20170105					
Laboratory ID:	01-013-07					
Total Suspended Solids	1.6	1.0	SM 2540D	1-9-17	1-10-17	



Date of Report: January 31, 2017
 Samples Submitted: January 5, 2017
 Laboratory Reference: 1701-013
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170105					
Laboratory ID:	01-013-08					
Total Suspended Solids	1.4	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	SEIMN-20170105					
Laboratory ID:	01-013-09					
Total Suspended Solids	3.6	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	SEIMS-20170105					
Laboratory ID:	01-013-10					
Total Suspended Solids	4.4	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	TOSMI-20170105					
Laboratory ID:	01-013-11					
Total Suspended Solids	1.6	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	TOSMO-20170105					
Laboratory ID:	01-013-12					
Total Suspended Solids	3.4	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	TYLMI-20170105					
Laboratory ID:	01-013-13					
Total Suspended Solids	1.0	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	TYLMO-20170105					
Laboratory ID:	01-013-14					
Total Suspended Solids	2.0	1.0	SM 2540D	1-9-17	1-10-17	



Date of Report: January 31, 2017
Samples Submitted: January 5, 2017
Laboratory Reference: 1701-013
Project: 14-05806-000

TOTAL SUSPENDED SOLIDS
SM 2540D

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA18-20170105					
Laboratory ID:	01-013-15					
Total Suspended Solids	2.8	1.0	SM 2540D	1-9-17	1-10-17	



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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0109W2					
Total Suspended Solids	ND	1.0	SM 2540D	1-9-17	1-10-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	01-013-08							
	ORIG	DUP						
Total Suspended Solids	1.40	1.20	NA	NA	NA	15	20	

SPIKE BLANK								
Laboratory ID:	SB0109W2							
	SB	SB		SB				
Total Suspended Solids	110	100	NA	110	78-113	NA	NA	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170105					
Laboratory ID:	01-013-01					
Turbidity	0.76	0.10	EPA 180.1	1-6-17	1-6-17	

Client ID:	COUMI-20170105					
Laboratory ID:	01-013-02					
Turbidity	1.9	0.10	EPA 180.1	1-6-17	1-6-17	

Client ID:	COUMO-20170105					
Laboratory ID:	01-013-03					
Turbidity	2.7	0.10	EPA 180.1	1-6-17	1-6-17	

Client ID:	EVAMS-20170105					
Laboratory ID:	01-013-04					
Turbidity	2.4	0.10	EPA 180.1	1-6-17	1-6-17	

Client ID:	EVALSS-20170105					
Laboratory ID:	01-013-05					
Turbidity	1.8	0.10	EPA 180.1	1-6-17	1-6-17	

Client ID:	MONMN-20170105					
Laboratory ID:	01-013-06					
Turbidity	2.6	0.10	EPA 180.1	1-6-17	1-6-17	

Client ID:	MONMS-20170105					
Laboratory ID:	01-013-07					
Turbidity	1.4	0.10	EPA 180.1	1-6-17	1-6-17	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170105					
Laboratory ID:	01-013-08					
Turbidity	3.1	0.10	EPA 180.1	1-6-17	1-6-17	

Client ID:	SEIMN-20170105					
Laboratory ID:	01-013-09					
Turbidity	1.4	0.10	EPA 180.1	1-6-17	1-6-17	

Client ID:	SEIMS-20170105					
Laboratory ID:	01-013-10					
Turbidity	2.2	0.10	EPA 180.1	1-6-17	1-6-17	

Client ID:	TOSMI-20170105					
Laboratory ID:	01-013-11					
Turbidity	1.2	0.10	EPA 180.1	1-6-17	1-6-17	

Client ID:	TOSMO-20170105					
Laboratory ID:	01-013-12					
Turbidity	2.2	0.10	EPA 180.1	1-6-17	1-6-17	

Client ID:	TYLMI-20170105					
Laboratory ID:	01-013-13					
Turbidity	3.9	0.10	EPA 180.1	1-6-17	1-6-17	

Client ID:	TYLMO-20170105					
Laboratory ID:	01-013-14					
Turbidity	3.4	0.10	EPA 180.1	1-6-17	1-6-17	



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TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA18-20170105					
Laboratory ID:	01-013-15					
Turbidity	1.8	0.10	EPA 180.1	1-6-17	1-6-17	



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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0106W1					
Turbidity	ND	0.10	EPA 180.1	1-6-17	1-6-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	01-013-01							
	ORIG	DUP						
Turbidity	0.760	0.750	NA	NA	NA	NA	1	15



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170105					
Laboratory ID:	01-013-01					
Hardness	11	1.0	200.7/SM 2340B	1-9-17	1-9-17	

Client ID:	COUMI-20170105					
Laboratory ID:	01-013-02					
Hardness	140	5.0	200.7/SM 2340B	1-9-17	1-9-17	

Client ID:	COUMO-20170105					
Laboratory ID:	01-013-03					
Hardness	110	1.0	200.7/SM 2340B	1-9-17	1-9-17	

Client ID:	EVAMS-20170105					
Laboratory ID:	01-013-04					
Hardness	90	1.0	200.7/SM 2340B	1-9-17	1-9-17	

Client ID:	EVALSS-20170105					
Laboratory ID:	01-013-05					
Hardness	83	1.0	200.7/SM 2340B	1-9-17	1-9-17	

Client ID:	MONMN-20170105					
Laboratory ID:	01-013-06					
Hardness	59	1.0	200.7/SM 2340B	1-9-17	1-9-17	

Client ID:	MONMS-20170105					
Laboratory ID:	01-013-07					
Hardness	160	5.0	200.7/SM 2340B	1-9-17	1-9-17	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170105					
Laboratory ID:	01-013-08					
Hardness	84	1.0	200.7/SM 2340B	1-9-17	1-9-17	

Client ID:	SEIMN-20170105					
Laboratory ID:	01-013-09					
Hardness	25	1.0	200.7/SM 2340B	1-9-17	1-9-17	

Client ID:	SEIMS-20170105					
Laboratory ID:	01-013-10					
Hardness	45	1.0	200.7/SM 2340B	1-9-17	1-9-17	

Client ID:	TOSMI-20170105					
Laboratory ID:	01-013-11					
Hardness	130	1.0	200.7/SM 2340B	1-9-17	1-9-17	

Client ID:	TOSMO-20170105					
Laboratory ID:	01-013-12					
Hardness	120	1.0	200.7/SM 2340B	1-9-17	1-9-17	

Client ID:	TYLMI-20170105					
Laboratory ID:	01-013-13					
Hardness	88	1.0	200.7/SM 2340B	1-9-17	1-9-17	

Client ID:	TYLMO-20170105					
Laboratory ID:	01-013-14					
Hardness	83	1.0	200.7/SM 2340B	1-9-17	1-9-17	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA18-20170105					
Laboratory ID:	01-013-15					
Hardness	150	5.0	200.7/SM 2340B	1-9-17	1-9-17	



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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0109WH1					
Hardness	ND	1.0	200.7/SM 2340B	1-9-17	1-9-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	01-013-01							
	ORIG	DUP						
Hardness	10.9	10.5	NA	NA	NA	4	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	01-013-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	148	143	132	132	10.9	104	100	75-125	3	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK								
Laboratory ID:	SB0109WH1							
	SB	SB			SB			
Hardness	132	132	NA	100	80-120	NA	NA	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170105					
Laboratory ID:	01-013-01					
Dissolved Organic Carbon	12	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	COUMI-20170105					
Laboratory ID:	01-013-02					
Dissolved Organic Carbon	3.2	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	COUMO-20170105					
Laboratory ID:	01-013-03					
Dissolved Organic Carbon	3.0	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	EVAMS-20170105					
Laboratory ID:	01-013-04					
Dissolved Organic Carbon	3.1	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	EVALSS-20170105					
Laboratory ID:	01-013-05					
Dissolved Organic Carbon	2.9	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	MONMN-20170105					
Laboratory ID:	01-013-06					
Dissolved Organic Carbon	3.7	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	MONMS-20170105					
Laboratory ID:	01-013-07					
Dissolved Organic Carbon	4.7	1.0	SM 5310B	1-16-17	1-16-17	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170105					
Laboratory ID:	01-013-08					
Dissolved Organic Carbon	3.2	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	SEIMN-20170105					
Laboratory ID:	01-013-09					
Dissolved Organic Carbon	5.0	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	SEIMS-20170105					
Laboratory ID:	01-013-10					
Dissolved Organic Carbon	3.2	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	TOSMI-20170105					
Laboratory ID:	01-013-11					
Dissolved Organic Carbon	3.6	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	TOSMO-20170105					
Laboratory ID:	01-013-12					
Dissolved Organic Carbon	2.8	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	TYLMI-20170105					
Laboratory ID:	01-013-13					
Dissolved Organic Carbon	4.4	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	TYLMO-20170105					
Laboratory ID:	01-013-14					
Dissolved Organic Carbon	3.5	1.0	SM 5310B	1-16-17	1-16-17	



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**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA18-20170105					
Laboratory ID:	01-013-15					
Dissolved Organic Carbon	4.8	1.0	SM 5310B	1-16-17	1-16-17	



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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0116D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	1-16-17	1-16-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	01-013-01							
	ORIG	DUP						
Dissolved Organic Carbon	11.8	11.8	NA	NA	NA	0	20	

MATRIX SPIKE

Laboratory ID:	01-013-01							
	MS	MS		MS				
Dissolved Organic Carbon	21.9	10.0	11.8	101	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0116D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.4	10.0	NA	104	75-125	NA	NA	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170105					
Laboratory ID:	01-013-01					
Total Phosphorus	ND	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	COUMI-20170105					
Laboratory ID:	01-013-02					
Total Phosphorus	0.053	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	COUMO-20170105					
Laboratory ID:	01-013-03					
Total Phosphorus	0.028	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	EVAMS-20170105					
Laboratory ID:	01-013-04					
Total Phosphorus	ND	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	EVALSS-20170105					
Laboratory ID:	01-013-05					
Total Phosphorus	0.017	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	MONMN-20170105					
Laboratory ID:	01-013-06					
Total Phosphorus	0.019	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	MONMS-20170105					
Laboratory ID:	01-013-07					
Total Phosphorus	0.012	0.010	EPA 365.1	1-12-17	1-13-17	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170105					
Laboratory ID:	01-013-08					
Total Phosphorus	0.017	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	SEIMN-20170105					
Laboratory ID:	01-013-09					
Total Phosphorus	0.014	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	SEIMS-20170105					
Laboratory ID:	01-013-10					
Total Phosphorus	0.021	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	TOSMI-20170105					
Laboratory ID:	01-013-11					
Total Phosphorus	0.040	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	TOSMO-20170105					
Laboratory ID:	01-013-12					
Total Phosphorus	0.042	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	TYLMI-20170105					
Laboratory ID:	01-013-13					
Total Phosphorus	0.012	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	TYLMO-20170105					
Laboratory ID:	01-013-14					
Total Phosphorus	0.023	0.010	EPA 365.1	1-12-17	1-13-17	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA18-20170105					
Laboratory ID:	01-013-15					
Total Phosphorus	0.012	0.010	EPA 365.1	1-12-17	1-13-17	



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**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0112W1					
Total Phosphorus	ND	0.010	EPA 365.1	1-12-17	1-13-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	01-013-01							
	ORIG	DUP						
Total Phosphorus	ND	ND	NA	NA	NA	NA	11	

MATRIX SPIKE								
Laboratory ID:	01-013-01							
	MS	MS		MS				
Total Phosphorus	0.268	0.250	ND	107	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0112W1							
	SB	SB		SB				
Total Phosphorus	0.249	0.250	NA	100	86-111	NA	NA	



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TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 01-013-01						
Client ID: COLM-20170105						
Copper	ND	1.0	200.8	1-9-17	1-9-17	
Zinc	ND	5.0	200.8	1-9-17	1-9-17	
Lab ID: 01-013-02						
Client ID: COUMI-20170105						
Copper	ND	1.0	200.8	1-9-17	1-9-17	
Zinc	10	5.0	200.8	1-9-17	1-9-17	
Lab ID: 01-013-03						
Client ID: COUMO-20170105						
Copper	ND	1.0	200.8	1-9-17	1-9-17	
Zinc	6.5	5.0	200.8	1-9-17	1-9-17	
Lab ID: 01-013-04						
Client ID: EVAMS-20170105						
Copper	ND	1.0	200.8	1-9-17	1-9-17	
Zinc	ND	5.0	200.8	1-9-17	1-9-17	
Lab ID: 01-013-05						
Client ID: EVALSS-20170105						
Copper	ND	1.0	200.8	1-9-17	1-9-17	
Zinc	ND	5.0	200.8	1-9-17	1-9-17	
Lab ID: 01-013-06						
Client ID: MONMN-20170105						
Copper	ND	1.0	200.8	1-9-17	1-9-17	
Zinc	ND	5.0	200.8	1-9-17	1-9-17	



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TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	01-013-07					
Client ID:	MONMS-20170105					
Copper	ND	1.0	200.8	1-9-17	1-9-17	
Zinc	5.2	5.0	200.8	1-9-17	1-9-17	
Lab ID:	01-013-08					
Client ID:	MONM-20170105					
Copper	ND	1.0	200.8	1-9-17	1-9-17	
Zinc	8.8	5.0	200.8	1-9-17	1-9-17	
Lab ID:	01-013-09					
Client ID:	SEIMN-20170105					
Copper	ND	1.0	200.8	1-9-17	1-9-17	
Zinc	ND	5.0	200.8	1-9-17	1-9-17	
Lab ID:	01-013-10					
Client ID:	SEIMS-20170105					
Copper	ND	1.0	200.8	1-9-17	1-9-17	
Zinc	ND	5.0	200.8	1-9-17	1-9-17	
Lab ID:	01-013-11					
Client ID:	TOSMI-20170105					
Copper	ND	1.0	200.8	1-9-17	1-9-17	
Zinc	85	5.0	200.8	1-9-17	1-9-17	
Lab ID:	01-013-12					
Client ID:	TOSMO-20170105					
Copper	ND	1.0	200.8	1-9-17	1-9-17	
Zinc	39	5.0	200.8	1-9-17	1-9-17	



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TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	01-013-13					
Client ID:	TYLMI-20170105					
Copper	1.2	1.0	200.8	1-9-17	1-9-17	
Zinc	5.2	5.0	200.8	1-9-17	1-9-17	

Lab ID:	01-013-14					
Client ID:	TYLMO-20170105					
Copper	ND	1.0	200.8	1-9-17	1-9-17	
Zinc	5.2	5.0	200.8	1-9-17	1-9-17	

Lab ID:	01-013-15					
Client ID:	QA18-20170105					
Copper	ND	1.0	200.8	1-9-17	1-9-17	
Zinc	ND	5.0	200.8	1-9-17	1-9-17	



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**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 1-9-17
Date Analyzed: 1-9-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0109WH2

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



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**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 1-9-17

Date Analyzed: 1-9-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 01-013-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	10.1	9.94	2	5.0	



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**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 1-9-17

Date Analyzed: 1-9-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 01-013-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	105	105	106	106	1	
Zinc	100	119	109	122	112	2	



Date of Report: January 31, 2017
 Samples Submitted: January 5, 2017
 Laboratory Reference: 1701-013
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 01-013-01						
Client ID: COLM-20170105						
Copper	ND	1.0	200.8		1-6-17	
Zinc	ND	5.0	200.8		1-6-17	
Lab ID: 01-013-02						
Client ID: COUMI-20170105						
Copper	ND	1.0	200.8		1-6-17	
Zinc	8.8	5.0	200.8		1-6-17	
Lab ID: 01-013-03						
Client ID: COUMO-20170105						
Copper	ND	1.0	200.8		1-6-17	
Zinc	5.6	5.0	200.8		1-6-17	
Lab ID: 01-013-04						
Client ID: EVAMS-20170105						
Copper	ND	1.0	200.8		1-6-17	
Zinc	ND	5.0	200.8		1-6-17	
Lab ID: 01-013-05						
Client ID: EVALSS-20170105						
Copper	ND	1.0	200.8		1-6-17	
Zinc	ND	5.0	200.8		1-6-17	
Lab ID: 01-013-06						
Client ID: MONMN-20170105						
Copper	ND	1.0	200.8		1-6-17	
Zinc	ND	5.0	200.8		1-6-17	



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: January 31, 2017
 Samples Submitted: January 5, 2017
 Laboratory Reference: 1701-013
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	01-013-07					
Client ID:	MONMS-20170105					
Copper	ND	1.0	200.8		1-6-17	
Zinc	6.1	5.0	200.8		1-6-17	
Lab ID:	01-013-08					
Client ID:	MONM-20170105					
Copper	ND	1.0	200.8		1-6-17	
Zinc	8.7	5.0	200.8		1-6-17	
Lab ID:	01-013-09					
Client ID:	SEIMN-20170105					
Copper	ND	1.0	200.8		1-6-17	
Zinc	ND	5.0	200.8		1-6-17	
Lab ID:	01-013-10					
Client ID:	SEIMS-20170105					
Copper	ND	1.0	200.8		1-6-17	
Zinc	ND	5.0	200.8		1-6-17	
Lab ID:	01-013-11					
Client ID:	TOSMI-20170105					
Copper	ND	1.0	200.8		1-6-17	
Zinc	84	5.0	200.8		1-6-17	
Lab ID:	01-013-12					
Client ID:	TOSMO-20170105					
Copper	ND	1.0	200.8		1-6-17	
Zinc	37	5.0	200.8		1-6-17	



Date of Report: January 31, 2017
 Samples Submitted: January 5, 2017
 Laboratory Reference: 1701-013
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	01-013-13					
Client ID:	TYLMI-20170105					
Copper	1.0	1.0	200.8		1-6-17	
Zinc	ND	5.0	200.8		1-6-17	

Lab ID:	01-013-14					
Client ID:	TYLMO-20170105					
Copper	ND	1.0	200.8		1-6-17	
Zinc	ND	5.0	200.8		1-6-17	

Lab ID:	01-013-15					
Client ID:	QA18-20170105					
Copper	ND	1.0	200.8		1-6-17	
Zinc	ND	5.0	200.8		1-6-17	



Date of Report: January 31, 2017
Samples Submitted: January 5, 2017
Laboratory Reference: 1701-013
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 1-6-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0106D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: January 31, 2017
Samples Submitted: January 5, 2017
Laboratory Reference: 1701-013
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 1-6-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 01-013-15

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: January 31, 2017
 Samples Submitted: January 5, 2017
 Laboratory Reference: 1701-013
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 1-6-17

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 01-013-15

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	80.0	100	84.0	105	5	
Zinc	80.0	88.6	111	93.8	117	6	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

Jan 30 2017
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20170105	Water	17-A000121	Micro, NUT
COUMI-20170105	Water	17-A000122	Micro, NUT
COUMO-20170105	Water	17-A000123	Micro, NUT
EVAMS-20170105	Water	17-A000124	Micro, NUT
EVALSS-20170105	Water	17-A000125	Micro, NUT
MONMN-20170105	Water	17-A000126	Micro, NUT
MONMS-20170105	Water	17-A000127	Micro, NUT
MONM-20170105	Water	17-A000128	Micro, NUT
SEIMN-20170105	Water	17-A000129	Micro, NUT
SEIMS-20170105	Water	17-A000130	Micro, NUT
TOSMI-20170105	Water	17-A000131	Micro, NUT
TOSMO-20170105	Water	17-A000132	Micro, NUT
TYLMI-20170105	Water	17-A000133	Micro, NUT
TYLMO-20170105	Water	17-A000134	Micro, NUT
QA18-20170105	Water	17-A000135	Micro, NUT

Your samples were received on Friday, January 6, 2017. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

Jan 30 2017
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to conact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 01-013

BACT = Bacteriological
CONV = Conventionals

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
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www.amtestlab.com



Professional
Analytical
Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
PO Number: 01-013
All results reported on an as received basis.

Date Received: 01/06/17
Date Reported: 1/30/17

AMTEST Identification Number 17-A000121
Client Identification COLM-20170105
Sampling Date 01/05/17, 09:35

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	10.	CFU/100 ml		1	SM 9222D	NG	01/06/17
Total Nitrogen (NOX&TKN)	0.71	mg/l		0.1			
Total Nitrogen (TKN)	0.600	mg/l		0.1	SM4500N	JC	01/24/17
Nitrate + Nitrite	0.11	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000122
Client Identification COUMI-20170105
Sampling Date 01/05/17, 15:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2.	CFU/100 ml		1	SM 9222D	NG	01/06/17
Total Nitrogen (NOX&TKN)	16.0	mg/l		0.1			
Total Nitrogen (TKN)	15.6	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.41	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000123
Client Identification COUMO-20170105
Sampling Date 01/05/17, 15:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	14.	CFU/100 ml		1	SM 9222D	NG	01/06/17
Total Nitrogen (NOX&TKN)	0.88	mg/l		0.1			
Total Nitrogen (TKN)	0.316	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.56	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000124
Client Identification EVAMS-20170105
Sampling Date 01/05/17, 13:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	12.	CFU/100 ml		1	SM 9222D	NG	01/06/17
Total Nitrogen (NOX&TKN)	2.51	mg/l		0.1			
Total Nitrogen (TKN)	0.507	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	2.0	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000125
Client Identification EVALSS-20170105
Sampling Date 01/05/17, 14:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	20.	CFU/100 ml		1	SM 9222D	NG	01/06/17
Total Nitrogen (NOX&TKN)	3.30	mg/l		0.1			
Total Nitrogen (TKN)	1.70	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	1.6	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000126
Client Identification MONMN-20170105
Sampling Date 01/05/17, 12:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	4.	CFU/100 ml		1	SM 9222D	NG	01/06/17
Total Nitrogen (NOX&TKN)	0.57	mg/l		0.1			
Total Nitrogen (TKN)	0.251	mg/l		0.1	SM4500N	JC	01/24/17
Nitrate + Nitrite	0.32	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000127
Client Identification MONMS-20170105
Sampling Date 01/05/17, 12:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	4.	CFU/100 ml		1	SM 9222D	NG	01/06/17
Total Nitrogen (NOX&TKN)	8.62	mg/l		0.1			
Total Nitrogen (TKN)	8.10	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.52	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000128
Client Identification MONM-20170105
Sampling Date 01/05/17, 12:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	14.	CFU/100 ml		1	SM 9222D	NG	01/06/17
Total Nitrogen (NOX&TKN)	0.64	mg/l		0.1			
Total Nitrogen (TKN)	0.166	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.47	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000129
Client Identification SEIMN-20170105
Sampling Date 01/05/17, 10:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	4.	CFU/100 ml		1	SM 9222D	NG	01/06/17
Total Nitrogen (NOX&TKN)	0.71	mg/l		0.1			
Total Nitrogen (TKN)	0.296	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.41	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000130
Client Identification SEIMS-20170105
Sampling Date 01/05/17, 11:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2.	CFU/100 ml		1	SM 9222D	NG	01/06/17
Total Nitrogen (NOX&TKN)	1.84	mg/l		0.1			
Total Nitrogen (TKN)	1.50	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.34	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000131
Client Identification TOSMI-20170105
Sampling Date 01/05/17, 14:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	96.	CFU/100 ml		1	SM 9222D	NG	01/06/17
Total Nitrogen (NOX&TKN)	1.09	mg/l		0.1			
Total Nitrogen (TKN)	0.293	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.80	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000132
Client Identification TOSMO-20170105
Sampling Date 01/05/17, 15:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	36.	CFU/100 ml		1	SM 9222D	NG	01/06/17
Total Nitrogen (NOX&TKN)	0.90	mg/l		0.1			
Total Nitrogen (TKN)	0.327	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.57	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000133
Client Identification TYLMI-20170105
Sampling Date 01/05/17, 13:20

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	14.	CFU/100 ml		1	SM 9222D	NG	01/06/17
Total Nitrogen (NOX&TKN)	1.27	mg/l		0.1			
Total Nitrogen (TKN)	0.454	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.82	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000134
Client Identification TYLMO-20170105
Sampling Date 01/05/17, 13:05

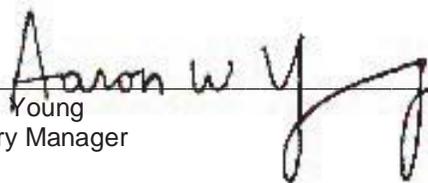
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2.	CFU/100 ml		1	SM 9222D	NG	01/06/17
Total Nitrogen (NOX&TKN)	0.82	mg/l		0.1			
Total Nitrogen (TKN)	0.138	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.68	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000135
Client Identification QA18-20170105
Sampling Date 01/05/17, 12:35

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2.	CFU/100 ml		1	SM 9222D	NG	01/06/17
Total Nitrogen (NOX&TKN)	4.51	mg/l		0.1			
Total Nitrogen (TKN)	4.00	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.51	mg/l		0.01	SM4500NO3	JC	01/13/17


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 17-A000121 to 17-A000135

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
17-A000121	Fecal Coliform	CFU/100 ml	10.	10.	0.00
17-A000135	Fecal Coliform	CFU/100 ml	2.	4.	67.
17-A000124	Total Nitrogen (TKN)	mg/l	0.507	0.553	8.7
17-A000134	Total Nitrogen (TKN)	mg/l	0.138	0.134	2.9
17-A000193	Total Nitrogen (TKN)	mg/l	0.294	0.310	5.3
17-A000262	Total Nitrogen (TKN)	mg/l	15.9	17.2	7.9
17-A000271	Total Nitrogen (TKN)	mg/l	0.181	0.198	9.0
17-A000281	Total Nitrogen (TKN)	mg/l	0.261	0.238	9.2
17-A000382	Total Nitrogen (TKN)	mg/l	1.00	1.10	9.5
17-A000089	Nitrate + Nitrite	mg/l	1.4	1.4	0.00
17-A000130	Nitrate + Nitrite	mg/l	0.34	0.34	0.00
17-A000191	Nitrate + Nitrite	mg/l	2.0	1.9	5.1
17-A000201	Nitrate + Nitrite	mg/l	0.69	0.72	4.3
17-A000267	Nitrate + Nitrite	mg/l	0.10	0.11	9.5
17-A000277	Nitrate + Nitrite	mg/l	0.49	0.49	0.00
17-A000293	Nitrate + Nitrite	mg/l	9.0	9.1	1.1

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
17-A000124	Total Nitrogen (TKN)	mg/l	0.507	2.69	2.00	109.15 %
17-A000134	Total Nitrogen (TKN)	mg/l	0.138	2.35	2.00	110.60 %
17-A000193	Total Nitrogen (TKN)	mg/l	0.294	2.53	2.00	111.80 %
17-A000262	Total Nitrogen (TKN)	mg/l	15.9	34.8	20.0	94.50 %
17-A000271	Total Nitrogen (TKN)	mg/l	0.181	2.10	2.00	95.95 %
17-A000281	Total Nitrogen (TKN)	mg/l	0.261	2.14	2.00	93.95 %
17-A000382	Total Nitrogen (TKN)	mg/l	1.00	2.90	2.00	95.00 %
17-A000089	Nitrate + Nitrite	mg/l	1.4	3.7	2.5	92.00 %
17-A000130	Nitrate + Nitrite	mg/l	0.34	0.80	0.50	92.00 %
17-A000191	Nitrate + Nitrite	mg/l	2.0	4.4	2.0	120.00 %
17-A000201	Nitrate + Nitrite	mg/l	0.69	1.2	0.50	102.00 %
17-A000267	Nitrate + Nitrite	mg/l	0.10	0.59	0.50	98.00 %
17-A000277	Nitrate + Nitrite	mg/l	0.49	1.0	0.50	102.00 %
17-A000293	Nitrate + Nitrite	mg/l	9.0	13.	5.0	80.00 %

QC Summary for sample numbers: 17-A000121 to 17-A000135...

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	1.00	1.07	107. %
Total Nitrogen (TKN)	mg/l	1.00	1.09	109. %
Total Nitrogen (TKN)	mg/l	1.00	1.07	107. %
Total Nitrogen (TKN)	mg/l	1.00	1.03	103. %
Total Nitrogen (TKN)	mg/l	1.00	1.01	101. %
Nitrate + Nitrite	mg/l	0.50	0.52	104. %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 01-013

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20170105 00121	1/5/17	9:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20170105 122	1/5/17	15:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20170105 123	1/5/17	15:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20170105 124	1/5/17	13:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20170105 125	1/5/17	14:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20170105 126	1/5/17	12:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20170105 127	1/5/17	12:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20170105 128	1/5/17	12:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20170105 129	1/5/17	10:25	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20170105 130	1/5/17	11:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company		Date	Time	Comments/Special Instructions
Relinquished by:		OnSite Env		1/6/17	730	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:		AmTest		1/6/17	730	
Relinquished by:		T=1.4				
Received by:						
Relinquished by:						
Received by:						



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 01-013

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
11	TOSMI-20170105 00131	1/5/17	14:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
12	TOSMO-20170105 132	1/5/17	15:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
13	TYLMI-20170105 133	1/5/17	13:20	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
14	TYLMO-20170105 134	1/5/17	13:05	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
15	QA18-20170105 135	1/5/17	12:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N

Signature	Company	Date	Time	Comments/Special Instructions
Relinquished by:		1/6/17	730	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:	AmTEST	1/6/17	730	
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

CHAIN OF CUSTODY

Turnaround Requested:

_____ 1 Day
_____ 2 Day
_____ 3 Day
 Standard

Laboratory No. **01-013**

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *										
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *				
1	COLM-201670105	9/15/17	0935	Water	7	X	X	X	X	X	X	X	X	X				
2	COUMI-201670105		1500	Water	7	X	X	X	X	X	X	X	X	X				
3	COUMO-201670105		1515	Water	7	X	X	X	X	X	X	X	X	X				
4	EVAMS-201670105		1350	Water	7	X	X	X	X	X	X	X	X	X				
5	EVALSS-201670105		1410	Water	7	X	X	X	X	X	X	X	X	X				
6	MONMN-201670105		1215	Water	7	X	X	X	X	X	X	X	X	X				
7	MONMS-201670105		1240	Water	7	X	X	X	X	X	X	X	X	X				
8	MONM-201670105		1200	Water	7	X	X	X	X	X	X	X	X	X				
9	SEIMN-201670105		1025	Water	7	X	X	X	X	X	X	X	X	X				
10	SEIMS-201670105		1130	Water	7	X	X	X	X	X	X	X	X	X				
11	TOSMI-201670105		1440	Water	7	X	X	X	X	X	X	X	X	X				
12	TOSMO-201670105		1530	Water	7	X	X	X	X	X	X	X	X	X				
13	TYLMI-201670105		1320	Water	7	X	X	X	X	X	X	X	X	X				
14	TYLMO-201670105		1305	Water	7	X	X	X	X	X	X	X	X	X				
15	QA10-20170105		1235	Water	7	X	X	X	X	X	X	X	X	X				

Relinquished by Miriam Herrera Date 1/5/17 Received by [Signature] Date 1/5/17
 Firm Herrera Time 1543 Firm [Signature] Time 1513

Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Ittner

CHAIN OF CUSTODY

Turnaround Requested:

 1 Day
 2 Day
 3 Day
 Standard

Laboratory No.

Page 1 of 1
01-013

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *										
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *					
COLM-201670105		01/05/17	0935	Water	7	X	X	X	X	X	X	X	X	X					
COUMI-201670105			1500	Water	7	X	X	X	X	X	X	X	X	X					
COUMO-201670105			1515	Water	7	X	X	X	X	X	X	X	X	X					
EVAMS-201670105			1350	Water	7	X	X	X	X	X	X	X	X	X					
EVALSS-201670105			1410	Water	7	X	X	X	X	X	X	X	X	X					
MONMN-201670105			1215	Water	7	X	X	X	X	X	X	X	X	X					
MONMS-201670105			1240	Water	7	X	X	X	X	X	X	X	X	X					
MONM-201670105			1200	Water	7	X	X	X	X	X	X	X	X	X					
SEIMN-201670105			1025	Water	7	X	X	X	X	X	X	X	X	X					
SEIMS-201670105			1130	Water	7	X	X	X	X	X	X	X	X	X					
TOSMI-201670105			1440	Water	7	X	X	X	X	X	X	X	X	X					
TOSMO-201670105			1530	Water	7	X	X	X	X	X	X	X	X	X					
TYLMI-201670105			1320	Water	7	X	X	X	X	X	X	X	X	X					
TYLMO-201670105			1305	Water	7	X	X	X	X	X	X	X	X	X					
QA10-20170105			1235	Water	7	X	X	X	X	X	X	X	X	X					

Relinquished by M. Mamm/hto Date 1/5/17 Received by [Signature] Date 1/5/17
 Firm Herrera Time 1543 Firm [Signature] Time 1513
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number: 14-05806-000
Personnel Performing Calibration: B. Blaud
Meter: YSI PRO DSS #1
Date/Time: 1/5/17 0805
Barometric Pressure Start of Day: ~~mm~~ Inches Hg: 30.6 Time: 6805
Barometric Pressure End of Day: ~~mm~~ Inches Hg: 30.6 Time: 6805

Calibration Procedures:

Rinse Multimeter Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	80	0	18.0	
Conductivity (µS/cm)	1011	1,000	18.1	
Conductivity (µS/cm)	98.4	100	18.2	
DO % Saturation	99.5	100	17.6	
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	5.4	0	17.4	
Conductivity (µS/cm)	100.0	100	17.5	
DO % Saturation	101.0	100	17.1	

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: ACE SURGENSEN / BRIANNA BLEVD

Sample Date: 1/5/17

Sample Time: 0935

PDT:

SITE ID: COLM

Base Flow or Storm Event?

Field Filtered Time: 0940

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY + COLD (21°F)

Water Quality Sampling

Sample ID: COLM-20170105

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	N
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	N
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	↓
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	↓
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	<u>NA</u>
Filter blank sample ID:	<u>NA</u>
Transfer blank sample ID:	<u>NA</u>

Visual and Olfactory Conditions:

Clarity: CLEAR
 Color: YELLOW (TANNIN)
 Odor: NONE
 Sheen: NONE
 Floatables: NONE

LABORATORY DELIVERY

Date: 1.5.17

Time: 15:43

Quality Assurance

Checked By: B Leuth Signature: [Signature]
 Date Checked: 2-7-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI-Pro Plus (15D100020)

YSI 17951

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): NA

Reference Point (description): NA

Water Quality Measurements

Temperature (°C) 0.3

Conductivity (µs/cm) 34.4

Dissolved Oxygen (mg/L) 14.3

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/BTS

Sample Date: 1/5/17

Sample Time: 1500

PDT: 70

SITE ID: COUM1

Base Flow or Storm Event?

Field Filtered Time: 1505

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: COUM-2017-0105

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: CLEAR
 Color: None
 Odor: None
 Sheen: None
 Floatables: None

LABORATORY DELIVERY

Date: 1.5.17

Time: 1543

Current Weather and Temp: SUNNY + COLD (36°F)

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI ProDSS1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.68

Reference Point (description): STAFF GAGE

Water Quality Measurements

Temperature (°C) 2.6

Conductivity (µs/cm) 277.7

Dissolved Oxygen (mg/L) 13.5

Quality Assurance

Checked By: S. Levent

Signature: [Signature]

Date Checked: 2-7-17

Time:

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/BR

Sample Date: 1/5/17

Sample Time: 1515

PDT:

SITE ID: COUMO

Base Flow or Storm Event?

Field Filtered Time: 1520

PST:

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY + CLOUD (36°F)

Water Quality Sampling

Sample ID: COUMO-20170105

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NR
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: CLEAR
 Color: NONE
 Odor:
 Sheen:
 Floatables:
↓

LABORATORY DELIVERY

Date: 1.5.17

Time: 1543

Quality Assurance

Checked By: S. Lenth

Signature:

Date Checked: 2-7-17

Time:
↓

Data Entered into Database? YES NO initials:

Date Entered: Time:
↓

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS I

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.215

Reference Point (description): STAFF GAUGE
REMOVED LEAF DEBRIS
ON GAUGE @ 1515

Water Quality Measurements

Temperature (°C) 3.1

Conductivity (µs/cm) 250.9

Dissolved Oxygen (mg/L) 13.4

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/BB

Sample Date: 1/5/17

Sample Time: 1350

PDT:

SITE ID: EVAMS

Base Flow or Storm Event?

Field Filtered Time: 1355

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: EVAMS-20170105

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: CLEAR
 Color: NONE
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: 1.5.17

Time: 1543

Current Weather and Temp: cloud + sunny, -32°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

✓ YSI Pro DSS I

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.85

Reference Point (description): STAFF GAGE

Water Quality Measurements

Temperature (°C) 2.4

Conductivity (µs/cm) 203.7

Dissolved Oxygen (mg/L) 13.5

Quality Assurance

Checked By: J. Lenth

Signature: [Signature]

Date Checked: 2-7-17

Time:

Data Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/BB

Sample Date: 1/5/17

Sample Time: 1410

PDT:

SITE ID: EVALSS

Base Flow or Storm Event?

Field Filtered Time: 1415
(Must filter within 15 minutes of collection)

PST:

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY + CLEAR (~72°F)

Water Quality Sampling

Sample ID: EVALSS-20170105

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input checked="" type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input checked="" type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input checked="" type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: CLEAR

Color: NONE

Odor: ↓

Sheen: ↓

Floatables: ↓

LABORATORY DELIVERY

Date: 1.5.17

Time: 1543

Quality Assurance

Checked By: S. Lenth

Signature: [Signature]

Date Checked: 2-7-17

Time:

Data Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro Plus

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.33

Reference Point (description): STAFF GAGE

Water Quality Measurements

Temperature (°C) 2.0

Conductivity (µs/cm) 187.7

Dissolved Oxygen (mg/L) 13.9

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/BB

Sample Date: 1/5/17

Sample Time: 1215

PDT:

SITE ID: MONMN

Base Flow or Storm Event?

Field Filtered Time: 1220

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY + CLOUD (22°F)

Water Quality Sampling

Sample ID: MONMN-20170105

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input checked="" type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input checked="" type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input checked="" type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: CLEAR

Color: NONE

Odor: ↓

Sheen: ↓

Floatables: ↓

LABORATORY DELIVERY

Date: 1.5.17

Time: 1543

Quality Assurance

Checked By: S. Leath

Signature: [Signature]

Date Checked: 2-7-17

Time:

Data Entered into Database? YES NO initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS 1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.97

Reference Point (description): STAFF GAGE

Water Quality Measurements

Temperature (°C) 21

Conductivity (µs/cm) 139.7

Dissolved Oxygen (mg/L) 13.4

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

 Field Personnel: AS/BB

 Sample Date: 1/5/17

 Sample Time: 1240

 PDT:

 SITE ID: MONMS

Base Flow or Storm Event?

 Field Filtered Time: 1245

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)


HERRERA

Project Name: Redmond Paired Watershed Study

 Current Weather and Temp: SUNNY + COLD (32°F)

Water Quality Sampling

 Sample ID: MONMS-20170105

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	Y
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

 Duplicate sample ID: QA12-20170105 (1235-sample time)

 Filter blank sample ID: NA

 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

 Clarity: CLEAR
 Color: NONE
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

 Date: 1.5.17

 Time: 1343

Quality Assurance

 Checked By: B. Leuth

 Signature: [Signature]

 Date Checked: 2-7-17

Time:

Data Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro DSS I

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

 Stream Stage (ft): NA

 Reference Point (description): MANHOLE LID FROZEN - UNABLE TO ACCESS

Water Quality Measurements

 Temperature (°C) 2.0
^{SP.} Conductivity (µs/cm) 3229

 Dissolved Oxygen (mg/L) 11.3

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/BS

Sample Date: 1/5/17

Sample Time: 1200

PDT:

SITE ID: MONM

Base Flow or Storm Event?

Field Filtered Time: 1205

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY + COLD (22°F)

Water Quality Sampling

Sample ID: MONM-20170105

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input checked="" type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input checked="" type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input checked="" type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: CLEAR

Color: NONE

Odor: ↓

Sheen: ↓

Floatables: ↓

LABORATORY DELIVERY

Date: 1-5-17

Time: 1543

Quality Assurance

Checked By: J. Leuth

Signature: [Signature]

Date Checked: 2-7-17

Time:

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

✓ YSI Pro DSS1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.55

Reference Point (description): TOP OF CULVERT TO 160 SURFACE

Water Quality Measurements

Temperature (°C) 1.3

Conductivity (µs/cm) 193.4

Dissolved Oxygen (mg/L) 14.2

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS / BB

Sample Date: 1/5/17

Sample Time: 1025

PDT:

SITE ID: SEIMN

Base Flow or Storm Event?

Field Filtered Time: 1030

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SNOW + COLD (22°F)

Water Quality Sampling

Sample ID: SEIMN-2017005

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input checked="" type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input checked="" type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input checked="" type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: VERY CLEAR
 Color: NONE
 Odor:
 Sheen:
 Floatables:

LABORATORY DELIVERY

Date: 1.5.17

Time: 1543

Quality Assurance

Checked By: S. Leuth

Signature: [Signature]

Date Checked: 2-7-17

Time:

Data Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.65

Reference Point (description): BOTTOM OF BENT ON STILLING WELL TO H₂O SURFACE

Water Quality Measurements

Temperature (°C) 1.5

Conductivity (µs/cm) 65.4

Dissolved Oxygen (mg/L) 143

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/BB
 Sample Date: 1/5/17 Sample Time: 1130 PDT:
 Base Flow or Storm Event? Field Filtered Time: 1135 PST:
 (Must filter within 15 minutes of collection)

SITE ID: SEIMS

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY + CLOUD (22°F)



Water Quality Sampling

Sample ID: SEIMS-20170105

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: CLEAR
 Color: NONE
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: 1-5-17 Time: 1543

Quality Assurance

Checked By: Z. Lenth Signature: [Signature]
 Date Checked: 2-7-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 ✓ YSI Pro DSS1 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.74
 Reference Point (description): STAFF CAGE IN FLUME

Water Quality Measurements

Temperature (°C) 10
 Conductivity (µs/cm) 98.5
 Dissolved Oxygen (mg/L) 14.0

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/BS

Sample Date: 1/5/17

Sample Time: 1440

PDT

SITE ID: TOSM1E

Base Flow or Storm Event?

Field Filtered Time: 1445

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY + COLD (32°F)

Water Quality Sampling

Sample ID: TOSM1-20170105

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	↕
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: CL-DR

Color: NO NR

Odor: ↓

Sheen: ↓

Floatables: ↓

LABORATORY DELIVERY

Date: 1.5.17

Time: 1543

Quality Assurance

Checked By: T. Lenth

Signature: [Signature]

Date Checked: 2-7-17

Time:

Data Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro D551

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.76

Reference Point (description): STAFF GAGE

Water Quality Measurements

Temperature (°C) 2.7

Conductivity (µs/cm) 285.3

Dissolved Oxygen (mg/L) 13.4

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/BB
 Sample Date: 1/5/17 Sample Time: 1530 PDT
 Base Flow or Storm Event? Field Filtered Time: 1535 PST
 (Must filter within 15 minutes of collection)

SITE ID: TOBMO
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: SUNNY + CLOUD (36°F)

Water Quality Sampling

Sample ID: TOBMO-20170105

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: CLEAR
 Color: NONE
 Odor:
 Sheen:
 Floatables:

LABORATORY DELIVERY

Date: 1.5.17 Time: 1543

Quality Assurance

Checked By: J. Lenth Signature: [Signature]
 Date Checked: 2-7-17 Time:
 Data Entered into Database? YES NO initials:
 Date Entered: Time:
 Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI ProDSS1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 0.55
 Reference Point (description): STAFF GAGE

Water Quality Measurements

Temperature (°C) 2.3
 Conductivity (µs/cm) 250.7
 Dissolved Oxygen (mg/L) 13.9

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/BB

Sample Date: 1/5/17

Sample Time: 1320

PDT:

SITE ID: TYLMI

Base Flow or Storm Event?

Field Filtered Time: 1325

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY + CALD (32°F)

Water Quality Sampling

Sample ID: TYLMI-20170105

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>Y</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear

Color: none

Odor: ↓

Sheen: ↓

Floatables: ↓

LABORATORY DELIVERY

Date: 1-5-17

Time: 1343

Quality Assurance

Checked By: S. Leach Signature: [Signature]

Date Checked: 2-7-17 Time:

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI DSS 1

YSI DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.58

Reference Point (description): top of weir vert ↓

Water Quality Measurements

Temperature (°C) 3.1

Conductivity (µs/cm) 193.8

Dissolved Oxygen (mg/L) 13.0

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/BB

Sample Date: 1/5/17

Sample Time: 1305

PDT:

SITE ID: TYLMO

Base Flow or Storm Event?

Field Filtered Time: 1310

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: TYLMO-20170105

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: CLEAR
 Color: NONE
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: 1.5.17

Time: 1543

Quality Assurance

Checked By: S. Lenth

Signature: [Signature]

Date Checked: 2-7-17

Time: [Blank]

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.89

Reference Point (description): TOP OF CURB TO H₂O SURFACE

Water Quality Measurements

Temperature (°C) 0.1

Conductivity (µs/cm) 185

Dissolved Oxygen (mg/L) 14.5



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 3/21/2017 Page 1 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 1/05/2017 / All sites, 1 FD (QA18) at MONMS

date 3/22/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	5	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	110	±20	15	≤25	D=1.2	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	1	≤25	25	≤25	OK	NONE
Hardness	OK / SM 2340B	NA	NA	4	≤180	≤1.0 mg/L 1.0 mg/L	104,100	±25	100	±15	4	≤20	6.4	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	11	≤28	≤1.0 mg/L 1.0 mg/L	101	±25	104	±15	0	≤20	2.1	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	8	≤28	≤0.01 mg/L 0.01 mg/L	107	±25	100	±20	NC	≤20	0	≤20	OK	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	8-19	≤28	≤0.1 mg/L 0.1 mg/L	92-111	±25	100-109	±20	0-8.7	≤20	62	≤20	OK	"J" MONMS DUE TO FIELD DUP RPD

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 3/21/2017 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 1/05/2017 / All sites, 1 FD (QA18) at MONMS

date 3/22/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	4	≤180	≤1.0 µg/L 1.0 µg/L	105,106	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	4	≤180	≤5.0 µg/L 5.0 µg/L	109,112	±25	NR	±15	2	≤20	NC	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	1	≤180	≤1.0 µg/L 1.0 µg/L	100,105	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	1	≤180	≤5.0 µg/L 5.0 µg/L	111,117	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	0, D=2	≤35	D=2	≤1	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

January 23, 2017

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1701-030

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on January 8, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular flourish.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: January 23, 2017
Samples Submitted: January 8, 2017
Laboratory Reference: 1701-030
Project: 14-05806-000

Case Narrative

Samples were collected on January 8, 2017 and received by the laboratory on January 8, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: January 23, 2017
 Samples Submitted: January 8, 2017
 Laboratory Reference: 1701-030
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170108					
Laboratory ID:	01-030-01					
Total Suspended Solids	1.2	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	COUMI-20170108					
Laboratory ID:	01-030-02					
Total Suspended Solids	4.4	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	COUMO-20170108					
Laboratory ID:	01-030-03					
Total Suspended Solids	3.2	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	EVAMS-20170108					
Laboratory ID:	01-030-04					
Total Suspended Solids	19	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	EVALSS-20170108					
Laboratory ID:	01-030-05					
Total Suspended Solids	8.4	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	MONMN-20170108					
Laboratory ID:	01-030-06					
Total Suspended Solids	3.6	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	MONMS-20170108					
Laboratory ID:	01-030-07					
Total Suspended Solids	5.4	1.0	SM 2540D	1-9-17	1-10-17	



Date of Report: January 23, 2017
 Samples Submitted: January 8, 2017
 Laboratory Reference: 1701-030
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170108					
Laboratory ID:	01-030-08					
Total Suspended Solids	10	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	SEIMN-20170108					
Laboratory ID:	01-030-09					
Total Suspended Solids	12	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	SEIMS-20170108					
Laboratory ID:	01-030-10					
Total Suspended Solids	27	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	TOSMI-20170108					
Laboratory ID:	01-030-11					
Total Suspended Solids	7.8	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	TOSMO-20170108					
Laboratory ID:	01-030-12					
Total Suspended Solids	6.2	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	TYLMI-20170108					
Laboratory ID:	01-030-13					
Total Suspended Solids	2.4	1.0	SM 2540D	1-9-17	1-10-17	

Client ID:	TYLMO-20170108					
Laboratory ID:	01-030-14					
Total Suspended Solids	13	1.0	SM 2540D	1-9-17	1-10-17	



Date of Report: January 23, 2017
Samples Submitted: January 8, 2017
Laboratory Reference: 1701-030
Project: 14-05806-000

TOTAL SUSPENDED SOLIDS
SM 2540D

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA19-20170108					
Laboratory ID:	01-030-15					
Total Suspended Solids	11	1.0	SM 2540D	1-9-17	1-10-17	



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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0109W3					
Total Suspended Solids	ND	1.0	SM 2540D	1-9-17	1-10-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	01-030-13							
	ORIG	DUP						
Total Suspended Solids	2.40	2.60	NA	NA	NA	8	20	

SPIKE BLANK								
Laboratory ID:	SB0109W3							
	SB	SB		SB				
Total Suspended Solids	107	100	NA	107	78-113	NA	NA	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170108					
Laboratory ID:	01-030-01					
Turbidity	0.90	0.10	EPA 180.1	1-9-17	1-9-17	

Client ID:	COUMI-20170108					
Laboratory ID:	01-030-02					
Turbidity	2.1	0.10	EPA 180.1	1-9-17	1-9-17	

Client ID:	COUMO-20170108					
Laboratory ID:	01-030-03					
Turbidity	2.1	0.10	EPA 180.1	1-9-17	1-9-17	

Client ID:	EVAMS-20170108					
Laboratory ID:	01-030-04					
Turbidity	6.2	0.10	EPA 180.1	1-9-17	1-9-17	

Client ID:	EVALSS-20170108					
Laboratory ID:	01-030-05					
Turbidity	2.3	0.10	EPA 180.1	1-9-17	1-9-17	

Client ID:	MONMN-20170108					
Laboratory ID:	01-030-06					
Turbidity	3.1	0.10	EPA 180.1	1-9-17	1-9-17	

Client ID:	MONMS-20170108					
Laboratory ID:	01-030-07					
Turbidity	33	0.10	EPA 180.1	1-9-17	1-9-17	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170108					
Laboratory ID:	01-030-08					
Turbidity	8.1	0.10	EPA 180.1	1-9-17	1-9-17	

Client ID:	SEIMN-20170108					
Laboratory ID:	01-030-09					
Turbidity	4.5	0.10	EPA 180.1	1-9-17	1-9-17	

Client ID:	SEIMS-20170108					
Laboratory ID:	01-030-10					
Turbidity	5.6	0.10	EPA 180.1	1-9-17	1-9-17	

Client ID:	TOSMI-20170108					
Laboratory ID:	01-030-11					
Turbidity	4.6	0.10	EPA 180.1	1-9-17	1-9-17	

Client ID:	TOSMO-20170108					
Laboratory ID:	01-030-12					
Turbidity	2.4	0.10	EPA 180.1	1-9-17	1-9-17	

Client ID:	TYLMI-20170108					
Laboratory ID:	01-030-13					
Turbidity	2.9	0.10	EPA 180.1	1-9-17	1-9-17	

Client ID:	TYLMO-20170108					
Laboratory ID:	01-030-14					
Turbidity	7.2	0.10	EPA 180.1	1-9-17	1-9-17	



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TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA19-20170108					
Laboratory ID:	01-030-15					
Turbidity	4.0	0.10	EPA 180.1	1-9-17	1-9-17	



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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0109W1					
Turbidity	ND	0.10	EPA 180.1	1-9-17	1-9-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	01-030-01							
	ORIG	DUP						
Turbidity	0.900	0.900	NA	NA	NA	NA	0	15



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170108					
Laboratory ID:	01-030-01					
Hardness	11	1.0	200.7/SM 2340B	1-17-17	1-17-17	

Client ID:	COUMI-20170108					
Laboratory ID:	01-030-02					
Hardness	130	5.0	200.7/SM 2340B	1-17-17	1-17-17	

Client ID:	COUMO-20170108					
Laboratory ID:	01-030-03					
Hardness	110	1.0	200.7/SM 2340B	1-17-17	1-17-17	

Client ID:	EVAMS-20170108					
Laboratory ID:	01-030-04					
Hardness	90	1.0	200.7/SM 2340B	1-17-17	1-17-17	

Client ID:	EVALSS-20170108					
Laboratory ID:	01-030-05					
Hardness	75	1.0	200.7/SM 2340B	1-17-17	1-17-17	

Client ID:	MONMN-20170108					
Laboratory ID:	01-030-06					
Hardness	52	1.0	200.7/SM 2340B	1-17-17	1-17-17	

Client ID:	MONMS-20170108					
Laboratory ID:	01-030-07					
Hardness	82	1.0	200.7/SM 2340B	1-17-17	1-17-17	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170108					
Laboratory ID:	01-030-08					
Hardness	81	1.0	200.7/SM 2340B	1-17-17	1-17-17	

Client ID:	SEIMN-20170108					
Laboratory ID:	01-030-09					
Hardness	24	1.0	200.7/SM 2340B	1-17-17	1-17-17	

Client ID:	SEIMS-20170108					
Laboratory ID:	01-030-10					
Hardness	43	1.0	200.7/SM 2340B	1-17-17	1-17-17	

Client ID:	TOSMI-20170108					
Laboratory ID:	01-030-11					
Hardness	88	1.0	200.7/SM 2340B	1-17-17	1-17-17	

Client ID:	TOSMO-20170108					
Laboratory ID:	01-030-12					
Hardness	94	1.0	200.7/SM 2340B	1-17-17	1-17-17	

Client ID:	TYLMI-20170108					
Laboratory ID:	01-030-13					
Hardness	85	1.0	200.7/SM 2340B	1-17-17	1-17-17	

Client ID:	TYLMO-20170108					
Laboratory ID:	01-030-14					
Hardness	78	1.0	200.7/SM 2340B	1-17-17	1-17-17	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA19-20170108					
Laboratory ID:	01-030-15					
Hardness	77	1.0	200.7/SM 2340B	1-17-17	1-17-17	



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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0117WH1					
Hardness	ND	1.0	200.7/SM 2340B	1-17-17	1-17-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	01-030-01							
	ORIG	DUP						
Hardness	10.7	10.2	NA	NA	NA	5	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	01-030-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	143	138	132	132	10.7	100	96	75-125	4	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK								
Laboratory ID:	SB0117WH1							
	SB	SB			SB			
Hardness	130	132	NA	98	80-120	NA	NA	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170108					
Laboratory ID:	01-030-01					
Dissolved Organic Carbon	11	1.0	SM 5310B	1-16-17	1-16-17	

Client ID:	COUMI-20170108					
Laboratory ID:	01-030-02					
Dissolved Organic Carbon	3.5	1.0	SM 5310B	1-16-17	1-16-17	

Client ID:	COUMO-20170108					
Laboratory ID:	01-030-03					
Dissolved Organic Carbon	2.8	1.0	SM 5310B	1-16-17	1-16-17	

Client ID:	EVAMS-20170108					
Laboratory ID:	01-030-04					
Dissolved Organic Carbon	3.5	1.0	SM 5310B	1-16-17	1-16-17	

Client ID:	EVALSS-20170108					
Laboratory ID:	01-030-05					
Dissolved Organic Carbon	2.9	1.0	SM 5310B	1-16-17	1-16-17	

Client ID:	MONMN-20170108					
Laboratory ID:	01-030-06					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	1-16-17	1-16-17	

Client ID:	MONMS-20170108					
Laboratory ID:	01-030-07					
Dissolved Organic Carbon	6.0	1.0	SM 5310B	1-16-17	1-16-17	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170108					
Laboratory ID:	01-030-08					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	SEIMN-20170108					
Laboratory ID:	01-030-09					
Dissolved Organic Carbon	5.0	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	SEIMS-20170108					
Laboratory ID:	01-030-10					
Dissolved Organic Carbon	4.0	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	TOSMI-20170108					
Laboratory ID:	01-030-11					
Dissolved Organic Carbon	2.7	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	TOSMO-20170108					
Laboratory ID:	01-030-12					
Dissolved Organic Carbon	2.4	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	TYLMI-20170108					
Laboratory ID:	01-030-13					
Dissolved Organic Carbon	4.1	1.0	SM 5310B	1-16-17	1-16-17	
Client ID:	TYLMO-20170108					
Laboratory ID:	01-030-14					
Dissolved Organic Carbon	4.2	1.0	SM 5310B	1-16-17	1-16-17	



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**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA19-20170108					
Laboratory ID:	01-030-15					
Dissolved Organic Carbon	3.1	1.0	SM 5310B	1-16-17	1-16-17	



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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0116D2					
Dissolved Organic Carbon	ND	1.0	SM 5310B	1-16-17	1-16-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	01-030-01							
	ORIG	DUP						
Dissolved Organic Carbon	11.2	11.3	NA	NA	NA	1	20	

MATRIX SPIKE

Laboratory ID:	01-030-01							
	MS	MS		MS				
Dissolved Organic Carbon	21.2	10.0	11.2	100	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0116D2							
	SB	SB		SB				
Dissolved Organic Carbon	10.2	10.0	NA	102	75-125	NA	NA	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170108					
Laboratory ID:	01-030-01					
Total Phosphorus	ND	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	COUMI-20170108					
Laboratory ID:	01-030-02					
Total Phosphorus	0.062	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	COUMO-20170108					
Laboratory ID:	01-030-03					
Total Phosphorus	0.032	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	EVAMS-20170108					
Laboratory ID:	01-030-04					
Total Phosphorus	0.017	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	EVALSS-20170108					
Laboratory ID:	01-030-05					
Total Phosphorus	0.016	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	MONMN-20170108					
Laboratory ID:	01-030-06					
Total Phosphorus	0.027	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	MONMS-20170108					
Laboratory ID:	01-030-07					
Total Phosphorus	0.060	0.010	EPA 365.1	1-12-17	1-13-17	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170108					
Laboratory ID:	01-030-08					
Total Phosphorus	0.042	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	SEIMN-20170108					
Laboratory ID:	01-030-09					
Total Phosphorus	0.036	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	SEIMS-20170108					
Laboratory ID:	01-030-10					
Total Phosphorus	0.052	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	TOSMI-20170108					
Laboratory ID:	01-030-11					
Total Phosphorus	0.036	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	TOSMO-20170108					
Laboratory ID:	01-030-12					
Total Phosphorus	0.044	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	TYLMI-20170108					
Laboratory ID:	01-030-13					
Total Phosphorus	0.014	0.010	EPA 365.1	1-12-17	1-13-17	

Client ID:	TYLMO-20170108					
Laboratory ID:	01-030-14					
Total Phosphorus	0.029	0.010	EPA 365.1	1-12-17	1-13-17	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA19-20170108					
Laboratory ID:	01-030-15					
Total Phosphorus	0.014	0.010	EPA 365.1	1-12-17	1-13-17	



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**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0112W2					
Total Phosphorus	ND	0.010	EPA 365.1	1-12-17	1-13-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	01-030-01							
	ORIG	DUP						
Total Phosphorus	ND	ND	NA	NA	NA	NA	11	

MATRIX SPIKE								
Laboratory ID:	01-030-01							
	MS	MS		MS				
Total Phosphorus	0.267	0.250	ND	107	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0112W2							
	SB	SB		SB				
Total Phosphorus	0.240	0.250	NA	96	86-111	NA	NA	



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**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 01-030-01						
Client ID: COLM-20170108						
Copper	ND	1.0	200.8	1-17-17	1-18-17	
Zinc	ND	5.0	200.8	1-17-17	1-18-17	
Lab ID: 01-030-02						
Client ID: COUMI-20170108						
Copper	ND	1.0	200.8	1-17-17	1-18-17	
Zinc	7.2	5.0	200.8	1-17-17	1-18-17	
Lab ID: 01-030-03						
Client ID: COUMO-20170108						
Copper	ND	1.0	200.8	1-17-17	1-18-17	
Zinc	6.1	5.0	200.8	1-17-17	1-18-17	
Lab ID: 01-030-04						
Client ID: EVAMS-20170108						
Copper	ND	1.0	200.8	1-17-17	1-18-17	
Zinc	ND	5.0	200.8	1-17-17	1-18-17	
Lab ID: 01-030-05						
Client ID: EVALSS-20170108						
Copper	ND	1.0	200.8	1-17-17	1-18-17	
Zinc	ND	5.0	200.8	1-17-17	1-18-17	
Lab ID: 01-030-06						
Client ID: MONMN-20170108						
Copper	ND	1.0	200.8	1-17-17	1-18-17	
Zinc	ND	5.0	200.8	1-17-17	1-18-17	



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**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	01-030-07					
Client ID:	MONMS-20170108					
Copper	3.2	1.0	200.8	1-17-17	1-18-17	
Zinc	9.4	5.0	200.8	1-17-17	1-18-17	
Lab ID:	01-030-08					
Client ID:	MONM-20170108					
Copper	1.0	1.0	200.8	1-17-17	1-18-17	
Zinc	12	5.0	200.8	1-17-17	1-18-17	
Lab ID:	01-030-09					
Client ID:	SEIMN-20170108					
Copper	ND	1.0	200.8	1-17-17	1-18-17	
Zinc	ND	5.0	200.8	1-17-17	1-18-17	
Lab ID:	01-030-10					
Client ID:	SEIMS-20170108					
Copper	ND	1.0	200.8	1-17-17	1-18-17	
Zinc	ND	5.0	200.8	1-17-17	1-18-17	
Lab ID:	01-030-11					
Client ID:	TOSMI-20170108					
Copper	1.5	1.0	200.8	1-17-17	1-18-17	
Zinc	44	5.0	200.8	1-17-17	1-18-17	
Lab ID:	01-030-12					
Client ID:	TOSMO-20170108					
Copper	ND	1.0	200.8	1-17-17	1-18-17	
Zinc	31	5.0	200.8	1-17-17	1-18-17	



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TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	01-030-13					
Client ID:	TYLMI-20170108					
Copper	1.0	1.0	200.8	1-17-17	1-18-17	
Zinc	ND	5.0	200.8	1-17-17	1-18-17	
Lab ID:	01-030-14					
Client ID:	TYLMO-20170108					
Copper	1.4	1.0	200.8	1-17-17	1-18-17	
Zinc	7.2	5.0	200.8	1-17-17	1-18-17	
Lab ID:	01-030-15					
Client ID:	QA19-20170108					
Copper	ND	1.0	200.8	1-17-17	1-18-17	
Zinc	ND	5.0	200.8	1-17-17	1-18-17	



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**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 1-17-17
Date Analyzed: 1-18-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0117WH2

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



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**TOTAL METALS
 EPA 200.8
 DUPLICATE QUALITY CONTROL**

Date Extracted: 1-17-17

Date Analyzed: 1-18-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 01-030-15

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



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**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 1-17-17

Date Analyzed: 1-18-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 01-030-15

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	109	109	110	110	1	
Zinc	100	114	114	115	115	1	



Date of Report: January 23, 2017
 Samples Submitted: January 8, 2017
 Laboratory Reference: 1701-030
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 01-030-01						
Client ID: COLM-20170108						
Copper	ND	1.0	200.8		1-17-17	
Zinc	ND	5.0	200.8		1-17-17	
Lab ID: 01-030-02						
Client ID: COUMI-20170108						
Copper	ND	1.0	200.8		1-17-17	
Zinc	ND	5.0	200.8		1-17-17	
Lab ID: 01-030-03						
Client ID: COUMO-20170108						
Copper	ND	1.0	200.8		1-17-17	
Zinc	ND	5.0	200.8		1-17-17	
Lab ID: 01-030-04						
Client ID: EVAMS-20170108						
Copper	ND	1.0	200.8		1-17-17	
Zinc	ND	5.0	200.8		1-17-17	
Lab ID: 01-030-05						
Client ID: EVALSS-20170108						
Copper	ND	1.0	200.8		1-17-17	
Zinc	ND	5.0	200.8		1-17-17	
Lab ID: 01-030-06						
Client ID: MONMN-20170108						
Copper	ND	1.0	200.8		1-17-17	
Zinc	ND	5.0	200.8		1-17-17	



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: January 23, 2017
 Samples Submitted: January 8, 2017
 Laboratory Reference: 1701-030
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	01-030-07					
Client ID:	MONMS-20170108					
Copper	ND	1.0	200.8		1-17-17	
Zinc	ND	5.0	200.8		1-17-17	
Lab ID:	01-030-08					
Client ID:	MONM-20170108					
Copper	ND	1.0	200.8		1-17-17	
Zinc	7.2	5.0	200.8		1-17-17	
Lab ID:	01-030-09					
Client ID:	SEIMN-20170108					
Copper	ND	1.0	200.8		1-17-17	
Zinc	ND	5.0	200.8		1-17-17	
Lab ID:	01-030-10					
Client ID:	SEIMS-20170108					
Copper	ND	1.0	200.8		1-17-17	
Zinc	ND	5.0	200.8		1-17-17	
Lab ID:	01-030-11					
Client ID:	TOSMI-20170108					
Copper	ND	1.0	200.8		1-17-17	
Zinc	37	5.0	200.8		1-17-17	
Lab ID:	01-030-12					
Client ID:	TOSMO-20170108					
Copper	ND	1.0	200.8		1-17-17	
Zinc	22	5.0	200.8		1-17-17	



Date of Report: January 23, 2017
 Samples Submitted: January 8, 2017
 Laboratory Reference: 1701-030
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	01-030-13					
Client ID:	TYLMI-20170108					
Copper	ND	1.0	200.8		1-17-17	
Zinc	ND	5.0	200.8		1-17-17	

Lab ID:	01-030-14					
Client ID:	TYLMO-20170108					
Copper	ND	1.0	200.8		1-17-17	
Zinc	5.0	5.0	200.8		1-17-17	

Lab ID:	01-030-15					
Client ID:	QA19-20170108					
Copper	ND	1.0	200.8		1-17-17	
Zinc	ND	5.0	200.8		1-17-17	



Date of Report: January 23, 2017
Samples Submitted: January 8, 2017
Laboratory Reference: 1701-030
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 1-17-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0117D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: January 23, 2017
Samples Submitted: January 8, 2017
Laboratory Reference: 1701-030
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 1-17-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 01-030-15

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: January 23, 2017
 Samples Submitted: January 8, 2017
 Laboratory Reference: 1701-030
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 1-17-17

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 01-030-15

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	71.6	90	74.8	94	4	
Zinc	80.0	75.8	95	78.6	98	4	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

Jan 20 2017
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20170108	Water	17-A000188	Micro, NUT
COUMI-20170108	Water	17-A000189	Micro, NUT
COUMO-20170108	Water	17-A000190	Micro, NUT
EVAMS-20170108	Water	17-A000191	Micro, NUT
EVALSS-20170108	Water	17-A000192	Micro, NUT
MONMN-20170108	Water	17-A000193	Micro, NUT
MONMS-20170108	Water	17-A000194	Micro, NUT
MONM-20170108	Water	17-A000195	Micro, NUT
SEIMN-20170108	Water	17-A000196	Micro, NUT
SEIMS-20170108	Water	17-A000197	Micro, NUT
TOSMI-20170108	Water	17-A000198	Micro, NUT
TOSMO-20170108	Water	17-A000199	Micro, NUT
TYLMI-20170108	Water	17-A000200	Micro, NUT
TYLMO-20170108	Water	17-A000201	Micro, NUT
QA-20170108	Water	17-A000202	Micro, NUT

Your samples were received on Monday, January 9, 2017. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
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Services**

Jan 20 2017
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to conact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 01-030

BACT = Bacteriological
CONV = Conventionals

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
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Professional
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Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
PO Number: 01-030
All results reported on an as received basis.

Date Received: 01/09/17
Date Reported: 1/20/17

AMTEST Identification Number 17-A000188
Client Identification COLM-20170108
Sampling Date 01/08/17, 15:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	330	CFU/100 ml		1	SM 9222D	JM	01/09/17
Total Nitrogen (NOX&TKN)	0.39	mg/l		0.1			
Total Nitrogen (TKN)	0.299	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.091	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number **17-A000189**
Client Identification **COUMI-20170108**
Sampling Date **01/08/17, 12:40**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	52.	CFU/100 ml		1	SM 9222D	JM	01/09/17
Total Nitrogen (NOX&TKN)	0.58	mg/l		0.1			
Total Nitrogen (TKN)	0.222	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.36	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number **17-A000190**
Client Identification **COUMO-20170108**
Sampling Date **01/08/17, 12:20**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	16.	CFU/100 ml		1	SM 9222D	JM	01/09/17
Total Nitrogen (NOX&TKN)	0.51	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.51	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000191
Client Identification EVAMS-20170108
Sampling Date 01/08/17, 13:35

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	22.	CFU/100 ml		1	SM 9222D	JM	01/09/17
Total Nitrogen (NOX&TKN)	2.37	mg/l		0.1			
Total Nitrogen (TKN)	0.370	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	2.0	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000192
Client Identification EVALSS-20170108
Sampling Date 01/08/17, 14:05

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	190	CFU/100 ml		1	SM 9222D	JM	01/09/17
Total Nitrogen (NOX&TKN)	1.64	mg/l		0.1			
Total Nitrogen (TKN)	0.143	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	1.5	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000193
Client Identification MONMN-20170108
Sampling Date 01/08/17, 13:55

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	170	CFU/100 ml		1	SM 9222D	JM	01/09/17
Total Nitrogen (NOX&TKN)	0.57	mg/l		0.1			
Total Nitrogen (TKN)	0.294	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.28	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000194
Client Identification MONMS-20170108
Sampling Date 01/08/17, 14:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	46.	CFU/100 ml		1	SM 9222D	JM	01/09/17
Total Nitrogen (NOX&TKN)	1.12	mg/l		0.1			
Total Nitrogen (TKN)	0.416	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.70	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000195
Client Identification MONM-20170108
Sampling Date 01/08/17, 14:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	20.	CFU/100 ml		1	SM 9222D	JM	01/09/17
Total Nitrogen (NOX&TKN)	0.71	mg/l		0.1			
Total Nitrogen (TKN)	0.212	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.50	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000196
Client Identification SEIMN-20170108
Sampling Date 01/08/17, 15:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	210	CFU/100 ml		1	SM 9222D	JM	01/09/17
Total Nitrogen (NOX&TKN)	0.62	mg/l		0.1			
Total Nitrogen (TKN)	0.228	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.39	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000197
Client Identification SEIMS-20170108
Sampling Date 01/08/17, 15:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	20.	CFU/100 ml		1	SM 9222D	JM	01/09/17
Total Nitrogen (NOX&TKN)	0.81	mg/l		0.1			
Total Nitrogen (TKN)	0.504	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.31	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000198
Client Identification TOSMI-20170108
Sampling Date 01/08/17, 12:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	110	CFU/100 ml		1	SM 9222D	JM	01/09/17
Total Nitrogen (NOX&TKN)	0.52	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.52	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000199
Client Identification TOSMO-20170108
Sampling Date 01/08/17, 13:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	50.	CFU/100 ml		1	SM 9222D	JM	01/09/17
Total Nitrogen (NOX&TKN)	0.47	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.47	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000200
Client Identification TYLMI-20170108
Sampling Date 01/08/17, 13:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2.	CFU/100 ml		1	SM 9222D	JM	01/09/17
Total Nitrogen (NOX&TKN)	0.93	mg/l		0.1			
Total Nitrogen (TKN)	0.132	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.80	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000201
Client Identification TYLMO-20170108
Sampling Date 01/08/17, 13:05

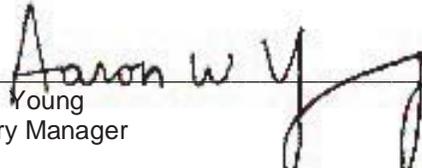
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	160	CFU/100 ml		1	SM 9222D	JM	01/09/17
Total Nitrogen (NOX&TKN)	0.84	mg/l		0.1			
Total Nitrogen (TKN)	0.152	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	0.69	mg/l		0.01	SM4500NO3	JC	01/13/17

AMTEST Identification Number 17-A000202
Client Identification QA-20170108
Sampling Date 01/08/17, 14:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	210	CFU/100 ml		1	SM 9222D	JM	01/09/17
Total Nitrogen (NOX&TKN)	1.65	mg/l		0.1			
Total Nitrogen (TKN)	0.250	mg/l		0.1	SM4500N	JC	01/17/17
Nitrate + Nitrite	1.4	mg/l		0.01	SM4500NO3	JC	01/13/17


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 17-A000188 to 17-A000202

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
17-A000192	Fecal Coliform	CFU/100 ml	190	170	11.
17-A000197	Fecal Coliform	CFU/100 ml	20.	20.	0.00
17-A000124	Total Nitrogen (TKN)	mg/l	0.507	0.553	8.7
17-A000134	Total Nitrogen (TKN)	mg/l	0.138	0.134	2.9
17-A000193	Total Nitrogen (TKN)	mg/l	0.294	0.310	5.3
17-A000262	Total Nitrogen (TKN)	mg/l	15.9	17.2	7.9
17-A000089	Nitrate + Nitrite	mg/l	1.4	1.4	0.00
17-A000130	Nitrate + Nitrite	mg/l	0.34	0.34	0.00
17-A000191	Nitrate + Nitrite	mg/l	2.0	1.9	5.1
17-A000201	Nitrate + Nitrite	mg/l	0.69	0.72	4.3
17-A000267	Nitrate + Nitrite	mg/l	0.10	0.11	9.5
17-A000277	Nitrate + Nitrite	mg/l	0.49	0.49	0.00
17-A000293	Nitrate + Nitrite	mg/l	9.0	9.1	1.1

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
17-A000124	Total Nitrogen (TKN)	mg/l	0.507	2.69	2.00	109.15 %
17-A000134	Total Nitrogen (TKN)	mg/l	0.138	2.35	2.00	110.60 %
17-A000193	Total Nitrogen (TKN)	mg/l	0.294	2.53	2.00	111.80 %
17-A000262	Total Nitrogen (TKN)	mg/l	15.9	34.8	20.0	94.50 %
17-A000089	Nitrate + Nitrite	mg/l	1.4	3.7	2.5	92.00 %
17-A000130	Nitrate + Nitrite	mg/l	0.34	0.80	0.50	92.00 %
17-A000191	Nitrate + Nitrite	mg/l	2.0	4.4	2.0	120.00 %
17-A000201	Nitrate + Nitrite	mg/l	0.69	1.2	0.50	102.00 %
17-A000267	Nitrate + Nitrite	mg/l	0.10	0.59	0.50	98.00 %
17-A000277	Nitrate + Nitrite	mg/l	0.49	1.0	0.50	102.00 %
17-A000293	Nitrate + Nitrite	mg/l	9.0	13.	5.0	80.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	1.00	1.07	107. %
Total Nitrogen (TKN)	mg/l	1.00	1.09	109. %
Total Nitrogen (TKN)	mg/l	1.00	1.07	107. %
Nitrate + Nitrite	mg/l	0.50	0.52	104. %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %

QC Summary for sample numbers: 17-A000188 to 17-A000202...

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 01-030

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20170108 00188	1/8/17	15:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20170108 89	1/8/17	12:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20170108 90	1/8/17	12:20	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20170108 91	1/8/17	13:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20170108 92	1/8/17	14:05	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20170108 93	1/8/17	13:55	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20170108 94	1/8/17	14:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20170108 95	1/8/17	14:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20170108 96	1/8/17	15:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20170108 97	1/8/17	15:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company	Date	Time	Comments/Special Instructions	
Relinquished by:		OnSite EA	1/8/17	825	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L	
Received by:		AmTest	1/8/17	825		
Relinquished by:		T=2.0				
Received by:						
Relinquished by:						
Received by:						



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3381

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 01-030

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
11	TOSMI-20170108 <i>00198</i>	1/8/17	12:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
12	TOSMO-20170108 <i>99</i>	1/8/17	13:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
13	TYLMI-20170108 <i>00200</i>	1/8/17	13:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
14	TYLMO-20170108 <i>01</i>	1/8/17	13:05	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
15	QA19-20170108 <i>02</i>	1/8/17	14:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N

Signature	Company	Date	Time	Comments/Special Instructions
<i>[Signature]</i>	<i>OnSite Env</i>	1/8/17	825	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Relinquished by:	<i>Amtest</i>	1/8/17	825	
Received by:	<i>T=2.0</i>			
Relinquished by:				
Received by:				



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iltner

CHAIN OF CUSTODY

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No.

01-030

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
-----------------------------------	-----------------------	---------------------------------	-------------------------------------	---------------------------	------------------------------	------------------------------	-----------------------------	-----------------------------------

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2016 70108	1-8-17	1550	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 70108		1240	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 70108		1220	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 70108		1835	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 70108		1405	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2016 70108		1255	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 70108		1415	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 70108		1445	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 70108		1530	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 70108		1508	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 70108		1230	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 70108		1300	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 70108		1330	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 70108		1305	Water	7	X	X	X	X	X	X	X	X	X
15	QA 19-20140108		1415	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by Miaunuk Date 1-8-17 Received by [Signature] Date 1/8/17
 Firm Herrera Time 1030 Firm OnSite Env Time 1030
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:

* - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants
 Project No.: 14-05806-000
 Project Name: Redmond Paired Watershed Study
 Project Manager: George Ittner

CHAIN OF CUSTODY

Turnaround Requested:

1 Day

2 Day

3 Day

Standard

Laboratory No. 01-030

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
-----------------------------------	-----------------------	---------------------------------	-------------------------------------	--------------------------	------------------------------	------------------------------	-----------------------------	-----------------------------------

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2016 70108	1-8-17	1550	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 70108		1240	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 70108		1220	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 70108		1825	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 70108		1405	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2016 70108		1255	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 70108		1415	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 70108		1445	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 70108		1520	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 70108		1508	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 70108		1230	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 70108		1300	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 70108		1330	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 70108		1305	Water	7	X	X	X	X	X	X	X	X	X
15	QA 19-20170108		1415	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by Miamun... Date 1-8-17 Received by [Signature] Date 1/8/17

Firm Herrera Time 1030 Firm OnSite Env Time 1030

Relinquished by _____ Date _____ Received by _____ Date _____

Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000
Personnel Performing Calibration:	B. Bland
Meter:	YSI Pro DSS #1
Date/Time:	1/8/2017 @ 10:55
Barometric Pressure Start of Day:	Inches Hg: 30.3 34.3 Time: 10:55
Barometric Pressure End of Day:	Inches Hg: 34.3 Time: 17:10

Calibration Procedures:

Rinse Multimeter Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	8.5	0	17.4	
Conductivity (µS/cm)	975	1,000	17.3	Recalibrated b/c way off on 100 µS/cm
Conductivity (µS/cm)	120.3	100	17.3	Re-measured @ 101.5 @ 17.7
DO % Saturation	99.6	100	17.4	
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	6.1	0	16.4	
Conductivity (µS/cm)	98.1	410.7 100	16.9	
DO % Saturation	101	21.8 100	16.0	

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	B. Bland		
Meter:	YSI ProDSS #2		
Date/Time:	1-8-2017 @ 10:55		
Barometric Pressure Start of Day:	Inches Hg: 750.2	Time:	10:55
Barometric Pressure End of Day:	Inches Hg: 745.3	Time:	17:10

Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	9.6	0	17.5	
Conductivity (µS/cm)	97.6	1,000	17.4	101.6 @ 17.6 redone
Conductivity (µS/cm)	119.6	100	17.3	Really high - recalibrated w/ 1000 µS/cm
DO % Saturation	96.7	100		Won't let me calibrate on value to 100%.
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	6.3	0	17.0	
Conductivity (µS/cm)	96.7	100	17.5	
DO % Saturation	97.8	100	16.8	

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
 2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
 3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
 4. Make sure there are no bubbles in the cell; wait 2 minutes.
 5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
 6. Check conductivity using 100 µS/cm standard.
- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 1-8-17 Sample Time: 15:50 PDT:
 Base Flow or Storm Event? STORM Field Filtered Time: 15:55 PST:
(Must filter within 15 minutes of collection)

SITE ID: COLM

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: RAINY @ 37°F

Water Quality Sampling

Sample ID: COLM-20170108

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: light bro clear
 Color: light brown, tanins
 Odor: none
 Sheen: -
 Floatables: -

LABORATORY DELIVERY

Date: 1-8-17 Time: 1630
Delivered to Blair's house. We will take to on-site Monday morning

Quality Assurance

Checked By: 3. Cortez Signature: [Signature]
 Date Checked: _____ Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI DSS 1 _____
 YSI DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): NA
 Reference Point (description): NA

Water Quality Measurements

Temperature (°C) 1.1
 Conductivity (µs/cm) 339
 Dissolved Oxygen (mg/L) 12.83

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: MB
 Sample Date: 1.8.17 Sample Time: 12:40 PDT:
 Base Flow or Storm Event? STORM Field Filtered Time: 12:45 PST:
(Must filter within 15 minutes of collection)

SITE ID: COUM1
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: Dizzle 43°F

Water Quality Sampling

Sample ID: COUM1 - 20170108

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: 1.8.2017 Time: 11030
Delivered to Blair's house

Quality Assurance

Checked By: J. Lamb Signature: [Signature]
 Date Checked: _____ Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI DSS 1 _____
 YSI DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.108
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 4.5
 Conductivity (µs/cm) 237.7
 Dissolved Oxygen (mg/L) 12.43

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 1-8-17 Sample Time: 12:20 PDT
 Base Flow or Storm Event? storm Field Filtered Time: 12:25 PST:
(Must filter within 15 minutes of collection)

SITE ID: COUMO

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Drizzle @ 43°F

Water Quality Sampling

Sample ID: COUMO-20170108

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: 1-8-2017 Time: 11:30
delivered to Blair's house

Quality Assurance

Checked By: T. Luntz Signature: [Signature]
 Date Checked: _____ Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI DSS 1 _____
 YSI DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.21
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 4.9
 Conductivity (µs/cm) 253.10
 Dissolved Oxygen (mg/L) ~~9.72~~ 12.33

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: VW
 Sample Date: 1/8/17 Sample Time: 15:35
 Base Flow or Storm Event: Storm Event Field Filtered Time: 15:35
(Must filter within 15 minutes of collection)

SITE ID: EVAMS
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: EVAMS 20170108

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:
 Clarity: clear
 Color: none
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: 1.8.2017 Time: 1630
delivered to BRAW'S house

Quality Assurance

Checked By: Z. Lenth Signature: [Signature]
 Date Checked: _____ Time: _____
 Data Entered into Database? YES / NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 44°F cloudy / windy

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
Ysi Pro DSS #1 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.84 3.84?
 Reference Point (description): Stage gage

Water Quality Measurements

Temperature (°C) 10.2 4.2
 Conductivity (µs/cm) 200.4
 Dissolved Oxygen (mg/L) 12.53

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: VW

Sample Date: 1/17

Base Flow or Storm Event? Storm

Sample Time: 14:05 / 14:15

Field Filtered Time: 14:05 / 14:15
(Must filter within 15 minutes of collection)

SITE ID: EVALSS

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study



HERRERA

Current Weather and Temp: 44° + light rain.

Water Quality Sampling

Sample ID: EVALSS-20170108

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<u>yes #19</u>
T. Phosphorus	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: ~~QA19~~ QA19 20170108

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear
 Color: no
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: 1.9.2017

Time: 1030

delivered to Blair's house

Quality Assurance

Checked By: Z Lenth

Signature: [Signature]

Date Checked: _____ Time: _____

Data Entered into Database? YES / NO initials: _____

Date Entered: _____ Time: _____

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS #1 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): (0.34) 2.34

Reference Point (description): stage gage

Water Quality Measurements

Temperature (°C) 4.2

Conductivity (µs/cm) 12.79 181.1

Dissolved Oxygen (mg/L) 101.1 12.79

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 1-8-17 Sample Time: 1355 PDT:
 Base Flow or Storm Event? STORM Field Filtered Time: 1400 PST:
(Must filter within 15 minutes of collection)

SITE ID: MONMN
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Raining 34°F

Water Quality Sampling

Sample ID: MONMN-20170108

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: 1-8-2017 Time: 1030
delivered to Blair's house

Quality Assurance

Checked By: S. Leuter Signature: [Signature]
 Date Checked: _____ Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI DSS 1 _____
 YSI DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 9.09
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 3.0
 Conductivity (µs/cm) 138.7
 Dissolved Oxygen (mg/L) 12.38

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 1-8-17 Sample Time: 1415 PDT:
 Base Flow or Storm Event? Storm Field Filtered Time: 1420 PST:
(Must filter within 15 minutes of collection)

SITE ID: MONMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Painting @ 39°F

Water Quality Sampling

Sample ID: MONMS-20170108

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>↓</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: cloudy
 Color: light brown
 Odor: None
 Sheen: None
 Floatables: no organic & sediment debris
 LABORATORY DELIVERY

Date: 1-8-2017 Time: 1430
delivered to Blair's house

Quality Assurance

Checked By: P. Lenth Signature: [Signature]
 Date Checked: _____ Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI DSS 1 _____
 YSI DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 6.76
 Reference Point (description): vault

Water Quality Measurements

Temperature (°C) 3.3
 Conductivity (µs/cm) 276.4
 Dissolved Oxygen (mg/L) 11.13

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: VW
 Sample Date: 1/8/17 Sample Time: 14:45 PDT
 Base Flow or Storm Event? Field Filtered Time: 14:45 PST
(Must filter within 15 minutes of collection)

SITE ID: MONM
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 44° light rain

Water Quality Sampling

Sample ID: MONM20170108

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: turbid
 Color: grey ish brown
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: 1-8-2017 Time: 1030
Delivered to Blair's House

Quality Assurance

Checked By: S. Cuth Signature: [Signature]
 Date Checked: _____ Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI ProDSS #1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 42" ± 3.5
 Reference Point (description): from top of culvert to WS.

Water Quality Measurements

Temperature (°C) 4.0°
 Conductivity (µs/cm) 214.6
 Dissolved Oxygen (mg/L) 12.82

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: VW

Sample Date: 1/8/17

Sample Time: 15:30

POT:

SITE ID: SEIMN

Base Flow or Storm Event:

Field Filtered Time: 1530

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Water Quality Sampling

Sample ID: SEIMN20170108

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 44 + light rain

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: no
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: 1-8-2017

Time: 11:30

Delivered to Blair's house

Quality Assurance

Checked By: J. Smith

Signature: [Signature]

Date Checked:

Time:

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI PRODSS #1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 8" 0.07

Reference Point (description): from bottom of bolt to WS

Water Quality Measurements

Temperature (°C) 3.5

Conductivity (µs/cm) 67.8

Dissolved Oxygen (mg/L) 12.84

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 1.8.17 Sample Time: 1500 PDT:
 Base Flow or Storm Event? Storm Field Filtered Time: 1505 PST:
(Must filter within 15 minutes of collection)

SITE ID: SEIMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: RAIN & 39°F

Water Quality Sampling

Sample ID: SEIMS-20FD108

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: light brown
 Odor: none
 Sheen: none
 Floatables: sediment

LABORATORY DELIVERY

Date: 1.8.2017 Time: 1630
Delivered to Blair's house

Quality Assurance

Checked By: T. Lenth Signature: [Signature]
 Date Checked: _____ Time: _____
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI DSS 1 _____
 YSI DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.77
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 2.8
 Conductivity (µs/cm) 100.10
 Dissolved Oxygen (mg/L) 12.53

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: VW

Sample Date: 1/8/17

Base Flow or Storm Event? Storm Event

Sample Time: 12:30

Field Filtered Time: 12:30

(Must filter within 15 minutes of collection)

SITE ID:

TSM120170108

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 43° and cloudy



Water Quality Sampling

Sample ID: TSM120170108

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>Y</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	<u>NA</u>
Filter blank sample ID:	<u>NA</u>
Transfer blank sample ID:	<u>NA</u>

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: 1-8-2017

Time: 10:30

Delivered to Blair's house

Quality Assurance

Checked By: J. Lenth

Signature: [Signature]

Date Checked:

Time:

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS #1 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.78

Reference Point (description): stage gage

Water Quality Measurements

Temperature (°C) 5.9

Conductivity (µs/cm) 209.9

Dissolved Oxygen (mg/L) 12.02

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: VW
 Sample Date: 1/8/17 Sample Time: 13:00 PDT
 Base Flow or Storm Event Field Filtered Time: 13:00 PST
(Must filter within 15 minutes of collection)

SITE ID: TOSMO

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 44°F + drizzle

Water Quality Sampling

Sample ID: TOSMO20170108

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: ~~NA~~ NA
 Filter blank sample ID: ~~NA~~ NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: 1.8.2017 Time: 11030
Delivered to Blair's house

Quality Assurance

Checked By: J. Lenth Signature: [Signature]
 Date Checked: _____ Time: _____
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro D35 #1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 0.56
 Reference Point (description): Stage gage

Water Quality Measurements

Temperature (°C) 4.8°
 Conductivity (µs/cm) 220.1
 Dissolved Oxygen (mg/L) 1253

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: MB

Sample Date: 1-8-17

Sample Time: 1330

PDT:

SITE ID: TYLMI

Base Flow or Storm Event? Storm

Field Filtered Time: 1335

PST:

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Drizzle 34°F

Water Quality Sampling

Sample ID: TYLMI-20170808

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: 1-8-2017 Time: 11030

Delivered to Blair's house

Quality Assurance

Checked By: J. Smith Signature: [Signature]

Date Checked: _____ Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI DSS 1 _____
 YSI DSS 2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.57
 Reference Point (description): top of culvert ↓

Water Quality Measurements

Temperature (°C) 4.7
 Conductivity (µs/cm) 195.8
 Dissolved Oxygen (mg/L) 11.93

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BMO
 Sample Date: 1-8-17 Sample Time: 13:05 PDT:
 Base Flow or Storm Event? Storm Field Filtered Time: 1310 PST:
(Must filter within 15 minutes of collection)

SITE ID: TYLMO

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Dizzle 34°F

Water Quality Sampling

Sample ID: TYLMO - 2017 0108

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor:
 Sheen:
 Floatables:

LABORATORY DELIVERY

Date: 1-8-2017 Time: 1030

Delivered to Blair's house

Quality Assurance

Checked By: S. Leuth Signature: [Signature]

Date Checked: _____ Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI DSS 1 _____
 YSI DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.84

Reference Point (description): top of culvert ↓

Water Quality Measurements

Temperature (°C) 3.3

Conductivity (µs/cm) 187.2

Dissolved Oxygen (mg/L) 12.84



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 3/21/2017 Page 1 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 1/08/2017 / All sites, 1 FD (QA19) at EVALSS

date 3/22/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	2	≤7	≤1.0 mg/L	NA	NA	107	±20	8	≤25	27	≤25	OK	"J" EVALSS DUE TO FIELD DUP RPD
						1.0 mg/L							27			
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU	NA	NA	NA	±10	0	≤25	54	≤25	OK	"J" EVALSS DUE TO FIELD DUP RPD
						0.1 NTU							54			
Hardness	OK / SM 2340B	NA	NA	9	≤180	≤1.0 mg/L	100,96	±25	98	±15	5	≤20	2.6	≤20	OK	NONE
						1.0 mg/L										
DOC	OK / SM 5310B	<15	≤15	8	≤28	≤1.0 mg/L	100	±25	102	±15	1	≤20	D=0.2	≤20	OK	NONE
						1.0 mg/L										
Total Phosphorus	OK / EPA 365.1	NA	NA	5	≤28	≤0.01 mg/L	107	±25	96	±20	NC	≤20	D=0.002	≤20	OK	NONE
						0.01 mg/L										
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	5-9	≤28	≤0.1 mg/L	102-120	±25	100-109	±20	4.3-5.3	≤20	0.6	≤20	OK	NONE
						0.1 mg/L										

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 3/21/2017 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 1/08/2017 / All sites, 1 FD (QA19) at EVALSS

date 3/22/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	10	≤180	≤1.0 µg/L 1.0 µg/L	109,110	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	10	≤180	≤5.0 µg/L 5.0 µg/L	114,115	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	9	≤180	≤1.0 µg/L 1.0 µg/L	90,94	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	9	≤180	≤5.0 µg/L 5.0 µg/L	95,98	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	11,0	≤35	10	≤1	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

February 8, 2017

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1701-094

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on January 17, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular flourish.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: February 8, 2017
Samples Submitted: January 17, 2017
Laboratory Reference: 1701-094
Project: 14-05806-000

Case Narrative

Samples were collected on January 17, 2017 and received by the laboratory on January 17, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: February 8, 2017
 Samples Submitted: January 17, 2017
 Laboratory Reference: 1701-094
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170117					
Laboratory ID:	01-094-01					
Total Suspended Solids	3.2	1.0	SM 2540D	1-18-17	1-19-17	

Client ID:	COUMI-20170117					
Laboratory ID:	01-094-02					
Total Suspended Solids	4.8	1.0	SM 2540D	1-18-17	1-19-17	

Client ID:	COUMO-20170117					
Laboratory ID:	01-094-03					
Total Suspended Solids	3.2	1.0	SM 2540D	1-18-17	1-19-17	

Client ID:	EVAMS-20170117					
Laboratory ID:	01-094-04					
Total Suspended Solids	4.4	1.0	SM 2540D	1-18-17	1-19-17	

Client ID:	EVALSS-20170117					
Laboratory ID:	01-094-05					
Total Suspended Solids	6.2	1.0	SM 2540D	1-18-17	1-19-17	

Client ID:	MONMN-20170117					
Laboratory ID:	01-094-06					
Total Suspended Solids	13	1.0	SM 2540D	1-18-17	1-19-17	

Client ID:	MONMS-20170117					
Laboratory ID:	01-094-07					
Total Suspended Solids	11	1.0	SM 2540D	1-18-17	1-19-17	



Date of Report: February 8, 2017
 Samples Submitted: January 17, 2017
 Laboratory Reference: 1701-094
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170117					
Laboratory ID:	01-094-08					
Total Suspended Solids	38	1.0	SM 2540D	1-18-17	1-19-17	

Client ID:	SEIMN-20170117					
Laboratory ID:	01-094-09					
Total Suspended Solids	110	2.5	SM 2540D	1-18-17	1-19-17	

Client ID:	SEIMS-20170117					
Laboratory ID:	01-094-10					
Total Suspended Solids	53	1.7	SM 2540D	1-18-17	1-19-17	

Client ID:	TOSMI-20170117					
Laboratory ID:	01-094-11					
Total Suspended Solids	440	5.0	SM 2540D	1-18-17	1-19-17	

Client ID:	TOSMO-20170117					
Laboratory ID:	01-094-12					
Total Suspended Solids	8.2	1.0	SM 2540D	1-18-17	1-19-17	

Client ID:	TYLMI-20170117					
Laboratory ID:	01-094-13					
Total Suspended Solids	6.4	1.0	SM 2540D	1-18-17	1-19-17	

Client ID:	TYLMO-20170117					
Laboratory ID:	01-094-14					
Total Suspended Solids	30	1.0	SM 2540D	1-18-17	1-19-17	



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TOTAL SUSPENDED SOLIDS
SM 2540D

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA21-20170117					
Laboratory ID:	01-094-15					
Total Suspended Solids	44	1.0	SM 2540D	1-18-17	1-19-17	



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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0118W1					
Total Suspended Solids	ND	1.0	SM 2540D	1-18-17	1-19-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	01-094-12							
	ORIG	DUP						
Total Suspended Solids	8.20	7.20	NA	NA	NA	13	20	

SPIKE BLANK								
Laboratory ID:	SB0118W1							
	SB	SB		SB				
Total Suspended Solids	95.0	100	NA	95	78-113	NA	NA	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170117					
Laboratory ID:	01-094-01					
Turbidity	1.2	0.10	EPA 180.1	1-18-17	1-18-17	

Client ID:	COUMI-20170117					
Laboratory ID:	01-094-02					
Turbidity	2.1	0.10	EPA 180.1	1-18-17	1-18-17	

Client ID:	COUMO-20170117					
Laboratory ID:	01-094-03					
Turbidity	2.2	0.10	EPA 180.1	1-18-17	1-18-17	

Client ID:	EVAMS-20170117					
Laboratory ID:	01-094-04					
Turbidity	1.3	0.10	EPA 180.1	1-18-17	1-18-17	

Client ID:	EVALSS-20170117					
Laboratory ID:	01-094-05					
Turbidity	1.4	0.10	EPA 180.1	1-18-17	1-18-17	

Client ID:	MONMN-20170117					
Laboratory ID:	01-094-06					
Turbidity	4.2	0.10	EPA 180.1	1-18-17	1-18-17	

Client ID:	MONMS-20170117					
Laboratory ID:	01-094-07					
Turbidity	16	0.10	EPA 180.1	1-18-17	1-18-17	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170117					
Laboratory ID:	01-094-08					
Turbidity	6.3	0.10	EPA 180.1	1-18-17	1-18-17	

Client ID:	SEIMN-20170117					
Laboratory ID:	01-094-09					
Turbidity	19	0.10	EPA 180.1	1-18-17	1-18-17	

Client ID:	SEIMS-20170117					
Laboratory ID:	01-094-10					
Turbidity	5.7	0.10	EPA 180.1	1-18-17	1-18-17	

Client ID:	TOSMI-20170117					
Laboratory ID:	01-094-11					
Turbidity	63	0.20	EPA 180.1	1-18-17	1-18-17	

Client ID:	TOSMO-20170117					
Laboratory ID:	01-094-12					
Turbidity	1.7	0.10	EPA 180.1	1-18-17	1-18-17	

Client ID:	TYLMI-20170117					
Laboratory ID:	01-094-13					
Turbidity	3.6	0.10	EPA 180.1	1-18-17	1-18-17	

Client ID:	TYLMO-20170117					
Laboratory ID:	01-094-14					
Turbidity	8.7	0.10	EPA 180.1	1-18-17	1-18-17	



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TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA21-20170117					
Laboratory ID:	01-094-15					
Turbidity	8.5	0.10	EPA 180.1	1-18-17	1-18-17	



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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0118W1					
Turbidity	ND	0.10	EPA 180.1	1-18-17	1-18-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	01-094-01							
	ORIG	DUP						
Turbidity	1.18	1.19	NA	NA	NA	NA	1	15



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170117					
Laboratory ID:	01-094-01					
Hardness	11	5.0	200.7/SM 2340B	1-24-17	1-25-17	

Client ID:	COUMI-20170117					
Laboratory ID:	01-094-02					
Hardness	140	5.0	200.7/SM 2340B	1-24-17	1-25-17	

Client ID:	COUMO-20170117					
Laboratory ID:	01-094-03					
Hardness	130	5.0	200.7/SM 2340B	1-24-17	1-25-17	

Client ID:	EVAMS-20170117					
Laboratory ID:	01-094-04					
Hardness	89	5.0	200.7/SM 2340B	1-24-17	1-25-17	

Client ID:	EVALSS-20170117					
Laboratory ID:	01-094-05					
Hardness	81	5.0	200.7/SM 2340B	1-24-17	1-25-17	

Client ID:	MONMN-20170117					
Laboratory ID:	01-094-06					
Hardness	68	5.0	200.7/SM 2340B	1-24-17	1-25-17	

Client ID:	MONMS-20170117					
Laboratory ID:	01-094-07					
Hardness	93	5.0	200.7/SM 2340B	1-24-17	1-25-17	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170117					
Laboratory ID:	01-094-08					
Hardness	84	5.0	200.7/SM 2340B	1-24-17	1-25-17	

Client ID:	SEIMN-20170117					
Laboratory ID:	01-094-09					
Hardness	29	1.0	200.7/SM 2340B	1-24-17	1-25-17	

Client ID:	SEIMS-20170117					
Laboratory ID:	01-094-10					
Hardness	43	1.0	200.7/SM 2340B	1-24-17	1-25-17	

Client ID:	TOSMI-20170117					
Laboratory ID:	01-094-11					
Hardness	140	5.0	200.7/SM 2340B	1-24-17	1-25-17	

Client ID:	TOSMO-20170117					
Laboratory ID:	01-094-12					
Hardness	110	5.0	200.7/SM 2340B	1-24-17	1-25-17	

Client ID:	TYLMI-20170117					
Laboratory ID:	01-094-13					
Hardness	83	5.0	200.7/SM 2340B	1-24-17	1-25-17	

Client ID:	TYLMO-20170117					
Laboratory ID:	01-094-14					
Hardness	85	5.0	200.7/SM 2340B	1-24-17	1-25-17	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA21-20170117					
Laboratory ID:	01-094-15					
Hardness	83	5.0	200.7/SM 2340B	1-24-17	1-25-17	



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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0124WH1					
Hardness	ND	1.0	200.7/SM 2340B	1-24-17	1-25-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	01-094-01							
	ORIG	DUP						
Hardness	10.9	11.0	NA	NA	NA	1	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	01-094-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	152	140	132	132	10.9	107	98	75-125	8	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK								
Laboratory ID:	SB0124WH1							
	SB	SB	SB	SB	SB			
Hardness	145	132	NA	110	80-120	NA	NA	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170117					
Laboratory ID:	01-094-01					
Dissolved Organic Carbon	11	1.0	SM 5310B	1-24-17	1-24-17	

Client ID:	COUMI-20170117					
Laboratory ID:	01-094-02					
Dissolved Organic Carbon	3.2	1.0	SM 5310B	1-24-17	1-24-17	

Client ID:	COUMO-20170117					
Laboratory ID:	01-094-03					
Dissolved Organic Carbon	3.2	1.0	SM 5310B	1-24-17	1-24-17	

Client ID:	EVAMS-20170117					
Laboratory ID:	01-094-04					
Dissolved Organic Carbon	3.2	1.0	SM 5310B	1-24-17	1-24-17	

Client ID:	EVALSS-20170117					
Laboratory ID:	01-094-05					
Dissolved Organic Carbon	3.0	1.0	SM 5310B	1-24-17	1-24-17	

Client ID:	MONMN-20170117					
Laboratory ID:	01-094-06					
Dissolved Organic Carbon	3.7	1.0	SM 5310B	1-24-17	1-24-17	

Client ID:	MONMS-20170117					
Laboratory ID:	01-094-07					
Dissolved Organic Carbon	5.0	1.0	SM 5310B	1-24-17	1-24-17	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170117					
Laboratory ID:	01-094-08					
Dissolved Organic Carbon	4.6	1.0	SM 5310B	1-24-17	1-24-17	

Client ID:	SEIMN-20170117					
Laboratory ID:	01-094-09					
Dissolved Organic Carbon	5.3	1.0	SM 5310B	1-24-17	1-24-17	

Client ID:	SEIMS-20170117					
Laboratory ID:	01-094-10					
Dissolved Organic Carbon	3.7	1.0	SM 5310B	1-24-17	1-24-17	

Client ID:	TOSMI-20170117					
Laboratory ID:	01-094-11					
Dissolved Organic Carbon	4.8	1.0	SM 5310B	1-24-17	1-24-17	

Client ID:	TOSMO-20170117					
Laboratory ID:	01-094-12					
Dissolved Organic Carbon	2.6	1.0	SM 5310B	1-24-17	1-24-17	

Client ID:	TYLMI-20170117					
Laboratory ID:	01-094-13					
Dissolved Organic Carbon	4.6	1.0	SM 5310B	1-24-17	1-24-17	

Client ID:	TYLMO-20170117					
Laboratory ID:	01-094-14					
Dissolved Organic Carbon	4.5	1.0	SM 5310B	1-24-17	1-24-17	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA21-20170117					
Laboratory ID:	01-094-15					
Dissolved Organic Carbon	4.0	1.0	SM 5310B	1-24-17	1-24-17	

Client ID:	QA20-20170117					
Laboratory ID:	01-094-16					
Dissolved Organic Carbon	ND	1.0	SM 5310B	1-24-17	1-24-17	



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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0124D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	1-24-17	1-24-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	01-094-01							
	ORIG	DUP						
Dissolved Organic Carbon	10.5	10.6	NA	NA	NA	1	20	

MATRIX SPIKE

Laboratory ID:	01-094-01							
	MS	MS		MS				
Dissolved Organic Carbon	20.4	10.0	10.5	99	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0124D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.0	10.0	NA	100	75-125	NA	NA	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170117					
Laboratory ID:	01-094-01					
Total Phosphorus	0.011	0.010	EPA 365.1	1-23-17	1-23-17	

Client ID:	COUMI-20170117					
Laboratory ID:	01-094-02					
Total Phosphorus	0.063	0.010	EPA 365.1	1-23-17	1-23-17	

Client ID:	COUMO-20170117					
Laboratory ID:	01-094-03					
Total Phosphorus	0.030	0.010	EPA 365.1	1-23-17	1-23-17	

Client ID:	EVAMS-20170117					
Laboratory ID:	01-094-04					
Total Phosphorus	0.011	0.010	EPA 365.1	1-23-17	1-23-17	

Client ID:	EVALSS-20170117					
Laboratory ID:	01-094-05					
Total Phosphorus	0.018	0.010	EPA 365.1	1-23-17	1-23-17	

Client ID:	MONMN-20170117					
Laboratory ID:	01-094-06					
Total Phosphorus	0.053	0.010	EPA 365.1	1-23-17	1-23-17	

Client ID:	MONMS-20170117					
Laboratory ID:	01-094-07					
Total Phosphorus	0.060	0.010	EPA 365.1	1-23-17	1-23-17	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170117					
Laboratory ID:	01-094-08					
Total Phosphorus	0.070	0.010	EPA 365.1	1-23-17	1-23-17	

Client ID:	SEIMN-20170117					
Laboratory ID:	01-094-09					
Total Phosphorus	0.13	0.010	EPA 365.1	1-23-17	1-23-17	

Client ID:	SEIMS-20170117					
Laboratory ID:	01-094-10					
Total Phosphorus	0.13	0.010	EPA 365.1	1-23-17	1-23-17	

Client ID:	TOSMI-20170117					
Laboratory ID:	01-094-11					
Total Phosphorus	0.98	0.020	EPA 365.1	1-23-17	1-23-17	

Client ID:	TOSMO-20170117					
Laboratory ID:	01-094-12					
Total Phosphorus	0.036	0.010	EPA 365.1	1-23-17	1-23-17	

Client ID:	TYLMI-20170117					
Laboratory ID:	01-094-13					
Total Phosphorus	0.024	0.010	EPA 365.1	1-23-17	1-23-17	

Client ID:	TYLMO-20170117					
Laboratory ID:	01-094-14					
Total Phosphorus	0.075	0.010	EPA 365.1	1-23-17	1-23-17	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA21-20170117					
Laboratory ID:	01-094-15					
Total Phosphorus	0.081	0.010	EPA 365.1	1-23-17	1-23-17	



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**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0123W1					
Total Phosphorus	ND	0.010	EPA 365.1	1-23-17	1-23-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	01-094-01							
	ORIG	DUP						
Total Phosphorus	0.0112	0.0120	NA	NA	NA	7	11	

MATRIX SPIKE								
Laboratory ID:	01-094-01							
	MS	MS		MS				
Total Phosphorus	0.270	0.250	0.0112	104	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0123W1							
	SB	SB		SB				
Total Phosphorus	0.240	0.250	NA	96	86-111	NA	NA	



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**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 01-094-01						
Client ID: COLM-20170117						
Copper	ND	1.0	200.8	1-23-17	1-25-17	
Zinc	ND	5.0	200.8	1-23-17	1-25-17	
Lab ID: 01-094-02						
Client ID: COUMI-20170117						
Copper	ND	1.0	200.8	1-23-17	1-25-17	
Zinc	7.6	5.0	200.8	1-23-17	1-25-17	
Lab ID: 01-094-03						
Client ID: COUMO-20170117						
Copper	ND	1.0	200.8	1-23-17	1-25-17	
Zinc	6.8	5.0	200.8	1-23-17	1-25-17	
Lab ID: 01-094-04						
Client ID: EVAMS-20170117						
Copper	ND	1.0	200.8	1-23-17	1-25-17	
Zinc	ND	5.0	200.8	1-23-17	1-25-17	
Lab ID: 01-094-05						
Client ID: EVALSS-20170117						
Copper	ND	1.0	200.8	1-23-17	1-25-17	
Zinc	ND	5.0	200.8	1-23-17	1-25-17	
Lab ID: 01-094-06						
Client ID: MONMN-20170117						
Copper	ND	1.0	200.8	1-23-17	1-25-17	
Zinc	7.5	5.0	200.8	1-23-17	1-25-17	



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TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	01-094-07					
Client ID:	MONMS-20170117					
Copper	1.9	1.0	200.8	1-23-17	1-25-17	
Zinc	7.3	5.0	200.8	1-23-17	1-25-17	

Lab ID:	01-094-08					
Client ID:	MONM-20170117					
Copper	2.0	1.0	200.8	1-23-17	1-25-17	
Zinc	24	5.0	200.8	1-23-17	1-25-17	

Lab ID:	01-094-09					
Client ID:	SEIMN-20170117					
Copper	2.8	1.0	200.8	1-23-17	1-25-17	
Zinc	5.7	5.0	200.8	1-23-17	1-25-17	

Lab ID:	01-094-10					
Client ID:	SEIMS-20170117					
Copper	1.4	1.0	200.8	1-23-17	1-25-17	
Zinc	5.4	5.0	200.8	1-23-17	1-25-17	

Lab ID:	01-094-11					
Client ID:	TOSMI-20170117					
Copper	20	2.5	200.8	1-23-17	1-25-17	
Zinc	270	13.0	200.8	1-23-17	1-25-17	

Lab ID:	01-094-12					
Client ID:	TOSMO-20170117					
Copper	ND	1.0	200.8	1-23-17	1-25-17	
Zinc	21	5.0	200.8	1-23-17	1-25-17	



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**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	01-094-13					
Client ID:	TYLMI-20170117					
Copper	1.5	1.0	200.8	1-23-17	1-25-17	
Zinc	6.2	5.0	200.8	1-23-17	1-25-17	

Lab ID:	01-094-14					
Client ID:	TYLMO-20170117					
Copper	6.9	1.0	200.8	1-23-17	1-25-17	
Zinc	22	5.0	200.8	1-23-17	1-25-17	

Lab ID:	01-094-15					
Client ID:	QA21-20170117					
Copper	2.0	1.0	200.8	1-23-17	1-25-17	
Zinc	23	5.0	200.8	1-23-17	1-25-17	



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**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 1-23-17
Date Analyzed: 1-25-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0123WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: February 8, 2017
Samples Submitted: January 17, 2017
Laboratory Reference: 1701-094
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 1-23-17

Date Analyzed: 1-25-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 01-094-03

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	6.80	7.44	9	5.0	



Date of Report: January 6, 2017
 Samples Submitted: January 6, 2017
 Laboratory Reference: 1701-094
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 1-23-17

Date Analyzed: 1-25-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 01-094-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	93.8	94	90.4	90	4	
Zinc	100	108	101	108	101	0	



Date of Report: February 8, 2017
 Samples Submitted: January 17, 2017
 Laboratory Reference: 1701-094
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 01-094-01						
Client ID: COLM-20170117						
Copper	ND	1.0	200.8		1-23-17	
Zinc	ND	5.0	200.8		1-23-17	
Lab ID: 01-094-02						
Client ID: COUMI-20170117						
Copper	ND	1.0	200.8		1-23-17	
Zinc	ND	5.0	200.8		1-23-17	
Lab ID: 01-094-03						
Client ID: COUMO-20170117						
Copper	ND	1.0	200.8		1-23-17	
Zinc	ND	5.0	200.8		1-23-17	
Lab ID: 01-094-04						
Client ID: EVAMS-20170117						
Copper	ND	1.0	200.8		1-23-17	
Zinc	ND	5.0	200.8		1-23-17	
Lab ID: 01-094-05						
Client ID: EVALSS-20170117						
Copper	ND	1.0	200.8		1-23-17	
Zinc	ND	5.0	200.8		1-23-17	
Lab ID: 01-094-06						
Client ID: MONMN-20170117						
Copper	ND	1.0	200.8		1-23-17	
Zinc	ND	5.0	200.8		1-23-17	



Date of Report: February 8, 2017
 Samples Submitted: January 17, 2017
 Laboratory Reference: 1701-094
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Analyzed	Flags
Lab ID:	01-094-07				
Client ID:	MONMS-20170117				
Copper	ND	1.0	200.8	1-23-17	
Zinc	ND	5.0	200.8	1-23-17	
Lab ID:	01-094-08				
Client ID:	MONM-20170117				
Copper	ND	1.0	200.8	1-23-17	
Zinc	5.1	5.0	200.8	1-23-17	
Lab ID:	01-094-09				
Client ID:	SEIMN-20170117				
Copper	ND	1.0	200.8	1-23-17	
Zinc	ND	5.0	200.8	1-23-17	
Lab ID:	01-094-10				
Client ID:	SEIMS-20170117				
Copper	ND	1.0	200.8	1-23-17	
Zinc	ND	5.0	200.8	1-23-17	
Lab ID:	01-094-11				
Client ID:	TOSMI-20170117				
Copper	ND	1.0	200.8	1-23-17	
Zinc	33	5.0	200.8	1-23-17	
Lab ID:	01-094-12				
Client ID:	TOSMO-20170117				
Copper	ND	1.0	200.8	1-23-17	
Zinc	17	5.0	200.8	1-23-17	



Date of Report: February 8, 2017
 Samples Submitted: January 17, 2017
 Laboratory Reference: 1701-094
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 01-094-13 Client ID: TYLMI-20170117						
Copper	ND	1.0	200.8		1-23-17	
Zinc	ND	5.0	200.8		1-23-17	
Lab ID: 01-094-14 Client ID: TYLMO-20170117						
Copper	2.4	1.0	200.8		1-23-17	
Zinc	5.1	5.0	200.8		1-23-17	
Lab ID: 01-094-15 Client ID: QA21-20170117						
Copper	ND	1.0	200.8		1-23-17	
Zinc	6.4	5.0	200.8		1-23-17	
Lab ID: 01-094-16 Client ID: QA20-20170117						
Copper	6.5	1.0	200.8		1-23-17	
Zinc	ND	5.0	200.8		1-23-17	



Date of Report: February 8, 2017
Samples Submitted: January 17, 2017
Laboratory Reference: 1701-094
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 1-23-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0123D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: February 8, 2017
Samples Submitted: January 17, 2017
Laboratory Reference: 1701-094
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 1-23-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 01-094-16

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	6.46	6.74	4	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: February 8, 2017
 Samples Submitted: January 17, 2017
 Laboratory Reference: 1701-094
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 1-23-17

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 01-094-16

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	79.2	91	81.0	93	2	
Zinc	80.0	77.4	97	79.2	99	2	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

Feb 8 2017
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: BLAIR GOODROW

Dear BLAIR GOODROW:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20170117	Water	17-A000642	Micro, NUT
COUMI-20170117	Water	17-A000643	Micro, NUT
COUMO-20170117	Water	17-A000644	Micro, NUT
EVAMS-20170117	Water	17-A000645	Micro, NUT
EVALSS-20170117	Water	17-A000646	Micro, NUT
MONMN-20170117	Water	17-A000647	Micro, NUT
MONMS-20170117	Water	17-A000648	Micro, NUT
MONM-20170117	Water	17-A000649	Micro, NUT
SEIMN-20170117	Water	17-A000650	Micro, NUT
SEIMS-20170117	Water	17-A000651	Micro, NUT
TOSMI-20170117	Water	17-A000652	Micro, NUT
TOSMO-20170117	Water	17-A000653	Micro, NUT
TYLMI-20170117	Water	17-A000654	Micro, NUT
TYLMO-20170117	Water	17-A000655	Micro, NUT
QA21-20170117	Water	17-A000656	Micro, NUT

Your samples were received on Wednesday, January 18, 2017. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

Feb 8 2017
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 01-094

BACT = Bacteriological
CONV = Conventionals

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
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Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



Professional
Analytical
Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: BLAIR GOODROW
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
PO Number: 01-094
All results reported on an as received basis.

Date Received: 01/18/17
Date Reported: 2/ 8/17

AMTEST Identification Number 17-A000642
Client Identification COLM-20170117
Sampling Date 01/17/17, 15:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	62.	CFU/100 ml		1	SM 9222D	NG	01/18/17
Total Nitrogen (NOX&TKN)	0.66	mg/l		0.1			
Total Nitrogen (TKN)	0.562	mg/l		0.1	SM4500N	JC	01/24/17
Nitrate + Nitrite	0.10	mg/l		0.01	SM4500NO3	JC	01/23/17

AMTEST Identification Number 17-A000643
Client Identification COUMI-20170117
Sampling Date 01/17/17, 07:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	58.	CFU/100 ml		1	SM 9222D	NG	01/18/17
Total Nitrogen (NOX&TKN)	0.61	mg/l		0.1			
Total Nitrogen (TKN)	0.248	mg/l		0.1	SM4500N	JC	01/24/17
Nitrate + Nitrite	0.36	mg/l		0.01	SM4500NO3	JC	01/23/17

AMTEST Identification Number 17-A000644
Client Identification COUMO-20170117
Sampling Date 01/17/17, 07:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	170	CFU/100 ml		1	SM 9222D	NG	01/18/17
Total Nitrogen (NOX&TKN)	0.97	mg/l		0.1			
Total Nitrogen (TKN)	0.443	mg/l		0.1	SM4500N	JC	01/24/17
Nitrate + Nitrite	0.53	mg/l		0.01	SM4500NO3	JC	01/23/17

AMTEST Identification Number 17-A000645
Client Identification EVAMS-20170117
Sampling Date 01/17/17, 08:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	28.	CFU/100 ml		1	SM 9222D	NG	01/18/17
Total Nitrogen (NOX&TKN)	2.43	mg/l		0.1			
Total Nitrogen (TKN)	0.531	mg/l		0.1	SM4500N	JC	01/24/17
Nitrate + Nitrite	1.9	mg/l		0.01	SM4500NO3	JC	01/23/17

AMTEST Identification Number 17-A000646
Client Identification EVALSS-20170117
Sampling Date 01/17/17, 08:55

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	26.	CFU/100 ml		1	SM 9222D	NG	01/18/17
Total Nitrogen (NOX&TKN)	1.85	mg/l		0.1			
Total Nitrogen (TKN)	0.250	mg/l		0.1	SM4500N	SW	02/01/17
Nitrate + Nitrite	1.6	mg/l		0.01	SM4500NO3	JC	01/23/17

AMTEST Identification Number 17-A000647
Client Identification MONMN-20170117
Sampling Date 01/17/17, 14:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	26.	CFU/100 ml		1	SM 9222D	NG	01/18/17
Total Nitrogen (NOX&TKN)	0.29	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	SW	02/01/17
Nitrate + Nitrite	0.29	mg/l		0.01	SM4500NO3	JC	01/23/17

AMTEST Identification Number 17-A000648
Client Identification MONMS-20170117
Sampling Date 01/17/17, 14:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	16.	CFU/100 ml		1	SM 9222D	NG	01/18/17
Total Nitrogen (NOX&TKN)	1.32	mg/l		0.1			
Total Nitrogen (TKN)	0.549	mg/l		0.1	SM4500N	SW	02/01/17
Nitrate + Nitrite	0.77	mg/l		0.01	SM4500NO3	JC	01/23/17

AMTEST Identification Number 17-A000649
Client Identification MONM-20170117
Sampling Date 01/17/17, 14:55

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	190	CFU/100 ml		1	SM 9222D	NG	01/18/17
Total Nitrogen (NOX&TKN)	0.92	mg/l		0.1			
Total Nitrogen (TKN)	0.626	mg/l		0.1	SM4500N	SW	02/01/17
Nitrate + Nitrite	0.29	mg/l		0.01	SM4500NO3	JC	01/23/17

AMTEST Identification Number 17-A000650
Client Identification SEIMN-20170117
Sampling Date 01/17/17, 15:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	270	CFU/100 ml		1	SM 9222D	NG	01/18/17
Total Nitrogen (NOX&TKN)	1.53	mg/l		0.1			
Total Nitrogen (TKN)	1.20	mg/l		0.1	SM4500N	SW	02/01/17
Nitrate + Nitrite	0.33	mg/l		0.01	SM4500NO3	JC	01/23/17

AMTEST Identification Number 17-A000651
Client Identification SEIMS-20170117
Sampling Date 01/17/17, 14:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	10.	CFU/100 ml		1	SM 9222D	NG	01/18/17
Total Nitrogen (NOX&TKN)	1.25	mg/l		0.1			
Total Nitrogen (TKN)	0.952	mg/l		0.1	SM4500N	SW	02/01/17
Nitrate + Nitrite	0.30	mg/l		0.01	SM4500NO3	JC	01/23/17

AMTEST Identification Number 17-A000652
Client Identification TOSMI-20170117
Sampling Date 01/17/17, 12:55

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	500	CFU/100 ml		1	SM 9222D	NG	01/18/17
Total Nitrogen (NOX&TKN)	2.66	mg/l		0.1			
Total Nitrogen (TKN)	1.90	mg/l		0.1	SM4500N	SW	02/01/17
Nitrate + Nitrite	0.76	mg/l		0.01	SM4500NO3	JC	01/23/17

AMTEST Identification Number 17-A000653
Client Identification TOSMO-20170117
Sampling Date 01/17/17, 12:35

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	120	CFU/100 ml		1	SM 9222D	NG	01/18/17
Total Nitrogen (NOX&TKN)	0.86	mg/l		0.1			
Total Nitrogen (TKN)	0.345	mg/l		0.1	SM4500N	SW	02/01/17
Nitrate + Nitrite	0.51	mg/l		0.01	SM4500NO3	JC	01/23/17

AMTEST Identification Number 17-A000654
Client Identification TYLMI-20170117
Sampling Date 01/17/17, 13:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	4.	CFU/100 ml		1	SM 9222D	NG	01/18/17
Total Nitrogen (NOX&TKN)	1.24	mg/l		0.1			
Total Nitrogen (TKN)	0.550	mg/l		0.1	SM4500N	SW	02/01/17
Nitrate + Nitrite	0.69	mg/l		0.01	SM4500NO3	JC	01/23/17

AMTEST Identification Number 17-A000655
Client Identification TYLMO-20170117
Sampling Date 01/17/17, 13:10

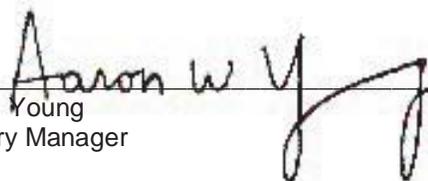
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	400	CFU/100 ml		1	SM 9222D	NG	01/18/17
Total Nitrogen (NOX&TKN)	1.48	mg/l		0.1			
Total Nitrogen (TKN)	0.919	mg/l		0.1	SM4500N	SW	02/01/17
Nitrate + Nitrite	0.56	mg/l		0.01	SM4500NO3	JC	01/23/17

AMTEST Identification Number 17-A000656
Client Identification QA21-20170117
Sampling Date 01/17/17, 15:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	140	CFU/100 ml		1	SM 9222D	NG	01/18/17
Total Nitrogen (NOX&TKN)	1.36	mg/l		0.1			
Total Nitrogen (TKN)	0.936	mg/l		0.1	SM4500N	SW	02/01/17
Nitrate + Nitrite	0.42	mg/l		0.01	SM4500NO3	JC	01/23/17


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 17-A000642 to 17-A000656

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
17-A000642	Fecal Coliform	CFU/100 ml	62.	62.	0.00
17-A000643	Fecal Coliform	CFU/100 ml	58.	60.	3.4
17-A000271	Total Nitrogen (TKN)	mg/l	0.181	0.198	9.0
17-A000281	Total Nitrogen (TKN)	mg/l	0.261	0.238	9.2
17-A000382	Total Nitrogen (TKN)	mg/l	1.00	1.10	9.5
17-A000852	Total Nitrogen (TKN)	mg/l	1.10	0.912	19.
17-A000913	Total Nitrogen (TKN)	mg/l	0.835	0.809	3.2
17-A001011	Total Nitrogen (TKN)	mg/l	0.236	0.257	8.5
17-A000647	Nitrate + Nitrite	mg/l	0.29	0.29	0.00
17-A000702	Nitrate + Nitrite	mg/l	7.0	6.8	2.9
17-A000717	Nitrate + Nitrite	mg/l	0.26	0.25	3.9
17-A000809	Nitrate + Nitrite	mg/l	0.023	0.022	4.4
17-A000913	Nitrate + Nitrite	mg/l	7.8	8.3	6.2

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
17-A000271	Total Nitrogen (TKN)	mg/l	0.181	2.10	2.00	95.95 %
17-A000281	Total Nitrogen (TKN)	mg/l	0.261	2.14	2.00	93.95 %
17-A000382	Total Nitrogen (TKN)	mg/l	1.00	2.90	2.00	95.00 %
17-A000852	Total Nitrogen (TKN)	mg/l	1.10	3.07	2.00	98.50 %
17-A000913	Total Nitrogen (TKN)	mg/l	0.835	2.80	2.00	98.25 %
17-A001011	Total Nitrogen (TKN)	mg/l	0.236	2.40	2.00	108.20 %
17-A000647	Nitrate + Nitrite	mg/l	0.29	0.74	0.50	90.00 %
17-A000702	Nitrate + Nitrite	mg/l	7.0	12.	5.0	100.00 %
17-A000717	Nitrate + Nitrite	mg/l	0.26	0.73	0.50	94.00 %
17-A000741	Nitrate + Nitrite	mg/l	0.65	1.1	0.50	90.00 %
17-A000809	Nitrate + Nitrite	mg/l	0.023	0.38	0.50	71.40 %
17-A000913	Nitrate + Nitrite	mg/l	7.8	13.	5.0	104.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	1.00	1.03	103. %
Total Nitrogen (TKN)	mg/l	1.00	1.01	101. %
Total Nitrogen (TKN)	mg/l	1.00	1.07	107. %
Total Nitrogen (TKN)	mg/l	1.00	1.05	105. %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %

QC Summary for sample numbers: 17-A000642 to 17-A000656...

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	0.936
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 01-094

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20170117 642	1/17/17	15:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20170117 643	1/17/17	7:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20170117 644	1/17/17	7:25	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20170117 645	1/17/17	8:25	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20170117 646	1/17/17	8:55	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20170117 647	1/17/17	14:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20170117 648	1/17/17	14:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20170117 649	1/17/17	14:55	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20170117 650	1/17/17	15:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20170117 651	1/17/17	14:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company		Date	Time	Comments/Special Instructions
Relinquished by:		OnSite, IA		1/15/17	700	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L 3:0°C
Received by:		AmTest		1/18/17	700	
Relinquished by:						
Received by:						
Relinquished by:						
Received by:						



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3381

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 01-094

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
11	TOSMI-20170117 652	1/17/17	12:55	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
12	TOSMO-20170117 653	1/17/17	12:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
13	TYLMI-20170117 654	1/17/17	13:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
14	TYLMO-20170117 655	1/17/17	13:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
15	QA21-20170117 656	1/17/17	15:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N

Signature	Company	Date	Time	Comments/Special Instructions
Relinquished by:	OnSite Environmental	1/15/17	700	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L 3.0°C
Received by:	AmTest	1/18/17	700	
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

CHAIN OF CUSTODY

Turnaround Requested:

_____ 1 Day

_____ 2 Day

_____ 3 Day

Standard

Laboratory No.

Page 1 of 1
01-094

Requested Analyses

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *			
1	COLM-2017 0117	1-17-17	15:45	Water	7	X	X	X	X	X	X	X	X	X			
2	COUMI-2017 0117		7:45	Water	7	X	X	X	X	X	X	X	X	X			
3	COUMO-2017 0117		7:25	Water	7	X	X	X	X	X	X	X	X	X			
4	EVAMS-2017 0117		8:25	Water	7	X	X	X	X	X	X	X	X	X			
5	EVALSS-2017 0117		8:55	Water	7	X	X	X	X	X	X	X	X	X			
6	MONMN-2017 0117		14:10	Water	7	X	X	X	X	X	X	X	X	X			
7	MONMS-2017 0117		14:30	Water	7	X	X	X	X	X	X	X	X	X			
8	MONM-2017 0117		14:55	Water	7	X	X	X	X	X	X	X	X	X			
9	SEIMN-2017 0117		15:15	Water	7	X	X	X	X	X	X	X	X	X			
10	SEIMS-2017 0117		14:15	Water	7	X	X	X	X	X	X	X	X	X			
11	TOSMI-2017 0117		12:55	Water	7	X	X	X	X	X	X	X	X	X			
12	TOSMO-2017 0117		12:35	Water	7	X	X	X	X	X	X	X	X	X			
13	TYLMI-2017 0117		12:45	Water	7	X	X	X	X	X	X	X	X	X			
14	TYLMO-2017 0117		13:10	Water	7	X	X	X	X	X	X	X	X	X			
15	QA 21-20170117		15:00	Water	7	X	X	X	X	X	X	X	X	X			
16	QA 20-20170117		10:10	Water	2	X	X	X	X					X			

Relinquished by M. Herrera Date 1-17-17 Received by [Signature] Date 1/17/17

Firm Herrera Time 10:37 Firm OSE Time 1637

Relinquished by _____ Date _____ Received by _____ Date _____

Firm _____ Time _____ Firm _____ Time _____

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants
 Project No.: 14-05806-000
 Project Name: Redmond Paired Watershed Study
 Project Manager: George Iftner

CHAIN OF CUSTODY

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No.	01-094
Requested Analyses	

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *								
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *			
1	COLM-2017 0117	1-17-17	15:45	Water	7	X	X	X	X	X	X	X	X	X			
2	COUMI-2017 0117		7:45	Water	7	X	X	X	X	X	X	X	X	X			
3	COUMO-2017 0117		7:25	Water	7	X	X	X	X	X	X	X	X	X			
4	EVAMS-2017 0117		8:25 11:10	Water	7	X	X	X	X	X	X	X	X	X			
5	EVALSS-2017 0117		8:55 11:30	Water	7	X	X	X	X	X	X	X	X	X			
6	MONMN-2017 0117		14:10 14:55	Water	7	X	X	X	X	X	X	X	X	X			
7	MONMS-2017 0117		14:30	Water	7	X	X	X	X	X	X	X	X	X			
8	MONM-2017 0117		14:55	Water	7	X	X	X	X	X	X	X	X	X			
9	SEIMN-2017 0117		15:15	Water	7	X	X	X	X	X	X	X	X	X			
10	SEIMS-2017 0117		14:15	Water	7	X	X	X	X	X	X	X	X	X			
11	TOSMI-2017 0117		12:55	Water	7	X	X	X	X	X	X	X	X	X			
12	TOSMO-2017 0117		12:35 12:55	Water	7	X	X	X	X	X	X	X	X	X			
13	TYLMI-2017 0117		13:45	Water	7	X	X	X	X	X	X	X	X	X			
14	TYLMO-2017 0117		13:10	Water	7	X	X	X	X	X	X	X	X	X			
15	QA 21-2017 0117		15:00	Water	7	X	X	X	X	X	X	X	X	X			
16	QA 20-2017 0117		16:10	Water	2	X	X		X					X			

Relinquished by M. Manu... Date 1-17-17 Received by [Signature] Date 1/17/17
 Firm Herrera Time 16:37 Firm OSI Time 1637
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	Brianna Bland		
Meter:	YSI PROPLUS		
Date/Time:	1.17.17 @ 10:15		
Barometric Pressure Start of Day:	Inches Hg: 753.8	Time: 10:15	
Barometric Pressure End of Day:	Inches Hg: —	Time: —	

Calibration Procedures:

Rinse Multimeter Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	2.8	0	18.2	
Conductivity (µS/cm)	1003	1,000	17.9	
Conductivity (µS/cm)	99.0	100	18.1	
DO % Saturation	99.0	100	16.0	
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	7.0	0	19.2	
Conductivity (µS/cm)	99.8	100	19.7	
DO % Saturation	98	100	18.2	

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	Brianna Bland		
Meter:	YSI 30 Salinity Meter / YSI SDA		
Date/Time:	1.19.19 @ 0:15		
Barometric Pressure Start of Day:	Inches Hg:	NA	Time: --
Barometric Pressure End of Day:	Inches Hg:	--	Time: --

Calibration Procedures:
Rinse Multimetric Sonde Between Each Operation
Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	5.2	0	18.1	
Conductivity (µS/cm)	1102	1,000	17.9	
Conductivity (µS/cm)	98	100	18.5	
DO % Saturation	100.8	100	17.6	

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	10.7	0	19.0	
Conductivity (µS/cm)	97	100	19.3	
DO % Saturation	98	100	19.2	

- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

98.9 17.7

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BFB
 Sample Date: 1.17.17 Sample Time: 1545 PDT:
 Base Flow or Storm Event? Storm Field Filtered Time: 1550 PST:
(Must filter within 15 minutes of collection)

SITE ID: COLM
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Raining, 42°F

Water Quality Sampling

Sample ID: COLM-20170117

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N ↓ ↓ ↓ ↓ ↓ ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: light orange
 Odor: none
 Sheen: none
 Floatables: organic debris
 LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. Lynch Signature: [Signature]
 Date Checked: 7-7-17 Time: _____
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI DSS 1 _____
 YSI DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): NA
 Reference Point (description): NA

Water Quality Measurements

Temperature (°C) 1.9
 Conductivity (µs/cm) 33.5
 Dissolved Oxygen (mg/L) 12.64

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB

SITE ID:

COUM1

Sample Date: 1-17-17

Sample Time: 7:45

PDT:

Base Flow or Storm Event? STORM

Field Filtered Time: 7:50

PST:

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: drizzling @ 37°F

Water Quality Sampling

Sample ID: COUM1-20170117

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: I. Lenth

Signature: [Signature]

Date Checked: 2-7-17

Time:

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI DSS 1

YSI DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.07

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 4.5

Conductivity (µs/cm) 293.7

Dissolved Oxygen (mg/L) 12.32

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB

Sample Date: 1.17.17

Sample Time: 7:25

PDT: X

SITE ID:

COUMO

Base Flow or Storm Event? Storm

Field Filtered Time: 7:30

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: drizzling, 31.0°F

Water Quality Sampling

Sample ID: COUMO-20170117

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: QA20-20170117

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: S. Leath

Signature: [Signature]

Date Checked: 2-7-17

Time:

Data Entered into Database? YES NO initials: [initials]

Date Entered: _____ Time: _____

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020) X

YSI DSS 1

YSI DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.20

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 4.9

Conductivity (µs/cm) 289.9

Dissolved Oxygen (mg/L) 93.2 12.90

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JM, VW

Sample Date: 1/17/17

Sample Time: 08:25

SITE ID: EVAMS

Base Flow or Storm Event? (S)

Field Filtered Time: 08:25

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 38°F light drizzle

Water Quality Sampling

Sample ID: EVAMS20170117

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC*	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn*	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: Clear
 Color: none
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. Lentz

Signature: [Signature]

Date Checked: 2-7-17

Time: _____

Data Entered into Database?

YES

NO

initials: _____

Date Entered: _____

Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI 100 30 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.86

Reference Point (description): Stream gage

Water Quality Measurements

Temperature (°C) 4.5°C

Conductivity (µs/cm) 205.3

Dissolved Oxygen (mg/L) 13.03

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JM + VW

Sample Date: 1/17/17

Sample Time: 8:55

EDT
 PST

SITE ID: EVALSS

Base Flow or Storm Event?

Field Filtered Time: 8:55

(Must filter within 15 minutes of collection)

Project Number: 14-05806-000



Water Quality Sampling

Sample ID: EVALSS 20170117

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
Color: none
Odor: no
Sheen: no
Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. Lynch

Signature: [Signature]

Date Checked: 2-7-17

Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 38°F cloudy

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI 30X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.34 2.34

Reference Point (description): Streamgage

Water Quality Measurements

Temperature (°C) 4.8

Conductivity (µs/cm) 180.5 1035%

Dissolved Oxygen (mg/L) 13.30

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 1.17.17 Sample Time: 1410 PDT:
 Base Flow or Storm Event? storm Field Filtered Time: 1415 PST:
(Must filter within 15 minutes of collection)

SITE ID: MONMN
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Raining, 41° F

Water Quality Sampling

Sample ID: MONMN-20170117

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: light brown
 Odor: none
 Sheen: none
 Floatables: susp sed, org. debris
LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. Leuth Signature: [Signature]
 Date Checked: 2-7-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020)
 YSI DSS 1 _____
 YSI DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 9.12
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 4.2
 Conductivity (µs/cm) 153.8
 Dissolved Oxygen (mg/L) 12.10

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 1.17.17 Sample Time: 1430 PDT:
 Base Flow or Storm Event? STORM Field Filtered Time: 1435 PST:
(Must filter within 15 minutes of collection)

SITE ID: MONMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Raining, 41°F

Water Quality Sampling

Sample ID: MONMS - 20170117

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>Y</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: light brown
 Odor: none
 Sheen: none
 Floatables: susp sed, org deb

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: S. Cant Signature: [Signature]
 Date Checked: 2-7-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020)
 YSI DSS 1 _____
 YSI DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 6.167
 Reference Point (description): vault

Water Quality Measurements

Temperature (°C) 4.5
 Conductivity (µs/cm) 293.2
 Dissolved Oxygen (mg/L) 10.77

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 1.17.17 Sample Time: 1450S PDT:
 Base Flow or Storm Event? STORM Field Filtered Time: 1500 PST:
(Must filter within 15 minutes of collection)

SITE ID: MONM
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Partly, 41°F

Water Quality Sampling

Sample ID: MONM-20170117

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	Y
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QA21-20170117
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: Light brown + clear
 Color: + light brown
 Odor: none
 Sheen: none
 Floatables: Susp sed, org det

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: S. Lentz Signature: [Signature]
 Date Checked: 2-7-17 Time: _____
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI DSS 1 _____
 YSI DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.28
 Reference Point (description): top of culvert

Water Quality Measurements

Temperature (°C) 4.7
 Conductivity (µs/cm) 220.2
 Dissolved Oxygen (mg/L) 12.27

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JM, UV

Sample Date: 1/17/17

Sample Time: 15:15

PDT:

SITE ID: SEIMN

Base Flow or Storm Event? Storm

Field Filtered Time: 15:15
(Must filter within 15 minutes of collection)

PST:

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: rainy, 43°

Water Quality Sampling

Sample ID: SEIMN20170117

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	<u>N</u>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<u>N</u>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<u>N</u>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<u>N</u>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<u>N</u>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>N</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: yellowish
 Odor: no
 Sheen: no
 Floatables: small amount of foam

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. Lenth Signature: [Signature]

Date Checked: 2-7-17 Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro 30 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.78'

Reference Point (description): From bottom of bolt to water surface

Water Quality Measurements

Temperature (°C) 4.2°

Conductivity (µs/cm) 67.4

Dissolved Oxygen (mg/L) 13.09

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JM, VW

Sample Date: 1/17/17

Sample Time: 14:15

PDT

SITE ID: SEIMS

Base Flow or Storm Event? Storm

Field Filtered Time: 14:15

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: rainy, 43°F

Water Quality Sampling

Sample ID: SEIMS20170117

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: Clear

Color: Brown

Odor: No

Sheen: No

Floatables: Minimal foam

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. Leuth

Signature: [Signature]

Date Checked: 2-7-17 Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI 30 X

YSI 550A for DO temp
YSI 30 for cond.

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.76

Reference Point (description): Staff gage

Water Quality Measurements

Temperature (°C) 3.7

Conductivity (µs/cm) 100.4

Dissolved Oxygen (mg/L) 13.08

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JM + VW

Sample Date: _____ Sample Time: 12:55 NOT PST

Base Flow or Storm Event? _____ Field Filtered Time: 12:55
(Must filter within 15 minutes of collection)

SITE ID: TOSMI

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 43°F Rain

Water Quality Sampling

Sample ID: TOSMI 20170117

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: turbid
 Color: brown
 Odor: none
 Sheen: none
 Floatables: some bubbles

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. Leath Signature: [Signature]

Date Checked: 2-7-17 Time: _____

Data Entered into Database? YES NO Initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI 30 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.9 ft

Reference Point (description): stream gage

Water Quality Measurements

Temperature (°C) ~~6.0~~ 6.0

Conductivity (µs/cm) ~~12.88~~ 443.3

Dissolved Oxygen (mg/L) ~~4.308~~ 443.3 12.88

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 1.17.17 Sample Time: 12:35 PDT:
 Base Flow or Storm Event? storm Field Filtered Time: 12:40 PST:
(Must filter within 15 minutes of collection)

SITE ID: TOSMO
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rainy, 42°F

Water Quality Sampling

Sample ID: TOSMO-20170117

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	
* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump					

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. Lenth Signature: [Signature]
 Date Checked: 2-7-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field/Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) X
 YSI DSS 1 _____
 YSI DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 0.56
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 10.4
 Conductivity (µs/cm) 234.7
 Dissolved Oxygen (mg/L) 12.21

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: db
 Sample Date: 1.17.17 Sample Time: 1345 PDT: X
 Base Flow or Storm Event? STORM Field Filtered Time: 1356 PST:
(Must filter within 15 minutes of collection)

SITE ID: TYLMI
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Drizzling, 41°F

Water Quality Sampling

Sample ID: TYLMI.20170117

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: S. Lenth Signature: [Signature]
 Date Checked: 2-7-17 Time: _____
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) X
 YSI DSS 1 _____
 YSI DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.54
 Reference Point (description): culvert ↓

Water Quality Measurements

Temperature (°C) 4.7
 Conductivity (µs/cm) 11.74 185.8
 Dissolved Oxygen (mg/L) 185.8 11.74

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: ABD
 Sample Date: 1.17.17 Sample Time: 13:10 PDT: X
 Base Flow or Storm Event? storm Field Filtered Time: 13:15 PST:
(Must filter within 15 minutes of collection)

SITE ID: TYLMO

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Raining, 42°F

Water Quality Sampling

Sample ID: TYLMO-20170117

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: Water brown cloudy
 Color: Water brown
 Odor: None
 Sheen: None
 Floatables: Susp. sediment, some organic debris

Date: _____ Time: _____

LABORATORY DELIVERY

Quality Assurance

Checked By: J. Lenth Signature: _____
 Date Checked: 2-7-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) X
 YSI DSS 1 _____
 YSI DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.77
 Reference Point (description): top of culvert ↓

Water Quality Measurements

Temperature (°C) 4.3
 Conductivity (µs/cm) 232.8
 Dissolved Oxygen (mg/L) 12.48



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 3/22/2017 Page 1 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 1/17/2017 / All sites, 1 FD (QA21) at MONM, 1 Filter blank (QA20)

date 3/22/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	2	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	95	±20	13	≤25	15	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	1	≤25	30	≤25	OK	"J"MONM DUE TO FIELD DUP RPD
Hardness	OK / SM 2340B	NA	NA	8	≤180	≤1.0 mg/L 1.0 mg/L	107,98	±25	110	±15	1	≤20	1.2	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	7	≤28	≤1.0 mg/L 1.0 mg/L	99	±25	100	±15	1	≤20	14	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	6	≤28	≤0.01 mg/L 0.01 mg/L	104	±25	96	±20	7	≤20	15	≤20	OK	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	6-7	≤28	≤0.1 mg/L 0.1 mg/L	90	±25	98-107	±20	0	≤20	39	≤20	OK	"J"MONM DUE TO FIELD DUP RPD

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 3/22/2017 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 1/17/2017 / All sites, 1 FD (QA21) at MONM, 1 Filter blank (QA20)

date 3/22/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	8	≤180	≤1.0 µg/L 1.0 µg/L	94,90	±25	NR	±15	NC	≤20	0	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	8	≤180	≤5.0 µg/L 5.0 µg/L	101,101	±25	NR	±15	9	≤20	4.2	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	6	≤180	≤1.0 µg/L 1.0 µg/L	91,93	±25	NR	±15	4	≤20	NC	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	6	≤180	≤5.0 µg/L 5.0 µg/L	97,99	±25	NR	±15	NC	≤20	D=1.3	≤20	OK	FB = 6.5; ALL ND EXCEPT TYLMO, FLAG RESULT "J"
Fecal Coliform	OK/ SM 9222D	NA	NA	1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	0,3,4	≤35	30	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

March 2, 2017

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1702-036

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on February 3, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular flourish.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: March 2, 2017
Samples Submitted: February 3, 2017
Laboratory Reference: 1702-036
Project: 14-05806-000

Case Narrative

Samples were collected on February 3, 2017 and received by the laboratory on February 3, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: March 2, 2017
 Samples Submitted: February 3, 2017
 Laboratory Reference: 1702-036
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170203					
Laboratory ID:	02-036-01					
Total Suspended Solids	2.6	1.0	SM 2540D	2-6-17	2-7-17	

Client ID:	COUMI-20170203					
Laboratory ID:	02-036-02					
Total Suspended Solids	76	2.5	SM 2540D	2-6-17	2-7-17	

Client ID:	COUMO-20170203					
Laboratory ID:	02-036-03					
Total Suspended Solids	130	2.5	SM 2540D	2-6-17	2-7-17	

Client ID:	EVAMS-20170203					
Laboratory ID:	02-036-04					
Total Suspended Solids	16	1.0	SM 2540D	2-6-17	2-7-17	

Client ID:	EVALSS-20170203					
Laboratory ID:	02-036-05					
Total Suspended Solids	36	1.0	SM 2540D	2-6-17	2-7-17	

Client ID:	MONMN-20170203					
Laboratory ID:	02-036-06					
Total Suspended Solids	25	1.0	SM 2540D	2-6-17	2-7-17	

Client ID:	MONMS-20170203					
Laboratory ID:	02-036-07					
Total Suspended Solids	18	1.0	SM 2540D	2-6-17	2-7-17	



Date of Report: March 2, 2017
 Samples Submitted: February 3, 2017
 Laboratory Reference: 1702-036
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170203					
Laboratory ID:	02-036-08					
Total Suspended Solids	35	1.0	SM 2540D	2-6-17	2-7-17	

Client ID:	SEIMN-20170203					
Laboratory ID:	02-036-09					
Total Suspended Solids	100	2.5	SM 2540D	2-6-17	2-7-17	

Client ID:	SEIMS-20170203					
Laboratory ID:	02-036-10					
Total Suspended Solids	61	1.7	SM 2540D	2-6-17	2-7-17	

Client ID:	TOSMI-20170203					
Laboratory ID:	02-036-11					
Total Suspended Solids	140	2.5	SM 2540D	2-6-17	2-7-17	

Client ID:	TOSMO-20170203					
Laboratory ID:	02-036-12					
Total Suspended Solids	580	5.0	SM 2540D	2-6-17	2-7-17	

Client ID:	TYLMI-20170203					
Laboratory ID:	02-036-13					
Total Suspended Solids	18	1.0	SM 2540D	2-6-17	2-7-17	

Client ID:	TYLMO-20170203					
Laboratory ID:	02-036-14					
Total Suspended Solids	37	1.7	SM 2540D	2-6-17	2-7-17	



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TOTAL SUSPENDED SOLIDS
SM 2540D

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA22-20170203					
Laboratory ID:	02-036-15					
Total Suspended Solids	16	1.0	SM 2540D	2-6-17	2-7-17	



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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0206W1					
Total Suspended Solids	ND	1.0	SM 2540D	2-6-17	2-7-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	02-036-07							
	ORIG	DUP						
Total Suspended Solids	18.2	18.4	NA	NA	NA	1	20	

SPIKE BLANK								
Laboratory ID:	SB0206W1							
	SB	SB		SB				
Total Suspended Solids	102	100	NA	102	78-113	NA	NA	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170203					
Laboratory ID:	02-036-01					
Turbidity	0.99	0.10	EPA 180.1	2-3-17	2-3-17	
Client ID:	COUMI-20170203					
Laboratory ID:	02-036-02					
Turbidity	30	0.10	EPA 180.1	2-3-17	2-3-17	
Client ID:	COUMO-20170203					
Laboratory ID:	02-036-03					
Turbidity	37	0.10	EPA 180.1	2-3-17	2-3-17	
Client ID:	EVAMS-20170203					
Laboratory ID:	02-036-04					
Turbidity	4.8	0.10	EPA 180.1	2-3-17	2-3-17	
Client ID:	EVALSS-20170203					
Laboratory ID:	02-036-05					
Turbidity	6.9	0.10	EPA 180.1	2-3-17	2-3-17	
Client ID:	MONMN-20170203					
Laboratory ID:	02-036-06					
Turbidity	8.3	0.10	EPA 180.1	2-3-17	2-3-17	
Client ID:	MONMS-20170203					
Laboratory ID:	02-036-07					
Turbidity	7.9	0.10	EPA 180.1	2-3-17	2-3-17	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170203					
Laboratory ID:	02-036-08					
Turbidity	11	0.10	EPA 180.1	2-3-17	2-3-17	

Client ID:	SEIMN-20170203					
Laboratory ID:	02-036-09					
Turbidity	26	0.10	EPA 180.1	2-3-17	2-3-17	

Client ID:	SEIMS-20170203					
Laboratory ID:	02-036-10					
Turbidity	12	0.10	EPA 180.1	2-3-17	2-3-17	

Client ID:	TOSMI-20170203					
Laboratory ID:	02-036-11					
Turbidity	36	0.10	EPA 180.1	2-3-17	2-3-17	

Client ID:	TOSMO-20170203					
Laboratory ID:	02-036-12					
Turbidity	100	0.50	EPA 180.1	2-3-17	2-3-17	

Client ID:	TYLMI-20170203					
Laboratory ID:	02-036-13					
Turbidity	8.5	0.10	EPA 180.1	2-3-17	2-3-17	

Client ID:	TYLMO-20170203					
Laboratory ID:	02-036-14					
Turbidity	12	0.10	EPA 180.1	2-3-17	2-3-17	



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TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA22-20170203					
Laboratory ID:	02-036-15					
Turbidity	5.5	0.10	EPA 180.1	2-3-17	2-3-17	



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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0203W1					
Turbidity	ND	0.10	EPA 180.1	2-3-17	2-3-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	02-031-01							
	ORIG	DUP						
Turbidity	12.7	12.7	NA	NA	NA	NA	0	15



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170203					
Laboratory ID:	02-036-01					
Hardness	9.5	1.0	200.7/SM 2340B	2-6-17	2-8-17	

Client ID:	COUMI-20170203					
Laboratory ID:	02-036-02					
Hardness	69	1.0	200.7/SM 2340B	2-6-17	2-8-17	

Client ID:	COUMO-20170203					
Laboratory ID:	02-036-03					
Hardness	90	1.0	200.7/SM 2340B	2-6-17	2-8-17	

Client ID:	EVAMS-20170203					
Laboratory ID:	02-036-04					
Hardness	82	1.0	200.7/SM 2340B	2-6-17	2-8-17	

Client ID:	EVALSS-20170203					
Laboratory ID:	02-036-05					
Hardness	74	1.0	200.7/SM 2340B	2-6-17	2-8-17	

Client ID:	MONMN-20170203					
Laboratory ID:	02-036-06					
Hardness	57	1.0	200.7/SM 2340B	2-6-17	2-8-17	

Client ID:	MONMS-20170203					
Laboratory ID:	02-036-07					
Hardness	96	1.0	200.7/SM 2340B	2-6-17	2-8-17	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170203					
Laboratory ID:	02-036-08					
Hardness	74	1.0	200.7/SM 2340B	2-6-17	2-8-17	

Client ID:	SEIMN-20170203					
Laboratory ID:	02-036-09					
Hardness	29	1.0	200.7/SM 2340B	2-6-17	2-8-17	

Client ID:	SEIMS-20170203					
Laboratory ID:	02-036-10					
Hardness	41	1.0	200.7/SM 2340B	2-6-17	2-8-17	

Client ID:	TOSMI-20170203					
Laboratory ID:	02-036-11					
Hardness	91	1.0	200.7/SM 2340B	2-6-17	2-8-17	

Client ID:	TOSMO-20170203					
Laboratory ID:	02-036-12					
Hardness	110	1.0	200.7/SM 2340B	2-6-17	2-8-17	

Client ID:	TYLMI-20170203					
Laboratory ID:	02-036-13					
Hardness	85	1.0	200.7/SM 2340B	2-6-17	2-8-17	

Client ID:	TYLMO-20170203					
Laboratory ID:	02-036-14					
Hardness	31	1.0	200.7/SM 2340B	2-6-17	2-8-17	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA22-20170203					
Laboratory ID:	02-036-15					
Hardness	79	1.0	200.7/SM 2340B	2-6-17	2-8-17	



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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0206WH3					
Hardness	ND	1.0	200.7/SM 2340B	2-6-17	2-8-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	02-036-01							
	ORIG	DUP						
Hardness	9.54	10.1	NA	NA	NA	6	20	

MATRIX SPIKES

Laboratory ID:	02-036-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	146	151	132	132	9.54	103	107	75-125	3	20

SPIKE BLANK

Laboratory ID:	SB0206WH3									
	SB		SB		SB					
Hardness	136		132		103			80-120	NA	NA



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170203					
Laboratory ID:	02-036-01					
Dissolved Organic Carbon	9.6	1.0	SM 5310B	2-6-17	2-6-17	
Client ID:	COUMI-20170203					
Laboratory ID:	02-036-02					
Dissolved Organic Carbon	3.7	1.0	SM 5310B	2-6-17	2-6-17	
Client ID:	COUMO-20170203					
Laboratory ID:	02-036-03					
Dissolved Organic Carbon	4.1	1.0	SM 5310B	2-6-17	2-6-17	
Client ID:	EVAMS-20170203					
Laboratory ID:	02-036-04					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	2-6-17	2-6-17	
Client ID:	EVALSS-20170203					
Laboratory ID:	02-036-05					
Dissolved Organic Carbon	3.1	1.0	SM 5310B	2-6-17	2-6-17	
Client ID:	MONMN-20170203					
Laboratory ID:	02-036-06					
Dissolved Organic Carbon	4.5	1.0	SM 5310B	2-6-17	2-6-17	
Client ID:	MONMS-20170203					
Laboratory ID:	02-036-07					
Dissolved Organic Carbon	4.8	1.0	SM 5310B	2-6-17	2-6-17	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170203					
Laboratory ID:	02-036-08					
Dissolved Organic Carbon	4.2	1.0	SM 5310B	2-6-17	2-6-17	
Client ID:	SEIMN-20170203					
Laboratory ID:	02-036-09					
Dissolved Organic Carbon	5.4	1.0	SM 5310B	2-6-17	2-6-17	
Client ID:	SEIMS-20170203					
Laboratory ID:	02-036-10					
Dissolved Organic Carbon	6.1	1.0	SM 5310B	2-6-17	2-6-17	
Client ID:	TOSMI-20170203					
Laboratory ID:	02-036-11					
Dissolved Organic Carbon	5.0	1.0	SM 5310B	2-6-17	2-6-17	
Client ID:	TOSMO-20170203					
Laboratory ID:	02-036-12					
Dissolved Organic Carbon	8.2	1.0	SM 5310B	2-6-17	2-6-17	
Client ID:	TYLMI-20170203					
Laboratory ID:	02-036-13					
Dissolved Organic Carbon	4.7	1.0	SM 5310B	2-6-17	2-6-17	
Client ID:	TYLMO-20170203					
Laboratory ID:	02-036-14					
Dissolved Organic Carbon	3.6	1.0	SM 5310B	2-6-17	2-6-17	



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**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA22-20170203					
Laboratory ID:	02-036-15					
Dissolved Organic Carbon	3.4	1.0	SM 5310B	2-6-17	2-6-17	



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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0206D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	2-6-17	2-6-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	02-036-01							
	ORIG	DUP						
Dissolved Organic Carbon	9.61	9.27	NA	NA	NA	4	20	

MATRIX SPIKE

Laboratory ID:	02-036-01							
	MS	MS		MS				
Dissolved Organic Carbon	19.0	10.0	9.61	94	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0206D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.9	10.0	NA	109	75-125	NA	NA	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170203					
Laboratory ID:	02-036-01					
Total Phosphorus	0.016	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	COUMI-20170203					
Laboratory ID:	02-036-02					
Total Phosphorus	0.15	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	COUMO-20170203					
Laboratory ID:	02-036-03					
Total Phosphorus	0.29	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	EVAMS-20170203					
Laboratory ID:	02-036-04					
Total Phosphorus	0.029	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	EVALSS-20170203					
Laboratory ID:	02-036-05					
Total Phosphorus	0.046	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	MONMN-20170203					
Laboratory ID:	02-036-06					
Total Phosphorus	0.076	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	MONMS-20170203					
Laboratory ID:	02-036-07					
Total Phosphorus	0.069	0.010	EPA 365.1	2-13-17	2-13-17	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170203					
Laboratory ID:	02-036-08					
Total Phosphorus	0.095	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	SEIMN-20170203					
Laboratory ID:	02-036-09					
Total Phosphorus	0.13	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	SEIMS-20170203					
Laboratory ID:	02-036-10					
Total Phosphorus	0.096	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	TOSMI-20170203					
Laboratory ID:	02-036-11					
Total Phosphorus	0.30	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	TOSMO-20170203					
Laboratory ID:	02-036-12					
Total Phosphorus	0.75	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	TYLMI-20170203					
Laboratory ID:	02-036-13					
Total Phosphorus	0.055	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	TYLMO-20170203					
Laboratory ID:	02-036-14					
Total Phosphorus	0.094	0.010	EPA 365.1	2-13-17	2-13-17	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA22-20170203					
Laboratory ID:	02-036-15					
Total Phosphorus	0.039	0.010	EPA 365.1	2-13-17	2-13-17	



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**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0213W1					
Total Phosphorus	ND	0.010	EPA 365.1	2-13-17	2-13-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	02-036-01							
	ORIG	DUP						
Total Phosphorus	0.0157	0.0146	NA	NA	NA	NA	7	11

MATRIX SPIKE								
Laboratory ID:	02-036-01							
	MS	MS		MS				
Total Phosphorus	0.262	0.250	0.0157	99	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0213W1							
	SB	SB		SB				
Total Phosphorus	0.237	0.250	NA	95	86-111	NA	NA	



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**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 02-036-01						
Client ID: COLM-20170203						
Copper	ND	1.0	200.8	2-6-17	2-9-17	
Zinc	ND	5.0	200.8	2-6-17	2-9-17	
Lab ID: 02-036-02						
Client ID: COUMI-20170203						
Copper	5.3	1.0	200.8	2-6-17	2-9-17	
Zinc	35	5.0	200.8	2-6-17	2-9-17	
Lab ID: 02-036-03						
Client ID: COUMO-20170203						
Copper	14	1.0	200.8	2-6-17	2-9-17	
Zinc	95	5.0	200.8	2-6-17	2-9-17	
Lab ID: 02-036-04						
Client ID: EVAMS-20170203						
Copper	ND	1.0	200.8	2-6-17	2-9-17	
Zinc	ND	5.0	200.8	2-6-17	2-9-17	
Lab ID: 02-036-05						
Client ID: EVALSS-20170203						
Copper	ND	1.0	200.8	2-6-17	2-9-17	
Zinc	ND	5.0	200.8	2-6-17	2-9-17	
Lab ID: 02-036-06						
Client ID: MONMN-20170203						
Copper	1.3	1.0	200.8	2-6-17	2-9-17	
Zinc	10	5.0	200.8	2-6-17	2-9-17	



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TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-036-07					
Client ID:	MONMS-20170203					
Copper	2.4	1.0	200.8	2-6-17	2-9-17	
Zinc	9.0	5.0	200.8	2-6-17	2-9-17	
Lab ID:	02-036-08					
Client ID:	MONM-20170203					
Copper	2.6	1.0	200.8	2-6-17	2-9-17	
Zinc	23	5.0	200.8	2-6-17	2-9-17	
Lab ID:	02-036-09					
Client ID:	SEIMN-20170203					
Copper	3.0	1.0	200.8	2-6-17	2-9-17	
Zinc	ND	5.0	200.8	2-6-17	2-9-17	
Lab ID:	02-036-10					
Client ID:	SEIMS-20170203					
Copper	ND	1.0	200.8	2-6-17	2-9-17	
Zinc	ND	5.0	200.8	2-6-17	2-9-17	
Lab ID:	02-036-11					
Client ID:	TOSMI-20170203					
Copper	20	1.0	200.8	2-6-17	2-9-17	
Zinc	340	5.0	200.8	2-6-17	2-9-17	
Lab ID:	02-036-12					
Client ID:	TOSMO-20170203					
Copper	28	1.0	200.8	2-6-17	2-9-17	
Zinc	330	5.0	200.8	2-6-17	2-9-17	



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TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-036-13					
Client ID:	TYLMI-20170203					
Copper	3.7	1.0	200.8	2-6-17	2-9-17	
Zinc	9.8	5.0	200.8	2-6-17	2-9-17	
Lab ID:	02-036-14					
Client ID:	TYLMO-20170203					
Copper	13	1.0	200.8	2-6-17	2-9-17	
Zinc	19	5.0	200.8	2-6-17	2-9-17	
Lab ID:	02-036-15					
Client ID:	QA22-20170203					
Copper	ND	1.0	200.8	2-6-17	2-9-17	
Zinc	ND	5.0	200.8	2-6-17	2-9-17	



Date of Report: March 2, 2017
Samples Submitted: February 3, 2017
Laboratory Reference: 1702-036
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 2-6-17
Date Analyzed: 2-9-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0206WH4

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: March 2, 2017
Samples Submitted: February 3, 2017
Laboratory Reference: 1702-036
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 2-6-17

Date Analyzed: 2-9-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 02-036-13

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	3.72	3.46	7	1.0	
Zinc	9.76	9.36	4	5.0	



Date of Report: March 2, 2017
 Samples Submitted: February 3, 2017
 Laboratory Reference: 1702-036
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 2-6-17

Date Analyzed: 2-9-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 02-036-13

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	88.4	85	90.4	87	2	
Zinc	100	102	92	105	95	3	



Date of Report: March 2, 2017
 Samples Submitted: February 3, 2017
 Laboratory Reference: 1702-036
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 02-036-01						
Client ID: COLM-20170203						
Copper	ND	1.0	200.8		2-8-17	
Zinc	ND	5.0	200.8		2-8-17	
Lab ID: 02-036-02						
Client ID: COUMI-20170203						
Copper	ND	1.0	200.8		2-8-17	
Zinc	ND	5.0	200.8		2-8-17	
Lab ID: 02-036-03						
Client ID: COUMO-20170203						
Copper	2.9	1.0	200.8		2-8-17	
Zinc	12	5.0	200.8		2-8-17	
Lab ID: 02-036-04						
Client ID: EVAMS-20170203						
Copper	ND	1.0	200.8		2-8-17	
Zinc	ND	5.0	200.8		2-8-17	
Lab ID: 02-036-05						
Client ID: EVALSS-20170203						
Copper	ND	1.0	200.8		2-8-17	
Zinc	ND	5.0	200.8		2-8-17	
Lab ID: 02-036-06						
Client ID: MONMN-20170203						
Copper	ND	1.0	200.8		2-8-17	
Zinc	ND	5.0	200.8		2-8-17	



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: March 2, 2017
 Samples Submitted: February 3, 2017
 Laboratory Reference: 1702-036
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-036-07					
Client ID:	MONMS-20170203					
Copper	ND	1.0	200.8		2-8-17	
Zinc	ND	5.0	200.8		2-8-17	
Lab ID:	02-036-08					
Client ID:	MONM-20170203					
Copper	ND	1.0	200.8		2-8-17	
Zinc	5.3	5.0	200.8		2-8-17	
Lab ID:	02-036-09					
Client ID:	SEIMN-20170203					
Copper	ND	1.0	200.8		2-8-17	
Zinc	ND	5.0	200.8		2-8-17	
Lab ID:	02-036-10					
Client ID:	SEIMS-20170203					
Copper	ND	1.0	200.8		2-8-17	
Zinc	ND	5.0	200.8		2-8-17	
Lab ID:	02-036-11					
Client ID:	TOSMI-20170203					
Copper	4.2	1.0	200.8		2-8-17	
Zinc	48	5.0	200.8		2-8-17	
Lab ID:	02-036-12					
Client ID:	TOSMO-20170203					
Copper	2.5	1.0	200.8		2-8-17	
Zinc	19	5.0	200.8		2-8-17	



Date of Report: March 2, 2017
 Samples Submitted: February 3, 2017
 Laboratory Reference: 1702-036
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-036-13					
Client ID:	TYLMI-20170203					
Copper	1.5	1.0	200.8		2-8-17	
Zinc	ND	5.0	200.8		2-8-17	

Lab ID:	02-036-14					
Client ID:	TYLMO-20170203					
Copper	9.3	1.0	200.8		2-8-17	
Zinc	ND	5.0	200.8		2-8-17	

Lab ID:	02-036-15					
Client ID:	QA22-20170203					
Copper	ND	1.0	200.8		2-8-17	
Zinc	ND	5.0	200.8		2-8-17	



Date of Report: March 2, 2017
Samples Submitted: February 3, 2017
Laboratory Reference: 1702-036
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 2-8-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0208D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: March 2, 2017
Samples Submitted: February 3, 2017
Laboratory Reference: 1702-036
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 2-8-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-036-10

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: March 2, 2017
 Samples Submitted: February 3, 2017
 Laboratory Reference: 1702-036
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 2-8-17

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 02-036-10

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	72.6	91	72.4	91	0	
Zinc	80.0	81.2	102	81.8	102	1	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

Mar 2 2017
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: Blair Goodrow

Dear Blair Goodrow:

Enclosed please find the analytical data for your Redmond Paired Watershed Study project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20170203	Water	17-A001551	Micro, NUT
COUMI-20170203	Water	17-A001552	Micro, NUT
COUMO-20170203	Water	17-A001553	Micro, NUT
EVAMS-20170203	Water	17-A001554	Micro, NUT
EVALSS-20170203	Water	17-A001555	Micro, NUT
MONMN-20170203	Water	17-A001556	Micro, NUT
MONMS-20170203	Water	17-A001557	Micro, NUT
MONM-20170203	Water	17-A001558	Micro, NUT
SEIMN-20170203	Water	17-A001559	Micro, NUT
SEIMS-20170203	Water	17-A001560	Micro, NUT
TOSMI-20170203	Water	17-A001561	Micro, NUT
TOSMO-20170203	Water	17-A001562	Micro, NUT
TYLMI-20170203	Water	17-A001563	Micro, NUT
TYLMO-20170203	Water	17-A001564	Micro, NUT
QA22-20170203	Water	17-A001565	Micro, NUT

Your samples were received on Saturday, February 4, 2017. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

Mar 2 2017
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-5806-000

BACT = Bacteriological
CONV = Conventionals

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
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Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



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Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: Blair Goodrow
Project Name: Redmond Paired Watershed Study
Project #: 14-5806-000
All results reported on an as received basis.

Date Received: 02/04/17
Date Reported: 3/ 2/17

AMTEST Identification Number 17-A001551
Client Identification COLM-20170203
Sampling Date 02/03/17, 16:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	64.	CFU/100 ml		1	SM 9222D	JM	02/04/17
Total Nitrogen (NOX&TKN)	0.81	mg/l		0.1			
Total Nitrogen (TKN)	0.679	mg/l		0.1	SM4500N	SW	02/17/17
Nitrate + Nitrite	0.13	mg/l		0.01	SM4500NO3	JC	02/22/17

AMTEST Identification Number 17-A001552
Client Identification COUMI-20170203
Sampling Date 02/03/17, 13:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	900	CFU/100 ml		1	SM 9222D	JM	02/04/17
Total Nitrogen (NOX&TKN)	1.12	mg/l		0.1			
Total Nitrogen (TKN)	0.884	mg/l		0.1	SM4500N	SW	02/17/17
Nitrate + Nitrite	0.24	mg/l		0.01	SM4500NO3	JC	02/22/17

AMTEST Identification Number 17-A001553
Client Identification COUMO-20170203
Sampling Date 02/03/17, 13:20

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	250	CFU/100 ml		1	SM 9222D	JM	02/04/17
Total Nitrogen (NOX&TKN)	2.13	mg/l		0.1			
Total Nitrogen (TKN)	1.70	mg/l		0.1	SM4500N	SW	02/17/17
Nitrate + Nitrite	0.43	mg/l		0.01	SM4500NO3	JC	02/22/17

AMTEST Identification Number 17-A001554
Client Identification EVAMS-20170203
Sampling Date 02/03/17, 14:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	4.	CFU/100 ml		1	SM 9222D	JM	02/04/17
Total Nitrogen (NOX&TKN)	2.65	mg/l		0.1			
Total Nitrogen (TKN)	0.750	mg/l		0.1	SM4500N	SW	02/17/17
Nitrate + Nitrite	1.9	mg/l		0.01	SM4500NO3	JC	02/22/17

AMTEST Identification Number 17-A001555
Client Identification EVALSS-20170203
Sampling Date 02/03/17, 15:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	17.	CFU/100 ml		1	SM 9222D	JM	02/04/17
Total Nitrogen (NOX&TKN)	2.17	mg/l		0.1			
Total Nitrogen (TKN)	0.669	mg/l		0.1	SM4500N	SW	02/17/17
Nitrate + Nitrite	1.5	mg/l		0.01	SM4500NO3	JC	02/22/17

AMTEST Identification Number 17-A001556
Client Identification MONMN-20170203
Sampling Date 02/03/17, 16:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	42.	CFU/100 ml		1	SM 9222D	JM	02/04/17
Total Nitrogen (NOX&TKN)	1.01	mg/l		0.1			
Total Nitrogen (TKN)	0.690	mg/l		0.1	SM4500N	SW	02/17/17
Nitrate + Nitrite	0.32	mg/l		0.01	SM4500NO3	JC	02/22/17

AMTEST Identification Number 17-A001557
Client Identification MONMS-20170203
Sampling Date 02/03/17, 16:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	150	CFU/100 ml		1	SM 9222D	JM	02/04/17
Total Nitrogen (NOX&TKN)	1.41	mg/l		0.1			
Total Nitrogen (TKN)	1.00	mg/l		0.1	SM4500N	SW	02/17/17
Nitrate + Nitrite	0.41	mg/l		0.01	SM4500NO3	JC	02/22/17

AMTEST Identification Number 17-A001558
Client Identification MONM-20170203
Sampling Date 02/03/17, 17:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	180	CFU/100 ml		1	SM 9222D	JM	02/04/17
Total Nitrogen (NOX&TKN)	0.39	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	JC	02/23/17
Nitrate + Nitrite	0.39	mg/l		0.01	SM4500NO3	JC	02/22/17

AMTEST Identification Number 17-A001559
Client Identification SEIMN-20170203
Sampling Date 02/03/17, 16:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	56.	CFU/100 ml		1	SM 9222D	JM	02/04/17
Total Nitrogen (NOX&TKN)	0.56	mg/l		0.1			
Total Nitrogen (TKN)	0.239	mg/l		0.1	SM4500N	JC	03/02/17
Nitrate + Nitrite	0.32	mg/l		0.01	SM4500NO3	JC	02/22/17

AMTEST Identification Number 17-A001560
Client Identification SEIMS-20170203
Sampling Date 02/03/17, 17:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	120	CFU/100 ml		1	SM 9222D	JM	02/04/17
Total Nitrogen (NOX&TKN)	1.69	mg/l		0.1			
Total Nitrogen (TKN)	1.41	mg/l		0.1	SM4500N	JC	02/23/17
Nitrate + Nitrite	0.28	mg/l		0.01	SM4500NO3	JC	02/22/17

AMTEST Identification Number 17-A001561
Client Identification TOSMI-20170203
Sampling Date 02/03/17, 13:55

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1200	CFU/100 ml		1	SM 9222D	JM	02/04/17
Total Nitrogen (NOX&TKN)	3.12	mg/l		0.1			
Total Nitrogen (TKN)	2.67	mg/l		0.1	SM4500N	JC	02/23/17
Nitrate + Nitrite	0.45	mg/l		0.01	SM4500NO3	JC	02/22/17

AMTEST Identification Number 17-A001562
Client Identification TOSMO-20170203
Sampling Date 02/03/17, 14:20

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1600	CFU/100 ml		1	SM 9222D	JM	02/04/17
Total Nitrogen (NOX&TKN)	2.00	mg/l		0.1			
Total Nitrogen (TKN)	1.48	mg/l		0.1	SM4500N	JC	02/23/17
Nitrate + Nitrite	0.52	mg/l		0.01	SM4500NO3	JC	02/22/17

AMTEST Identification Number 17-A001563
Client Identification TYLMI-20170203
Sampling Date 02/03/17, 15:35

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	80.	CFU/100 ml		1	SM 9222D	JM	02/04/17
Total Nitrogen (NOX&TKN)	3.08	mg/l		0.1			
Total Nitrogen (TKN)	2.37	mg/l		0.1	SM4500N	JC	02/23/17
Nitrate + Nitrite	0.71	mg/l		0.01	SM4500NO3	JC	02/22/17

AMTEST Identification Number 17-A001564
Client Identification TYLMO-20170203
Sampling Date 02/03/17, 15:00

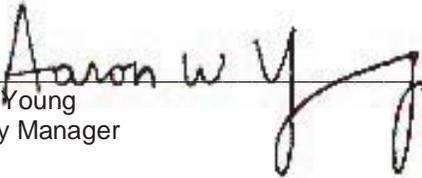
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	100	CFU/100 ml		1	SM 9222D	JM	02/04/17
Total Nitrogen (NOX&TKN)	1.45	mg/l		0.1			
Total Nitrogen (TKN)	1.18	mg/l		0.1	SM4500N	JC	02/23/17
Nitrate + Nitrite	0.27	mg/l		0.01	SM4500NO3	JC	02/22/17

AMTEST Identification Number 17-A001565
Client Identification QA22-20170203
Sampling Date 02/03/17, 14:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	23.	CFU/100 ml		1	SM 9222D	JM	02/04/17
Total Nitrogen (NOX&TKN)	4.92	mg/l		0.1			
Total Nitrogen (TKN)	3.22	mg/l		0.1	SM4500N	JC	02/23/17
Nitrate + Nitrite	1.7	mg/l		0.01	SM4500NO3	JC	02/22/17


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 17-A001551 to 17-A001565

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
17-A001554	Fecal Coliform	CFU/100 ml	4.	4.	0.00
17-A001564	Fecal Coliform	CFU/100 ml	100	150	40.
17-A001282	Total Nitrogen (TKN)	mg/l	2.00	1.90	5.1
17-A001528	Total Nitrogen (TKN)	mg/l	61.6	61.6	0.00
17-A001555	Total Nitrogen (TKN)	mg/l	0.669	0.711	6.1
17-A001557	Total Nitrogen (TKN)	mg/l	1.00	0.928	7.5
17-A001738	Total Nitrogen (TKN)	mg/l	0.792	0.540	38.
17-A001748	Total Nitrogen (TKN)	mg/l	0.485	0.532	9.2
17-A001818	Total Nitrogen (TKN)	mg/l	0.363	0.369	1.6
17-A001836	Total Nitrogen (TKN)	mg/l	0.143	0.121	17.
17-A001856	Total Nitrogen (TKN)	mg/l	0.905	0.886	2.1
17-A002019	Total Nitrogen (TKN)	mg/l	0.114	< 0.1	
17-A002029	Total Nitrogen (TKN)	mg/l	0.114	< 0.1	
17-A002118	Total Nitrogen (TKN)	mg/l	0.342	0.311	9.5
17-a001739	Total Nitrogen (TKN)	mg/l	0.249	0.288	15.
17-A001535	Nitrate + Nitrite	mg/l	2.0	2.1	4.9
17-A001552	Nitrate + Nitrite	mg/l	0.24	0.23	4.3
17-A001562	Nitrate + Nitrite	mg/l	0.52	0.52	0.00
17-A001736	Nitrate + Nitrite	mg/l	0.46	0.44	4.4
17-A001747	Nitrate + Nitrite	mg/l	0.38	0.37	2.7
17-A001841	Nitrate + Nitrite	mg/l	0.87	0.87	0.00
17-A001860	Nitrate + Nitrite	mg/l	0.013	0.011	17.
17-A002022	Nitrate + Nitrite	mg/l	0.080	0.078	2.5
17-A002048	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
17-A001282	Total Nitrogen (TKN)	mg/l	2.00	3.90	2.00	95.00 %
17-A001555	Total Nitrogen (TKN)	mg/l	0.669	2.75	2.00	104.05 %
17-A001557	Total Nitrogen (TKN)	mg/l	1.00	2.92	2.00	96.00 %
17-A001565	Total Nitrogen (TKN)	mg/l	3.22	8.24	5.00	100.40 %
17-A001738	Total Nitrogen (TKN)	mg/l	0.792	2.91	2.50	84.72 %
17-A001748	Total Nitrogen (TKN)	mg/l	0.485	2.68	2.50	87.80 %
17-A001818	Total Nitrogen (TKN)	mg/l	0.363	2.47	2.50	84.28 %
17-A001836	Total Nitrogen (TKN)	mg/l	0.143	2.68	2.50	101.48 %
17-A001856	Total Nitrogen (TKN)	mg/l	0.905	3.35	2.50	97.80 %
17-A002019	Total Nitrogen (TKN)	mg/l	0.114	2.52	2.50	96.24 %
17-A002029	Total Nitrogen (TKN)	mg/l	0.114	2.35	2.50	89.44 %
17-A001535	Nitrate + Nitrite	mg/l	2.0	4.4	2.5	96.00 %
17-A001552	Nitrate + Nitrite	mg/l	0.24	0.69	0.50	90.00 %

QC Summary for sample numbers: 17-A001551 to 17-A001565...

MATRIX SPIKES continued....

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
17-A001562	Nitrate + Nitrite	mg/l	0.52	1.0	0.50	96.00 %
17-A001736	Nitrate + Nitrite	mg/l	0.46	0.91	0.50	90.00 %
17-A001747	Nitrate + Nitrite	mg/l	0.38	0.82	0.50	88.00 %
17-A001841	Nitrate + Nitrite	mg/l	0.87	1.3	0.50	86.00 %
17-A001860	Nitrate + Nitrite	mg/l	0.013	0.45	0.50	87.40 %
17-A002022	Nitrate + Nitrite	mg/l	0.080	0.51	0.50	86.00 %
17-A002048	Nitrate + Nitrite	mg/l	< 0.01	0.46	0.50	92.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	1.00	0.974	97.4 %
Total Nitrogen (TKN)	mg/l	1.00	0.956	95.6 %
Total Nitrogen (TKN)	mg/l	1.00	1.04	104. %
Total Nitrogen (TKN)	mg/l	1.00	1.03	103. %
Total Nitrogen (TKN)	mg/l	1.00	1.05	105. %
Total Nitrogen (TKN)	mg/l	1.00	1.07	107. %
Total Nitrogen (TKN)	mg/l	1.00	1.14	114. %
Total Nitrogen (TKN)	mg/l	1.00	0.914	91.4 %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request
 1 Day 2 Day 3 Day
 Standard
 Other: _____

Laboratory Reference #: 02-036

Project Manager: Blair Goodrow
 email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1551	COLM-20170203	2/3/17	16:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
1552	COUMI-20170203	2/3/17	13:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
1553	COUMO-20170203	2/3/17	13:20	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
1554	EVAMS-20170203	2/3/17	14:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
1555	EVALSS-20170203	2/3/17	15:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
1556	MONMN-20170203	2/3/17	16:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
1557	MONMS-20170203	2/3/17	16:25	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
1558	MONM-20170203	2/3/17	17:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
1559	SEIMN-20170203	2/3/17	16:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
1560	SEIMS-20170203	2/3/17	17:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N

Signature	Company	Date	Time	Comments/Special Instructions
Relinquished by:	OnSite Env	2/4/17	9:10	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:	AmTest Env	2/4/17	9:10	
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 02-036

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
11	TOSMI-20170203	2/3/17	13:55	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
12	TOSMO-20170203	2/3/17	14:20	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
13	TYLMI-20170203	2/3/17	15:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
14	TYLMO-20170203	2/3/17	15:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
15	QA22-20170203	2/3/17	14:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N

1561
1562
1563
1564
1565

Signature	Company	Date	Time	Comments/Special Instructions
Relinquished by:	OnSite Env Inc	2/4/17	9:10	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:	AmTest Inc	2/4/17	9:10	
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants

Project No.: 14-05806-000

Project Name: Redmond Paired Watershed Study

Project Manager: George Iftner

CHAIN OF CUSTODY

02-036

Page 1 of 1

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No.

Requested Analyses

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2017-0203	16:30	2/3/17	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2017-0203	13:50		Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2017-0203	13:20		Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2017-0203	14:40		Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2017-0203	15:10		Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2017-0203	15:00		Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2017-0203	16:25		Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2017-0203	17:00		Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2017-0203	16:00		Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2017-0203	17:45		Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2017-0203	13:55		Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2017-0203	14:20		Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2017-0203	15:35		Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2017-0203	15:00		Water	7	X	X	X	X	X	X	X	X	X
15	QA22-2017-0203	14:00	*	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by George Iftner Date 2/3/17 Received by [Signature] Date 2/3/17
 Firm Herrera Time 18:40 Firm O&E Time 18:40

Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:

* - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants

Project No.: 14-05806-000

Project Name: Redmond Paired Watershed Study

Project Manager: George Ifner

CHAIN OF CUSTODY

02-036

Page 1 of 1

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No.

Requested Analyses

Lab ID	Sample Identification	Time Date		Matrix	# of Cont.	Requested Analyses										
		Date Sampled	Time Sampled			Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B)*	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-IB)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8)*		
1	COLM-2017-0203	16:30	2/3/17	Water	7	X	X	X	X	X	X	X	X	X		
2	COUMI-2017-0203	13:50		Water	7	X	X	X	X	X	X	X	X	X		
3	COUMO-2017-0203	13:20		Water	7	X	X	X	X	X	X	X	X	X		
4	EVAMS-2017-0203	14:40		Water	7	X	X	X	X	X	X	X	X	X		
5	EVALSS-2017-0203	15:10		Water	7	X	X	X	X	X	X	X	X	X		
6	MONMN-2017-0203	16:00		Water	7	X	X	X	X	X	X	X	X	X		
7	MONMS-2017-0203	16:25		Water	7	X	X	X	X	X	X	X	X	X		
8	MONM-2017-0203	17:08		Water	7	X	X	X	X	X	X	X	X	X		
9	SEIMN-2017-0203	16:00		Water	7	X	X	X	X	X	X	X	X	X		
10	SEIMS-2017-0203	17:45		Water	7	X	X	X	X	X	X	X	X	X		
11	TOSMI-2017-0203	13:55		Water	7	X	X	X	X	X	X	X	X	X		
12	TOSMO-2017-0203	14:20		Water	7	X	X	X	X	X	X	X	X	X		
13	TYLMI-2017-0203	15:35		Water	7	X	X	X	X	X	X	X	X	X		
14	TYLMO-2017-0203	15:00		Water	7	X	X	X	X	X	X	X	X	X		
15	QA22-2017-0203	14:00		Water	7	X	X	X	X	X	X	X	X	X		

Relinquished by George Ifner Date 2/3/17 Received by [Signature] Date 2/3/17
 Firm Herrera Time 18:40 Firm OBE Time 18:40

Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	A. SVENDSEN		
Meter:	YSI ProDSS #2		
Date/Time:	2/3/17 1130		
Barometric Pressure Start of Day:	Inches Hg: 747.0	Time: 1148	
Barometric Pressure End of Day:	Inches Hg: 745.8	Time: 2030	

PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	1.5	0	18.7	
Conductivity (µS/cm)	1,001	1,000	18.4	
Conductivity (µS/cm)	99.7	100	19.0	
DO % Saturation	99.0	100	17.9	

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	1.7	0	18.9	
Conductivity (µS/cm)	99.9	100	18.8	
DO % Saturation	98.8	100	18.1	

Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:



1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
 2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
 3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
 4. Make sure there are no bubbles in the cell; wait 2 minutes.
 5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
 6. Check conductivity using 100 µS/cm standard.
- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000			
Personnel Performing Calibration:	A. SVENDSEN			
Meter:	YSI PRO DSS #1			
Date/Time:	2/3/17 1130			
Barometric Pressure Start of Day:	Inches Hg:	746.2	Time:	1145
Barometric Pressure End of Day:	Inches Hg:	745.1	Time:	1930

PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	2.0	0	18.8	
Conductivity (µS/cm)	990	1,000	18.6	CALIB'D; READS 1,000 µS AFTER CAL
Conductivity (µS/cm)	99.6	100	18.9	
DO % Saturation	99.2	100	18.2	

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	1.7	0	19.0	
Conductivity (µS/cm)	99.8	100	19.1	
DO % Saturation	99.1	100	18.7	

Calibration Procedures:

Rinse Multimeter Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: E. Estner, A. Higg
 Sample Date: 2-3-17 Sample Time: 16:30 PDT
 Base Flow or Storm Event? Storm Field Filtered Time: 16:35 PST
(Must filter within 15 minutes of collection)

SITE ID: COLM
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: COLM-20170203

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: Very lt. brown
 Odor: NO
 Sheen: None
 Floatables: Natural foam

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leath Signature: [Signature]
 Date Checked: 2-21-17 Time: 4:40
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: Rain 38° F.

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 X _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 5.61
 Reference Point (description): Stream gauge

Water Quality Measurements

Temperature (°C) 20.2
 Specific Conductivity (µs/cm) 31.4
 Dissolved Oxygen (mg/L) 12.71

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. SWENSSON
 Sample Date: 2/3/1 Sample Time: 1350
 Base Flow or Storm Event? Storm Field Filtered Time: 1355
(Must filter within 15 minutes of collection)

SITE ID: COUM 1
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: LIGHT RAIN, 39°F

Water Quality Sampling

Sample ID: COUM1-20170203

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:
 Clarity: TURBID
 Color: DARK BROWN
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Sasha Lenth Signature: [Signature]
 Date Checked: 3-21-17 Time: 1416
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 2.74
 Reference Point (description): S6

Water Quality Measurements

Temperature (°C) 4.9
 Specific Conductivity (µs/cm) 157.3
 Dissolved Oxygen (mg/L) 12.45

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS
 Sample Date: 2/3/17 Sample Time: 1320 PDT
 Base Flow or Storm Event? Field Filtered Time: 1325 PST
(Must filter within 15 minutes of collection)

SITE ID: COUM0
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: COUM 2017.0203

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: VERY TURBID
 Color: DARK BROWN
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Sohee Lenth Signature: [Signature]
 Date Checked: 2-21-17 Time: 1440
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Light rain 39° f

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.30
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 5.5
 Specific Conductivity (µs/cm) 218.2
 Dissolved Oxygen (mg/L) 12.26

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



HERRERA

Field Personnel: G. Iffler, A. Higgs
 Sample Date: 2-3-17 Sample Time: 14:40 PDT
 Base Flow or Storm Event? Storm Field Filtered Time: 14:45 PST
(Must filter within 15 minutes of collection)

SITE ID: EKAMS
 Project Number: 14-05806-000

Water Quality Sampling

Sample ID: EKAMS-20170203

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	✓
DOC *	HDPE	250 ml	1	HCL	✓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	✓
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	✓
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	✓
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	✓
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	✓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: 0222-20170203
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Sarah Lenth Signature: [Signature]
 Date Checked: 3-21-17 Time: 14:40
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Steady rain 39°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 X
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.89
 Reference Point (description): Stream Gauge

Water Quality Measurements

Temperature (°C) 4.3° C
 Specific Conductivity (µs/cm) 187.4 µs/cm
 Dissolved Oxygen (mg/L) 12.53

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Ifner, A. Niyas
 Sample Date: 2-3-17 Sample Time: 15:10 PDT
 Base Flow or Storm Event? Storm Field Filtered Time: 15:15 PST:
(Must filter within 15 minutes of collection)

SITE ID: EVALSS
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: EVALSS-2017 02 03

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Slightly turbid
 Color: Very light Brown
 Odor: None
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 3-21-17 Time: 4:40
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Steady rain 39°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

- YSI 556 (05M1466)
- YSI Pro Plus (15D100020)
- YSI Pro DSS 1
- YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.37
 Reference Point (description): Strbana gauge

Water Quality Measurements

Temperature (°C) 4.6
 Specific Conductivity (µs/cm) 172.7
 Dissolved Oxygen (mg/L) 12.67

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS

Sample Date: 2-3-17

Sample Time: 1600

PDT

SITE ID: MONMN

Base Flow or Storm Event?

Field Filtered Time: 1605

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Water Quality Sampling

Sample ID: MONMN-20170203

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: STEADY RAIN, 37°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: MOD. TURBID
 Color: LIB + T Blown
 Odor:
 Sheen:
 Floatables:

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Leuth Signature: [Signature]

Date Checked: 2-21-17 Time: 4:00

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 9.17

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 4.1

Specific Conductivity (µs/cm) 113.5

Dissolved Oxygen (mg/L) 12.30

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS
 Sample Date: 2.3.17 Sample Time: 1625 PDT
 Base Flow or Storm Event Field Filtered Time: 1630 PST
 (Must filter within 15 minutes of collection)

SITE ID: MONMS
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: MONMS-20170203

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: MCD. TURBID
 Color: LIGHT BROWN
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Sam Leath Signature: [Signature]
 Date Checked: 2.21.17 Time: 4:40
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: STEADY RAIN, 37°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro DSS 1
YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 6.68
 Reference Point (description): TOP OF PVC w/WLI

Water Quality Measurements

Temperature (°C) 4.4
 Specific Conductivity (µs/cm) 398.6
 Dissolved Oxygen (mg/L) 10.72

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AR

Sample Date: 2-3-17

Sample Time: 1700

PDF

SITE ID: MONM

Base Flow or Storm Event? Storm

Field Filtered Time: 1705

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: STEADY RAIN, 37°F

Water Quality Sampling

Sample ID: MONM-20170203

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: MOD. TURBID
 Color: LIGHT BROWN
 Odor: ---
 Sheen: ---
 Floatables: ---

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Leath Signature: [Signature]

Date Checked: 3-21-17 Time: 14:40

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 59 INCHES

Reference Point (description): TOP OF CURVE

Water Quality Measurements

Temperature (°C) 4.3

Specific Conductivity (µs/cm) 204.2

Dissolved Oxygen (mg/L) 12.72

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Iftner, A. Higley
 Sample Date: 2-3-17 Sample Time: 16:00 PDT
 Base Flow or Storm Event? Storm Field Filtered Time: 16:05 PST:
(Must filter within 15 minutes of collection)

SITE ID: SEIMN
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Steady rain 39°F

Water Quality Sampling

Sample ID: SEIMN-20170203

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:
 Clarity: Very slightly turbid
 Color: slight yellowish brown
 Odor: None
 Sheen: NA NA
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Soren Lenth Signature: [Signature]
 Date Checked: 3-21-17 Time: 4:40
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

- YSI 556 (05M1466) _____
- YSI Pro Plus (15D100020) _____
- YSI Pro DSS 1 X _____
- YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 7.51
 Reference Point (description): Stream gauge

Water Quality Measurements

Temperature (°C) 4.0
 Specific Conductivity (µs/cm) 63.8
 Dissolved Oxygen (mg/L) 12.72

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. J. Fisher
 Sample Date: 2-3-17 Sample Time: 17:45 PDT
 Base Flow or Storm Event? Storm Field Filtered Time: 17:50 PST
 (Must filter within 15 minutes of collection)

SITE ID: SEIMS
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: SEIMS-2017 0203

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain 37°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Slightly turbid
 Color: light brown
 Odor: None
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Tina Lantz Signature: [Signature]
 Date Checked: 3-21-17 Time: 9:40
 Data Entered into Database? YES NO Initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 X _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.85
 Reference Point (description): Stream gauge

Water Quality Measurements

Temperature (°C) 3.4°
 Specific Conductivity (µs/cm) 84.4
 Dissolved Oxygen (mg/L) 12.45

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: C. Iffner, A. Higgins
 Sample Date: 2-3-17 Sample Time: 13:55 PDT
 Base Flow or Storm Event? Storm Field Filtered Time: 14:00 PST

SITE ID: TOSMIF

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain 39° F

Water Quality Sampling

Sample ID: TOSMIF-20170203

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Very turbid
 Color: Light Brown
 Odor: None
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 3-21-17 Time: 4:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

- YSI 556 (05M1466)
- YSI Pro Plus (15D100020)
- YSI Pro DSS 1
- YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.99
 Reference Point (description): stream gauge

Water Quality Measurements

Temperature (°C) 5.7°
 Specific Conductivity (µs/cm) 254
 Dissolved Oxygen (mg/L) 12.2

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. SVENLIDSEN

Sample Date: 2/13/17

Sample Time: 1420

SITE ID: TOSMO

PDT

Base Flow or Storm Event? (circled)

Field Filtered Time: 1425

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: STEADY RAIN, ~ 38F

Water Quality Sampling

Sample ID: TOSMO-20170203

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: VERY TURBID

Color: BROWN

Odor: ---

Sheen: ---

Floatables: LEAVES, FOAM

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Lentz

Signature: [Signature]

Date Checked: 3-21-17

Time: 4:40

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.84

Reference Point (description): SL

Water Quality Measurements

Temperature (°C) 5.4

Specific Conductivity (µs/cm) 198.8

Dissolved Oxygen (mg/L) 12.33

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS

Sample Date: 2-3-17

Sample Time: 1535

PDT:

SITE ID: TYLMI

Base Flow or Storm Event?

Field Filtered Time: 1540

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: LIGHT RAIN, 38°F

Water Quality Sampling

Sample ID: TYLMI-20170203

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	/
Filter blank sample ID:	/
Transfer blank sample ID:	/

Visual and Olfactory Conditions:

Clarity: MODERATELY TURBID
 Color: SLIGHT BROWN
 Odor: —
 Sheen: —
 Floatables: —

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lamb Signature: [Signature]

Date Checked: 3-21-17 Time: 14:40

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.50

Reference Point (description): TOP OF CURB OF RIM

Water Quality Measurements

Temperature (°C) 5.3

Specific Conductivity (µs/cm) 198.2

Dissolved Oxygen (mg/L) 11.77

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS

Sample Date: 2-3-17 Sample Time: 1500 PDT

Base Flow or Storm Event? Storm Field Filtered Time: 1505 PST

(Must filter within 15 minutes of collection)

SITE ID: TYLMO

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: STEADY RAIN 36°F

Water Quality Sampling

Sample ID: TYLMO-20170203

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: TURBID
 Color: BROWN
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Edna Herrera Signature: [Signature]

Date Checked: 2-21-17 Time: 4:40

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.55 FT

Reference Point (description): TOP OF CONCRETE RIM

Water Quality Measurements

Temperature (°C) 4.3

Specific Conductivity (µs/cm) 105.6

Dissolved Oxygen (mg/L) 12.48



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 3/22/2017 Page 1 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 2/03/2017 / All sites, 1 FD (QA22) at EVAMS

date 3/22/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	4	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	102	±20	1	≤25	0	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	<1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	0	≤25	14	≤25	OK	NONE
Hardness	OK / SM 2340B	NA	NA	5	≤180	≤1.0 mg/L 1.0 mg/L	103,107	±25	103	±15	6	≤20	3.7	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	3	≤28	≤1.0 mg/L 1.0 mg/L	94	±25	109	±15	4	≤20	D=0.5	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	10	≤28	≤0.01 mg/L 0.01 mg/L	99	±25	95	±20	7	≤20	D=0.010	≤20	OK	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	14-19	≤28	≤0.1 mg/L 0.1 mg/L	90-104	±25	91-114	±20	0-7.5	≤20	60	≤20	OK	FLAG EVAMS "J" DUE TO FD EXCEEDANCE.

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 3/22/2017 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 2/03/2017 / All sites, 1 FD (QA22) at EVAMS

date 3/22/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	6	≤180	≤1.0 µg/L 1.0 µg/L	85,87	±25	NR	±15	7	≤20	NC	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	6	≤180	≤5.0 µg/L 5.0 µg/L	92,95	±25	NR	±15	4	≤20	NC	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	5	≤180	≤1.0 µg/L 1.0 µg/L	91,91	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	5	≤180	≤5.0 µg/L 5.0 µg/L	102,102	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	0,40	≤35	D=19	≤50	OK	FLAG EVAMS "J" DUE TO FD EXCEEDANCE. FLAG TYLMO "J" DUE TO LAB DUP EXCEEDANCE.

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

March 2, 2017

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1702-068

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on February 9, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular flourish.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: March 2, 2017
Samples Submitted: February 9, 2017
Laboratory Reference: 1702-068
Project: 14-05806-000

Case Narrative

Samples were collected on February 8, 2017 and received by the laboratory on February 9, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



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**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170208					
Laboratory ID:	02-068-01					
Total Suspended Solids	2.0	1.0	SM 2540D	2-14-17	2-15-17	

Client ID:	COUMI-20170208					
Laboratory ID:	02-068-02					
Total Suspended Solids	38	1.7	SM 2540D	2-14-17	2-15-17	

Client ID:	COUMO-20170208					
Laboratory ID:	02-068-03					
Total Suspended Solids	26	1.0	SM 2540D	2-14-17	2-15-17	

Client ID:	EVAMS-20170208					
Laboratory ID:	02-068-04					
Total Suspended Solids	15	1.0	SM 2540D	2-14-17	2-15-17	

Client ID:	EVALSS-20170208					
Laboratory ID:	02-068-05					
Total Suspended Solids	15	1.0	SM 2540D	2-14-17	2-15-17	

Client ID:	MONMN-20170208					
Laboratory ID:	02-068-06					
Total Suspended Solids	7.6	1.0	SM 2540D	2-14-17	2-15-17	

Client ID:	MONMS-20170208					
Laboratory ID:	02-068-07					
Total Suspended Solids	5.4	1.0	SM 2540D	2-14-17	2-15-17	



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**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170208					
Laboratory ID:	02-068-08					
Total Suspended Solids	19	1.0	SM 2540D	2-14-17	2-15-17	

Client ID:	SEIMN-20170208					
Laboratory ID:	02-068-09					
Total Suspended Solids	21	1.0	SM 2540D	2-14-17	2-15-17	

Client ID:	SEIMS-20170208					
Laboratory ID:	02-068-10					
Total Suspended Solids	31	1.0	SM 2540D	2-14-17	2-15-17	

Client ID:	TOSMI-20170208					
Laboratory ID:	02-068-11					
Total Suspended Solids	60	1.0	SM 2540D	2-14-17	2-15-17	

Client ID:	TOSMO-20170208					
Laboratory ID:	02-068-12					
Total Suspended Solids	47	1.7	SM 2540D	2-14-17	2-15-17	

Client ID:	TYLMI-20170208					
Laboratory ID:	02-068-13					
Total Suspended Solids	18	1.0	SM 2540D	2-14-17	2-15-17	

Client ID:	TYLMO-20170208					
Laboratory ID:	02-068-14					
Total Suspended Solids	13	1.0	SM 2540D	2-14-17	2-15-17	



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TOTAL SUSPENDED SOLIDS
SM 2540D

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA23-20170208					
Laboratory ID:	02-068-15					
Total Suspended Solids	28	1.0	SM 2540D	2-14-17	2-15-17	



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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0214W1					
Total Suspended Solids	ND	1.0	SM 2540D	2-14-17	2-15-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	02-068-13							
	ORIG	DUP						
Total Suspended Solids	18.4	19.2	NA	NA	NA	4	20	

SPIKE BLANK								
Laboratory ID:	SB0214W1							
	SB	SB		SB				
Total Suspended Solids	93.0	100	NA	93	78-113	NA	NA	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170208					
Laboratory ID:	02-068-01					
Turbidity	0.41	0.10	EPA 180.1	2-9-17	2-9-17	

Client ID:	COUMI-20170208					
Laboratory ID:	02-068-02					
Turbidity	11	0.10	EPA 180.1	2-9-17	2-9-17	

Client ID:	COUMO-20170208					
Laboratory ID:	02-068-03					
Turbidity	13	0.10	EPA 180.1	2-9-17	2-9-17	

Client ID:	EVAMS-20170208					
Laboratory ID:	02-068-04					
Turbidity	6.5	0.10	EPA 180.1	2-9-17	2-9-17	

Client ID:	EVALSS-20170208					
Laboratory ID:	02-068-05					
Turbidity	5.5	0.10	EPA 180.1	2-9-17	2-9-17	

Client ID:	MONMN-20170208					
Laboratory ID:	02-068-06					
Turbidity	4.1	0.10	EPA 180.1	2-9-17	2-9-17	

Client ID:	MONMS-20170208					
Laboratory ID:	02-068-07					
Turbidity	5.2	0.10	EPA 180.1	2-9-17	2-9-17	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170208					
Laboratory ID:	02-068-08					
Turbidity	9.5	0.10	EPA 180.1	2-9-17	2-9-17	

Client ID:	SEIMN-20170208					
Laboratory ID:	02-068-09					
Turbidity	7.0	0.10	EPA 180.1	2-9-17	2-9-17	

Client ID:	SEIMS-20170208					
Laboratory ID:	02-068-10					
Turbidity	10	0.10	EPA 180.1	2-9-17	2-9-17	

Client ID:	TOSMI-20170208					
Laboratory ID:	02-068-11					
Turbidity	23	0.10	EPA 180.1	2-9-17	2-9-17	

Client ID:	TOSMO-20170208					
Laboratory ID:	02-068-12					
Turbidity	24	0.10	EPA 180.1	2-9-17	2-9-17	

Client ID:	TYLMI-20170208					
Laboratory ID:	02-068-13					
Turbidity	9.8	0.10	EPA 180.1	2-9-17	2-9-17	

Client ID:	TYLMO-20170208					
Laboratory ID:	02-068-14					
Turbidity	6.6	0.10	EPA 180.1	2-9-17	2-9-17	



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TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA23-20170208					
Laboratory ID:	02-068-15					
Turbidity	11	0.10	EPA 180.1	2-9-17	2-9-17	



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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0209W1					
Turbidity	ND	0.10	EPA 180.1	2-9-17	2-9-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	02-056-01							
	ORIG	DUP						
Turbidity	1.99	2.00	NA	NA	NA	NA	1	15



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170208					
Laboratory ID:	02-068-01					
Hardness	9.8	5.0	200.7/SM 2340B	2-10-17	2-15-17	

Client ID:	COUMI-20170208					
Laboratory ID:	02-068-02					
Hardness	66	5.0	200.7/SM 2340B	2-10-17	2-15-17	

Client ID:	COUMO-20170208					
Laboratory ID:	02-068-03					
Hardness	65	5.0	200.7/SM 2340B	2-10-17	2-15-17	

Client ID:	EVAMS-20170208					
Laboratory ID:	02-068-04					
Hardness	66	5.0	200.7/SM 2340B	2-10-17	2-15-17	

Client ID:	EVALSS-20170208					
Laboratory ID:	02-068-05					
Hardness	61	5.0	200.7/SM 2340B	2-10-17	2-15-17	

Client ID:	MONMN-20170208					
Laboratory ID:	02-068-06					
Hardness	36	5.0	200.7/SM 2340B	2-10-17	2-15-17	

Client ID:	MONMS-20170208					
Laboratory ID:	02-068-07					
Hardness	74	5.0	200.7/SM 2340B	2-10-17	2-15-17	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170208					
Laboratory ID:	02-068-08					
Hardness	52	5.0	200.7/SM 2340B	2-10-17	2-15-17	

Client ID:	SEIMN-20170208					
Laboratory ID:	02-068-09					
Hardness	18	1.0	200.7/SM 2340B	2-10-17	2-16-17	

Client ID:	SEIMS-20170208					
Laboratory ID:	02-068-10					
Hardness	32	1.0	200.7/SM 2340B	2-10-17	2-16-17	

Client ID:	TOSMI-20170208					
Laboratory ID:	02-068-11					
Hardness	64	1.0	200.7/SM 2340B	2-10-17	2-16-17	

Client ID:	TOSMO-20170208					
Laboratory ID:	02-068-12					
Hardness	53	1.0	200.7/SM 2340B	2-10-17	2-16-17	

Client ID:	TYLMI-20170208					
Laboratory ID:	02-068-13					
Hardness	46	1.0	200.7/SM 2340B	2-10-17	2-16-17	

Client ID:	TYLMO-20170208					
Laboratory ID:	02-068-14					
Hardness	36	1.0	200.7/SM 2340B	2-10-17	2-16-17	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA23-20170208					
Laboratory ID:	02-068-15					
Hardness	67	1.0	200.7/SM 2340B	2-10-17	2-16-17	



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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0210WH2					
Hardness	ND	1.0	200.7/SM 2340B	2-10-17	2-15-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	02-068-01							
	ORIG	DUP						
Hardness	9.80	8.88	NA	NA	NA	NA	10	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	02-068-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	141	145	132	132	9.80	99	102	75-125	3	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags	
SPIKE BLANK									
Laboratory ID:	SB0210WH2								
	SB		SB		SB				
Hardness	140		132		NA	106	80-120	NA	NA



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170208					
Laboratory ID:	02-068-01					
Dissolved Organic Carbon	9.5	1.0	SM 5310B	2-16-17	2-16-17	
Client ID:	COUMI-20170208					
Laboratory ID:	02-068-02					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	2-16-17	2-16-17	
Client ID:	COUMO-20170208					
Laboratory ID:	02-068-03					
Dissolved Organic Carbon	3.7	1.0	SM 5310B	2-16-17	2-16-17	
Client ID:	EVAMS-20170208					
Laboratory ID:	02-068-04					
Dissolved Organic Carbon	5.3	1.0	SM 5310B	2-16-17	2-16-17	
Client ID:	EVALSS-20170208					
Laboratory ID:	02-068-05					
Dissolved Organic Carbon	5.3	1.0	SM 5310B	2-16-17	2-16-17	
Client ID:	MONMN-20170208					
Laboratory ID:	02-068-06					
Dissolved Organic Carbon	4.2	1.0	SM 5310B	2-16-17	2-16-17	
Client ID:	MONMS-20170208					
Laboratory ID:	02-068-07					
Dissolved Organic Carbon	5.3	1.0	SM 5310B	2-16-17	2-16-17	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170208					
Laboratory ID:	02-068-08					
Dissolved Organic Carbon	4.3	1.0	SM 5310B	2-16-17	2-16-17	
Client ID:	SEIMN-20170208					
Laboratory ID:	02-068-09					
Dissolved Organic Carbon	7.0	1.0	SM 5310B	2-16-17	2-16-17	
Client ID:	SEIMS-20170208					
Laboratory ID:	02-068-10					
Dissolved Organic Carbon	6.1	1.0	SM 5310B	2-16-17	2-16-17	
Client ID:	TOSMI-20170208					
Laboratory ID:	02-068-11					
Dissolved Organic Carbon	3.3	1.0	SM 5310B	2-16-17	2-16-17	
Client ID:	TOSMO-20170208					
Laboratory ID:	02-068-12					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	2-16-17	2-16-17	
Client ID:	TYLMI-20170208					
Laboratory ID:	02-068-13					
Dissolved Organic Carbon	5.6	1.0	SM 5310B	2-16-17	2-16-17	
Client ID:	TYLMO-20170208					
Laboratory ID:	02-068-14					
Dissolved Organic Carbon	3.5	1.0	SM 5310B	2-16-17	2-16-17	



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**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA23-20170208					
Laboratory ID:	02-068-15					
Dissolved Organic Carbon	3.5	1.0	SM 5310B	2-16-17	2-16-17	



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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0216D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	2-16-17	2-16-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	02-068-02							
	ORIG	DUP						
Dissolved Organic Carbon	3.91	3.88	NA	NA	NA	1	20	

MATRIX SPIKE

Laboratory ID:	02-068-02							
	MS	MS		MS				
Dissolved Organic Carbon	14.7	10.0	3.91	108	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0216D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.8	10.0	NA	108	75-125	NA	NA	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170208					
Laboratory ID:	02-068-01					
Total Phosphorus	0.014	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	COUMI-20170208					
Laboratory ID:	02-068-02					
Total Phosphorus	0.093	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	COUMO-20170208					
Laboratory ID:	02-068-03					
Total Phosphorus	0.077	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	EVAMS-20170208					
Laboratory ID:	02-068-04					
Total Phosphorus	0.035	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	EVALSS-20170208					
Laboratory ID:	02-068-05					
Total Phosphorus	0.047	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	MONMN-20170208					
Laboratory ID:	02-068-06					
Total Phosphorus	0.036	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	MONMS-20170208					
Laboratory ID:	02-068-07					
Total Phosphorus	0.034	0.010	EPA 365.1	2-13-17	2-13-17	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170208					
Laboratory ID:	02-068-08					
Total Phosphorus	0.047	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	SEIMN-20170208					
Laboratory ID:	02-068-09					
Total Phosphorus	0.049	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	SEIMS-20170208					
Laboratory ID:	02-068-10					
Total Phosphorus	0.049	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	TOSMI-20170208					
Laboratory ID:	02-068-11					
Total Phosphorus	0.14	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	TOSMO-20170208					
Laboratory ID:	02-068-12					
Total Phosphorus	0.12	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	TYLMI-20170208					
Laboratory ID:	02-068-13					
Total Phosphorus	0.040	0.010	EPA 365.1	2-13-17	2-13-17	

Client ID:	TYLMO-20170208					
Laboratory ID:	02-068-14					
Total Phosphorus	0.038	0.010	EPA 365.1	2-13-17	2-13-17	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA23-20170208					
Laboratory ID:	02-068-15					
Total Phosphorus	0.062	0.010	EPA 365.1	2-13-17	2-13-17	



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**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0213W2					
Total Phosphorus	ND	0.010	EPA 365.1	2-13-17	2-13-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	02-068-01							
	ORIG	DUP						
Total Phosphorus	0.0141	0.0104	NA	NA	NA	30	11	C

MATRIX SPIKE								
Laboratory ID:	02-068-01							
	MS	MS		MS				
Total Phosphorus	0.266	0.250	0.0141	101	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0213W2							
	SB	SB		SB				
Total Phosphorus	0.246	0.250	NA	98	86-111	NA	NA	



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**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 02-068-01						
Client ID: COLM-20170208						
Copper	ND	1.0	200.8	2-10-17	2-13-17	
Zinc	ND	5.0	200.8	2-10-17	2-13-17	
Lab ID: 02-068-02						
Client ID: COUMI-20170208						
Copper	2.7	1.0	200.8	2-10-17	2-13-17	
Zinc	22	5.0	200.8	2-10-17	2-13-17	
Lab ID: 02-068-03						
Client ID: COUMO-20170208						
Copper	5.1	1.0	200.8	2-10-17	2-13-17	
Zinc	39	5.0	200.8	2-10-17	2-13-17	
Lab ID: 02-068-04						
Client ID: EVAMS-20170208						
Copper	1.1	1.0	200.8	2-10-17	2-13-17	
Zinc	5.9	5.0	200.8	2-10-17	2-13-17	
Lab ID: 02-068-05						
Client ID: EVALSS-20170208						
Copper	1.1	1.0	200.8	2-10-17	2-13-17	
Zinc	ND	5.0	200.8	2-10-17	2-13-17	
Lab ID: 02-068-06						
Client ID: MONMN-20170208						
Copper	1.5	1.0	200.8	2-10-17	2-13-17	
Zinc	9.7	5.0	200.8	2-10-17	2-13-17	



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TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-068-07					
Client ID:	MONMS-20170208					
Copper	2.7	1.0	200.8	2-10-17	2-13-17	
Zinc	10	5.0	200.8	2-10-17	2-13-17	
Lab ID:	02-068-08					
Client ID:	MONM-20170208					
Copper	2.0	1.0	200.8	2-10-17	2-13-17	
Zinc	31	5.0	200.8	2-10-17	2-13-17	
Lab ID:	02-068-09					
Client ID:	SEIMN-20170208					
Copper	ND	1.0	200.8	2-10-17	2-13-17	
Zinc	ND	5.0	200.8	2-10-17	2-13-17	
Lab ID:	02-068-10					
Client ID:	SEIMS-20170208					
Copper	1.1	1.0	200.8	2-10-17	2-13-17	
Zinc	ND	5.0	200.8	2-10-17	2-13-17	
Lab ID:	02-068-11					
Client ID:	TOSMI-20170208					
Copper	18	1.0	200.8	2-10-17	2-13-17	
Zinc	140	5.0	200.8	2-10-17	2-13-17	
Lab ID:	02-068-12					
Client ID:	TOSMO-20170208					
Copper	10	1.0	200.8	2-10-17	2-13-17	
Zinc	88	5.0	200.8	2-10-17	2-13-17	



Date of Report: March 2, 2017
 Samples Submitted: February 9, 2017
 Laboratory Reference: 1702-068
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-068-13					
Client ID:	TYLMI-20170208					
Copper	3.7	1.0	200.8	2-10-17	2-13-17	
Zinc	11	5.0	200.8	2-10-17	2-13-17	
Lab ID:	02-068-14					
Client ID:	TYLMO-20170208					
Copper	3.4	1.0	200.8	2-10-17	2-13-17	
Zinc	16	5.0	200.8	2-10-17	2-13-17	
Lab ID:	02-068-15					
Client ID:	QA23-20170208					
Copper	5.6	1.0	200.8	2-10-17	2-13-17	
Zinc	43	5.0	200.8	2-10-17	2-13-17	



Date of Report: March 2, 2017
Samples Submitted: February 9, 2017
Laboratory Reference: 1702-068
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 2-10-17
Date Analyzed: 2-13-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0210WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: March 2, 2017
Samples Submitted: February 9, 2017
Laboratory Reference: 1702-068
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 2-10-17

Date Analyzed: 2-13-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 02-068-09

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: March 2, 2017
 Samples Submitted: February 9, 2017
 Laboratory Reference: 1702-068
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 2-10-17

Date Analyzed: 2-13-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 02-068-09

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	102	102	104	104	2	
Zinc	100	111	111	113	113	1	



Date of Report: March 2, 2017
 Samples Submitted: February 9, 2017
 Laboratory Reference: 1702-068
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 02-068-01						
Client ID: COLM-20170208						
Copper	ND	1.0	200.8		2-9-17	
Zinc	ND	5.0	200.8		2-9-17	
Lab ID: 02-068-02						
Client ID: COUMI-20170208						
Copper	ND	1.0	200.8		2-9-17	
Zinc	6.9	5.0	200.8		2-9-17	
Lab ID: 02-068-03						
Client ID: COUMO-20170208						
Copper	1.6	1.0	200.8		2-9-17	
Zinc	19	5.0	200.8		2-9-17	
Lab ID: 02-068-04						
Client ID: EVAMS-20170208						
Copper	ND	1.0	200.8		2-9-17	
Zinc	ND	5.0	200.8		2-9-17	
Lab ID: 02-068-05						
Client ID: EVALSS-20170208						
Copper	ND	1.0	200.8		2-9-17	
Zinc	ND	5.0	200.8		2-9-17	
Lab ID: 02-068-06						
Client ID: MONMN-20170208						
Copper	ND	1.0	200.8		2-9-17	
Zinc	ND	5.0	200.8		2-9-17	



Date of Report: March 2, 2017
 Samples Submitted: February 9, 2017
 Laboratory Reference: 1702-068
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-068-07					
Client ID:	MONMS-20170208					
Copper	1.3	1.0	200.8		2-9-17	
Zinc	5.5	5.0	200.8		2-9-17	
Lab ID:	02-068-08					
Client ID:	MONM-20170208					
Copper	ND	1.0	200.8		2-9-17	
Zinc	16	5.0	200.8		2-9-17	
Lab ID:	02-068-09					
Client ID:	SEIMN-20170208					
Copper	ND	1.0	200.8		2-9-17	
Zinc	ND	5.0	200.8		2-9-17	
Lab ID:	02-068-10					
Client ID:	SEIMS-20170208					
Copper	ND	1.0	200.8		2-9-17	
Zinc	ND	5.0	200.8		2-9-17	
Lab ID:	02-068-11					
Client ID:	TOSMI-20170208					
Copper	3.0	1.0	200.8		2-9-17	
Zinc	39	5.0	200.8		2-9-17	
Lab ID:	02-068-12					
Client ID:	TOSMO-20170208					
Copper	1.7	1.0	200.8		2-9-17	
Zinc	21	5.0	200.8		2-9-17	



Date of Report: March 2, 2017
 Samples Submitted: February 9, 2017
 Laboratory Reference: 1702-068
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-068-13					
Client ID:	TYLMI-20170208					
Copper	1.7	1.0	200.8		2-9-17	
Zinc	6.8	5.0	200.8		2-9-17	
Lab ID:	02-068-14					
Client ID:	TYLMO-20170208					
Copper	1.7	1.0	200.8		2-9-17	
Zinc	10	5.0	200.8		2-9-17	
Lab ID:	02-068-15					
Client ID:	QA23-20170208					
Copper	1.5	1.0	200.8		2-9-17	
Zinc	20	5.0	200.8		2-9-17	



Date of Report: March 2, 2017
Samples Submitted: February 9, 2017
Laboratory Reference: 1702-068
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 2-9-17
Matrix: Water
Units: ug/L (ppb)
Lab ID: MB0209D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: March 2, 2017
Samples Submitted: February 9, 2017
Laboratory Reference: 1702-068
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 2-9-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-068-15

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	1.47	1.37	7	1.0	
Zinc	19.6	18.7	5	5.0	



Date of Report: March 2, 2017
 Samples Submitted: February 9, 2017
 Laboratory Reference: 1702-068
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 2-9-17

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 02-068-15

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	71.0	87	73.2	90	3	
Zinc	80.0	96.0	96	98.8	99	3	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





CHAIN OF CUSTODY

14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

Turnaround Requested:

_____ 1 Day

_____ 2 Day

_____ 3 Day

Standard

Laboratory No. 02-068

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *										
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *					
1	COLM-2017 0208	2-8-17	18:00	Water	7	X	X	X	X	X	X	X	X	X					
2	COUMI-2017 0208	2-8-17	15:55	Water	7	X	X	X	X	X	X	X	X	X					
3	COUMO-2017 0208	2-8-17	15:20	Water	7	X	X	X	X	X	X	X	X	X					
4	EVAMS-2017 0208	2-8-17	15:50	Water	7	X	X	X	X	X	X	X	X	X					
5	EVALSS-2017 0208	2-8-17	16:10	Water	7	X	X	X	X	X	X	X	X	X					
6	MONMN-2017 0208	2-8-17	17:50	Water	7	X	X	X	X	X	X	X	X	X					
7	MONMS-2017 0208	2-8-17	18:30	Water	7	X	X	X	X	X	X	X	X	X					
8	MONM-2017 0208 0208	2-8-17	18:45	Water	7	X	X	X	X	X	X	X	X	X					
9	SEIMN-2017 0208	2-8-17	17:35	Water	7	X	X	X	X	X	X	X	X	X					
10	SEIMS-2017 0208	2-8-17	16:55	Water	7	X	X	X	X	X	X	X	X	X					
11	TOSMI-2017 0208	2-8-17	15:20	Water	7	X	X	X	X	X	X	X	X	X					
12	TOSMO-2017 0208	2-8-17	16:20	Water	7	X	X	X	X	X	X	X	X	X					
13	TYLMI-2017 0208	2-8-17	17:20	Water	7	X	X	X	X	X	X	X	X	X					
14	TYLMO-2017 0208	2-8-17	17:00	Water	7	X	X	X	X	X	X	X	X	X					
15	QA-23-20170208	2-8-17	16:00	Water	7	X	X	X	X	X	X	X	X	X					

Relinquished by Nathan W Date 2/9/17 Received by [Signature] Date 2-9-17

Firm Herrera Time 7:05 Firm OSE Time 7:06A

Relinquished by _____ Date _____ Received by _____ Date _____

Firm _____ Time _____ Firm _____ Time _____

Comments:

* - field filtered with 0.45 µm filter within 15 minutes of collecting sample



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Ittner

CHAIN OF CUSTODY

Laboratory No. **02-068**

Requested Analyses

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organic Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organic Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2017 0208	2-8-17	18:00	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2017 0208	2-8-17	15:55	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2017 0208	2-8-17	15:20	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2017 0208	2-8-17	15:50	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2017 0208	2-8-17	16:10	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2017 0208	2-8-17	17:50	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2017 0208	2-8-17	18:30	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2017 0208	2-8-17	18:45	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2017 0208	2-8-17	17:35	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2017 0208	2-8-17	16:55	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2017 0208	2-8-17	15:20	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2017 0208	2-8-17	16:20	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2017 0208	2-8-17	17:20	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2017 0208	2-8-17	17:00	Water	7	X	X	X	X	X	X	X	X	X
15	QA-23-2017 0208	2-8-17	16:00	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by Nathan W Date 2/9/17 Received by [Signature] Date 2-9-17
 Firm Herrera Time 7:05 Firm OSE Time 7:06A
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	Brianna Bland		
Meter:	YSI PRODS5 #1		
Date/Time:	2/17 14:20		
Barometric Pressure Start of Day:	mmHg:	Inches-Hg:	Time:
		752.3	14:20
Barometric Pressure End of Day:	mmHg:	Inches-Hg:	Time:

PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	2.4	0	18.6	
Conductivity (µS/cm)	999	1,000	18.7	
Conductivity (µS/cm)	101.0	100	18.5	
DO % Saturation	100.0	100	17.8	

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)		0		
Conductivity (µS/cm)		100		
DO % Saturation		100		

Did not recalibrate following sampling

Calibration Procedures:
Rinse Multimter Sonde Between Each Operation
Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:



1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
 2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
 3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
 4. Make sure there are no bubbles in the cell; wait 2 minutes.
 5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
 6. Check conductivity using 100 µS/cm standard.
- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number: 14-05806-000
Personnel Performing Calibration: Brianna Bland
Meter: YSI PAPIUS
Date/Time: 2/8/17 14:20
Barometric Pressure Start of Day: ^{MM} Inches Hg: 752.9 Time: 1420
Barometric Pressure End of Day: ^{MM} Inches Hg: Time:

PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	5.4	0	18.3	
Conductivity (µS/cm)	997	1,000	18.5	
Conductivity (µS/cm)	103.2	100	18.0	
DO % Saturation	98.6	100	17.1	
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)		0		
Conductivity (µS/cm)		100		
DO % Saturation		100		

Did not recalibrate following sampling

Calibration Procedures:

Rinse Multimter Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB + VW

Sample Date: 2-8-17

Sample Time: 18:00

PDX

SITE ID: COLM

Base Flow or Storm Event?

Field Filtered Time: 18:00

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: COLM 20170208

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: light yellow
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. Van Leeth Signature: [Signature]
 Date Checked: 5-22-17 Time: 9:00
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Current Weather and Temp: 39°F + light rain

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): N/A

Reference Point (description): NA

Water Quality Measurements

Temperature (°C) 23

Specific Conductivity (µs/cm) 29.8

Dissolved Oxygen (mg/L) 12.54

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



HERRERA

Field Personnel: B. J. Janner
 Sample Date: 2/8/17 Sample Time: 15:55 PDT
 Base Flow or Storm Event? Field Filtered Time: 16:00 PST
 (Must filter within 15 minutes of collection)

SITE ID: COMMI
 Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 35° raining

Water Quality Sampling

Sample ID: COMMI-2017.0217

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 3-22-17 Time: 9:01
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
YSI Pro DSS 1 ✓ _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.80
 Reference Point (description): stream gauge

Water Quality Measurements

Temperature (°C) 4.0
 Specific Conductivity (µs/cm) 159-
 Dissolved Oxygen (mg/L) 12.75

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Ifthner
 Sample Date: 2/9/17 Sample Time: 15:20 PDT
 Base Flow or Storm Event? (Storm Event?) Field Filtered Time: 15:25 PST
(Must filter within 15 minutes of collection)

SITE ID: COUMO
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: 35° and raining.

Water Quality Sampling

Sample ID: COUMO-20170208

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	yes
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: GA23-20170208 16:00
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 3-27-17 Time: 19:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

- YSI 556 (05M1466)
- YSI Pro Plus (15D100020)
- YSI Pro DSS 1
- YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.37
 Reference Point (description): Stag gauge

Water Quality Measurements

Temperature (°C) 4.5
 Specific Conductivity (µs/cm) 247
 Dissolved Oxygen (mg/L) 12.52

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB B VW

Sample Date: 2-8-17

Sample Time: 15:50

PDT

SITE

ID: EVAMS

Base Flow or Storm Event? Storm

Field Filtered Time: 15:50

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: EVAMS-20170208

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>↓</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: light brwn/tan
 Color: ↓ clear
 Odor: none
 Sheen: ↓ some organic debris
 Floatables: ↓ some organic debris

LABORATORY DELIVERY

Date:

Time:

Current Weather and Temp: drizzling 33.6°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.92

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 4.4

Specific Conductivity (µs/cm) 162.0

Dissolved Oxygen (mg/L) 12.39

Quality Assurance

Checked By: John Leath Signature: [Signature]

Date Checked: 3-22-17 Time: 9:00

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB + VW

Sample Date: 2.8.17

Sample Time: 16:10

PDT:

SITE

ID: EVALLS

Base Flow or Storm Event?

Field Filtered Time: 16:10

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: EVALLS 20170208

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: light brown
 Odor: none
 Sheen: none
 Floatables: organic material

LABORATORY DELIVERY

Date: _____ Time: _____

Current Weather and Temp: 39°F light rain

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.43 ft
 Reference Point (description): staff gadge

Water Quality Measurements

Temperature (°C) 4.5
 Specific Conductivity (µs/cm) 148.1
 Dissolved Oxygen (mg/L) 12.69

Quality Assurance

Checked By: John Smith Signature: _____
 Date Checked: 3.22.17 Time: 9:00
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: Col. Ithner

Sample Date: 2-8-17

Sample Time: 17:50

PDT

SITE ID: MONMN

Base Flow or Storm Event? Storm

Field Filtered Time: 17:55

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Water Quality Sampling

Sample ID: MONMN-20170208

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 35° raining

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]

Date Checked: 3-22-17 Time: 19:00

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.33'

Reference Point (description): Stream gauge

Water Quality Measurements

Temperature (°C) 4.2

Specific Conductivity (µs/cm) 115

Dissolved Oxygen (mg/L) 12.63

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Iffrey
 Sample Date: 2-8-17 Sample Time: 18:30 PBT:
 Base Flow or Storm Event? Storm Field Filtered Time: 18:35 PST:
(Must filter within 15 minutes of collection)

SITE ID: MONMS

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 35 rain.

Water Quality Sampling

Sample ID: MONMS-20170208

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Sheri Leitch Signature: [Signature]
 Date Checked: 3-22-17 Time: 9:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

- YSI 556 (05M1466)
- YSI Pro Plus (15D100020)
- ~~YSI Pro DSS 1~~
- YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 64.57
 Reference Point (description): PVC pipe in manhole

Water Quality Measurements

Temperature (°C) 3.9
 Specific Conductivity (µs/cm) 321
 Dissolved Oxygen (mg/L) 11.34

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & VW

Sample Date: 2.8.17

Sample Time: 18:45

PDT: X

SITE ID: MONM

Base Flow or Storm Event? Storm Event

Field Filtered Time: 18:45

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 39°f drizzle

Water Quality Sampling

Sample ID: MONM20170208

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: turbid
 Color: brown
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: _____

Date Checked: 2.22.17 Time: 9:00

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) X
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 38 13/16 inches = 3.23

Reference Point (description): top of culvert down to WS

Water Quality Measurements

Temperature (°C) 4.3

Specific Conductivity (µs/cm) 166.8

Dissolved Oxygen (mg/L) ~~12.53~~ 12.53

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB + VW

Sample Date: 2.8.17

Sample Time: 17:35

PDT:

SITE ID: SEIMN

Base Flow or Storm Event? (Storm Event)

Field Filtered Time: 17:35
(Must filter within 15 minutes of collection)

PST:

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 39°F or light rain

Water Quality Sampling

Sample ID: SEIMN 2017 0208

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: light brown
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leuth Signature: [Signature]
 Date Checked: 2.22.17 Time: 9:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 6 5/16 inches

Reference Point (description): from top of wall down to WS

Water Quality Measurements

Temperature (°C) 3.4°
 Specific Conductivity (µs/cm) 48.3
 Dissolved Oxygen (mg/L) 12.73

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB + VW

Sample Date: 2.8.17

Sample Time: 16:55

PDT:

SITE ID: SEIMS

Base Flow or Storm Event?

Field Filtered Time: 16:55
(Must filter within 15 minutes of collection)

PST:

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: SEIMS20170208

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: slightly turbid
 Color: brown
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 3-22-17 Time: 9:00
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Current Weather and Temp: 39F light rain

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.89
 Reference Point (description): staff gauge

Water Quality Measurements

Temperature (°C) 3.4
 Specific Conductivity (µs/cm) 73.3
 Dissolved Oxygen (mg/L) 12.35

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB + VW
 Sample Date: 2/8/17 Sample Time: 15:20 PDT: X
 Base Flow or Storm Event? (Storm Event) Field Filtered Time: 15:20 PST:
 (Must filter within 15 minutes of collection)

SITE ID: TOSM1 TOSM1
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: 39°F + rain

Water Quality Sampling

Sample ID: TOSM12070208

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: wt turbid
 Color: brownish grey
 Odor: none
 Sheen: none
 Floatables: organic material

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 3-22-17 Time: 19:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI Pro Plus (15D100020) X
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 1.0 ft
 Reference Point (description): staff gauge

Water Quality Measurements

Temperature (°C) 4.2
 Specific Conductivity (µs/cm) 271.3
 Dissolved Oxygen (mg/L) 12.86

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: P. Iffner
 Sample Date: 2-8-17 Sample Time: 16:20 PDT
 Base Flow or Storm Event? Storm Event Field Filtered Time: 16:25 PST:
(Must filter within 15 minutes of collection)

SITE ID: TOSM0
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: TOSM0-20170208

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: slightly turbid
 Color: very light brown
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lamb Signature: [Signature]
 Date Checked: 2-22-17 Time: 19:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 35° raining lightly

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

- YSI 556 (05M1466)
- YSI Pro Plus (15D100020)
- YSI Pro DSS 1
- YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot):
 Stream Stage (ft): 0.87
 Reference Point (description): Stream gauge

Water Quality Measurements

Temperature (°C) 4.3°
 Specific Conductivity (µs/cm) 207
 Dissolved Oxygen (mg/L) 12.88

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. J. J. J.

SITE ID: TYLMI

Sample Date: 2-8-17

Sample Time: 17:20

PDT

Base Flow or Storm Event?

Field Filtered Time: 17:25

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Water Quality Sampling

Sample ID: TYLMI-20170208

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 35° raining lightly

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC*	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn*	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: light brown
 Odor: musty organic
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Smith Signature: [Signature]
 Date Checked: 3-22-17 Time: 19:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
~~YSI Pro DSS 1~~
YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 134 cm
 Reference Point (description): down from culvert

Water Quality Measurements

Temperature (°C) 4.0°
 Specific Conductivity (µs/cm) 146
 Dissolved Oxygen (mg/L) 12.54

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. J. Fisher

Sample Date: 2-8-17

Sample Time: 17:00

PDT

SITE ID: TYLMO

Base Flow or Storm Event? (circled)

Field Filtered Time: 17:05

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: TYLMO-20170208

Current Weather and Temp: 35° lt. rain.

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: very light brown
 Odor: none
 Sheen: none
 Floatables: none
musty organic odor

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lamb Signature: [Signature]
 Date Checked: 2-22-17 Time: 9:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

- YSI 556 (05M1466)
- YSI Pro Plus (15D100020)
- YSI Pro DSS 1
- YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 8.2 cm
 Reference Point (description): Down from culvert

Water Quality Measurements

Temperature (°C) 3.80
 Specific Conductivity (µs/cm) 119.9
 Dissolved Oxygen (mg/L) 12.9



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 3/22/2017 Page 1 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 2/08/2017 / All sites, 1 FD (QA23) at

date 3/22/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	7	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	93	±20	4	≤25	7.4	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	1	≤25	17	≤25	OK	NONE
Hardness	OK / SM 2340B	NA	NA	7	≤180	≤1.0 mg/L 1.0 mg/L	99,102	±25	106	±15	10	≤20	3.0	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	8	≤28	≤1.0 mg/L 1.0 mg/L	108	±25	108	±15	1	≤20	5.6	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	5	≤28	≤0.01 mg/L 0.01 mg/L	101	±25	98	±20	D=0.004	≤20	22	≤20	OK	FLAG COUMO “J” DUE TO FD EXCEEDANCE.
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	16-17	≤28	≤0.1 mg/L 0.1 mg/L	85-90	±25	91-107	±20	4.9-38	≤20	70	≤20	OK	FLAG COUMO “J” DUE TO FD EXCEEDANCE. FLAG EVALS “J” DUE TO LAB DUP EXCEEDANCE.

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 3/22/2017 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 2/08/2017 / All sites, 1 FD (QA23) at

date 3/22/2016

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	5	≤180	≤1.0 µg/L 1.0 µg/L	102,104	±25	NR	±15	7	≤20	9.3	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	5	≤180	≤5.0 µg/L 5.0 µg/L	111,113	±25	NR	±15	4	≤20	9.8	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	1	≤180	≤1.0 µg/L 1.0 µg/L	87,90	±25	NR	±15	7	≤20	D=0.1	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	1	≤180	≤5.0 µg/L 5.0 µg/L	96,99	±25	NR	±15	5	≤20	D=1	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	29,37	≤35	29	≤50	OK	FLAG TYLMO "J" DUE TO LAB DUP EXCEEDANCE.

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

March 17, 2017

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1703-054

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on March 7, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: March 17, 2017
Samples Submitted: March 7, 2017
Laboratory Reference: 1703-054
Project: 14-05806-000

Case Narrative

Samples were collected on March 7, 2017 and received by the laboratory on March 7, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: March 17, 2017
 Samples Submitted: March 7, 2017
 Laboratory Reference: 1703-054
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170307					
Laboratory ID:	03-054-01					
Total Suspended Solids	1.2	1.0	SM 2540D	3-9-17	3-10-17	

Client ID:	COUMI-20170307					
Laboratory ID:	03-054-02					
Total Suspended Solids	19	1.0	SM 2540D	3-9-17	3-10-17	

Client ID:	COUMO-20170307					
Laboratory ID:	03-054-03					
Total Suspended Solids	11	1.0	SM 2540D	3-9-17	3-10-17	

Client ID:	EVAMS-20170307					
Laboratory ID:	03-054-04					
Total Suspended Solids	13	1.0	SM 2540D	3-9-17	3-10-17	

Client ID:	EVALSS-20170307					
Laboratory ID:	03-054-05					
Total Suspended Solids	10	1.0	SM 2540D	3-9-17	3-10-17	

Client ID:	MONMN-20170307					
Laboratory ID:	03-054-06					
Total Suspended Solids	6.0	1.0	SM 2540D	3-9-17	3-10-17	

Client ID:	MONMS-20170307					
Laboratory ID:	03-054-07					
Total Suspended Solids	6.6	1.0	SM 2540D	3-9-17	3-10-17	



Date of Report: March 17, 2017
 Samples Submitted: March 7, 2017
 Laboratory Reference: 1703-054
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170307					
Laboratory ID:	03-054-08					
Total Suspended Solids	10	1.0	SM 2540D	3-9-17	3-10-17	

Client ID:	SEIMN-20170307					
Laboratory ID:	03-054-09					
Total Suspended Solids	13	1.0	SM 2540D	3-9-17	3-10-17	

Client ID:	SEIMS-20170307					
Laboratory ID:	03-054-10					
Total Suspended Solids	14	1.0	SM 2540D	3-9-17	3-10-17	

Client ID:	TOSMI-20170307					
Laboratory ID:	03-054-11					
Total Suspended Solids	22	1.0	SM 2540D	3-9-17	3-10-17	

Client ID:	TOSMO-20170307					
Laboratory ID:	03-054-12					
Total Suspended Solids	25	1.0	SM 2540D	3-9-17	3-10-17	

Client ID:	TYLMI-20170307					
Laboratory ID:	03-054-13					
Total Suspended Solids	7.4	1.0	SM 2540D	3-9-17	3-10-17	

Client ID:	TYLMO-20170307					
Laboratory ID:	03-054-14					
Total Suspended Solids	10	1.0	SM 2540D	3-9-17	3-10-17	



Date of Report: March 17, 2017
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TOTAL SUSPENDED SOLIDS
SM 2540D

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-24-20170307					
Laboratory ID:	03-054-15					
Total Suspended Solids	6.0	1.0	SM 2540D	3-9-17	3-10-17	



Date of Report: March 17, 2017
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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0309W1					
Total Suspended Solids	ND	1.0	SM 2540D	3-9-17	3-10-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-054-12							
	ORIG	DUP						
Total Suspended Solids	25.0	26.8	NA	NA	NA	7	20	

SPIKE BLANK								
Laboratory ID:	SB0309W1							
	SB	SB		SB				
Total Suspended Solids	96.0	100	NA	96	78-113	NA	NA	



Date of Report: March 17, 2017
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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170307					
Laboratory ID:	03-054-01					
Turbidity	0.88	0.10	EPA 180.1	3-8-17	3-8-17	

Client ID:	COUMI-20170307					
Laboratory ID:	03-054-02					
Turbidity	8.4	0.10	EPA 180.1	3-8-17	3-8-17	

Client ID:	COUMO-20170307					
Laboratory ID:	03-054-03					
Turbidity	6.3	0.10	EPA 180.1	3-8-17	3-8-17	

Client ID:	EVAMS-20170307					
Laboratory ID:	03-054-04					
Turbidity	4.1	0.10	EPA 180.1	3-8-17	3-8-17	

Client ID:	EVALSS-20170307					
Laboratory ID:	03-054-05					
Turbidity	4.7	0.10	EPA 180.1	3-8-17	3-8-17	

Client ID:	MONMN-20170307					
Laboratory ID:	03-054-06					
Turbidity	4.4	0.10	EPA 180.1	3-8-17	3-8-17	

Client ID:	MONMS-20170307					
Laboratory ID:	03-054-07					
Turbidity	4.8	0.10	EPA 180.1	3-8-17	3-8-17	



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 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170307					
Laboratory ID:	03-054-08					
Turbidity	13	0.10	EPA 180.1	3-8-17	3-8-17	

Client ID:	SEIMN-20170307					
Laboratory ID:	03-054-09					
Turbidity	4.7	0.10	EPA 180.1	3-8-17	3-8-17	

Client ID:	SEIMS-20170307					
Laboratory ID:	03-054-10					
Turbidity	1.5	0.10	EPA 180.1	3-8-17	3-8-17	

Client ID:	TOSMI-20170307					
Laboratory ID:	03-054-11					
Turbidity	11	0.10	EPA 180.1	3-8-17	3-8-17	

Client ID:	TOSMO-20170307					
Laboratory ID:	03-054-12					
Turbidity	12	0.10	EPA 180.1	3-8-17	3-8-17	

Client ID:	TYLMI-20170307					
Laboratory ID:	03-054-13					
Turbidity	4.7	0.10	EPA 180.1	3-8-17	3-8-17	

Client ID:	TYLMO-20170307					
Laboratory ID:	03-054-14					
Turbidity	4.8	0.10	EPA 180.1	3-8-17	3-8-17	



Date of Report: March 17, 2017
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Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-24-20170307					
Laboratory ID:	03-054-15					
Turbidity	4.3	0.10	EPA 180.1	3-8-17	3-8-17	



Date of Report: March 17, 2017
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 Project: 14-05806-000

**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0308W1					
Turbidity	ND	0.10	EPA 180.1	3-8-17	3-8-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-054-01							
	ORIG	DUP						
Turbidity	0.880	0.890	NA	NA	NA	NA	1	15



Date of Report: March 17, 2017
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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170307					
Laboratory ID:	03-054-01					
Hardness	7.1	1.0	200.7/SM 2340B	3-9-17	3-9-17	

Client ID:	COUMI-20170307					
Laboratory ID:	03-054-02					
Hardness	67	1.0	200.7/SM 2340B	3-9-17	3-9-17	

Client ID:	COUMO-20170307					
Laboratory ID:	03-054-03					
Hardness	53	1.0	200.7/SM 2340B	3-9-17	3-9-17	

Client ID:	EVAMS-20170307					
Laboratory ID:	03-054-04					
Hardness	68	1.0	200.7/SM 2340B	3-9-17	3-9-17	

Client ID:	EVALSS-20170307					
Laboratory ID:	03-054-05					
Hardness	66	1.0	200.7/SM 2340B	3-9-17	3-9-17	

Client ID:	MONMN-20170307					
Laboratory ID:	03-054-06					
Hardness	35	1.0	200.7/SM 2340B	3-9-17	3-9-17	

Client ID:	MONMS-20170307					
Laboratory ID:	03-054-07					
Hardness	64	1.0	200.7/SM 2340B	3-9-17	3-9-17	



Date of Report: March 17, 2017
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 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170307					
Laboratory ID:	03-054-08					
Hardness	49	1.0	200.7/SM 2340B	3-9-17	3-9-17	

Client ID:	SEIMN-20170307					
Laboratory ID:	03-054-09					
Hardness	19	1.0	200.7/SM 2340B	3-9-17	3-9-17	

Client ID:	SEIMS-20170307					
Laboratory ID:	03-054-10					
Hardness	32	1.0	200.7/SM 2340B	3-9-17	3-9-17	

Client ID:	TOSMI-20170307					
Laboratory ID:	03-054-11					
Hardness	25	1.0	200.7/SM 2340B	3-9-17	3-9-17	

Client ID:	TOSMO-20170307					
Laboratory ID:	03-054-12					
Hardness	35	1.0	200.7/SM 2340B	3-9-17	3-9-17	

Client ID:	TYLMI-20170307					
Laboratory ID:	03-054-13					
Hardness	50	1.0	200.7/SM 2340B	3-9-17	3-9-17	

Client ID:	TYLMO-20170307					
Laboratory ID:	03-054-14					
Hardness	33	1.0	200.7/SM 2340B	3-9-17	3-9-17	



Date of Report: March 17, 2017
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Laboratory Reference: 1703-054
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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-24-20170307					
Laboratory ID:	03-054-15					
Hardness	32	1.0	200.7/SM 2340B	3-9-17	3-9-17	



Date of Report: March 17, 2017
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 Laboratory Reference: 1703-054
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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0309WH2					
Hardness	ND	1.0	200.7/SM 2340B	3-9-17	3-9-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-054-01							
	ORIG	DUP						
Hardness	7.12	7.06	NA	NA	NA	NA	1	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	03-054-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	140	136	132	132	7.12	101	98	75-125	3	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK								
Laboratory ID:	SB0309WH2							
	SB	SB			SB			
Hardness	130	132	NA	98	80-120	NA	NA	



Date of Report: March 17, 2017
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 Laboratory Reference: 1703-054
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170307					
Laboratory ID:	03-054-01					
Dissolved Organic Carbon	9.0	1.0	SM 5310B	3-14-17	3-14-17	
Client ID:	COUMI-20170307					
Laboratory ID:	03-054-02					
Dissolved Organic Carbon	4.2	1.0	SM 5310B	3-14-17	3-14-17	
Client ID:	COUMO-20170307					
Laboratory ID:	03-054-03					
Dissolved Organic Carbon	3.4	1.0	SM 5310B	3-14-17	3-14-17	
Client ID:	EVAMS-20170307					
Laboratory ID:	03-054-04					
Dissolved Organic Carbon	4.8	1.0	SM 5310B	3-14-17	3-14-17	
Client ID:	EVALSS-20170307					
Laboratory ID:	03-054-05					
Dissolved Organic Carbon	4.5	1.0	SM 5310B	3-14-17	3-14-17	
Client ID:	MONMN-20170307					
Laboratory ID:	03-054-06					
Dissolved Organic Carbon	4.2	1.0	SM 5310B	3-14-17	3-14-17	
Client ID:	MONMS-20170307					
Laboratory ID:	03-054-07					
Dissolved Organic Carbon	5.0	1.0	SM 5310B	3-14-17	3-14-17	



Date of Report: March 17, 2017
 Samples Submitted: March 7, 2017
 Laboratory Reference: 1703-054
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170307					
Laboratory ID:	03-054-08					
Dissolved Organic Carbon	4.4	1.0	SM 5310B	3-14-17	3-14-17	
Client ID:	SEIMN-20170307					
Laboratory ID:	03-054-09					
Dissolved Organic Carbon	7.1	1.0	SM 5310B	3-14-17	3-14-17	
Client ID:	SEIMS-20170307					
Laboratory ID:	03-054-10					
Dissolved Organic Carbon	5.6	1.0	SM 5310B	3-14-17	3-14-17	
Client ID:	TOSMI-20170307					
Laboratory ID:	03-054-11					
Dissolved Organic Carbon	2.9	1.0	SM 5310B	3-14-17	3-14-17	
Client ID:	TOSMO-20170307					
Laboratory ID:	03-054-12					
Dissolved Organic Carbon	3.2	1.0	SM 5310B	3-14-17	3-14-17	
Client ID:	TYLMI-20170307					
Laboratory ID:	03-054-13					
Dissolved Organic Carbon	5.7	1.0	SM 5310B	3-14-17	3-14-17	
Client ID:	TYLMO-20170307					
Laboratory ID:	03-054-14					
Dissolved Organic Carbon	2.9	1.0	SM 5310B	3-14-17	3-14-17	



Date of Report: March 17, 2017
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Laboratory Reference: 1703-054
Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-24-20170307					
Laboratory ID:	03-054-15					
Dissolved Organic Carbon	4.4	1.0	SM 5310B	3-14-17	3-14-17	



Date of Report: March 17, 2017
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 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0314D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	3-14-17	3-14-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-054-01							
	ORIG	DUP						
Dissolved Organic Carbon	9.04	9.15	NA	NA	NA	1	20	

MATRIX SPIKE

Laboratory ID:	03-054-01							
	MS	MS		MS				
Dissolved Organic Carbon	18.7	10.0	9.04	97	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0314D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.8	10.0	NA	108	75-125	NA	NA	



Date of Report: March 17, 2017
 Samples Submitted: March 7, 2017
 Laboratory Reference: 1703-054
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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170307					
Laboratory ID:	03-054-01					
Total Phosphorus	ND	0.010	EPA 365.1	3-13-17	3-13-17	

Client ID:	COUMI-20170307					
Laboratory ID:	03-054-02					
Total Phosphorus	0.064	0.010	EPA 365.1	3-13-17	3-13-17	

Client ID:	COUMO-20170307					
Laboratory ID:	03-054-03					
Total Phosphorus	0.040	0.010	EPA 365.1	3-13-17	3-13-17	

Client ID:	EVAMS-20170307					
Laboratory ID:	03-054-04					
Total Phosphorus	0.10	0.010	EPA 365.1	3-13-17	3-13-17	

Client ID:	EVALSS-20170307					
Laboratory ID:	03-054-05					
Total Phosphorus	0.028	0.010	EPA 365.1	3-13-17	3-13-17	

Client ID:	MONMN-20170307					
Laboratory ID:	03-054-06					
Total Phosphorus	0.023	0.010	EPA 365.1	3-13-17	3-13-17	

Client ID:	MONMS-20170307					
Laboratory ID:	03-054-07					
Total Phosphorus	0.027	0.010	EPA 365.1	3-13-17	3-13-17	



Date of Report: March 17, 2017
 Samples Submitted: March 7, 2017
 Laboratory Reference: 1703-054
 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170307					
Laboratory ID:	03-054-08					
Total Phosphorus	0.035	0.010	EPA 365.1	3-13-17	3-13-17	

Client ID:	SEIMN-20170307					
Laboratory ID:	03-054-09					
Total Phosphorus	0.029	0.010	EPA 365.1	3-13-17	3-13-17	

Client ID:	SEIMS-20170307					
Laboratory ID:	03-054-10					
Total Phosphorus	0.039	0.010	EPA 365.1	3-13-17	3-13-17	

Client ID:	TOSMI-20170307					
Laboratory ID:	03-054-11					
Total Phosphorus	0.044	0.010	EPA 365.1	3-13-17	3-13-17	

Client ID:	TOSMO-20170307					
Laboratory ID:	03-054-12					
Total Phosphorus	0.048	0.010	EPA 365.1	3-13-17	3-13-17	

Client ID:	TYLMI-20170307					
Laboratory ID:	03-054-13					
Total Phosphorus	0.036	0.010	EPA 365.1	3-13-17	3-13-17	

Client ID:	TYLMO-20170307					
Laboratory ID:	03-054-14					
Total Phosphorus	0.042	0.010	EPA 365.1	3-13-17	3-13-17	



Date of Report: March 17, 2017
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Laboratory Reference: 1703-054
Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-24-20170307					
Laboratory ID:	03-054-15					
Total Phosphorus	0.026	0.010	EPA 365.1	3-13-17	3-13-17	



Date of Report: March 17, 2017
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 Laboratory Reference: 1703-054
 Project: 14-05806-000

**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0313W1					
Total Phosphorus	ND	0.010	EPA 365.1	3-13-17	3-13-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-054-01							
	ORIG	DUP						
Total Phosphorus	ND	0.0103	NA	NA	NA	NA	11	

MATRIX SPIKE								
Laboratory ID:	03-054-01							
	MS	MS		MS				
Total Phosphorus	0.253	0.250	ND	101	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0313W1							
	SB	SB		SB				
Total Phosphorus	0.231	0.250	NA	92	86-111	NA	NA	



Date of Report: March 17, 2017
 Samples Submitted: March 7, 2017
 Laboratory Reference: 1703-054
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 03-054-01						
Client ID: COLM-20170307						
Copper	ND	1.0	200.8	3-8-17	3-9-17	
Zinc	7.7	5.0	200.8	3-8-17	3-9-17	
Lab ID: 03-054-02						
Client ID: COUMI-20170307						
Copper	2.0	1.0	200.8	3-8-17	3-9-17	
Zinc	11	5.0	200.8	3-8-17	3-9-17	
Lab ID: 03-054-03						
Client ID: COUMO-20170307						
Copper	2.4	1.0	200.8	3-8-17	3-9-17	
Zinc	14	5.0	200.8	3-8-17	3-9-17	
Lab ID: 03-054-04						
Client ID: EVAMS-20170307						
Copper	ND	1.0	200.8	3-8-17	3-9-17	
Zinc	ND	5.0	200.8	3-8-17	3-9-17	
Lab ID: 03-054-05						
Client ID: EVALSS-20170307						
Copper	ND	1.0	200.8	3-8-17	3-9-17	
Zinc	ND	5.0	200.8	3-8-17	3-9-17	
Lab ID: 03-054-06						
Client ID: MONMN-20170307						
Copper	1.4	1.0	200.8	3-8-17	3-9-17	
Zinc	7.0	5.0	200.8	3-8-17	3-9-17	



Date of Report: March 17, 2017
 Samples Submitted: March 7, 2017
 Laboratory Reference: 1703-054
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	03-054-07					
Client ID:	MONMS-20170307					
Copper	2.1	1.0	200.8	3-8-17	3-9-17	
Zinc	5.8	5.0	200.8	3-8-17	3-9-17	
Lab ID:	03-054-08					
Client ID:	MONM-20170307					
Copper	1.8	1.0	200.8	3-8-17	3-9-17	
Zinc	21	5.0	200.8	3-8-17	3-9-17	
Lab ID:	03-054-09					
Client ID:	SEIMN-20170307					
Copper	1.1	1.0	200.8	3-8-17	3-9-17	
Zinc	ND	5.0	200.8	3-8-17	3-9-17	
Lab ID:	03-054-10					
Client ID:	SEIMS-20170307					
Copper	ND	1.0	200.8	3-8-17	3-9-17	
Zinc	ND	5.0	200.8	3-8-17	3-9-17	
Lab ID:	03-054-11					
Client ID:	TOSMI-20170307					
Copper	5.3	1.0	200.8	3-8-17	3-9-17	
Zinc	43	5.0	200.8	3-8-17	3-9-17	
Lab ID:	03-054-12					
Client ID:	TOSMO-20170307					
Copper	4.4	1.0	200.8	3-8-17	3-9-17	
Zinc	26	5.0	200.8	3-8-17	3-9-17	



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TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	03-054-13					
Client ID:	TYLMI-20170307					
Copper	3.7	1.0	200.8	3-8-17	3-9-17	
Zinc	7.5	5.0	200.8	3-8-17	3-9-17	
Lab ID:	03-054-14					
Client ID:	TYLMO-20170307					
Copper	3.2	1.0	200.8	3-8-17	3-9-17	
Zinc	29	5.0	200.8	3-8-17	3-9-17	
Lab ID:	03-054-15					
Client ID:	QA-24-20170307					
Copper	1.4	1.0	200.8	3-8-17	3-9-17	
Zinc	6.3	5.0	200.8	3-8-17	3-9-17	



Date of Report: March 17, 2017
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**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 3-8-17
Date Analyzed: 3-9-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0308WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



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**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 3-8-17

Date Analyzed: 3-9-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 03-054-07

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	2.14	1.95	10	1.0	
Zinc	5.82	5.80	0	5.0	



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**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 3-8-17

Date Analyzed: 3-9-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 03-054-07

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	98.7	97	98.8	97	0	
Zinc	100	118	113	119	113	1	



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**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 03-054-01						
Client ID: COLM-20170307						
Copper	ND	1.0	200.8		3-8-17	
Zinc	ND	5.0	200.8		3-8-17	
Lab ID: 03-054-02						
Client ID: COUMI-20170307						
Copper	ND	1.0	200.8		3-8-17	
Zinc	ND	5.0	200.8		3-8-17	
Lab ID: 03-054-03						
Client ID: COUMO-20170307						
Copper	ND	1.0	200.8		3-8-17	
Zinc	6.6	5.0	200.8		3-8-17	
Lab ID: 03-054-04						
Client ID: EVAMS-20170307						
Copper	ND	1.0	200.8		3-8-17	
Zinc	ND	5.0	200.8		3-8-17	
Lab ID: 03-054-05						
Client ID: EVALSS-20170307						
Copper	ND	1.0	200.8		3-8-17	
Zinc	ND	5.0	200.8		3-8-17	
Lab ID: 03-054-06						
Client ID: MONMN-20170307						
Copper	ND	1.0	200.8		3-8-17	
Zinc	ND	5.0	200.8		3-8-17	



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: March 17, 2017
 Samples Submitted: March 7, 2017
 Laboratory Reference: 1703-054
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	03-054-07					
Client ID:	MONMS-20170307					
Copper	ND	1.0	200.8		3-8-17	
Zinc	ND	5.0	200.8		3-8-17	
Lab ID:	03-054-08					
Client ID:	MONM-20170307					
Copper	ND	1.0	200.8		3-8-17	
Zinc	12	5.0	200.8		3-8-17	
Lab ID:	03-054-09					
Client ID:	SEIMN-20170307					
Copper	ND	1.0	200.8		3-8-17	
Zinc	ND	5.0	200.8		3-8-17	
Lab ID:	03-054-10					
Client ID:	SEIMS-20170307					
Copper	ND	1.0	200.8		3-8-17	
Zinc	ND	5.0	200.8		3-8-17	
Lab ID:	03-054-11					
Client ID:	TOSMI-20170307					
Copper	2.1	1.0	200.8		3-8-17	
Zinc	23	5.0	200.8		3-8-17	
Lab ID:	03-054-12					
Client ID:	TOSMO-20170307					
Copper	1.3	1.0	200.8		3-8-17	
Zinc	9.9	5.0	200.8		3-8-17	



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DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	03-054-13					
Client ID:	TYLMI-20170307					
Copper	1.5	1.0	200.8		3-8-17	
Zinc	ND	5.0	200.8		3-8-17	

Lab ID:	03-054-14					
Client ID:	TYLMO-20170307					
Copper	ND	1.0	200.8		3-8-17	
Zinc	15	5.0	200.8		3-8-17	

Lab ID:	03-054-15					
Client ID:	QA-24-20170307					
Copper	ND	1.0	200.8		3-8-17	
Zinc	ND	5.0	200.8		3-8-17	



Date of Report: March 17, 2017
Samples Submitted: March 7, 2017
Laboratory Reference: 1703-054
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 3-8-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0308D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: March 17, 2017
Samples Submitted: March 7, 2017
Laboratory Reference: 1703-054
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 3-8-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 03-054-15

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: March 17, 2017
Samples Submitted: March 7, 2017
Laboratory Reference: 1703-054
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
MS/MSD QUALITY CONTROL**

Date Analyzed: 3-8-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 03-054-15

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	70.8	89	69.4	87	2	
Zinc	80.0	81.2	102	80.8	101	0	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

Mar 16 2017
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20170307	Water	17-A003150	Micro, NUT
COUMI-20170307	Water	17-A003151	Micro, NUT
COUMO-20170307	Water	17-A003152	Micro, NUT
EVAMS-20170307	Water	17-A003153	Micro, NUT
EVALSS-20170307	Water	17-A003154	Micro, NUT
MONMN-20170307	Water	17-A003155	Micro, NUT
MONMNS-20170307	Water	17-A003156	Micro, NUT
MONM-20170307	Water	17-A003157	Micro, NUT
SEIMN-20170307	Water	17-A003158	Micro, NUT
SEIMS-20170307	Water	17-A003159	Micro, NUT
TOSMI-20170307	Water	17-A003160	Micro, NUT
TOSMO-20170307	Water	17-A003161	Micro, NUT
TYLMI-20170307	Water	17-A003162	Micro, NUT
TYLMO-20170307	Water	17-A003163	Micro, NUT
QA-24-20170307	Water	17-A003164	Micro, NUT

Your samples were received on Wednesday, March 8, 2017. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
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Services**

Mar 16 2017
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 03-054

BACT = Bacteriological
CONV = Conventional

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



Professional
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Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
PO Number: 03-054
All results reported on an as received basis.

Date Received: 03/08/17
Date Reported: 3/16/17

AMTEST Identification Number 17-A003150
Client Identification COLM-20170307
Sampling Date 03/07/17, 16:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	120	CFU/100 ml		1	SM 9222D	NG	03/07/17
Total Nitrogen (NOX&TKN)	0.66	mg/l		0.1			
Total Nitrogen (TKN)	0.585	mg/l		0.1	SM4500N	SW	03/14/17
Nitrate + Nitrite	0.072	mg/l		0.01	SM4500NO3	JC	03/13/17

AMTEST Identification Number 17-A003151
Client Identification COUMI-20170307
Sampling Date 03/07/17, 13:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	110	CFU/100 ml		1	SM 9222D	NG	03/07/17
Total Nitrogen (NOX&TKN)	0.76	mg/l		0.1			
Total Nitrogen (TKN)	0.451	mg/l		0.1	SM4500N	SW	03/14/17
Nitrate + Nitrite	0.31	mg/l		0.01	SM4500NO3	JC	03/13/17

AMTEST Identification Number 17-A003152
Client Identification COUMO-20170307
Sampling Date 03/07/17, 13:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	64.	CFU/100 ml		1	SM 9222D	NG	03/07/17
Total Nitrogen (NOX&TKN)	0.87	mg/l		0.1			
Total Nitrogen (TKN)	0.550	mg/l		0.1	SM4500N	SW	03/14/17
Nitrate + Nitrite	0.32	mg/l		0.01	SM4500NO3	JC	03/13/17

AMTEST Identification Number 17-A003153
Client Identification EVAMS-20170307
Sampling Date 03/07/17, 13:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	30.	CFU/100 ml		1	SM 9222D	NG	03/07/17
Total Nitrogen (NOX&TKN)	2.80	mg/l		0.1			
Total Nitrogen (TKN)	1.20	mg/l		0.1	SM4500N	SW	03/14/17
Nitrate + Nitrite	1.6	mg/l	D	0.1	SM4500NO3	JC	03/13/17

AMTEST Identification Number 17-A003154
Client Identification EVALSS-20170307
Sampling Date 03/07/17, 13:56

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	32.	CFU/100 ml		1	SM 9222D	NG	03/07/17
Total Nitrogen (NOX&TKN)	2.38	mg/l		0.1			
Total Nitrogen (TKN)	0.880	mg/l		0.1	SM4500N	SW	03/14/17
Nitrate + Nitrite	1.5	mg/l	D	0.1	SM4500NO3	JC	03/13/17

AMTEST Identification Number 17-A003155
Client Identification MONMN-20170307
Sampling Date 03/07/17, 14:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	16.	CFU/100 ml		1	SM 9222D	NG	03/07/17
Total Nitrogen (NOX&TKN)	0.80	mg/l		0.1			
Total Nitrogen (TKN)	0.582	mg/l		0.1	SM4500N	SW	03/14/17
Nitrate + Nitrite	0.22	mg/l		0.01	SM4500NO3	JC	03/13/17

AMTEST Identification Number 17-A003156
Client Identification MONMNS-20170307
Sampling Date 03/07/17, 16:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1400	CFU/100 ml		1	SM 9222D	NG	03/07/17
Total Nitrogen (NOX&TKN)	0.97	mg/l		0.1			
Total Nitrogen (TKN)	0.622	mg/l		0.1	SM4500N	SW	03/14/17
Nitrate + Nitrite	0.35	mg/l		0.01	SM4500NO3	JC	03/13/17

AMTEST Identification Number 17-A003157
Client Identification MONM-20170307
Sampling Date 03/07/17, 17:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	190	CFU/100 ml		1	SM 9222D	NG	03/07/17
Total Nitrogen (NOX&TKN)	0.97	mg/l		0.1			
Total Nitrogen (TKN)	0.647	mg/l		0.1	SM4500N	SW	03/14/17
Nitrate + Nitrite	0.32	mg/l		0.01	SM4500NO3	JC	03/13/17

AMTEST Identification Number 17-A003158
Client Identification SEIMN-20170307
Sampling Date 03/07/17, 15:20

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	46.	CFU/100 ml		1	SM 9222D	NG	03/07/17
Total Nitrogen (NOX&TKN)	0.86	mg/l		0.1			
Total Nitrogen (TKN)	0.546	mg/l		0.1	SM4500N	SW	03/14/17
Nitrate + Nitrite	0.31	mg/l		0.01	SM4500NO3	JC	03/13/17

AMTEST Identification Number 17-A003159
Client Identification SEIMS-20170307
Sampling Date 03/07/17, 14:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	32.	CFU/100 ml		1	SM 9222D	NG	03/07/17
Total Nitrogen (NOX&TKN)	0.85	mg/l		0.1			
Total Nitrogen (TKN)	0.608	mg/l		0.1	SM4500N	SW	03/14/17
Nitrate + Nitrite	0.24	mg/l		0.01	SM4500NO3	JC	03/13/17

AMTEST Identification Number 17-A003160
Client Identification TOSMI-20170307
Sampling Date 03/07/17, 13:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	230	CFU/100 ml		1	SM 9222D	NG	03/07/17
Total Nitrogen (NOX&TKN)	0.74	mg/l		0.1			
Total Nitrogen (TKN)	0.523	mg/l		0.1	SM4500N	SW	03/14/17
Nitrate + Nitrite	0.22	mg/l		0.01	SM4500NO3	JC	03/13/17

AMTEST Identification Number 17-A003161
Client Identification TOSMO-20170307
Sampling Date 03/07/17, 14:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	150	CFU/100 ml		1	SM 9222D	NG	03/07/17
Total Nitrogen (NOX&TKN)	0.84	mg/l		0.1			
Total Nitrogen (TKN)	0.602	mg/l		0.1	SM4500N	SW	03/14/17
Nitrate + Nitrite	0.24	mg/l		0.01	SM4500NO3	JC	03/13/17

AMTEST Identification Number 17-A003162
Client Identification TYLMI-20170307
Sampling Date 03/07/17, 15:20

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	40.	CFU/100 ml		1	SM 9222D	NG	03/07/17
Total Nitrogen (NOX&TKN)	0.98	mg/l		0.1			
Total Nitrogen (TKN)	0.625	mg/l		0.1	SM4500N	SW	03/14/17
Nitrate + Nitrite	0.36	mg/l		0.01	SM4500NO3	JC	03/13/17

AMTEST Identification Number 17-A003163
Client Identification TYLMO-20170307
Sampling Date 03/07/17, 14:45

Results

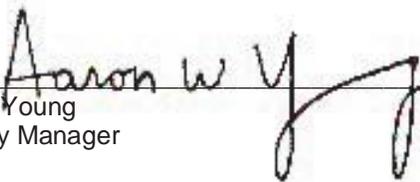
PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	74.	CFU/100 ml		1	SM 9222D	NG	03/07/17
Total Nitrogen (NOX&TKN)	0.80	mg/l		0.1			
Total Nitrogen (TKN)	0.501	mg/l		0.1	SM4500N	SW	03/14/17
Nitrate + Nitrite	0.30	mg/l		0.01	SM4500NO3	JC	03/13/17

AMTEST Identification Number 17-A003164
Client Identification QA-24-20170307
Sampling Date 03/07/17, 14:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	14.	CFU/100 ml		1	SM 9222D	NG	03/07/17
Total Nitrogen (NOX&TKN)	0.83	mg/l		0.1			
Total Nitrogen (TKN)	0.608	mg/l		0.1	SM4500N	SW	03/14/17
Nitrate + Nitrite	0.22	mg/l		0.01	SM4500NO3	JC	03/13/17

D = The reported value is from a dilution.


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 17-A003150 to 17-A003164

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
17-A003150	Fecal Coliform	CFU/100 ml	120	99.	19.
17-A003164	Fecal Coliform	CFU/100 ml	14.	18.	25.
17-A003165	Fecal Coliform	CFU/100 ml	< 2	< 2	
17-A003104	Total Nitrogen (TKN)	mg/l	0.407	0.463	13.
17-A003158	Total Nitrogen (TKN)	mg/l	0.546	0.547	0.18
17-A003227	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
17-A003235	Total Nitrogen (TKN)	mg/l	0.139	< 0.1	
17-A003098	Nitrate + Nitrite	mg/l	0.94	0.95	1.1
17-A003152	Nitrate + Nitrite	mg/l	0.32	0.33	3.1
17-A003162	Nitrate + Nitrite	mg/l	0.36	0.37	2.7
17-A003376	Nitrate + Nitrite	mg/l	2.2	2.1	4.7

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
17-A003104	Total Nitrogen (TKN)	mg/l	0.407	2.28	2.00	93.65 %
17-A003158	Total Nitrogen (TKN)	mg/l	0.546	2.56	2.00	100.70 %
17-A003227	Total Nitrogen (TKN)	mg/l	< 0.1	2.52	2.00	126.00 %
17-A003235	Total Nitrogen (TKN)	mg/l	0.139	2.53	2.00	119.55 %
17-A003098	Nitrate + Nitrite	mg/l	0.94	1.4	0.50	92.00 %
17-A003152	Nitrate + Nitrite	mg/l	0.32	0.76	0.50	88.00 %
17-A003162	Nitrate + Nitrite	mg/l	0.36	0.82	0.50	92.00 %
17-A003376	Nitrate + Nitrite	mg/l	2.2	4.5	2.5	92.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	1.00	0.978	97.8 %
Total Nitrogen (TKN)	mg/l	1.00	0.979	97.9 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.51	102. %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1

QC Summary for sample numbers: 17-A003150 to 17-A003164...

BLANKS continued....

ANALYTE	UNITS	RESULT
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

5.4°

Turnaround Request
 1 Day 2 Day 3 Day
 Standard
 Other: _____

Laboratory Reference #: 03-054
 Project Manager: Blair Goodrow
 email: bgoodrow@onsite-env.com
 Project Number: 14-05806-000
 Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20170307 3150	3/7/17	16:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20170307 51	3/7/17	13:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20170307 52	3/7/17	13:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20170307 53	3/7/17	13:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20170307 54	3/7/17	13:56	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20170307 55	3/7/17	14:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20170307 56	3/7/17	16:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20170307 57	3/7/17	17:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20170307 58	3/7/17	15:20	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20170307 59	3/7/17	14:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company		Date	Time	Comments/Special Instructions
Relinquished by: <i>[Signature]</i>		AmTest		3/8/17	840	
Received by: <i>[Signature]</i>		AmTest		3/8/17	840	
Relinquished by:						
Received by:						
Relinquished by:						EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:						



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

5.4°

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 03-054

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
11	TOSMI-20170307 <i>3160</i>	3/7/17	13:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 450C-N
12	TOSMO-20170307 <i>61</i>	3/7/17	14:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 450C-N
13	TYLMI-20170307 <i>62</i>	3/7/17	15:20	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 450C-N
14	TYLMO-20170307 <i>63</i>	3/7/17	14:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 450C-N
15	QA-24-0307 <i>QA-24-20170307</i> <i>64</i>	3/7/17	14:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 450C-N

Signature	Company	Date	Time	Comments/Special Instructions
<i>[Signature]</i>	<i>CSV</i>	<i>3/8/17</i>	<i>846</i>	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Relinquished by:	<i>AmTest</i>	<i>3/8/17</i>	<i>840</i>	
Received by:				
Relinquished by:				
Received by:				

*changed ID via email from David B @ OS& AM 3/8/17



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

CHAIN OF CUSTODY

Turnaround Requested:

 1 Day
 2 Day
 3 Day
 Standard

Laboratory No. 03-054
Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2017 0307	3-7-17	16:00	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2017 0307	3-7-17	13:40	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2017 0307	3-7-17	13:10	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2017 0307	3-7-17	13:45	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2017 0307	3-7-17	13:56	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2017 0307	3-7-17	14:10	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2017 0307	3-7-17	16:50	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2017 0307	3-7-17	17:00	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2017 0307	3-7-17	15:20	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2017 0307	3-7-17	14:40	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2017 0307	3-7-17	13:10	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2017 0307	3-7-17	14:10	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2017 0307	3-7-17	15:20	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2017 0307	3-7-17	14:45	Water	7	X	X	X	X	X	X	X	X	X
15	QA-24-0307 20170307	3-7-17	14:10	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by [Signature] Date 3/7/17 Received by [Signature] Date 3/7/17
 Firm Herrera Time 17:48 Firm [Signature] Time 1748
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample



CHAIN OF CUSTODY

14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Ittner

Turnaround Requested:
 1 Day
 2 Day
 3 Day
 Standard

Laboratory No. **03-054**
 Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2017 0307	3-7-17	16:00	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2017 0307	3-7-17	13:40	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2017 0307	3-7-17	13:10	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2017 0307	3-7-17	13:45	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2017 0307	3-7-17	13:56	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2017 0307	3-7-17	14:10	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2017 0307	3-7-17	16:50	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2017 0307	3-7-17	17:00	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2017 0307	3-7-17	15:20	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2017 0307	3-7-17	14:40	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2017 0307	3-7-17	13:10	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2017 0307	3-7-17	14:10	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2017 0307	3-7-17	15:20	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2017 0307	3-7-17	14:45	Water	7	X	X	X	X	X	X	X	X	X
15	QA-24-0307	3-7-17	14:10	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by [Signature] Date 3/7/17 Received by [Signature] Date 3/7/17
 Firm Herrera Time 17:48 Firm [Signature] Time 1748
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number: 14-05806-000
Personnel Performing Calibration: A. SVENDSEN
Meter: YSI ProDSS #1
Date/Time: 3/7/17
Barometric Pressure Start of Day: mmHg: 758.0 Time: 0926
Barometric Pressure End of Day: mmHg: 755.2 Time: 1938

PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	4.4	0	19.1	
Conductivity (µS/cm)	1,000	1,000	18.7	
Conductivity (µS/cm)	101.0	100	19.0	
DO % Saturation	99.9	100	19.1	

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	4.2	0	17.7	
Conductivity (µS/cm)	100.3	100	18.5	
DO % Saturation	100.6	100	18.7	

Calibration Procedures:

Rinse Multimeter Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	A. SVENDSEN		
Meter:	YSI PRODS5 #2		
Date/Time:	3/7/17		
Barometric Pressure Start of Day:	mmHg: 758.8	Time: 0926	
Barometric Pressure End of Day:	mmHg: 756.1	Time: 1939	

Calibration Procedures:
Rinse Multimenter Sonde Between Each Operation
Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	1.7	0	19.4	
Conductivity (µS/cm)	1008	1,000	19.0	CALIB'D @ 1,000. READS 1,000'S AFTER
Conductivity (µS/cm)	101.1	100	19.3	
DO % Saturation	99.8	100	19.6	

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	4.2	0	18.0	
Conductivity (µS/cm)	99.8	100	19.1	
DO % Saturation	99.5	100	18.9	

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JM + VW

Sample Date: 3/7/17

Sample Time: 16:00

PDT

SITE ID: COLM

Base Flow or Storm Event? Storm

Field Filtered Time: 16:00

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 40° + Rain

Water Quality Sampling

Sample ID: COLM 20170307

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	
Filter blank sample ID:	
Transfer blank sample ID:	

Visual and Olfactory Conditions:

Clarity:	clear
Color:	brownish yellow
Odor:	none
Sheen:	none
Floatables:	none

LABORATORY DELIVERY

Date:	Time:

Quality Assurance

Checked By: <u>Sarah Leuth</u>	Signature: <u>[Signature]</u>
Date Checked: <u>3-21-17</u>	Time: <u>14:30</u>
Data Entered into Database?	YES NO initials:
Date Entered:	Time:
Notes:	

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 5.83 ft.

Reference Point (description): Stream staffgag

Water Quality Measurements

Temperature (°C) 4.3

Conductivity (µs/cm) 26.5

Dissolved Oxygen (mg/L) 12.21

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. JENSEN

Sample Date: 3.7.17

Sample Time: 1340

(PDT)

SITE ID: COUM1

Base Flow or Storm Event?

Field Filtered Time: 1345

(PST)

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: STEADY RAIN, INTERMITT PICKING UP, 39°F

Water Quality Sampling

Sample ID: COUM1-20170307

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: N/A
 Filter blank sample ID: ↓
 Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

Clarity: MODERATELY TURBID
 Color: LIGHT BROWN
 Odor: None
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: S. Lenth Signature: [Signature]
 Date Checked: 3-21-17 Time: 4:30
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)
YSI Pro DSS 1
 YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.79
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 6.1
 Specific Conductivity (µs/cm) 162.8
 Dissolved Oxygen (mg/L) 12.3

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: Alex SVENOSKA

Sample Date: 3.7.17

Sample Time: 1310

PDT

SITE ID: COUMC.

Base Flow or Storm Event? Storm

Field Filtered Time: 1315

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Water Quality Sampling

Sample ID: COUMC-20170307

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: STeady Rain, 38°F ^(LOW INTENS INT)

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: N/A
 Filter blank sample ID: ↓
 Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

Clarity: SLIGHTLY TURBID
 Color: FAIRLY CLEAR
 Odor: NONE
 Sheen: NONE
 Floatables: NONE

LABORATORY DELIVERY

Date: _____ Time: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.34 / 1.35

Reference Point (description): STAFF GAGE (56)

BEFORE / AFTER REMOVING SMALL STICKS AROUND S.G.

Water Quality Measurements

Temperature (°C) 6.4

Specific Conductivity (µs/cm) 109.4

Dissolved Oxygen (mg/L) 12.2

Quality Assurance

Checked By: John Leuth Signature: [Signature]

Date Checked: 3-21-17 Time: 19:30

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JM + VW

Sample Date: 3/7/17

Sample Time: 13:45

PDT:

SITE ID: EVAMS

Base Flow or Storm Event? Storm Event

Field Filtered Time: 13:45

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 40°F + rain.

Water Quality Sampling

Sample ID: EVAMS 20170307

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: *[Signature]*
 Date Checked: 3-21-17 Time: 4:30
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
 YSI OSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.7
 Reference Point (description): Stream staff gage

Water Quality Measurements

Temperature (°C) 5.9°
 Conductivity (µs/cm) 168.2
 Dissolved Oxygen (mg/L) 12.17

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JM + VW

Sample Date: 3/7/17

Sample Time: 13:50

PDT:

SITE ID: EVALSS

Base Flow or Storm Event?

Field Filtered Time: 13:56

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: EVALSS20170307

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<div style="display: flex; align-items: center;"> ↑ ↓ </div>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Slightly turbid
 Color: yellow
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Solomon Lenth Signature: [Signature]

Date Checked: 3-21-17 Time: 4:30

Data Entered into Database? YES NO Initials: _____

Date Entered: _____ Time: _____

Notes: _____

Current Weather and Temp: 40°F + rain

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.36

Reference Point (description): Staff gage

Water Quality Measurements

Temperature (°C) 5.9°

Conductivity (µs/cm) 154.6

Dissolved Oxygen (mg/L) 12.52

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. SUNDSEW
 Sample Date: 3.9.17 Sample Time: 1410 (PDT)
 Base Flow or Storm Event: Storm Event Field Filtered Time: 1415 (PST)
 (Must filter within 15 minutes of collection)

SITE ID: MONMAN
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: VERY LIGHT RAIN, 40°F

Water Quality Sampling

Sample ID: MONMAN-20170307

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	Y
DOC *	HDPE	250 ml	1	HCL	Y
Focal Col. Bact.	HDPE	250 ml	1	EDTA	Y
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	Y
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	Y
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	Y
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QA24 @ 1415 QA24-20170307
 Filter blank sample ID: N/A
 Transfer blank sample ID: N/A

Visual and Olfactory Conditions:

Clarity: FIRMLY CLEAR, SLIGHT TURBID
 Color: NONE
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 3-21-17 Time: 14:30
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)
YSI Pro DSS 1
YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 9.20
 Reference Point (description): 60

Water Quality Measurements

Temperature (°C) 5.9
 Specific Conductivity (µs/cm) 93.1
 Dissolved Oxygen (mg/L) 12.2

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JM + VW
 Sample Date: 3/7/17 Sample Time: 16:50 PDT
 Base Flow or Storm Event? (circled) Field Filtered Time: 16:50 PST
(Must filter within 15 minutes of collection)

SITE ID: MONMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 40° F + sprinkling

Water Quality Sampling

Sample ID: MONMS 2070307

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	2
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 3-21-17 Time: 4:30
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 6.5
 Reference Point (description): pipe in manhole.

Water Quality Measurements

Temperature (°C) 6.7
 Conductivity (µs/cm) 174.9
 Dissolved Oxygen (mg/L) 11.26

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Sworse
 Sample Date: 3-7-17 Sample Time: 1700 PDT:
 Base Flow or Storm Event? PST: Field Filtered Time: 1705
(Must filter within 15 minutes of collection)

SITE ID: MONM
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: LIGHT MIST, 40°F

Water Quality Sampling

Sample ID: MONM-20170307

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	↓
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	↓
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	↓
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	↓
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 μm filter and vacuum hand pump

Duplicate sample ID: N/A
 Filter blank sample ID: ↓
 Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

Clarity: TURBID
 Color: BROWN
 Odor: NONE
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 3-21-17 Time: 4:30
 Data Entered into Database? YES NO Initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)
YSI Pro DSS 1
YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.27

Reference Point (description): TOP OF CULVERT P4M

Water Quality Measurements

Temperature (°C) 6.3
 Specific Conductivity (μs/cm) 134.8
 Dissolved Oxygen (mg/L) 12.4

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JM + VW

Sample Date: 3/7/17

Sample Time: 15:20

PDT

SITE ID: SEIMN

Base Flow or Storm Event? Storm Event

Field Filtered Time: 15:20

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 40° + Rain

Water Quality Sampling

Sample ID: SEIMN20170307

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear
 Color: yellow
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Lentz Signature: *[Signature]*

Date Checked: 3-21-17 Time: 4:30

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 6.75"

Reference Point (description): from top of bolt to WS

Water Quality Measurements

Temperature (°C) 4.9°C

Conductivity (µs/cm) 49.7

Dissolved Oxygen (mg/L) 12.66

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JM + VW

Sample Date: 3/7/17

Sample Time: 1440

PDT:

SITE ID: SEIMS

Base Flow or (Storm Event?)

Field Filtered Time: 14:40

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 40°F + rain

Water Quality Sampling

Sample ID: SEIMS20170307

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: yellow
 Odor: hb
 Sheen: hb
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: *John Lentz* Signature: *[Signature]*
 Date Checked: 3-21-17 Time: 14:30
 Data Entered into Database? YES NO Initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)

YSI DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.91

Reference Point (description): *Stream Staff gage*

Water Quality Measurements

Temperature (°C) 5.3°C

Conductivity (µs/cm) 77.3

Dissolved Oxygen (mg/L) 12.16

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JM + VW

Sample Date: 3/7/17

Sample Time: 13:10

PDT: X

SITE ID: TOSMI

Base Flow or Storm Event? Storm

Field Filtered Time: 13:10

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 40°F + Showers

Water Quality Sampling

Sample ID: TOSMI 2017 0307

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>↓</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	
Filter blank sample ID:	
Transfer blank sample ID:	

Visual and Olfactory Conditions:

Clarity:	<u>turbid</u>
Color:	<u>grey brown</u>
Odor:	<u>no</u>
Sheen:	<u>no</u>
Floatables:	<u>no</u>

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]

Date Checked: 3-21-17 Time: 14:30

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.89 ft

Reference Point (description): Stream staff gage

Water Quality Measurements

Temperature (°C) 6.5

Conductivity (µs/cm) 67.5

Dissolved Oxygen (mg/L) 12.26

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. SVENDSEN

Sample Date: 3-7-17

Sample Time: 1410

PDT:

SITE ID: TOSMO

Base Flow or Storm Event?

Field Filtered Time: 1415

PST:

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: STGAD 9 LIGHT RAIN, 40°F

Water Quality Sampling

Sample ID: TOSMO-20170307

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	✓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: N/A

Filter blank sample ID: ↓

Transfer blank sample ID: ↓

Visual and Olfactory Conditions: MODERATELY TURBID SLIGHTLY ELEVATED

Clarity: MOD. TURBID
 Color: LIGHT BROWN
 Odor: NONE
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: _____

Date Checked: 3-21-17 Time: 14:30

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1 _____

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.84 / 0.78

BEFORE / AFTER REMOVING 4-INCH-DIA STICK FROM CONCRETE WEIR

Reference Point (description): S6

Water Quality Measurements

Temperature (°C) 6.4

Specific Conductivity (µs/cm) AS 91.5

Dissolved Oxygen (mg/L) AS 12.4

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. SVENDSEN
 Sample Date: 3-7-17 Sample Time: 1520 PDT?
 Base Flow or Storm Event? ? Field Filtered Time: 1525 PST:
(Must filter within 15 minutes of collection)

SITE ID: TYLMI
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: STEADY LIGHT RAIN, 40°F

Water Quality Sampling

Sample ID: TYLMI-20170307

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorus	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: N/A
 Filter blank sample ID: ↓
 Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

Clarity: FAIRLY CLEAR
 Color: NONE
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lamb Signature: [Signature]
 Date Checked: 3-21-17 Time: 4:30
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)
YSI Pro DSS 1
 YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.48

Reference Point (description): TOP OF CULVERT RIM

Water Quality Measurements

Temperature (°C) 6.4
 Specific Conductivity (µs/cm) 121.5
 Dissolved Oxygen (mg/L) 12.1

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. SVENDSEN

Sample Date: 3-7-17

Sample Time: 1445

EDF

SITE ID: TYLMO

Base Flow or Storm Event?

Field Filtered Time: 1450

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: STEADY LIGHT RAIN, 40°F

Water Quality Sampling

Sample ID: TYLMO-20170307

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 μm filter and vacuum hand pump

Duplicate sample ID: N/A

Filter blank sample ID: ↓

Transfer blank sample ID: ↓

Visual and Olfactory Conditions: SLIGHTLY ELEVATED

Clarity: M-D. TURBID

Color: LIGHT BROWN

Odor: NONE

Sheen: ↓

Floatables: ↓

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lamb Signature: [Signature]

Date Checked: 3-21-17 Time: 14:30

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.73

Reference Point (description): TOP OF CONCRETE PIM

Water Quality Measurements

Temperature (°C) 6.4

Specific Conductivity (μs/cm) 81.1

Dissolved Oxygen (mg/L) 12.2



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 3/23/2017 Page 1 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 3/07/2017 / All sites, 1 FD (QA24) at MONMN

date 3/22/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	3	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	96	±20	7	≤25	0	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	1	≤25	23	≤25	OK	NONE
Hardness	OK / SM 2340B	NA	NA	2	≤180	≤1.0 mg/L 1.0 mg/L	101,98	±25	98	±15	1	≤20	9.0	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	7	≤28	≤1.0 mg/L 1.0 mg/L	97	±25	108	±15	1	≤20	4.6	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	6	≤28	≤0.01 mg/L 0.01 mg/L	101	±25	92	±20	NC	≤20	12	≤20	OK	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	6-7	≤28	≤0.1 mg/L 0.1 mg/L	88-101	±25	98-102	±20	0.2-3.1	≤20	3.7	≤20	OK	NONW

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 3/23/2017 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 3/07/2017 / All sites, 1 FD (QA24) at MONMN

date 3/22/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	2	≤180	≤1.0 µg/L 1.0 µg/L	97,97	±25	NR	±15	10	≤20	0	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	2	≤180	≤5.0 µg/L 5.0 µg/L	113,113	±25	NR	±15	0	≤20	11	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	1	≤180	≤1.0 µg/L 1.0 µg/L	89,87	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	1	≤180	≤5.0 µg/L 5.0 µg/L	102,101	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Fecal Coliform	OK / SM 9222D	NA	NA	1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	19,25	≤35	13	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

May 2, 2017

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1704-114

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on April 12, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular flourish.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: May 2, 2017
Samples Submitted: April 12, 2017
Laboratory Reference: 1704-114
Project: 14-05806-000

Case Narrative

Samples were collected on April 12, 2017 and received by the laboratory on April 12, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170412					
Laboratory ID:	04-114-01					
Total Suspended Solids	3.0	1.0	SM 2540D	4-18-17	4-19-17	

Client ID:	COUMI-20170412					
Laboratory ID:	04-114-02					
Total Suspended Solids	150	2.0	SM 2540D	4-18-17	4-19-17	

Client ID:	COUMO-20170412					
Laboratory ID:	04-114-03					
Total Suspended Solids	62	1.0	SM 2540D	4-18-17	4-19-17	

Client ID:	EVAMS-20170412					
Laboratory ID:	04-114-04					
Total Suspended Solids	21	1.0	SM 2540D	4-18-17	4-19-17	

Client ID:	EVALSS-20170412					
Laboratory ID:	04-114-05					
Total Suspended Solids	23	1.0	SM 2540D	4-18-17	4-19-17	

Client ID:	MONMN-20170412					
Laboratory ID:	04-114-06					
Total Suspended Solids	19	1.0	SM 2540D	4-18-17	4-19-17	

Client ID:	MONMS-20170412					
Laboratory ID:	04-114-07					
Total Suspended Solids	17	1.0	SM 2540D	4-18-17	4-19-17	



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170412					
Laboratory ID:	04-114-08					
Total Suspended Solids	22	1.0	SM 2540D	4-18-17	4-19-17	

Client ID:	SEIMN-20170412					
Laboratory ID:	04-114-09					
Total Suspended Solids	20	1.0	SM 2540D	4-18-17	4-19-17	

Client ID:	SEIMS-20170412					
Laboratory ID:	04-114-10					
Total Suspended Solids	39	1.0	SM 2540D	4-18-17	4-19-17	

Client ID:	TOSMI-20170412					
Laboratory ID:	04-114-11					
Total Suspended Solids	130	1.3	SM 2540D	4-18-17	4-19-17	

Client ID:	TOSMO-20170412					
Laboratory ID:	04-114-12					
Total Suspended Solids	170	2.0	SM 2540D	4-18-17	4-19-17	

Client ID:	TYLMI-20170412					
Laboratory ID:	04-114-13					
Total Suspended Solids	15	1.0	SM 2540D	4-18-17	4-19-17	

Client ID:	TYLMO-20170412					
Laboratory ID:	04-114-14					
Total Suspended Solids	31	1.0	SM 2540D	4-18-17	4-19-17	

Client ID:	QA-25-20170412					
Laboratory ID:	04-114-15					
Total Suspended Solids	3.0	1.0	SM 2540D	4-18-17	4-19-17	



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0418W1					
Total Suspended Solids	ND	1.0	SM 2540D	4-18-17	4-19-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	04-114-01							
	ORIG	DUP						
Total Suspended Solids	3.00	3.50	NA	NA	NA	15	20	

SPIKE BLANK								
Laboratory ID:	SB0418W1							
	SB	SB		SB				
Total Suspended Solids	109	100	NA	109	78-113	NA	NA	



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170412					
Laboratory ID:	04-114-01					
Turbidity	1.8	0.10	EPA 180.1	4-12-17	4-12-17	

Client ID:	COUMI-20170412					
Laboratory ID:	04-114-02					
Turbidity	37	0.10	EPA 180.1	4-12-17	4-12-17	

Client ID:	COUMO-20170412					
Laboratory ID:	04-114-03					
Turbidity	13	0.10	EPA 180.1	4-12-17	4-12-17	

Client ID:	EVAMS-20170412					
Laboratory ID:	04-114-04					
Turbidity	12	0.10	EPA 180.1	4-12-17	4-12-17	

Client ID:	EVALSS-20170412					
Laboratory ID:	04-114-05					
Turbidity	6.2	0.10	EPA 180.1	4-12-17	4-12-17	

Client ID:	MONMN-20170412					
Laboratory ID:	04-114-06					
Turbidity	7.0	0.10	EPA 180.1	4-12-17	4-12-17	

Client ID:	MONMS-20170412					
Laboratory ID:	04-114-07					
Turbidity	7.8	0.10	EPA 180.1	4-12-17	4-12-17	



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170412					
Laboratory ID:	04-114-08					
Turbidity	9.0	0.10	EPA 180.1	4-12-17	4-12-17	

Client ID:	SEIMN-20170412					
Laboratory ID:	04-114-09					
Turbidity	7.9	0.10	EPA 180.1	4-12-17	4-12-17	

Client ID:	SEIMS-20170412					
Laboratory ID:	04-114-10					
Turbidity	14	0.10	EPA 180.1	4-12-17	4-12-17	

Client ID:	TOSMI-20170412					
Laboratory ID:	04-114-11					
Turbidity	37	0.10	EPA 180.1	4-12-17	4-12-17	

Client ID:	TOSMO-20170412					
Laboratory ID:	04-114-12					
Turbidity	45	0.10	EPA 180.1	4-12-17	4-12-17	

Client ID:	TYLMI-20170412					
Laboratory ID:	04-114-13					
Turbidity	12	0.10	EPA 180.1	4-12-17	4-12-17	

Client ID:	TYLMO-20170412					
Laboratory ID:	04-114-14					
Turbidity	15	0.10	EPA 180.1	4-12-17	4-12-17	



Date of Report: May 2, 2017
Samples Submitted: April 12, 2017
Laboratory Reference: 1704-114
Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-25-20170412					
Laboratory ID:	04-114-15					
Turbidity	1.8	0.10	EPA 180.1	4-12-17	4-12-17	



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0412W1					
Turbidity	ND	0.10	EPA 180.1	4-12-17	4-12-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	04-114-01							
	ORIG	DUP						
Turbidity	1.77	1.77	NA	NA	NA	NA	0	15



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170412					
Laboratory ID:	04-114-01					
Hardness	8.3	1.0	200.7/SM 2340B	4-19-17	4-19-17	

Client ID:	COUMI-20170412					
Laboratory ID:	04-114-02					
Hardness	70	5.0	200.7/SM 2340B	4-19-17	4-19-17	

Client ID:	COUMO-20170412					
Laboratory ID:	04-114-03					
Hardness	42	1.0	200.7/SM 2340B	4-19-17	4-19-17	

Client ID:	EVAMS-20170412					
Laboratory ID:	04-114-04					
Hardness	67	5.0	200.7/SM 2340B	4-19-17	4-19-17	

Client ID:	EVALSS-20170412					
Laboratory ID:	04-114-05					
Hardness	69	5.0	200.7/SM 2340B	4-19-17	4-19-17	

Client ID:	MONMN-20170412					
Laboratory ID:	04-114-06					
Hardness	39	1.0	200.7/SM 2340B	4-19-17	4-19-17	

Client ID:	MONMS-20170412					
Laboratory ID:	04-114-07					
Hardness	70	5.0	200.7/SM 2340B	4-19-17	4-19-17	



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170412					
Laboratory ID:	04-114-08					
Hardness	57	5.0	200.7/SM 2340B	4-19-17	4-19-17	

Client ID:	SEIMN-20170412					
Laboratory ID:	04-114-09					
Hardness	21	1.0	200.7/SM 2340B	4-19-17	4-19-17	

Client ID:	SEIMS-20170412					
Laboratory ID:	04-114-10					
Hardness	34	1.0	200.7/SM 2340B	4-19-17	4-19-17	

Client ID:	TOSMI-20170412					
Laboratory ID:	04-114-11					
Hardness	27	1.0	200.7/SM 2340B	4-19-17	4-19-17	

Client ID:	TOSMO-20170412					
Laboratory ID:	04-114-12					
Hardness	35	1.0	200.7/SM 2340B	4-19-17	4-19-17	

Client ID:	TYLMI-20170412					
Laboratory ID:	04-114-13					
Hardness	70	1.0	200.7/SM 2340B	4-19-17	4-19-17	

Client ID:	TYLMO-20170412					
Laboratory ID:	04-114-14					
Hardness	29	1.0	200.7/SM 2340B	4-19-17	4-19-17	



Date of Report: May 2, 2017
Samples Submitted: April 12, 2017
Laboratory Reference: 1704-114
Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-25-20170412					
Laboratory ID:	04-114-15					
Hardness	7.8	1.0	200.7/SM 2340B	4-19-17	4-19-17	



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0419WH2					
Hardness	ND	1.0	200.7/SM 2340B	4-19-17	4-19-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	04-114-01							
	ORIG	DUP						
Hardness	8.29	7.94	NA	NA	NA	NA	4	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	04-114-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	149	144	132	132	8.29	107	103	75-125	3	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK								
Laboratory ID:	SB0419WH2							
	SB	SB			SB			
Hardness	145	132	NA	110	80-120	NA	NA	



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170412					
Laboratory ID:	04-114-01					
Dissolved Organic Carbon	10	1.0	SM 5310B	4-18-17	4-18-17	
Client ID:	COUMI-20170412					
Laboratory ID:	04-114-02					
Dissolved Organic Carbon	4.5	1.0	SM 5310B	4-18-17	4-18-17	
Client ID:	COUMO-20170412					
Laboratory ID:	04-114-03					
Dissolved Organic Carbon	3.6	1.0	SM 5310B	4-18-17	4-18-17	
Client ID:	EVAMS-20170412					
Laboratory ID:	04-114-04					
Dissolved Organic Carbon	4.6	1.0	SM 5310B	4-18-17	4-18-17	
Client ID:	EVALSS-20170412					
Laboratory ID:	04-114-05					
Dissolved Organic Carbon	4.4	1.0	SM 5310B	4-18-17	4-18-17	
Client ID:	MONMN-20170412					
Laboratory ID:	04-114-06					
Dissolved Organic Carbon	5.0	1.0	SM 5310B	4-18-17	4-18-17	
Client ID:	MONMS-20170412					
Laboratory ID:	04-114-07					
Dissolved Organic Carbon	6.0	1.0	SM 5310B	4-18-17	4-18-17	



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170412					
Laboratory ID:	04-114-08					
Dissolved Organic Carbon	5.3	1.0	SM 5310B	4-18-17	4-18-17	
Client ID:	SEIMN-20170412					
Laboratory ID:	04-114-09					
Dissolved Organic Carbon	7.5	1.0	SM 5310B	4-18-17	4-18-17	
Client ID:	SEIMS-20170412					
Laboratory ID:	04-114-10					
Dissolved Organic Carbon	6.1	1.0	SM 5310B	4-18-17	4-18-17	
Client ID:	TOSMI-20170412					
Laboratory ID:	04-114-11					
Dissolved Organic Carbon	3.1	1.0	SM 5310B	4-18-17	4-18-17	
Client ID:	TOSMO-20170412					
Laboratory ID:	04-114-12					
Dissolved Organic Carbon	3.7	1.0	SM 5310B	4-18-17	4-18-17	
Client ID:	TYLMI-20170412					
Laboratory ID:	04-114-13					
Dissolved Organic Carbon	6.3	1.0	SM 5310B	4-18-17	4-18-17	
Client ID:	TYLMO-20170412					
Laboratory ID:	04-114-14					
Dissolved Organic Carbon	3.4	1.0	SM 5310B	4-18-17	4-18-17	



Date of Report: May 2, 2017
Samples Submitted: April 12, 2017
Laboratory Reference: 1704-114
Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-25-20170412					
Laboratory ID:	04-114-15					
Dissolved Organic Carbon	10	1.0	SM 5310B	4-18-17	4-18-17	



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0418D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	4-18-17	4-18-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	04-114-01							
	ORIG	DUP						
Dissolved Organic Carbon	10.4	10.5	NA	NA	NA	1	20	

MATRIX SPIKE								
Laboratory ID:	04-114-01							
	MS	MS		MS				
Dissolved Organic Carbon	20.3	10.0	10.4	99	75-125	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0418D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.7	10.0	NA	107	75-125	NA	NA	



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170412					
Laboratory ID:	04-114-01					
Total Phosphorus	0.014	0.010	EPA 365.1	4-17-17	1-17-17	

Client ID:	COUMI-20170412					
Laboratory ID:	04-114-02					
Total Phosphorus	0.17	0.010	EPA 365.1	4-17-17	1-17-17	

Client ID:	COUMO-20170412					
Laboratory ID:	04-114-03					
Total Phosphorus	0.085	0.010	EPA 365.1	4-17-17	1-17-17	

Client ID:	EVAMS-20170412					
Laboratory ID:	04-114-04					
Total Phosphorus	0.022	0.010	EPA 365.1	4-17-17	1-17-17	

Client ID:	EVALSS-20170412					
Laboratory ID:	04-114-05					
Total Phosphorus	0.024	0.010	EPA 365.1	4-17-17	1-17-17	

Client ID:	MONMN-20170412					
Laboratory ID:	04-114-06					
Total Phosphorus	0.053	0.010	EPA 365.1	4-17-17	1-17-17	

Client ID:	MONMS-20170412					
Laboratory ID:	04-114-07					
Total Phosphorus	0.031	0.010	EPA 365.1	4-17-17	1-17-17	



Date of Report: May 2, 2017
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 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170412					
Laboratory ID:	04-114-08					
Total Phosphorus	0.042	0.010	EPA 365.1	4-17-17	1-17-17	

Client ID:	SEIMN-20170412					
Laboratory ID:	04-114-09					
Total Phosphorus	0.031	0.010	EPA 365.1	4-17-17	1-17-17	

Client ID:	SEIMS-20170412					
Laboratory ID:	04-114-10					
Total Phosphorus	0.059	0.010	EPA 365.1	4-17-17	1-17-17	

Client ID:	TOSMI-20170412					
Laboratory ID:	04-114-11					
Total Phosphorus	0.17	0.010	EPA 365.1	4-17-17	1-17-17	

Client ID:	TOSMO-20170412					
Laboratory ID:	04-114-12					
Total Phosphorus	0.24	0.010	EPA 365.1	4-17-17	1-17-17	

Client ID:	TYLMI-20170412					
Laboratory ID:	04-114-13					
Total Phosphorus	0.070	0.010	EPA 365.1	4-17-17	1-17-17	

Client ID:	TYLMO-20170412					
Laboratory ID:	04-114-14					
Total Phosphorus	0.19	0.010	EPA 365.1	4-17-17	1-17-17	



Date of Report: May 2, 2017
Samples Submitted: April 12, 2017
Laboratory Reference: 1704-114
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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-25-20170412					
Laboratory ID:	04-114-15					
Total Phosphorus	0.016	0.010	EPA 365.1	4-17-17	1-17-17	



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
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 Project: 14-05806-000

**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0417W1					
Total Phosphorus	ND	0.010	EPA 365.1	4-17-17	1-17-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	04-114-01							
	ORIG	DUP						
Total Phosphorus	0.0142	0.0142	NA	NA	NA	0	11	

MATRIX SPIKE								
Laboratory ID:	04-114-01							
	MS	MS		MS				
Total Phosphorus	0.264	0.250	0.0142	100	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0417W1							
	SB	SB		SB				
Total Phosphorus	0.243	0.250	NA	97	86-111	NA	NA	



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 04-114-01						
Client ID: COLM-20170412						
Copper	ND	1.0	200.8	4-18-17	4-19-17	
Zinc	ND	5.0	200.8	4-18-17	4-19-17	
Lab ID: 04-114-02						
Client ID: COUMI-20170412						
Copper	6.2	1.0	200.8	4-18-17	4-19-17	
Zinc	27	5.0	200.8	4-18-17	4-19-17	
Lab ID: 04-114-03						
Client ID: COUMO-20170412						
Copper	4.1	1.0	200.8	4-18-17	4-19-17	
Zinc	24	5.0	200.8	4-18-17	4-19-17	
Lab ID: 04-114-04						
Client ID: EVAMS-20170412						
Copper	ND	1.0	200.8	4-18-17	4-19-17	
Zinc	ND	5.0	200.8	4-18-17	4-19-17	
Lab ID: 04-114-05						
Client ID: EVALSS-20170412						
Copper	ND	1.0	200.8	4-18-17	4-19-17	
Zinc	ND	5.0	200.8	4-18-17	4-19-17	
Lab ID: 04-114-06						
Client ID: MONMN-20170412						
Copper	1.6	1.0	200.8	4-18-17	4-19-17	
Zinc	8.5	5.0	200.8	4-18-17	4-19-17	



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-114-07					
Client ID:	MONMS-20170412					
Copper	2.4	1.0	200.8	4-18-17	4-19-17	
Zinc	8.8	5.0	200.8	4-18-17	4-19-17	
Lab ID:	04-114-08					
Client ID:	MONM-20170412					
Copper	1.7	1.0	200.8	4-18-17	4-19-17	
Zinc	15	5.0	200.8	4-18-17	4-19-17	
Lab ID:	04-114-09					
Client ID:	SEIMN-20170412					
Copper	1.2	1.0	200.8	4-18-17	4-19-17	
Zinc	ND	5.0	200.8	4-18-17	4-19-17	
Lab ID:	04-114-10					
Client ID:	SEIMS-20170412					
Copper	1.5	1.0	200.8	4-18-17	4-19-17	
Zinc	ND	5.0	200.8	4-18-17	4-19-17	
Lab ID:	04-114-11					
Client ID:	TOSMI-20170412					
Copper	10	1.0	200.8	4-18-17	4-19-17	
Zinc	140	5.0	200.8	4-18-17	4-19-17	
Lab ID:	04-114-12					
Client ID:	TOSMO-20170412					
Copper	10	1.0	200.8	4-18-17	4-19-17	
Zinc	140	5.0	200.8	4-18-17	4-19-17	



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TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-114-13					
Client ID:	TYLMI-20170412					
Copper	3.4	1.0	200.8	4-18-17	4-19-17	
Zinc	9.2	5.0	200.8	4-18-17	4-19-17	
Lab ID:	04-114-14					
Client ID:	TYLMO-20170412					
Copper	5.0	1.0	200.8	4-18-17	4-19-17	
Zinc	27	5.0	200.8	4-18-17	4-19-17	
Lab ID:	04-114-15					
Client ID:	QA-25-20170412					
Copper	ND	1.0	200.8	4-18-17	4-19-17	
Zinc	ND	5.0	200.8	4-18-17	4-19-17	



Date of Report: May 2, 2017
Samples Submitted: April 12, 2017
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**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 4-18-17
Date Analyzed: 4-19-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0418WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
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 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 DUPLICATE QUALITY CONTROL**

Date Extracted: 4-18-17

Date Analyzed: 4-19-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 04-114-15

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



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**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 4-18-17

Date Analyzed: 4-19-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 04-114-15

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	97.6	98	99.6	100	2	
Zinc	100	103	103	104	104	1	



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**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 04-114-01						
Client ID: COLM-20170412						
Copper	ND	1.0	200.8		4-17-17	
Zinc	ND	5.0	200.8		4-17-17	
Lab ID: 04-114-02						
Client ID: COUMI-20170412						
Copper	ND	1.0	200.8		4-17-17	
Zinc	5.5	5.0	200.8		4-17-17	
Lab ID: 04-114-03						
Client ID: COUMO-20170412						
Copper	ND	1.0	200.8		4-17-17	
Zinc	7.8	5.0	200.8		4-17-17	
Lab ID: 04-114-04						
Client ID: EVAMS-20170412						
Copper	ND	1.0	200.8		4-17-17	
Zinc	ND	5.0	200.8		4-17-17	
Lab ID: 04-114-05						
Client ID: EVALSS-20170412						
Copper	ND	1.0	200.8		4-17-17	
Zinc	ND	5.0	200.8		4-17-17	
Lab ID: 04-114-06						
Client ID: MONMN-20170412						
Copper	ND	1.0	200.8		4-17-17	
Zinc	ND	5.0	200.8		4-17-17	



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-114-07					
Client ID:	MONMS-20170412					
Copper	ND	1.0	200.8		4-17-17	
Zinc	5.4	5.0	200.8		4-17-17	
Lab ID:	04-114-08					
Client ID:	MONM-20170412					
Copper	ND	1.0	200.8		4-17-17	
Zinc	11	5.0	200.8		4-17-17	
Lab ID:	04-114-09					
Client ID:	SEIMN-20170412					
Copper	ND	1.0	200.8		4-17-17	
Zinc	ND	5.0	200.8		4-17-17	
Lab ID:	04-114-10					
Client ID:	SEIMS-20170412					
Copper	ND	1.0	200.8		4-17-17	
Zinc	ND	5.0	200.8		4-17-17	
Lab ID:	04-114-11					
Client ID:	TOSMI-20170412					
Copper	1.9	1.0	200.8		4-17-17	
Zinc	28	5.0	200.8		4-17-17	
Lab ID:	04-114-12					
Client ID:	TOSMO-20170412					
Copper	1.4	1.0	200.8		4-17-17	
Zinc	21	5.0	200.8		4-17-17	



Date of Report: May 2, 2017
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DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-114-13					
Client ID:	TYLMI-20170412					
Copper	1.6	1.0	200.8		4-17-17	
Zinc	ND	5.0	200.8		4-17-17	
Lab ID:	04-114-14					
Client ID:	TYLMO-20170412					
Copper	1.7	1.0	200.8		4-17-17	
Zinc	9.5	5.0	200.8		4-17-17	
Lab ID:	04-114-15					
Client ID:	QA-25-20170412					
Copper	ND	1.0	200.8		4-17-17	
Zinc	ND	5.0	200.8		4-17-17	



Date of Report: May 2, 2017
Samples Submitted: April 12, 2017
Laboratory Reference: 1704-114
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 4-17-17
Matrix: Water
Units: ug/L (ppb)
Lab ID: MB0417D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: May 2, 2017
Samples Submitted: April 12, 2017
Laboratory Reference: 1704-114
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 4-17-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 04-114-15

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: May 2, 2017
 Samples Submitted: April 12, 2017
 Laboratory Reference: 1704-114
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 4-17-17

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 04-114-15

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	71.8	90	71.2	89	1	
Zinc	80.0	81.8	102	81.8	102	0	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

May 2 2017
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20170412	Water	17-A005100	Micro, NUT
COUMI-20170412	Water	17-A005101	Micro, NUT
COUMO-20170412	Water	17-A005102	Micro, NUT
EVAMS-20170412	Water	17-A005103	Micro, NUT
EVALSS-20170412	Water	17-A005104	Micro, NUT
MONMN-20170412	Water	17-A005105	Micro, NUT
MONMS-20170412	Water	17-A005106	Micro, NUT
MONM-20170412	Water	17-A005107	Micro, NUT
SEIMN-20170412	Water	17-A005108	Micro, NUT
SEIMS-20170412	Water	17-A005109	Micro, NUT
TOSMI-20170412	Water	17-A005110	Micro, NUT
TOSMO-20170412	Water	17-A005111	Micro, NUT
TYLMI-20170412	Water	17-A005112	Micro, NUT
TYLMO-20170412	Water	17-A005113	Micro, NUT
QA-25-20170412	Water	17-A005114	Micro, NUT

Your samples were received on Wednesday, April 12, 2017. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

May 2 2017
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 04-114

BACT = Bacteriological
CONV = Conventional

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



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ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
PO Number: 04-114
All results reported on an as received basis.

Date Received: 04/12/17
Date Reported: 5/ 2/17

AMTEST Identification Number 17-A005100
Client Identification COLM-20170412
Sampling Date 04/12/17, 07:55

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	50.	CFU/100 ml		1	SM 9222D	NG	04/12/17
Total Nitrogen (NOX&TKN)	0.86	mg/l		0.1			
Total Nitrogen (TKN)	0.857	mg/l		0.1	SM4500N	JC	04/24/17
Nitrate + Nitrite	< 0.01	mg/l		0.01	SM4500NO3	JC	04/17/17

AMTEST Identification Number **17-A005101**
Client Identification **COUMI-20170412**
Sampling Date **04/12/17, 04:55**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	610	CFU/100 ml		1	SM 9222D	NG	04/12/17
Total Nitrogen (NOX&TKN)	1.67	mg/l		0.1			
Total Nitrogen (TKN)	1.50	mg/l		0.1	SM4500N	JC	04/24/17
Nitrate + Nitrite	0.17	mg/l		0.01	SM4500NO3	JC	04/17/17

AMTEST Identification Number **17-A005102**
Client Identification **COUMO-20170412**
Sampling Date **04/12/17, 04:35**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	280	CFU/100 ml		1	SM 9222D	NG	04/12/17
Total Nitrogen (NOX&TKN)	1.16	mg/l		0.1			
Total Nitrogen (TKN)	0.978	mg/l		0.1	SM4500N	JC	04/24/17
Nitrate + Nitrite	0.18	mg/l		0.01	SM4500NO3	JC	04/17/17

AMTEST Identification Number 17-A005103
Client Identification EVAMS-20170412
Sampling Date 04/12/17, 05:20

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	58.	CFU/100 ml		1	SM 9222D	NG	04/12/17
Total Nitrogen (NOX&TKN)	1.59	mg/l		0.1			
Total Nitrogen (TKN)	0.902	mg/l		0.1	SM4500N	JC	04/27/17
Nitrate + Nitrite	0.69	mg/l	D	0.1	SM4500NO3	JC	04/17/17

AMTEST Identification Number 17-A005104
Client Identification EVALSS-20170412
Sampling Date 04/12/17, 05:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	40.	CFU/100 ml		1	SM 9222D	NG	04/12/17
Total Nitrogen (NOX&TKN)	1.19	mg/l		0.1			
Total Nitrogen (TKN)	0.673	mg/l		0.1	SM4500N	JC	04/27/17
Nitrate + Nitrite	0.52	mg/l	D	0.1	SM4500NO3	JC	04/17/17

AMTEST Identification Number 17-A005105
Client Identification MONMN-20170412
Sampling Date 04/12/17, 06:55

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	20.	CFU/100 ml		1	SM 9222D	NG	04/12/17
Total Nitrogen (NOX&TKN)	0.87	mg/l		0.1			
Total Nitrogen (TKN)	0.774	mg/l		0.1	SM4500N	JC	04/27/17
Nitrate + Nitrite	0.092	mg/l		0.01	SM4500NO3	JC	04/17/17

AMTEST Identification Number 17-A005106
Client Identification MONMS-20170412
Sampling Date 04/12/17, 06:35

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	24.	CFU/100 ml		1	SM 9222D	NG	04/12/17
Total Nitrogen (NOX&TKN)	0.89	mg/l		0.1			
Total Nitrogen (TKN)	0.693	mg/l		0.1	SM4500N	JC	04/27/17
Nitrate + Nitrite	0.20	mg/l		0.01	SM4500NO3	JC	04/17/17

AMTEST Identification Number 17-A005107
Client Identification MONM-20170412
Sampling Date 04/12/17, 07:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	42.	CFU/100 ml		1	SM 9222D	NG	04/12/17
Total Nitrogen (NOX&TKN)	0.80	mg/l		0.1			
Total Nitrogen (TKN)	0.665	mg/l		0.1	SM4500N	JC	04/27/17
Nitrate + Nitrite	0.14	mg/l		0.01	SM4500NO3	JC	04/17/17

AMTEST Identification Number 17-A005108
Client Identification SEIMN-20170412
Sampling Date 04/12/17, 07:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	6.	CFU/100 ml		1	SM 9222D	NG	04/12/17
Total Nitrogen (NOX&TKN)	3.66	mg/l		0.1			
Total Nitrogen (TKN)	3.50	mg/l		0.1	SM4500N	JC	04/27/17
Nitrate + Nitrite	0.16	mg/l		0.01	SM4500NO3	JC	04/17/17

AMTEST Identification Number 17-A005109
Client Identification SEIMS-20170412
Sampling Date 04/12/17, 06:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	380	CFU/100 ml		1	SM 9222D	NG	04/12/17
Total Nitrogen (NOX&TKN)	1.91	mg/l		0.1			
Total Nitrogen (TKN)	1.70	mg/l		0.1	SM4500N	JC	04/27/17
Nitrate + Nitrite	0.21	mg/l		0.01	SM4500NO3	JC	04/25/17

AMTEST Identification Number 17-A005110
Client Identification TOSMI-20170412
Sampling Date 04/12/17, 04:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	590	CFU/100 ml		1	SM 9222D	NG	04/12/17
Total Nitrogen (NOX&TKN)	1.24	mg/l		0.1			
Total Nitrogen (TKN)	1.10	mg/l		0.1	SM4500N	JC	04/27/17
Nitrate + Nitrite	0.14	mg/l		0.01	SM4500NO3	JC	04/25/17

AMTEST Identification Number 17-A005111
Client Identification TOSMO-20170412
Sampling Date 04/12/17, 05:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	740	CFU/100 ml		1	SM 9222D	NG	04/12/17
Total Nitrogen (NOX&TKN)	1.92	mg/l		0.1			
Total Nitrogen (TKN)	1.80	mg/l		0.1	SM4500N	JC	04/27/17
Nitrate + Nitrite	0.12	mg/l		0.01	SM4500NO3	JC	04/25/17

AMTEST Identification Number 17-A005112
Client Identification TYLMI-20170412
Sampling Date 04/12/17, 06:05

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	62.	CFU/100 ml		1	SM 9222D	NG	04/12/17
Total Nitrogen (NOX&TKN)	2.37	mg/l		0.1			
Total Nitrogen (TKN)	2.00	mg/l		0.1	SM4500N	JC	04/27/17
Nitrate + Nitrite	0.37	mg/l		0.01	SM4500NO3	JC	04/25/17

AMTEST Identification Number 17-A005113
Client Identification TYLMO-20170412
Sampling Date 04/12/17, 05:40

Results

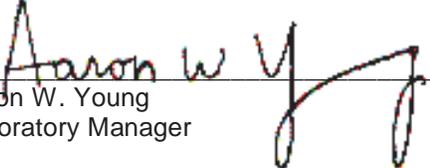
PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	140	CFU/100 ml		1	SM 9222D	NG	04/12/17
Total Nitrogen (NOX&TKN)	2.05	mg/l		0.1			
Total Nitrogen (TKN)	1.80	mg/l		0.1	SM4500N	JC	04/27/17
Nitrate + Nitrite	0.25	mg/l		0.01	SM4500NO3	JC	04/25/17

AMTEST Identification Number 17-A005114
Client Identification QA-25-20170412
Sampling Date 04/12/17, 08:05

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	34.	CFU/100 ml		1	SM 9222D	NG	04/12/17
Total Nitrogen (NOX&TKN)	1.15	mg/l		0.1			
Total Nitrogen (TKN)	1.10	mg/l		0.1	SM4500N	JC	04/27/17
Nitrate + Nitrite	0.049	mg/l		0.01	SM4500NO3	JC	04/25/17

D = The reported value is from a dilution.


 Aaron W. Young
 Laboratory Manager

QC Summary for sample numbers: 17-A005100 to 17-A005114

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
17-A005090	Fecal Coliform	CFU/100 ml	210	200	4.9
17-A005100	Fecal Coliform	CFU/100 ml	50.	52.	3.9
17-A005114	Fecal Coliform	CFU/100 ml	34.	40.	16.
17-A004696	Total Nitrogen (TKN)	mg/l	4.30	4.50	4.5
17-A004987	Total Nitrogen (TKN)	mg/l	0.652	0.628	3.8
17-A005102	Total Nitrogen (TKN)	mg/l	0.978	0.986	0.81
17-A005112	Total Nitrogen (TKN)	mg/l	2.00	2.20	9.5
17-A005453	Total Nitrogen (TKN)	mg/l	21.2	19.6	7.8
17-A005460	Total Nitrogen (TKN)	mg/l	0.452	0.452	0.00
17-A004596	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	
17-A004683	Nitrate + Nitrite	mg/l	0.32	0.31	3.2
17-A004693	Nitrate + Nitrite	mg/l	1.6	1.7	6.1
17-A004807	Nitrate + Nitrite	mg/l	2.0	2.0	0.00
17-A004990	Nitrate + Nitrite	mg/l	1.0	1.0	0.00
17-A004991	Nitrate + Nitrite	mg/l	0.34	0.29	16.
17-A005154	Nitrate + Nitrite	mg/l	0.19	0.19	0.00
17-A005499	Nitrate + Nitrite	mg/l	0.022	0.020	9.5

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPKAMT	RECOVERY
17-A004696	Total Nitrogen (TKN)	mg/l	4.30	15.7	10.0	114.00 %
17-A004987	Total Nitrogen (TKN)	mg/l	0.652	2.71	2.00	102.90 %
17-A005102	Total Nitrogen (TKN)	mg/l	0.978	3.30	2.00	116.10 %
17-A005112	Total Nitrogen (TKN)	mg/l	2.00	3.90	2.00	95.00 %
17-A005453	Total Nitrogen (TKN)	mg/l	21.2	42.1	20.0	104.50 %
17-A005460	Total Nitrogen (TKN)	mg/l	0.452	2.45	2.00	99.90 %
17-A004596	Nitrate + Nitrite	mg/l	< 0.01	0.47	0.50	94.00 %
17-A004683	Nitrate + Nitrite	mg/l	0.32	0.77	0.50	90.00 %
17-A004693	Nitrate + Nitrite	mg/l	1.6	2.6	1.0	100.00 %
17-A004990	Nitrate + Nitrite	mg/l	1.0	1.4	0.50	80.00 %
17-A004991	Nitrate + Nitrite	mg/l	0.34	0.74	0.50	80.00 %
17-A005154	Nitrate + Nitrite	mg/l	0.19	0.65	0.50	92.00 %
17-A005499	Nitrate + Nitrite	mg/l	0.022	0.47	0.50	89.60 %

QC Summary for sample numbers: 17-A005100 to 17-A005114...

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	1.00	1.08	108. %
Total Nitrogen (TKN)	mg/l	1.00	1.06	106. %
Total Nitrogen (TKN)	mg/l	1.00	1.01	101. %
Nitrate + Nitrite	mg/l	0.50	0.48	96.0 %
Nitrate + Nitrite	mg/l	0.50	0.48	96.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.48	96.0 %
Nitrate + Nitrite	mg/l	0.50	0.48	96.0 %
Nitrate + Nitrite	mg/l	0.50	0.47	94.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.47	94.0 %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %
Nitrate + Nitrite	mg/l	0.50	0.45	90.0 %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th Pl Kirkland, WA 98034

Phone Number: (425) 885-1664

Laboratory Reference #: 04-112

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other:

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20170412 5100	4/12/17	0755	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20170412 01	4/12/17	0455	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20170412 02	4/12/17	0435	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20170412 03	4/12/17	0520	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20170412 04	4/12/17	0540	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20170412 05	4/12/17	0655	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20170412 06	4/12/17	0635	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONNM-20170412 07	4/12/17	0725	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20170412 08	4/12/17	0710	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20170412 09	4/12/17	0615	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Relinquished by: [Signature]		Company: [Signature]		Date: 4/12/17	Time: 10:55	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by: [Signature]		Company: AMTEST		Date: 4/12/17	Time: 10:55	
Relinquished by:						
Received by:						
Relinquished by:						
Received by:						
Relinquished by:						
Received by:						

AMTEST Turned = 8.9
Pickup



14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants
 Project No.: 14-05806-000
 Project Name: Redmond Paired Watershed Study
 Project Manager: George Ithner

CHAIN OF CUSTODY

Turnaround Requested:
 1 Day
 2 Day
 3 Day
 Standard

Laboratory No. **04-134**

Requested Analyses

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2017 0412	4.12.17	4:35	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2017 0412	4.12.17	4:55	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2017 0412	4.12.17	4:35	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2017 0412	4.12.17	5:20	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2017 0412	4.12.17	5:40	Water	7	X	X	X	X	X	X	X	X	X
6	MONNM-2017 0412	4.12.17	6:55	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2017 0412	4.12.17	6:35	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2017 0412	4.12.17	7:25	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2017 0412	4.12.17	7:10	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2017 0412	4.12.17	6:15	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2017 0412	4.12.17	4:40	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2017 0412	4.12.17	5:15	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2017 0412	4.12.17	6:05	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2017 0412	4.12.17	5:40	Water	7	X	X	X	X	X	X	X	X	X
15	QA-25-20170412	4.12.17	8:05	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by Winn Date 4.12.17

Received by [Signature] Date 4/12/17

Firm Herrera Time 9:05

Firm OSF Time 9:05 AM

Relinquished by _____ Date _____

Received by _____ Date _____

Firm _____ Time _____

Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study



Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
 Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

Project Number: 14-05806-000
 Personnel Performing Calibration: ALEX SWENSON
 Meter: YSI 955E1
 Date/Time: 4/21/14 4:15 Time: 4:15
 Barometric Pressure Start of Day: mmHg: 31.3
 Barometric Pressure End of Day: mmHg: 753.7

PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	—	0	—	
Conductivity (µS/cm)	992	1,000	13.1	
Conductivity (µS/cm)	101.4	100	13.1	
DO % Saturation	99.8	100	13.3	

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	3.9	0	14.8	
Conductivity (µS/cm)	100.8	100	15.0	
DO % Saturation	101.3	100	15.2	

Handwritten signature or initials.

METER CALIBRATION LOG - Redmond Paired Watershed Study



Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
 Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.

Project Number: 14-05806-000
 Personnel Performing Calibration: B. BLAND
 Meter: YSI DSS #2
 Date/Time: 4/21/17 4:15
 Barometric Pressure Start of Day: mmHg: 743 Time: 4:15
 Barometric Pressure End of Day: mmHg: 754 Time: 8:30

PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	99.7	0	13.1	
Conductivity (µS/cm)	99.1	1,000	13.1	
Conductivity (µS/cm)	99.7	100	13.1	
DO % Saturation	97.9	100	13.2	

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	4.2	0	17.8	
Conductivity (µS/cm)	99.3	100	10.5	
DO % Saturation	99.2	100	10.2	

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



SITE ID: COLM
 Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 46°F + Rain

Field Personnel: AS & VW
 Sample Date: 4/12/17 Sample Time: 7:55/8:05 PDT:
 Base Flow or Storm Event? Field Filtered Time: 7:55/8:05 PST:
 (Must filter within 15 minutes of collection)

Water Quality Sampling

Sample ID: COLM20170412

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	yes
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	✓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: GAZS-20170412
 Filler blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:
 Clarity: clear
 Color: tannin
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY
 Date: _____ Time: _____

Quality Assurance

Checked By: Sam Leub Signature: _____
 Date Checked: 5-30-17 Time: 12:45
 Data Entered into Database? YES NO
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (05M1466)
 YSI Pro Plus (15D100020)
YSI ProDSS#1 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 5.78
 Reference Point (description): Staff gauge

Water Quality Measurements

Temperature (°C) 9.3
 Conductivity (µs/cm) 26.4
 Dissolved Oxygen (mg/L) 10.73

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: B. Blaud
 Sample Date: 4.12.17
 Base Flow or Storm Event? Storm

SITE ID: COUMI
 Project Number: 14-05806-000
 Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain 45°F

Water Quality Sampling
 Sample ID: COUMI-20170412

Parameter	Bottle Type	Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: cloudy
 Color: light/med brown
 Odor: none
 Sheen: none
 Floatables: slip sed

Date: _____ Time: _____
 LABORATORY DELIVERY

Quality Assurance

Checked By: [Signature] Signature: _____
 Date Checked: 5-30-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration
 Check which field meter was used and complete the meter calibration form
 YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 X

Stream Stage Measurement
 Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 2.83

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 8.9
 Specific Conductivity (µs/cm) 108.1
 Dissolved Oxygen (mg/L) W.3

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: B. Blaw
 Sample Date: 4.12.17
 Base Flow or Storm Event?

SITE ID: COUMO
 Project Number: 14-05806-000
 Project Name: Redmond Paired Watershed Study

Current Weather and Temp: RAIN, 45°F

Water Quality Sampling

Sample ID: COUMO-20170412

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:
 Clarity: cloudy
 Color: light grey
 Odor: none
 Sheen: none
 Floatables: slurp sed

Date: _____ Time: _____
 LABORATORY DELIVERY

Quality Assurance

Checked By: B. Blaw Signature: _____
 Date Checked: 5-30-17 Time: 12:45
 Data Entered into Database? YES NO
 Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration
 Check which field meter was used and complete the meter calibration form
 YSI Pro Plus (1SD100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 X

Stream Stage Measurement
 Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 1.44

Reference Point (description): SG - no debris

Water Quality Measurements
 Temperature (°C) 9.0
 Specific Conductivity (µs/cm) 87.8
 Dissolved Oxygen (mg/L) 10.92

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS + VW

Sample Date: 4/12/17

Sample Time: 5:20

Base Flow or Storm Event? (Storm)

Field Filtered Time: 5:20

(Must filter within 15 minutes of collection)

SITE

ID: EVAMS

Project Number: 14-05806-000

Water Quality Sampling

Sample ID: EVAMS20170412

Parameter	Bottle Type	Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Slight turbidity

Color: light brown

Odor: none

Sheen: none

Floatables: none

LABORATORY DELIVERY

Date: _____

Time: _____

Quality Assurance

Checked By: Jan Luth Signature: _____

Date Checked: 5-30-17 Time: 12:45

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes: _____



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 46°F and Rain

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI PRO DSS# X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.99

Reference Point (description): Staff gauge

Water Quality Measurements

Temperature (°C) 8.9

Conductivity (µs/cm) 158.5

Dissolved Oxygen (mg/L) 11.25

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS & JW

Sample Date: 4/22/17

Sample Time: 5:40

PDT

Base Flow or Storm Event? Storm Event

Field Filtered Time: 5:40

PST

(Must filter within 15 minutes of collection)

SITE ID: EVALSS

Project Number: 14-05806-000

Water Quality Sampling

Sample ID: EVALSS20V70412

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: Slightly turbidity

Color: NO

Odor: NO

Sheen: NO

Floatables: NO

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: Samantha Signature: [Signature]

Date Checked: 5-30-17 Time: 12:05

Date Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 46°F + Rain

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS #1 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 7.38

Reference Point (description): Staff gauge

Water Quality Measurements

Temperature (°C) 18.9

Conductivity (µs/cm) 152.4

Dissolved Oxygen (mg/L) 11.51



FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: B. Baud

Sample Date: 4.12.17

Sample Time: 6:55

Base Flow or Storm Event? Storm

Field Filtered Time: 7:00

(Must filter within 15 minutes of collection)

SITE ID:

MONMN

Project Number: 14-05806-000

Water Quality Sampling

Sample ID: MONMN-20170412

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness: Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: cloudy

Color: clear

Odor: none

Sheen: none

Floatables: susp sed org deb

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: Sabrina Leath Signature: [Signature]

Date Checked: 5-30-17 Time: 12:45

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

PBT

PST

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain 47°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 9.21

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 9.0

Specific Conductivity (µs/cm) 99.0

Dissolved Oxygen (mg/L) 10.87



FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: B. Bland

Sample Date: 4.12.17

Sample Time: 0:35

Base Flow or Storm Event? Storm

Field Filtered Time: 0:40

(Must filter within 15 minutes of collection)

SITE ID:

MONMS

Project Number: 14-05806-000

Water Quality Sampling

Sample ID: MONMS-20170412

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>2</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: cloudy

Color: none

Odor: none

Sheen: none

Floables: susp sedi org debris

LABORATORY DELIVERY

Date: _____

Time: _____

Quality Assurance

Checked By: Brian South Signature: _____

Date Checked: 5-30-17 Time: 12:45

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

PDT

PST

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain 47°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1 _____

YSI Pro DSS 2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.57

Reference Point (description): Vault

Water Quality Measurements

Temperature (°C) 9.0

Specific Conductivity (µs/cm) 109.5

Dissolved Oxygen (mg/L) 9.31



FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: B. Bloyd

Sample Date: 4.12.17

Sample Time: 7:25

Base Flow or Storm Event? Storm

Field Filtered Time: 7:30

(Must filter within 15 minutes of collection)

SITE ID:

MONM

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain 48°F



Water Quality Sampling

Sample ID: MONM-20170421

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: cloudy

Color: light brown

Odor: none

Sheen: none

Floatables: slip sed

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: [Signature] Signature:

Date Checked: 5-30-17 Time: 12:45

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.24

Reference Point (description): top of culvert ↓

Water Quality Measurements

Temperature (°C) 9.4

Specific Conductivity (µs/cm) 133.8

Dissolved Oxygen (mg/L) 11.28

15 Feb 2017

[Handwritten scribbles]

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



SITE ID: SEIMN
 Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 46°F + rain

Field Personnel: AS + W
 Sample Date: 4 Sample Time: 7:10 PDT
 Base Flow or Storm Event? Field Filtered Time: 7:10 PST
 (Must filter within 15 minutes of collection)

Water Quality Sampling

Sample ID: SEIMN 2017 0412

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	2
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	4

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:
 Filter blank sample ID:
 Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear
 Color: lightish
 Odor: no
 Sheen: no
 Flocculants: no

LABORATORY DELIVERY

Date: _____ Time: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (OSM1466)
 YSI Pro Plus (15D100020)

YSI Pro DSS #1 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.5 inches

Reference Point (description): top of bank to WS

Water Quality Measurements

Temperature (°C) 8.2

Conductivity (µs/cm) 53.3

Dissolved Oxygen (mg/L) 11.58

Quality Assurance

Checked By: Zoe Leavitt Signature: *[Signature]*

Date Checked: 5-30-17 Time: 12:45

Data Entered into Database? YES NO

Date Entered: _____ Time: _____

Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS + WDW VW

Sample Date: 4/12/17

Sample Time: 6:15

PDT

Base Flow or Storm Event?

Field Filled Time: 6:15

PST

SITE

ID: SEIMS

Project Number: 14-05806-000

Water Quality Sampling

Sample ID: SEIMS20170412

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: Slightly turbid
 Color: light brown
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Linder Signature: [Signature]

Date Checked: 5-30-17 Time: 12:05

Date Entered into Database? YES NO Initials:

Date Entered: _____ Time: _____

Notes:

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 46° and rain

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI ProDSS #1 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.90

Reference Point (description): Staff gauge

Water Quality Measurements

Temperature (°C) 6.1

Conductivity (µs/cm) 20.4

Dissolved Oxygen (mg/L) 11.09



FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: **AS + VW**

Sample Date: **4/12/17**

Sample Time: **4:40**

PDT PST

Base Flow or Storm Event? Storm

Field Filtered Time: **4:40**

(Must filter within 15 minutes of collection)

SITE

ID: **TOSMI**

Project Number: **14-05806-000**

Water Quality Sampling

Sample ID: **TOSMI20170412**

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: **turbid**

Color: **grey**

Odor: **no**

Sheen: **no**

Floatables: **no**

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: **John Lewis** Signature: *[Signature]*

Date Checked: **5-30-17** Time: **12:45**

Date Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes:

Project Name: **Redmond Paired Watershed Study**

Current Weather and Temp: **46° F + rain**

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS #1

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): **1.05**

Reference Point (description): **@ Staff gauge**

Water Quality Measurements

Temperature (°C): **9.3**

Conductivity (µs/cm): **35.7**

Dissolved Oxygen (mg/L): **11.34**



HERRERA

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: B. Blawd

Sample Date: 4-12-17

Sample Time: 5:15

Base Flow or Storm Event? Storm

Field Filtered Time: 5:20

(Must filter within 15 minutes of collection)

SITE ID: TOSMD

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: RAIN 45°F



Water Quality Sampling

Sample ID: TOSMD-20170412

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: light turbid cloudy
 Color: light medium brown
 Odor: none
 Sheen: none
 Floatables: susp sed

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Lewis Signature: [Signature]

Date Checked: 5-30-17 Time: 12:55

Date Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.90

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 9.3

Specific Conductivity (µs/cm) 61.7

Dissolved Oxygen (mg/L) 11.31

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: B. Bland

Sample Date: 4.12.17

Base Flow or Storm Event? Storm

Sample Time: 0:05

Field Filtered Time: 0:10

(Must filter within 15 minutes of collection)

SITE ID: TYLMI

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain 40°F



Water Quality Sampling

Sample ID: TYLMI-20170421

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bast.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>Y</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: cloudy
 Color: light brown
 Odor: none
 Sheen: none
 Floatables: susp sed / org. debris
 LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lewis Signature: _____
 Date Checked: 5-30-17 Time: 12:05
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.53

Reference Point (description): top of culvert

Water Quality Measurements

Temperature (°C) 9.2

Specific Conductivity (µs/cm) 125.5

Dissolved Oxygen (mg/L) 10.01

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: B. Bland
 Sample Date: 4.12.17 Sample Time: 5:40
 Base Flow or Storm Event? STORM Field Filtered Time: 5:45
 (Must filter within 15 minutes of collection)

SITE ID: TYLMO
 Project Number: 14-05806-000

Water Quality Sampling

Sample ID: TYLMO-20170412

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: cloudy
 Color: light brown
 Odor: none
 Sheen: none
 Floatables: susp sed, organic debris
 LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: B. Bland Signature: _____
 Date Checked: 5-30-17 Time: _____
 Data Entered into Database? YES NO initials: BB
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI DSS 1 _____
 YSI DSS 2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 2.80
 Reference Point (description): top of culvert ↓

Water Quality Measurements

Temperature (°C) 9.5
 Conductivity (µs/cm) 102.8
 Dissolved Oxygen (mg/L) 10.90



Data Quality Assurance Worksheet

By G. Catarra

Date 5/17/2017 Page 1 of 2

Checked: initials JL

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Sample Date/Sample ID: 4/12/2017 / All sites, 1 FD (QA25) at COLM date 5/30/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal	Reported	Goal	Reported	Goal	Reported	Goal	Reported	Goal	Reported	Goal		
TSS	OK/ SM 2540D	NA	NA	7	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	±20	109	±20	15	≤25	0	≤25	OK	NONE
Turbidity	OK/ EPA 180.1	NA	NA	<1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	±10	NA	±10	0	≤25	0	≤25	OK	NONE
Hardness	OK/ SM 2340B	NA	NA	7	≤180	≤1.0 mg/L 1.0 mg/L	107/103	±25	±15	110	±15	4	≤20	6.2	≤20	OK	NONE
DOC	OK/ SM 5310B	<15	≤15	6	≤28	≤1.0 mg/L 1.0 mg/L	99	±25	±15	107	±15	1	≤20	0	≤20	OK	NONE
Total Phosphorus	OK/ EPA 365.1	NA	NA	5	≤28	≤0.01 mg/L 0.01 mg/L	100	±25	±20	97	±20	0	≤20	13	≤20	OK	NONE
Total Nitrogen (TKN + N+N)	OK/ SM 4500 N-B	NA	NA	5-12	≤28	≤0.1 mg/L 0.1 mg/L	116,95	±25	±20	90-108	±20	0.8,9,5	≤20	30 (TKN), NC(N+N)	≤20	OK	FLAG TKN "J" FOR COLM DUE TO FIELD DUP EXCEEDANCE.

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra
 Date 5/17/2017 Page 2 of 2
 Checked: initials JL
 date 5/30/2017

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria
 Sample Date/Sample ID: 4/12/2017 / All sites, 1 FD (QA25) at COLM

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	7	≤180	≤1.0 µg/L 1.0 µg/L	100	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE	
Total Zinc	OK/ EPA 200.8	NA	NA	7	≤180	≤5.0 µg/L 5.0 µg/L	104	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE	
Dissolved Copper	OK/ EPA 200.8	<15	≤15	5	≤180	≤1.0 µg/L 1.0 µg/L	89	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE	
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	5	≤180	≤5.0 µg/L 5.0 µg/L	102	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE	
Fecal Coliform	OK / SM9222D	NA	NA	<1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	3,9,16	≤35	38	≤50	OK	FLAG COLM "J" DUE TO FIELD DUPLICATE EXCEEDANCE	

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

June 2, 2017

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1705-081

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on May 5, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy, handwritten oval scribble.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 2, 2017
Samples Submitted: May 5, 2017
Laboratory Reference: 1705-081
Project: 14-05806-000

Case Narrative

Samples were collected on May 4, 2017 and received by the laboratory on May 5, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: June 2, 2017
 Samples Submitted: May 5, 2017
 Laboratory Reference: 1705-081
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170504					
Laboratory ID:	05-081-01					
Total Suspended Solids	5.8	0.80	SM 2540D	5-8-17	5-8-17	

Client ID:	COUMI-20170504					
Laboratory ID:	05-081-02					
Total Suspended Solids	2800	8.0	SM 2540D	5-8-17	5-8-17	

Client ID:	COUMO-20170504					
Laboratory ID:	05-081-03					
Total Suspended Solids	54	1.3	SM 2540D	5-8-17	5-8-17	

Client ID:	EVAMS-20170504					
Laboratory ID:	05-081-04					
Total Suspended Solids	150	4.0	SM 2540D	5-8-17	5-8-17	

Client ID:	EVALSS-20170504					
Laboratory ID:	05-081-05					
Total Suspended Solids	90	2.0	SM 2540D	5-8-17	5-8-17	

Client ID:	MONMN-20170504					
Laboratory ID:	05-081-06					
Total Suspended Solids	20	0.80	SM 2540D	5-8-17	5-8-17	

Client ID:	MONMS-20170504					
Laboratory ID:	05-081-07					
Total Suspended Solids	9.8	0.80	SM 2540D	5-8-17	5-8-17	



Date of Report: June 2, 2017
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**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170504					
Laboratory ID:	05-081-08					
Total Suspended Solids	31	1.0	SM 2540D	5-8-17	5-8-17	

Client ID:	SEIMN-20170504					
Laboratory ID:	05-081-09					
Total Suspended Solids	27	0.80	SM 2540D	5-8-17	5-8-17	

Client ID:	SEIMS-20170504					
Laboratory ID:	05-081-10					
Total Suspended Solids	42	1.3	SM 2540D	5-8-17	5-8-17	

Client ID:	TOSMI-20170504					
Laboratory ID:	05-081-11					
Total Suspended Solids	150	2.0	SM 2540D	5-8-17	5-8-17	

Client ID:	TOSMO-20170504					
Laboratory ID:	05-081-12					
Total Suspended Solids	440	8.0	SM 2540D	5-8-17	5-8-17	

Client ID:	TYLMI-20170504					
Laboratory ID:	05-081-13					
Total Suspended Solids	32	1.3	SM 2540D	5-8-17	5-8-17	

Client ID:	TYLMO-20170504					
Laboratory ID:	05-081-14					
Total Suspended Solids	31	1.3	SM 2540D	5-8-17	5-8-17	



Date of Report: June 2, 2017
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TOTAL SUSPENDED SOLIDS
SM 2540D

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-26-20170504					
Laboratory ID:	05-081-15					
Total Suspended Solids	290	2.0	SM 2540D	5-8-17	5-8-17	



Date of Report: June 2, 2017
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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0508W1					
Total Suspended Solids	ND	0.80	SM 2540D	5-8-17	5-8-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-081-01							
	ORIG	DUP						
Total Suspended Solids	5.80	6.00	NA	NA	NA	3	20	

SPIKE BLANK								
Laboratory ID:	SB0508W1							
	SB	SB		SB				
Total Suspended Solids	94.0	100	NA	94	78-113	NA	NA	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170504					
Laboratory ID:	05-081-01					
Turbidity	1.6	0.10	EPA 180.1	5-5-17	5-5-17	

Client ID:	COUMI-20170504					
Laboratory ID:	05-081-02					
Turbidity	650	5.0	EPA 180.1	5-5-17	5-5-17	

Client ID:	COUMO-20170504					
Laboratory ID:	05-081-03					
Turbidity	12	0.10	EPA 180.1	5-5-17	5-5-17	

Client ID:	EVAMS-20170504					
Laboratory ID:	05-081-04					
Turbidity	63	0.50	EPA 180.1	5-5-17	5-5-17	

Client ID:	EVALSS-20170504					
Laboratory ID:	05-081-05					
Turbidity	22	0.10	EPA 180.1	5-5-17	5-5-17	

Client ID:	MONMN-20170504					
Laboratory ID:	05-081-06					
Turbidity	7.0	0.10	EPA 180.1	5-5-17	5-5-17	

Client ID:	MONMS-20170504					
Laboratory ID:	05-081-07					
Turbidity	8.2	0.10	EPA 180.1	5-5-17	5-5-17	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170504					
Laboratory ID:	05-081-08					
Turbidity	11	0.10	EPA 180.1	5-5-17	5-5-17	

Client ID:	SEIMN-20170504					
Laboratory ID:	05-081-09					
Turbidity	7.1	0.10	EPA 180.1	5-5-17	5-5-17	

Client ID:	SEIMS-20170504					
Laboratory ID:	05-081-10					
Turbidity	9.8	0.10	EPA 180.1	5-5-17	5-5-17	

Client ID:	TOSMI-20170504					
Laboratory ID:	05-081-11					
Turbidity	21	0.10	EPA 180.1	5-5-17	5-5-17	

Client ID:	TOSMO-20170504					
Laboratory ID:	05-081-12					
Turbidity	130	0.50	EPA 180.1	5-5-17	5-5-17	

Client ID:	TYLMI-20170504					
Laboratory ID:	05-081-13					
Turbidity	13	0.10	EPA 180.1	5-5-17	5-5-17	

Client ID:	TYLMO-20170504					
Laboratory ID:	05-081-14					
Turbidity	13	0.10	EPA 180.1	5-5-17	5-5-17	



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TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-26-20170504					
Laboratory ID:	05-081-15					
Turbidity	33	0.20	EPA 180.1	5-5-17	5-5-17	



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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0505W1					
Turbidity	ND	0.10	EPA 180.1	5-5-17	5-5-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-081-01							
	ORIG	DUP						
Turbidity	1.61	1.59	NA	NA	NA	NA	1	15



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170504					
Laboratory ID:	05-081-01					
Hardness	9.0	1.0	200.7/SM 2340B	5-10-17	5-15-17	

Client ID:	COUMI-20170504					
Laboratory ID:	05-081-02					
Hardness	130	1.0	200.7/SM 2340B	5-10-17	5-15-17	

Client ID:	COUMO-20170504					
Laboratory ID:	05-081-03					
Hardness	43	1.0	200.7/SM 2340B	5-10-17	5-15-17	

Client ID:	EVAMS-20170504					
Laboratory ID:	05-081-04					
Hardness	72	1.0	200.7/SM 2340B	5-10-17	5-15-17	

Client ID:	EVALSS-20170504					
Laboratory ID:	05-081-05					
Hardness	63	1.0	200.7/SM 2340B	5-10-17	5-15-17	

Client ID:	MONMN-20170504					
Laboratory ID:	05-081-06					
Hardness	42	1.0	200.7/SM 2340B	5-10-17	5-15-17	

Client ID:	MONMS-20170504					
Laboratory ID:	05-081-07					
Hardness	76	1.0	200.7/SM 2340B	5-10-17	5-15-17	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170504					
Laboratory ID:	05-081-08					
Hardness	55	1.0	200.7/SM 2340B	5-10-17	5-15-17	

Client ID:	SEIMN-20170504					
Laboratory ID:	05-081-09					
Hardness	23	1.0	200.7/SM 2340B	5-10-17	5-15-17	

Client ID:	SEIMS-20170504					
Laboratory ID:	05-081-10					
Hardness	35	1.0	200.7/SM 2340B	5-10-17	5-15-17	

Client ID:	TOSMI-20170504					
Laboratory ID:	05-081-11					
Hardness	28	1.0	200.7/SM 2340B	5-10-17	5-15-17	

Client ID:	TOSMO-20170504					
Laboratory ID:	05-081-12					
Hardness	82	1.0	200.7/SM 2340B	5-10-17	5-15-17	

Client ID:	TYLMI-20170504					
Laboratory ID:	05-081-13					
Hardness	46	1.0	200.7/SM 2340B	5-10-17	5-15-17	

Client ID:	TYLMO-20170504					
Laboratory ID:	05-081-14					
Hardness	35	1.0	200.7/SM 2340B	5-10-17	5-15-17	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-26-20170504					
Laboratory ID:	05-081-15					
Hardness	37	1.0	200.7/SM 2340B	5-10-17	5-15-17	



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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0510WH2					
Hardness	ND	1.0	200.7/SM 2340B	5-10-17	5-15-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-081-01							
	ORIG	DUP						
Hardness	9.01	9.08	NA	NA	NA	1	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	05-081-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	148	146	132	132	9.01	105	104	75-125	1	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK								
Laboratory ID:	SB0510WH2							
	SB	SB			SB			
Hardness	136	132	NA	103	80-120	NA	NA	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170504					
Laboratory ID:	05-081-01					
Dissolved Organic Carbon	12	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	COUMI-20170504					
Laboratory ID:	05-081-02					
Dissolved Organic Carbon	7.0	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	COUMO-20170504					
Laboratory ID:	05-081-03					
Dissolved Organic Carbon	5.8	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	EVAMS-20170504					
Laboratory ID:	05-081-04					
Dissolved Organic Carbon	6.5	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	EVALSS-20170504					
Laboratory ID:	05-081-05					
Dissolved Organic Carbon	6.5	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	MONMN-20170504					
Laboratory ID:	05-081-06					
Dissolved Organic Carbon	5.8	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	MONMS-20170504					
Laboratory ID:	05-081-07					
Dissolved Organic Carbon	9.0	1.0	SM 5310B	5-10-17	5-10-17	



Date of Report: June 2, 2017
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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170504					
Laboratory ID:	05-081-08					
Dissolved Organic Carbon	6.1	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	SEIMN-20170504					
Laboratory ID:	05-081-09					
Dissolved Organic Carbon	8.8	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	SEIMS-20170504					
Laboratory ID:	05-081-10					
Dissolved Organic Carbon	8.4	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	TOSMI-20170504					
Laboratory ID:	05-081-11					
Dissolved Organic Carbon	8.6	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	TOSMO-20170504					
Laboratory ID:	05-081-12					
Dissolved Organic Carbon	5.9	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	TYLMI-20170504					
Laboratory ID:	05-081-13					
Dissolved Organic Carbon	8.4	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	TYLMO-20170504					
Laboratory ID:	05-081-14					
Dissolved Organic Carbon	6.1	1.0	SM 5310B	5-10-17	5-10-17	



Date of Report: June 2, 2017
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**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-26-20170504					
Laboratory ID:	05-081-15					
Dissolved Organic Carbon	9.2	1.0	SM 5310B	5-10-17	5-10-17	



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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0510D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	5-10-17	5-10-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-081-03							
	ORIG	DUP						
Dissolved Organic Carbon	5.84	5.82	NA	NA	NA	0	20	

MATRIX SPIKE

Laboratory ID:	05-081-03							
	MS	MS		MS				
Dissolved Organic Carbon	17.0	10.0	5.84	112	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0510D1							
	SB	SB		SB				
Dissolved Organic Carbon	11.6	10.0	NA	116	75-125	NA	NA	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170504					
Laboratory ID:	05-081-01					
Total Phosphorus	0.019	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	COUMI-20170504					
Laboratory ID:	05-081-02					
Total Phosphorus	2.3	0.050	EPA 365.1	5-16-17	5-17-17	

Client ID:	COUMO-20170504					
Laboratory ID:	05-081-03					
Total Phosphorus	0.15	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	EVAMS-20170504					
Laboratory ID:	05-081-04					
Total Phosphorus	0.24	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	EVALSS-20170504					
Laboratory ID:	05-081-05					
Total Phosphorus	0.12	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	MONMN-20170504					
Laboratory ID:	05-081-06					
Total Phosphorus	0.067	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	MONMS-20170504					
Laboratory ID:	05-081-07					
Total Phosphorus	0.061	0.010	EPA 365.1	5-16-17	5-17-17	



Date of Report: June 2, 2017
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 Laboratory Reference: 1705-081
 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170504					
Laboratory ID:	05-081-08					
Total Phosphorus	0.074	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	SEIMN-20170504					
Laboratory ID:	05-081-09					
Total Phosphorus	0.039	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	SEIMS-20170504					
Laboratory ID:	05-081-10					
Total Phosphorus	0.069	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	TOSMI-20170504					
Laboratory ID:	05-081-11					
Total Phosphorus	0.14	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	TOSMO-20170504					
Laboratory ID:	05-081-12					
Total Phosphorus	0.72	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	TYLMI-20170504					
Laboratory ID:	05-081-13					
Total Phosphorus	0.084	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	TYLMO-20170504					
Laboratory ID:	05-081-14					
Total Phosphorus	0.071	0.010	EPA 365.1	5-16-17	5-17-17	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-26-20170504					
Laboratory ID:	05-081-15					
Total Phosphorus	0.24	0.010	EPA 365.1	5-16-17	5-17-17	



Date of Report: June 2, 2017
 Samples Submitted: May 5, 2017
 Laboratory Reference: 1705-081
 Project: 14-05806-000

**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0516W1					
Total Phosphorus	ND	0.010	EPA 365.1	5-16-17	5-17-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-081-01							
	ORIG	DUP						
Total Phosphorus	0.0193	0.0185	NA	NA	NA	4	11	

MATRIX SPIKE								
Laboratory ID:	05-081-01							
	MS	MS		MS				
Total Phosphorus	0.271	0.250	0.0193	101	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0516W1							
	SB	SB		SB				
Total Phosphorus	0.236	0.250	NA	94	86-111	NA	NA	



Date of Report: June 2, 2017
 Samples Submitted: May 5, 2017
 Laboratory Reference: 1705-081
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 05-081-01						
Client ID: COLM-20170504						
Copper	ND	1.0	200.8	5-10-17	5-10-17	
Zinc	ND	5.0	200.8	5-10-17	5-10-17	
Lab ID: 05-081-02						
Client ID: COUMI-20170504						
Copper	44	1.0	200.8	5-10-17	5-10-17	
Zinc	370	13	200.8	5-10-17	5-10-17	
Lab ID: 05-081-03						
Client ID: COUMO-20170504						
Copper	6.9	1.0	200.8	5-10-17	5-10-17	
Zinc	52	5.0	200.8	5-10-17	5-10-17	
Lab ID: 05-081-04						
Client ID: EVAMS-20170504						
Copper	5.0	1.0	200.8	5-10-17	5-10-17	
Zinc	20	5.0	200.8	5-10-17	5-10-17	
Lab ID: 05-081-05						
Client ID: EVALSS-20170504						
Copper	2.7	1.0	200.8	5-10-17	5-10-17	
Zinc	14	5.0	200.8	5-10-17	5-10-17	
Lab ID: 05-081-06						
Client ID: MONMN-20170504						
Copper	1.9	1.0	200.8	5-10-17	5-10-17	
Zinc	9.9	5.0	200.8	5-10-17	5-10-17	



Date of Report: June 2, 2017
 Samples Submitted: May 5, 2017
 Laboratory Reference: 1705-081
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-081-07					
Client ID:	MONMS-20170504					
Copper	2.7	1.0	200.8	5-10-17	5-10-17	
Zinc	10	5.0	200.8	5-10-17	5-10-17	
Lab ID:	05-081-08					
Client ID:	MONM-20170504					
Copper	2.1	1.0	200.8	5-10-17	5-10-17	
Zinc	26	5.0	200.8	5-10-17	5-10-17	
Lab ID:	05-081-09					
Client ID:	SEIMN-20170504					
Copper	1.2	1.0	200.8	5-10-17	5-10-17	
Zinc	ND	5.0	200.8	5-10-17	5-10-17	
Lab ID:	05-081-10					
Client ID:	SEIMS-20170504					
Copper	ND	1.0	200.8	5-10-17	5-10-17	
Zinc	ND	5.0	200.8	5-10-17	5-10-17	
Lab ID:	05-081-11					
Client ID:	TOSMI-20170504					
Copper	13	1.0	200.8	5-10-17	5-10-17	
Zinc	78	5.0	200.8	5-10-17	5-10-17	
Lab ID:	05-081-12					
Client ID:	TOSMO-20170504					
Copper	51	1.0	200.8	5-10-17	5-10-17	
Zinc	760	25	200.8	5-10-17	5-10-17	



Date of Report: June 2, 2017
 Samples Submitted: May 5, 2017
 Laboratory Reference: 1705-081
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-081-13					
Client ID:	TYLMI-20170504					
Copper	5.1	1.0	200.8	5-10-17	5-10-17	
Zinc	27	5.0	200.8	5-10-17	5-10-17	
Lab ID:	05-081-14					
Client ID:	TYLMO-20170504					
Copper	6.0	1.0	200.8	5-10-17	5-10-17	
Zinc	250	13	200.8	5-10-17	5-10-17	
Lab ID:	05-081-15					
Client ID:	QA-26-20170504					
Copper	16	1.0	200.8	5-10-17	5-10-17	
Zinc	130	5.0	200.8	5-10-17	5-10-17	



Date of Report: June 2, 2017
Samples Submitted: May 5, 2017
Laboratory Reference: 1705-081
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 5-10-17
Date Analyzed: 5-10-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0510WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: June 2, 2017
Samples Submitted: May 5, 2017
Laboratory Reference: 1705-081
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 5-10-17

Date Analyzed: 5-10-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 05-081-07

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	2.74	2.62	5	1.0	
Zinc	10.1	9.78	3	5.0	



Date of Report: January 6, 2017
 Samples Submitted: January 6, 2017
 Laboratory Reference: 1705-081
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 5-10-17

Date Analyzed: 5-10-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 05-081-07

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	96.8	94	97.8	95	1	
Zinc	100	117	107	116	106	0	



Date of Report: June 2, 2017
 Samples Submitted: May 5, 2017
 Laboratory Reference: 1705-081
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 05-081-01						
Client ID: COLM-20170504						
Copper	ND	1.0	200.8		5-10-17	
Zinc	ND	5.0	200.8		5-10-17	
Lab ID: 05-081-02						
Client ID: COUMI-20170504						
Copper	ND	1.0	200.8		5-10-17	
Zinc	ND	5.0	200.8		5-10-17	
Lab ID: 05-081-03						
Client ID: COUMO-20170504						
Copper	2.1	1.0	200.8		5-10-17	
Zinc	15	5.0	200.8		5-10-17	
Lab ID: 05-081-04						
Client ID: EVAMS-20170504						
Copper	ND	1.0	200.8		5-10-17	
Zinc	ND	5.0	200.8		5-10-17	
Lab ID: 05-081-05						
Client ID: EVALSS-20170504						
Copper	ND	1.0	200.8		5-10-17	
Zinc	ND	5.0	200.8		5-10-17	
Lab ID: 05-081-06						
Client ID: MONMN-20170504						
Copper	ND	1.0	200.8		5-10-17	
Zinc	ND	5.0	200.8		5-10-17	



Date of Report: June 2, 2017
 Samples Submitted: May 5, 2017
 Laboratory Reference: 1705-081
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-081-07					
Client ID:	MONMS-20170504					
Copper	ND	1.0	200.8		5-10-17	
Zinc	ND	5.0	200.8		5-10-17	
Lab ID:	05-081-08					
Client ID:	MONM-20170504					
Copper	ND	1.0	200.8		5-10-17	
Zinc	9.0	5.0	200.8		5-10-17	
Lab ID:	05-081-09					
Client ID:	SEIMN-20170504					
Copper	ND	1.0	200.8		5-10-17	
Zinc	ND	5.0	200.8		5-10-17	
Lab ID:	05-081-10					
Client ID:	SEIMS-20170504					
Copper	ND	1.0	200.8		5-10-17	
Zinc	ND	5.0	200.8		5-10-17	
Lab ID:	05-081-11					
Client ID:	TOSMI-20170504					
Copper	6.2	1.0	200.8		5-10-17	
Zinc	32	5.0	200.8		5-10-17	
Lab ID:	05-081-12					
Client ID:	TOSMO-20170504					
Copper	2.4	1.0	200.8		5-10-17	
Zinc	20	5.0	200.8		5-10-17	



Date of Report: June 2, 2017
 Samples Submitted: May 5, 2017
 Laboratory Reference: 1705-081
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-081-13					
Client ID:	TYLMI-20170504					
Copper	2.2	1.0	200.8		5-10-17	
Zinc	14	5.0	200.8		5-10-17	
Lab ID:	05-081-14					
Client ID:	TYLMO-20170504					
Copper	2.8	1.0	200.8		5-10-17	
Zinc	190	5.0	200.8		5-10-17	
Lab ID:	05-081-15					
Client ID:	QA-26-20170504					
Copper	6.4	1.0	200.8		5-10-17	
Zinc	29	5.0	200.8		5-10-17	



Date of Report: June 2, 2017
Samples Submitted: May 5, 2017
Laboratory Reference: 1705-081
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 5-10-17
Matrix: Water
Units: ug/L (ppb)
Lab ID: MB0510D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: June 2, 2017
Samples Submitted: May 5, 2017
Laboratory Reference: 1705-081
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 5-10-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-081-12

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	2.36	2.36	0	1.0	
Zinc	19.8	19.0	4	5.0	



Date of Report: June 2, 2017
 Samples Submitted: May 5, 2017
 Laboratory Reference: 1705-081
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 5-10-17

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 05-081-12

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	72.8	88	70.8	86	3	
Zinc	80.0	94.4	93	90.6	89	4	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

Jun 2 2017
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20170504	Water	17-A006630	Micro, NUT
COLUMI-20170504	Water	17-A006631	Micro, NUT
COUMO-20170504	Water	17-A006632	Micro, NUT
EVAMS-20170504	Water	17-A006633	Micro, NUT
EVALSS-20170504	Water	17-A006634	Micro, NUT
MONMN-20170504	Water	17-A006635	Micro, NUT
MONMS-20170504	Water	17-A006636	Micro, NUT
MONM-20170504	Water	17-A006637	Micro, NUT
SEIMN-20170504	Water	17-A006638	Micro, NUT
SEIMS-20170504	Water	17-A006639	Micro, NUT
TOSMI-20170504	Water	17-A006640	Micro, NUT
TOSMO-20170504	Water	17-A006641	Micro, NUT
TYLMI-20170504	Water	17-A006642	Micro, NUT
TYLMO-20170504	Water	17-A006643	Micro, NUT
QA-26-20170504	Water	17-A006644	Micro, NUT

Your samples were received on Friday, May 5, 2017. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

Jun 2 2017
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-111
PO Number: 05-081

BACT = Bacteriological
CONV = Conventional

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



*Professional
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Services*

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-111
PO Number: 05-081
All results reported on an as received basis.

Date Received: 05/05/17
Date Reported: 6/ 2/17

AMTEST Identification Number 17-A006630
Client Identification COLM-20170504
Sampling Date 05/04/17, 22:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	72.	CFU/100 ml		1	SM 9222D	JM	05/05/17
Total Nitrogen (NOX&TKN)	0.83	mg/l		0.1			
Total Nitrogen (TKN)	0.756	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.072	mg/l		0.01	SM4500NO3	JC	05/17/17

AMTEST Identification Number 17-A006631
Client Identification COUMI-20170504
Sampling Date 05/04/17, 18:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	17000	CFU/100 ml		1	SM 9222D	JM	05/05/17
Total Nitrogen (NOX&TKN)	12.0	mg/l		0.1			
Total Nitrogen (TKN)	11.6	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.39	mg/l		0.01	SM4500NO3	JC	05/17/17

AMTEST Identification Number 17-A006632
Client Identification COUMO-20170504
Sampling Date 05/04/17, 18:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2300	CFU/100 ml		1	SM 9222D	JM	05/05/17
Total Nitrogen (NOX&TKN)	1.32	mg/l		0.1			
Total Nitrogen (TKN)	1.10	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.22	mg/l		0.01	SM4500NO3	JC	05/17/17

AMTEST Identification Number 17-A006633
Client Identification EVAMS-20170504
Sampling Date 05/04/17, 19:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2200	CFU/100 ml		1	SM 9222D	JM	05/05/17
Total Nitrogen (NOX&TKN)	2.88	mg/l		0.1			
Total Nitrogen (TKN)	2.00	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.88	mg/l		0.01	SM4500NO3	JC	05/17/17

AMTEST Identification Number 17-A006634
Client Identification EVALSS-20170504
Sampling Date 05/04/17, 19:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	3600	CFU/100 ml		1	SM 9222D	JM	05/05/17
Total Nitrogen (NOX&TKN)	2.08	mg/l		0.1			
Total Nitrogen (TKN)	1.20	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.88	mg/l		0.01	SM4500NO3	JC	05/17/17

AMTEST Identification Number 17-A006635
Client Identification MONMN-20170504
Sampling Date 05/04/17, 21:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	420	CFU/100 ml		1	SM 9222D	JM	05/05/17
Total Nitrogen (NOX&TKN)	0.91	mg/l		0.1			
Total Nitrogen (TKN)	0.771	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.14	mg/l		0.01	SM4500NO3	JC	05/17/17

AMTEST Identification Number 17-A006636
Client Identification MONMS-20170504
Sampling Date 05/04/17, 21:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	870	CFU/100 ml		1	SM 9222D	JM	05/05/17
Total Nitrogen (NOX&TKN)	1.10	mg/l		0.1			
Total Nitrogen (TKN)	0.854	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.25	mg/l		0.01	SM4500NO3	JC	05/17/17

AMTEST Identification Number 17-A006637
Client Identification MONM-20170504
Sampling Date 05/04/17, 22:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	780	CFU/100 ml		1	SM 9222D	JM	05/05/17
Total Nitrogen (NOX&TKN)	0.96	mg/l		0.1			
Total Nitrogen (TKN)	0.782	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.18	mg/l		0.01	SM4500NO3	JC	05/17/17

AMTEST Identification Number 17-A006638
Client Identification SEIMN-20170504
Sampling Date 05/04/17, 21:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	130	CFU/100 ml		1	SM 9222D	JM	05/05/17
Total Nitrogen (NOX&TKN)	0.97	mg/l		0.1			
Total Nitrogen (TKN)	0.796	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.17	mg/l		0.01	SM4500NO3	JC	05/17/17

AMTEST Identification Number 17-A006639
Client Identification SEIMS-20170504
Sampling Date 05/04/17, 20:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	740	CFU/100 ml		1	SM 9222D	JM	05/05/17
Total Nitrogen (NOX&TKN)	1.48	mg/l		0.1			
Total Nitrogen (TKN)	1.30	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.18	mg/l		0.01	SM4500NO3	JC	05/17/17

AMTEST Identification Number 17-A006640
Client Identification TOSMI-20170504
Sampling Date 05/04/17, 18:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2500	CFU/100 ml		1	SM 9222D	JM	05/05/17
Total Nitrogen (NOX&TKN)	3.24	mg/l		0.1			
Total Nitrogen (TKN)	2.80	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.44	mg/l		0.01	SM4500NO3	JC	05/17/17

AMTEST Identification Number 17-A006641
Client Identification TOSMO-20170504
Sampling Date 05/04/17, 19:20

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	5600	CFU/100 ml		1	SM 9222D	JM	05/05/17
Total Nitrogen (NOX&TKN)	4.16	mg/l		0.1			
Total Nitrogen (TKN)	3.90	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.26	mg/l		0.01	SM4500NO3	JC	05/17/17

AMTEST Identification Number 17-A006642
Client Identification TYLMI-20170504
Sampling Date 05/04/17, 20:20

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	3700	CFU/100 ml		1	SM 9222D	JM	05/05/17
Total Nitrogen (NOX&TKN)	1.32	mg/l		0.1			
Total Nitrogen (TKN)	1.10	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.22	mg/l		0.01	SM4500NO3	JC	05/17/17

AMTEST Identification Number 17-A006643
Client Identification TYLMO-20170504
Sampling Date 05/04/17, 19:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	4100	CFU/100 ml		1	SM 9222D	JM	05/05/17
Total Nitrogen (NOX&TKN)	1.24	mg/l		0.1			
Total Nitrogen (TKN)	0.981	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.26	mg/l		0.01	SM4500NO3	JC	05/17/17

AMTEST Identification Number 17-A006644
Client Identification QA-26-20170504
Sampling Date 05/04/17, 18:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2100	CFU/100 ml		1	SM 9222D	JM	05/05/17
Total Nitrogen (NOX&TKN)	5.28	mg/l		0.1			
Total Nitrogen (TKN)	4.80	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	0.48	mg/l		0.01	SM4500NO3	JC	05/17/17


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 17-A006630 to 17-A006644

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
17-A006637	Fecal Coliform	CFU/100 ml	780	610	24.
17-A006643	Fecal Coliform	CFU/100 ml	4100	3600	13.
17-A006635	Total Nitrogen (TKN)	mg/l	0.771	0.819	6.0
17-A006643	Total Nitrogen (TKN)	mg/l	0.981	1.02	3.9
17-A006791	Total Nitrogen (TKN)	mg/l	0.575	0.633	9.6
17-A006808	Total Nitrogen (TKN)	mg/l	0.336	0.327	2.7
17-A006902	Total Nitrogen (TKN)	mg/l	0.515	0.547	6.0
17-A006948	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
17-A007078	Total Nitrogen (TKN)	mg/l	1.20	1.30	8.0
17-A007171	Total Nitrogen (TKN)	mg/l	0.332	0.341	2.7
17-A007192	Total Nitrogen (TKN)	mg/l	0.527	0.555	5.2
17-A007202	Total Nitrogen (TKN)	mg/l	0.747	0.664	12.
17-A007212	Total Nitrogen (TKN)	mg/l	1.50	1.80	18.
17-A006149	Nitrate + Nitrite	mg/l	20.	19.	5.1
17-A006634	Nitrate + Nitrite	mg/l	0.88	0.88	0.00
17-A006644	Nitrate + Nitrite	mg/l	0.48	0.45	6.5

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPKAMT	RECOVERY
17-A006635	Total Nitrogen (TKN)	mg/l	0.771	2.78	2.00	100.45 %
17-A006643	Total Nitrogen (TKN)	mg/l	0.981	2.87	2.00	94.45 %
17-A006791	Total Nitrogen (TKN)	mg/l	0.575	2.56	2.00	99.25 %
17-A006808	Total Nitrogen (TKN)	mg/l	0.336	2.08	2.00	87.20 %
17-A006902	Total Nitrogen (TKN)	mg/l	0.515	2.53	2.00	100.75 %
17-A006948	Total Nitrogen (TKN)	mg/l	< 0.1	2.07	2.00	103.50 %
17-A007078	Total Nitrogen (TKN)	mg/l	1.20	2.99	2.00	89.50 %
17-A007171	Total Nitrogen (TKN)	mg/l	0.332	2.44	2.00	105.40 %
17-A007192	Total Nitrogen (TKN)	mg/l	0.527	2.62	2.00	104.65 %
17-A007202	Total Nitrogen (TKN)	mg/l	0.747	2.68	2.00	96.65 %
17-A007212	Total Nitrogen (TKN)	mg/l	1.50	3.50	2.00	100.00 %
17-A006149	Nitrate + Nitrite	mg/l	20.	32.	12.	100.00 %
17-A006634	Nitrate + Nitrite	mg/l	0.88	3.0	2.5	84.80 %
17-A006644	Nitrate + Nitrite	mg/l	0.48	0.96	0.50	96.00 %

QC Summary for sample numbers: 17-A006630 to 17-A006644...

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	1.00	0.942	94.2 %
Total Nitrogen (TKN)	mg/l	1.00	0.939	93.9 %
Total Nitrogen (TKN)	mg/l	1.00	1.00	100. %
Total Nitrogen (TKN)	mg/l	1.00	0.948	94.8 %
Total Nitrogen (TKN)	mg/l	20.0	19.1	95.5 %
Nitrate + Nitrite	mg/l	0.50	0.46	92.0 %
Nitrate + Nitrite	mg/l	0.50	0.48	96.0 %
Nitrate + Nitrite	mg/l	0.50	0.48	96.0 %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request
 1 Day 2 Day 3 Day
 Standard
 Other: _____

Laboratory Reference #: 05-081
 Project Manager: Blair Goodrow
 email: bgoodrow@onsite-env.com
 Project Number: 14-05806-000
 Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20170504 <i>lele 30</i>	5/4/17	2200	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20170504 <i>31</i>	5/4/17	1830	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20170504 <i>32</i>	5/4/17	1810	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20170504 <i>33</i>	5/4/17	1910	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20170504 <i>34</i>	5/4/17	1940	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20170504 <i>35</i>	5/4/17	2110	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20170504 <i>36</i>	5/4/17	2140	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20170504 <i>37</i>	5/4/17	2210	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20170504 <i>38</i>	5/4/17	2125	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20170504 <i>39</i>	5/4/17	2030	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company		Date	Time	Comments/Special Instructions
Relinquished by: <i>[Signature]</i>		<i>ATE</i>		<i>5/5/17</i>	<i>12:50</i>	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by: <i>[Signature]</i>		<i>Am Test</i>		<i>5/5/17</i>	<i>12:50</i>	
Relinquished by:						
Received by:						
Relinquished by:						
Received by:						



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 05-081

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
11	TOSMI-20170504 40	5/4/17	1810	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
12	TOSMO-20170504 41	5/4/17	1920	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
13	TYLMI-20170504 42	5/4/17	2020	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
14	TYLMO-20170504 43	5/4/17	1940	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
15	QA-26-20170504 44	5/4/17	1815	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N

Signature	Company	Date	Time	Comments/Special Instructions
Relinquished by:		5/5/17	12:50	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:	Am Test	5/5/17	12:50	
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				



CHAIN OF CUSTODY

14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

Turnaround Requested:
 1 Day
 2 Day
 3 Day
 Standard

Laboratory No. 05-081
 Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2017 0504	5-4-17	22:00	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2017 0504		18:30	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2017 0504		18:10	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2017 0504		19:10	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2017 0504		19:40	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2017 0504		21:00	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2017 0504		21:40	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2017 0504		22:10	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2017 0504		21:25	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2017 0504		20:30	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2017 0504		18:10	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2017 0504		19:20	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2017 0504		20:20	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2017 0504		19:40	Water	7	X	X	X	X	X	X	X	X	X
15	QA-26-2017 0504	5-4-17	18:15	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by George Iftner Date 5-5-17 Received by [Signature] Date 5/5/17
 Firm Herrera Env. Cons. Time 9:20 Firm OSE Time 9:20
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample



Redmond, WA 98052
J.3881

CHAIN OF CUSTODY

Turnaround Requested:

_____ 1 Day

_____ 2 Day

_____ 3 Day

Standard

Laboratory No. 05-081

Requested Analyses

Client: Herrera Environmental Consultants

Project No.: 14-05806-000

Project Name: Redmond Paired Watershed Study

Project Manager: George Ifner

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *										
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *					
1	COLM-2017 0504	5-4-17	22:00	Water	7	X	X	X	X	X	X	X	X	X					
2	COUMI-2017 0504		18:30	Water	7	X	X	X	X	X	X	X	X	X					
3	COUMO-2017 0504		18:10	Water	7	X	X	X	X	X	X	X	X	X					
4	EVAMS-2017 0504		19:10	Water	7	X	X	X	X	X	X	X	X	X					
5	EVALSS-2017 0504		19:40	Water	7	X	X	X	X	X	X	X	X	X					
6	MONMN-2017 0504		21:00	Water	7	X	X	X	X	X	X	X	X	X					
7	MONMS-2017 0504		21:40	Water	7	X	X	X	X	X	X	X	X	X					
8	MONM-2017 0504		22:10	Water	7	X	X	X	X	X	X	X	X	X					
9	SEIMN-2017 0504		21:25	Water	7	X	X	X	X	X	X	X	X	X					
10	SEIMS-2017 0504		20:30	Water	7	X	X	X	X	X	X	X	X	X					
11	TOSMI-2017 0504		18:10	Water	7	X	X	X	X	X	X	X	X	X					
12	TOSMO-2017 0504		19:20	Water	7	X	X	X	X	X	X	X	X	X					
13	TYLMI-2017 0504		20:20	Water	7	X	X	X	X	X	X	X	X	X					
14	TYLMO-2017 0504		19:40	Water	7	X	X	X	X	X	X	X	X	X					
15	QA26-2017 0504	5-4-17	18:15	Water	7	X	X	X	X	X	X	X	X	X					

Relinquished by George Ifner Date 5-5-17 Received by [Signature] Date 5/5/17

Firm Herrera Env. Cons. Time 9:20 Firm OSE Time 9:20

Relinquished by _____ Date _____ Received by _____ Date _____

Firm _____ Time _____ Firm _____ Time _____

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	A. Sverdrup		
Meter:	YSI PRODS5 #1		
Date/Time:	5/4/17 14:45		
Barometric Pressure Start of Day:	Inches Hg:	753.7	Time: 14:54
Barometric Pressure End of Day:	Inches Hg:		Time:

Calibration Procedures:

Rinse Multimeter Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	1.4	0	22.8	
Conductivity (µS/cm)	999	1,000	22.8	
Conductivity (µS/cm)	101.1	100	22.7	
DO % Saturation	101.1	100	22.3	Reads 100% after calibrated.
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	*	0		
Conductivity (µS/cm)		100		
DO % Saturation		100		

* Did not run post event check

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	A. Svendsen		
Meter:	VSI PRO DSS #2		
Date/Time:	5/4/17 15:00		
Barometric Pressure Start of Day:	Inches Hg: 253.9	Time:	15:04
Barometric Pressure End of Day:	Inches Hg:	Time:	

Calibration Procedures:
Rinse Multimetric Sonde Between Each Operation
Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	1.4	0	22.9	
Conductivity (µS/cm)	992	1,000	22.9	Reads 1,000 µS after calibrated
Conductivity (µS/cm)	100.9	100	22.8	
DO % Saturation	99.1	100	22.3	Reads 99.2% after calibration

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	*	0		
Conductivity (µS/cm)		100		
DO % Saturation		100		

* Did not run post event checks.

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
 2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
 3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
 4. Make sure there are no bubbles in the cell; wait 2 minutes.
 5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
 6. Check conductivity using 100 µS/cm standard.
- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB + VW
 Sample Date: 5/4/17 Sample Time: 22:00 PDT
 Base Flow or Storm Event? Field Filtered Time: 22:00 PST
 (Must filter within 15 minutes of collection)

SITE ID: COLM

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 65°F cloudy

Water Quality Sampling

Sample ID: COLM20170405

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>NO</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:
 Clarity: light tannins clear
 Color: light tannins
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lovell Signature: [Signature]
 Date Checked: 5-29-17 Time: 16:30
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 5.96
 Reference Point (description): staff gage

Water Quality Measurements

Temperature (°C) 15.7
 Conductivity (µs/cm) 27.4
 Dissolved Oxygen (mg/L) 8.97

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Effer

Sample Date: 5/4/17

Sample Time: 18:30

PDT:

SITE ID: COUMI

Base Flow or Storm Event? Storm

Field Filtered Time: 18:40

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 66° + Rain

Water Quality Sampling

Sample ID: COUMI-20170504

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: Very turbid
 Color: Dark Brown
 Odor: None
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lester Signature: [Signature]

Date Checked: 5-24-17 Time: 16:30

Data Entered into Database? YES NO Initials: _____

Date Entered: _____ Time: _____

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1 _____

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.0

Reference Point (description): staff gauge

Water Quality Measurements

Temperature (°C) 14.4

Specific Conductivity (µs/cm) 96.8

Dissolved Oxygen (mg/L) 97.9

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Jaffer

Sample Date: 5/4/17

Sample Time: 18:10

PDT

SITE ID: COMMO

Base Flow or Storm Event? Storm

Field Filtered Time: 18:20

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain 66°

Water Quality Sampling

Sample ID: COMMO-20170504

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: V. Slightly turbid
 Color: V. light brown
 Odor: None
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: Sara Leath

Signature: [Signature]

Date Checked: 5-24-17

Time: 16:30

Date Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.40

Reference Point (description): Stream gauge

Water Quality Measurements

Temperature (°C) 16.7

Specific Conductivity (µs/cm) 101.9 µs/cm

Dissolved Oxygen (mg/L) 93.7

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB + VW

Sample Date: 5.4.17

Sample Time: 19:10

PDT:

SITE ID: EVAMS

Base Flow or Storm Event?

Field Filtered Time: 19:10

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Water Quality Sampling

Sample ID: EVAMS20170504

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>NO</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: turbid

Color: brown

Odor: no

Sheen: no

Floatables: no

LABORATORY DELIVERY

Date:

Time:

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 65°F + light drizzle

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.03

Reference Point (description): @ staff gauge

Water Quality Measurements

Temperature (°C) 13.9

Conductivity (µs/cm) 129.8

Dissolved Oxygen (mg/L) 9.91

Quality Assurance

Checked By: John Lentz

Signature:

Date Checked: 5-24-17

Time: 16:30

Data Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB+vw

Sample Date: 5.4.17

Sample Time: 19:40

PDT:

SITE ID: EVALSS

Base Flow or Storm Event?

Field Filtered Time: 19:40

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: EVALSS20170504

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NO
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: turbid

Color: brown

Odor: no

Sheen: no

Floatables: no

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: Z. L. Smith

Signature:

Date Checked: 5-24-17

Time: 16:30

Data Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:

Current Weather and Temp: 65°F + drizzle

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot):

Stream Stage (ft): 2.44

Reference Point (description):

@ Staff gauge

Water Quality Measurements

Temperature (°C)

13.9

Conductivity (µs/cm)

136.0

Dissolved Oxygen (mg/L)

10.14

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Iffner

Sample Date: 5/4/17

Sample Time: 21:10

PDT

SITE ID: MONMN

Base Flow or Storm Event? Storm

Field Filtered Time: 21:15

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: MONMN-20170504

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear

Color: colorless

Odor: odorless

Sheen: NA

Floatables: NA

LABORATORY DELIVERY

Date: _____

Time: _____

Quality Assurance

Checked By: Silver Lenth

Signature: [Signature]

Date Checked: 5-24-17

Time: 16:30

Data Entered into Database?

YES

NO

initials: _____

Date Entered: _____

Time: _____

Notes: _____

Current Weather and Temp: 66° + rain ruin stopped

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.19'

Reference Point (description): staff gauge

Water Quality Measurements

Temperature (°C) 15.7

Specific Conductivity (µs/cm) 101.6

Dissolved Oxygen (mg/L) 94.7

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Ithner

Sample Date: 5/4/17

Sample Time: 21:40

SITE ID: MONMS

Base Flow or Storm Event? Storm

Field Filtered Time: 21:45

PDT: PST:

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 66° + Rain stopped

Water Quality Sampling

Sample ID: MONMS-20170504

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leuth Signature: [Signature]
 Date Checked: 5-24-17 Time: 16:30
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form *- started again about 21:30*

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 6.56

Reference Point (description): Water level Indicator

Water Quality Measurements

Temperature (°C) 14.5

Specific Conductivity (µs/cm) 187.7

Dissolved Oxygen (mg/L) 72.9

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. T. Fisher

Sample Date: 5/4/17

Sample Time: 22:10

PDT

SITE ID: MONM

Base Flow or Storm Event? Storm

Field Filtered Time: 22:15

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: MONM-26170504

Current Weather and Temp: 66° + Rain

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCl	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: _____
 Floatables: NA NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Susan Leuth Signatures: [Signature]

Date Checked: 5-24-17 Time: 16:30

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
YSI Pro DSS 2 _____

rainy

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): Not measured
 Reference Point (description): unsafe

Water Quality Measurements

Temperature (°C) 14.9
 Specific Conductivity (µs/cm) 129.3
 Dissolved Oxygen (mg/L) 98.2

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB+VW

Sample Date: 05/04/17

Base Flow or Storm Event? Storm Event?

Sample Time: 21:25

Field Filtered Time: 21:25

(Must filter within 15 minutes of collection)

SITE ID:

PDT

PST:

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 65°F cloudy

Water Quality Sampling

Sample ID: SEIMN20170405

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NO ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: light tannin
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____

Time: _____

Quality Assurance

Checked By: John Lenth

Signature: [Signature]

Date Checked: 5-24-17

Time: 16:30

Data Entered into Database? YES NO

initials: _____

Date Entered: _____

Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.58 ft

Reference Point (description): top of bot. to WS.

Water Quality Measurements

Temperature (°C) 12.4

Conductivity (µs/cm) 51.4

Dissolved Oxygen (mg/L) 1038

13

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB & VW

Sample Date: 5/4/17

Sample Time: 20:30

PDT

SITE ID: SEIMS

Base Flow or Storm Event? Storm

Field Filtered Time: 20:30

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 65°F + sprinkle

Water Quality Sampling

Sample ID: SEIMS20170504

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	No
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: turbid
 Color: brown
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leuth

Signature: *[Signature]*

Date Checked: 5-24-17

Time: 16:30

Data Entered into Database?

YES NO initials:

Date Entered: _____ Time: _____

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.91

Reference Point (description): @ Staff gauge

Water Quality Measurements

Temperature (°C) 17.5

Conductivity (µs/cm) 76.2

Dissolved Oxygen (mg/l) 9.70

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB + VW
 Sample Date: 5/4/17
 Base Flow or (Storm Event)

QA

Sample Time: 18:10 / 18:15 PST X
 Field Filtered Time: 18:10 / 18:15 PST
(Must filter within 15 minutes of collection)

SITE ID: TOSHMI
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 65° f + thunderstorm

Water Quality Sampling

Sample ID: TOSMI 20170504

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	yes
DOC *	HDPE	250 ml	1	HCL	yes
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	yes
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	yes
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	yes
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	yes
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	yes

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QA26-20170504
 Filter blank sample ID:
 Transfer blank sample ID:

Visual and Olfactory Conditions:
 Clarity: turbid
 Color: brownish grey
 Odor: none
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Edwin Leitch Signature: [Signature]
 Date Checked: 5-24-17 Time: 16:30
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 1.4
 Reference Point (description): C. Staff gauge

Water Quality Measurements

Temperature (°C) 16.2
 Conductivity (µs/cm) 84.5
 Dissolved Oxygen (mg/L) 9.67

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. IFTNER

Sample Date: 5/4/17

Sample Time: 19:20

PDT

SITE ID: TOSMO

Base Flow or Storm Event? Storm

Field Filtered Time: 19:10

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: TOSMO-2017-0504

Current Weather and Temp: 66° + Rain

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity:

Color:

Odor:

Sheen:

Floatables:

V. turbid
Dark brown
None
NA NA

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: Solun Lenth

Signature:

Date Checked: 5-24-17

Time: 16:30

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.02

Reference Point (description): Stall gauge

Water Quality Measurements

Temperature (°C) 15.8

Specific Conductivity (µs/cm) 64.5

Dissolved Oxygen (mg/L) 97.5

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



HERRERA

Field Personnel: G. J. Fisher

Sample Date: 5/4/17

Sample Time: 20:20

SITE ID: TYL MI

Base Flow or Storm Event? Storm

Field Filtered Time: 20:25

PDT
PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 66° + Rain

Water Quality Sampling

Sample ID: TYLMI-20170504

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: V. slightly turbid
 Color: V. light brown
 Odor: None
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leuth Signature: [Signature]
 Date Checked: 5-24-17 Time: 16:30
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.42

Reference Point (description): Tape measure

Water Quality Measurements

Temperature (°C) 14.3

Specific Conductivity (µs/cm) 101.1

Dissolved Oxygen (mg/L) 92.0

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



HERRERA

Field Personnel: G. Iffner

Sample Date: 5/4/17

Sample Time: 19:40

PDT

SITE ID: TYLMO

Base Flow or Storm Event? Storm

Field Filtered Time: 19:50

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 66° + Rain

Water Quality Sampling

Sample ID: TYLMO-20170504

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: 1/2 slight turbid
 Color: 1/2 light brown
 Odor: None
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 5-24-17 Time: 16:30
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.68

Reference Point (description): Tape measure

Water Quality Measurements

Temperature (°C) 15.1

Specific Conductivity (µs/cm) 84.3 µs/cm

Dissolved Oxygen (mg/L) 9.5



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Sample Date/Sample ID: 5/04/2017 / All sites, 1 FD (QA26) at TOSMI

By G. Catarra

Date 6/13/2017 Page 1 of 2

Checked: initials JL

date 7/14/17

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	4	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	94	±20	3	≤25	64	≤25	OK	FLAG TOSMI "J" DUE TO FIELD DUP EXCEEDANCE
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	1	≤25	44	≤25	OK	FLAG TOSMI "J" DUE TO FIELD DUP EXCEEDANCE
Hardness	OK / SM 2340B	NA	NA	11	≤180	≤1.0 mg/L 1.0 mg/L	105,104	±25	103	±15	1	≤20	28	≤20	OK	FLAG TOSMI "J" DUE TO FIELD DUP EXCEEDANCE
DOC	OK / SM 5310B	<15	≤15	6	≤28	≤1.0 mg/L 1.0 mg/L	112	±25	107	±15	1	≤20	6.7	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	13	≤28	≤0.01 mg/L 0.01 mg/L	100	±25	97	±20	0	≤20	53	≤20	OK	FLAG TOSMI "J" DUE TO FIELD DUP EXCEEDANCE
Total Nitrogen (TKN + N+N)	OK/ SM 4500 N-B	NA	NA	13,22	≤28	≤0.1 mg/L 0.1 mg/L	116,95	±25	90-108	±20	0.8,9.5	≤20	53 (TKN), 8.7(N+N)	≤20	OK	FLAG TKN "J" FOR TOSMI DUE TO FIELD DUP EXCEEDANCE.

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 6/13/2017 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 5/04/2017 / All sites, 1 FD (QA26) at TOSMI

date 7/14/17

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	6	≤180	≤1.0 µg/L 1.0 µg/L	100	±25	NR	±15	NC	≤20	21	≤20	OK	FLAG TOSMI "J" DUE TO FIELD DUP EXCEEDANCE
Total Zinc	OK/ EPA 200.8	NA	NA	6	≤180	≤5.0 µg/L 5.0 µg/L	104	±25	NR	±15	NC	≤20	50	≤20	OK	FLAG TOSMI "J" DUE TO FIELD DUP EXCEEDANCE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	6	≤180	≤1.0 µg/L 1.0 µg/L	89	±25	NR	±15	NC	≤20	3.2	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	6	≤180	≤5.0 µg/L 5.0 µg/L	102	±25	NR	±15	NC	≤20	9.8	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	3.9,16	≤35	17	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

June 2, 2017

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1705-112

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on May 8, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy, circular scribble.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 2, 2017
Samples Submitted: May 8, 2017
Laboratory Reference: 1705-112
Project: 14-05806-000

Case Narrative

Samples were collected on May 8, 2017 and received by the laboratory on May 8, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: June 2, 2017
 Samples Submitted: May 8, 2017
 Laboratory Reference: 1705-112
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170508					
Laboratory ID:	05-112-01					
Total Suspended Solids	ND	0.80	SM 2540D	5-11-17	5-12-17	

Client ID:	COUMI-20170508					
Laboratory ID:	05-112-02					
Total Suspended Solids	7.4	0.80	SM 2540D	5-11-17	5-12-17	

Client ID:	COUMO-20170508					
Laboratory ID:	05-112-03					
Total Suspended Solids	4.6	0.80	SM 2540D	5-11-17	5-12-17	

Client ID:	EVAMS-20170508					
Laboratory ID:	05-112-04					
Total Suspended Solids	ND	0.80	SM 2540D	5-11-17	5-12-17	

Client ID:	EVALSS-20170508					
Laboratory ID:	05-112-05					
Total Suspended Solids	ND	0.80	SM 2540D	5-11-17	5-12-17	

Client ID:	MONMN-20170508					
Laboratory ID:	05-112-06					
Total Suspended Solids	ND	0.80	SM 2540D	5-11-17	5-12-17	

Client ID:	MONMS-20170508					
Laboratory ID:	05-112-07					
Total Suspended Solids	ND	0.80	SM 2540D	5-11-17	5-12-17	



Date of Report: June 2, 2017
 Samples Submitted: May 8, 2017
 Laboratory Reference: 1705-112
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170508					
Laboratory ID:	05-112-08					
Total Suspended Solids	ND	0.80	SM 2540D	5-11-17	5-12-17	

Client ID:	SEIMN-20170508					
Laboratory ID:	05-112-09					
Total Suspended Solids	5.6	0.80	SM 2540D	5-11-17	5-12-17	

Client ID:	SEIMS-20170508					
Laboratory ID:	05-112-10					
Total Suspended Solids	5.4	0.80	SM 2540D	5-11-17	5-12-17	

Client ID:	TOSMI-20170508					
Laboratory ID:	05-112-11					
Total Suspended Solids	ND	0.80	SM 2540D	5-11-17	5-12-17	

Client ID:	TOSMO-20170508					
Laboratory ID:	05-112-12					
Total Suspended Solids	ND	0.80	SM 2540D	5-11-17	5-12-17	

Client ID:	TYLMI-20170508					
Laboratory ID:	05-112-13					
Total Suspended Solids	9.2	0.80	SM 2540D	5-11-17	5-12-17	

Client ID:	TYLMO-20170508					
Laboratory ID:	05-112-14					
Total Suspended Solids	ND	0.80	SM 2540D	5-11-17	5-12-17	



Date of Report: June 2, 2017
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Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA27-20170508					
Laboratory ID:	05-112-15					
Total Suspended Solids	ND	0.80	SM 2540D	5-11-17	5-12-17	



Date of Report: June 2, 2017
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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0511W1					
Total Suspended Solids	ND	0.80	SM 2540D	5-11-17	5-12-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-112-06							
	ORIG	DUP						
Total Suspended Solids	ND	ND	NA	NA	NA	NA	20	

SPIKE BLANK								
Laboratory ID:	SB0511W1							
	SB	SB		SB				
Total Suspended Solids	82.0	100	NA	82	78-113	NA	NA	



Date of Report: June 2, 2017
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 Laboratory Reference: 1705-112
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170508					
Laboratory ID:	05-112-01					
Turbidity	0.90	0.10	EPA 180.1	5-9-17	5-9-17	

Client ID:	COUMI-20170508					
Laboratory ID:	05-112-02					
Turbidity	4.1	0.10	EPA 180.1	5-9-17	5-9-17	

Client ID:	COUMO-20170508					
Laboratory ID:	05-112-03					
Turbidity	1.2	0.10	EPA 180.1	5-9-17	5-9-17	

Client ID:	EVAMS-20170508					
Laboratory ID:	05-112-04					
Turbidity	1.3	0.10	EPA 180.1	5-9-17	5-9-17	

Client ID:	EVALSS-20170508					
Laboratory ID:	05-112-05					
Turbidity	0.87	0.10	EPA 180.1	5-9-17	5-9-17	

Client ID:	MONMN-20170508					
Laboratory ID:	05-112-06					
Turbidity	1.6	0.10	EPA 180.1	5-9-17	5-9-17	

Client ID:	MONMS-20170508					
Laboratory ID:	05-112-07					
Turbidity	2.9	0.10	EPA 180.1	5-9-17	5-9-17	



Date of Report: June 2, 2017
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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170508					
Laboratory ID:	05-112-08					
Turbidity	3.7	0.10	EPA 180.1	5-9-17	5-9-17	

Client ID:	SEIMN-20170508					
Laboratory ID:	05-112-09					
Turbidity	1.4	0.10	EPA 180.1	5-9-17	5-9-17	

Client ID:	SEIMS-20170508					
Laboratory ID:	05-112-10					
Turbidity	2.8	0.10	EPA 180.1	5-9-17	5-9-17	

Client ID:	TOSMI-20170508					
Laboratory ID:	05-112-11					
Turbidity	2.8	0.10	EPA 180.1	5-9-17	5-9-17	

Client ID:	TOSMO-20170508					
Laboratory ID:	05-112-12					
Turbidity	2.4	0.10	EPA 180.1	5-9-17	5-9-17	

Client ID:	TYLMI-20170508					
Laboratory ID:	05-112-13					
Turbidity	2.1	0.10	EPA 180.1	5-9-17	5-9-17	

Client ID:	TYLMO-20170508					
Laboratory ID:	05-112-14					
Turbidity	1.3	0.10	EPA 180.1	5-9-17	5-9-17	



Date of Report: June 2, 2017
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TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA27-20170508					
Laboratory ID:	05-112-15					
Turbidity	1.2	0.10	EPA 180.1	5-9-17	5-9-17	



Date of Report: June 2, 2017
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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0509W1					
Turbidity	ND	0.10	EPA 180.1	5-9-17	5-9-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-112-01							
	ORIG	DUP						
Turbidity	0.900	0.900	NA	NA	NA	NA	0	15



Date of Report: June 2, 2017
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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170508					
Laboratory ID:	05-112-01					
Hardness	7.9	1.0	200.7/SM 2340B	5-15-17	5-15-17	

Client ID:	COUMI-20170508					
Laboratory ID:	05-112-02					
Hardness	110	1.0	200.7/SM 2340B	5-15-17	5-15-17	

Client ID:	COUMO-20170508					
Laboratory ID:	05-112-03					
Hardness	97	1.0	200.7/SM 2340B	5-15-17	5-15-17	

Client ID:	EVAMS-20170508					
Laboratory ID:	05-112-04					
Hardness	81	1.0	200.7/SM 2340B	5-15-17	5-15-17	

Client ID:	EVALSS-20170508					
Laboratory ID:	05-112-05					
Hardness	74	1.0	200.7/SM 2340B	5-15-17	5-15-17	

Client ID:	MONMN-20170508					
Laboratory ID:	05-112-06					
Hardness	55	1.0	200.7/SM 2340B	5-15-17	5-15-17	

Client ID:	MONMS-20170508					
Laboratory ID:	05-112-07					
Hardness	110	1.0	200.7/SM 2340B	5-15-17	5-15-17	



Date of Report: June 2, 2017
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 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170508					
Laboratory ID:	05-112-08					
Hardness	72	1.0	200.7/SM 2340B	5-15-17	5-15-17	

Client ID:	SEIMN-20170508					
Laboratory ID:	05-112-09					
Hardness	22	1.0	200.7/SM 2340B	5-15-17	5-15-17	

Client ID:	SEIMS-20170508					
Laboratory ID:	05-112-10					
Hardness	40	1.0	200.7/SM 2340B	5-15-17	5-15-17	

Client ID:	TOSMI-20170508					
Laboratory ID:	05-112-11					
Hardness	82	1.0	200.7/SM 2340B	5-15-17	5-15-17	

Client ID:	TOSMO-20170508					
Laboratory ID:	05-112-12					
Hardness	98	1.0	200.7/SM 2340B	5-15-17	5-15-17	

Client ID:	TYLMI-20170508					
Laboratory ID:	05-112-13					
Hardness	73	1.0	200.7/SM 2340B	5-15-17	5-15-17	

Client ID:	TYLMO-20170508					
Laboratory ID:	05-112-14					
Hardness	70	1.0	200.7/SM 2340B	5-15-17	5-15-17	



Date of Report: June 2, 2017
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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA27-20170508					
Laboratory ID:	05-112-15					
Hardness	100	1.0	200.7/SM 2340B	5-15-17	5-15-17	



Date of Report: June 2, 2017
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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0515WH1					
Hardness	ND	1.0	200.7/SM 2340B	5-15-17	5-15-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-112-01							
	ORIG	DUP						
Hardness	7.91	8.23	NA	NA	NA	4	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	05-112-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	144	148	132	132	7.91	103	106	75-125	3	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK								
Laboratory ID:	SB0515WH1							
	SB	SB			SB			
Hardness	136	132	NA	103	80-120	NA	NA	



Date of Report: June 2, 2017
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 Laboratory Reference: 1705-112
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170508					
Laboratory ID:	05-112-01					
Dissolved Organic Carbon	11	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	COUMI-20170508					
Laboratory ID:	05-112-02					
Dissolved Organic Carbon	3.7	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	COUMO-20170508					
Laboratory ID:	05-112-03					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	EVAMS-20170508					
Laboratory ID:	05-112-04					
Dissolved Organic Carbon	4.4	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	EVALSS-20170508					
Laboratory ID:	05-112-05					
Dissolved Organic Carbon	3.8	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	MONMN-20170508					
Laboratory ID:	05-112-06					
Dissolved Organic Carbon	4.4	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	MONMS-20170508					
Laboratory ID:	05-112-07					
Dissolved Organic Carbon	6.1	1.0	SM 5310B	5-10-17	5-10-17	



Date of Report: June 2, 2017
 Samples Submitted: May 8, 2017
 Laboratory Reference: 1705-112
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170508					
Laboratory ID:	05-112-08					
Dissolved Organic Carbon	4.1	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	SEIMN-20170508					
Laboratory ID:	05-112-09					
Dissolved Organic Carbon	6.9	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	SEIMS-20170508					
Laboratory ID:	05-112-10					
Dissolved Organic Carbon	4.0	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	TOSMI-20170508					
Laboratory ID:	05-112-11					
Dissolved Organic Carbon	3.3	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	TOSMO-20170508					
Laboratory ID:	05-112-12					
Dissolved Organic Carbon	3.4	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	TYLMI-20170508					
Laboratory ID:	05-112-13					
Dissolved Organic Carbon	5.6	1.0	SM 5310B	5-10-17	5-10-17	

Client ID:	TYLMO-20170508					
Laboratory ID:	05-112-14					
Dissolved Organic Carbon	4.1	1.0	SM 5310B	5-10-17	5-10-17	



Date of Report: June 2, 2017
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Laboratory Reference: 1705-112
Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA27-20170508					
Laboratory ID:	05-112-15					
Dissolved Organic Carbon	2.9	1.0	SM 5310B	5-10-17	5-10-17	



Date of Report: June 2, 2017
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 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0510D2					
Dissolved Organic Carbon	ND	1.0	SM 5310B	5-10-17	5-10-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-112-01							
	ORIG	DUP						
Dissolved Organic Carbon	11.4	11.3	NA	NA	NA	1	20	

MATRIX SPIKE

Laboratory ID:	05-112-01							
	MS	MS		MS				
Dissolved Organic Carbon	21.1	10.0	11.4	97	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0510D2							
	SB	SB		SB				
Dissolved Organic Carbon	11.1	10.0	NA	111	75-125	NA	NA	



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 Samples Submitted: May 8, 2017
 Laboratory Reference: 1705-112
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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170508					
Laboratory ID:	05-112-01					
Total Phosphorus	0.011	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	COUMI-20170508					
Laboratory ID:	05-112-02					
Total Phosphorus	0.063	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	COUMO-20170508					
Laboratory ID:	05-112-03					
Total Phosphorus	0.039	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	EVAMS-20170508					
Laboratory ID:	05-112-04					
Total Phosphorus	0.012	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	EVALSS-20170508					
Laboratory ID:	05-112-05					
Total Phosphorus	0.017	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	MONMN-20170508					
Laboratory ID:	05-112-06					
Total Phosphorus	0.023	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	MONMS-20170508					
Laboratory ID:	05-112-07					
Total Phosphorus	0.023	0.010	EPA 365.1	5-16-17	5-17-17	



Date of Report: June 2, 2017
 Samples Submitted: May 8, 2017
 Laboratory Reference: 1705-112
 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170508					
Laboratory ID:	05-112-08					
Total Phosphorus	0.027	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	SEIMN-20170508					
Laboratory ID:	05-112-09					
Total Phosphorus	0.029	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	SEIMS-20170508					
Laboratory ID:	05-112-10					
Total Phosphorus	0.025	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	TOSMI-20170508					
Laboratory ID:	05-112-11					
Total Phosphorus	0.033	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	TOSMO-20170508					
Laboratory ID:	05-112-12					
Total Phosphorus	0.041	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	TYLMI-20170508					
Laboratory ID:	05-112-13					
Total Phosphorus	0.032	0.010	EPA 365.1	5-16-17	5-17-17	

Client ID:	TYLMO-20170508					
Laboratory ID:	05-112-14					
Total Phosphorus	0.026	0.010	EPA 365.1	5-16-17	5-17-17	



Date of Report: June 2, 2017
Samples Submitted: May 8, 2017
Laboratory Reference: 1705-112
Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA27-20170508					
Laboratory ID:	05-112-15					
Total Phosphorus	0.043	0.010	EPA 365.1	5-16-17	5-17-17	



Date of Report: June 2, 2017
 Samples Submitted: May 8, 2017
 Laboratory Reference: 1705-112
 Project: 14-05806-000

**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0516W2					
Total Phosphorus	ND	0.010	EPA 365.1	5-16-17	5-17-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-112-01							
	ORIG	DUP						
Total Phosphorus	0.0114	ND	NA	NA	NA	NA	11	

MATRIX SPIKE								
Laboratory ID:	05-112-01							
	MS	MS		MS				
Total Phosphorus	0.265	0.250	0.0114	101	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0516W2							
	SB	SB		SB				
Total Phosphorus	0.228	0.250	NA	91	86-111	NA	NA	



Date of Report: June 2, 2017
 Samples Submitted: May 8, 2017
 Laboratory Reference: 1705-112
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 05-112-01						
Client ID: COLM-20170508						
Copper	ND	1.0	200.8	5-17-17	5-17-17	
Zinc	ND	5.0	200.8	5-17-17	5-17-17	
Lab ID: 05-112-02						
Client ID: COUMI-20170508						
Copper	1.1	1.0	200.8	5-17-17	5-17-17	
Zinc	39	5.0	200.8	5-17-17	5-17-17	
Lab ID: 05-112-03						
Client ID: COUMO-20170508						
Copper	ND	1.0	200.8	5-17-17	5-17-17	
Zinc	17	5.0	200.8	5-17-17	5-17-17	
Lab ID: 05-112-04						
Client ID: EVAMS-20170508						
Copper	ND	1.0	200.8	5-17-17	5-18-17	
Zinc	ND	5.0	200.8	5-17-17	5-18-17	
Lab ID: 05-112-05						
Client ID: EVALSS-20170508						
Copper	ND	1.0	200.8	5-17-17	5-18-17	
Zinc	ND	5.0	200.8	5-17-17	5-18-17	
Lab ID: 05-112-06						
Client ID: MONMN-20170508						
Copper	1.0	1.0	200.8	5-17-17	5-18-17	
Zinc	ND	5.0	200.8	5-17-17	5-18-17	



Date of Report: June 2, 2017
 Samples Submitted: May 8, 2017
 Laboratory Reference: 1705-112
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-112-07					
Client ID:	MONMS-20170508					
Copper	1.3	1.0	200.8	5-17-17	5-18-17	
Zinc	ND	5.0	200.8	5-17-17	5-18-17	
Lab ID:	05-112-08					
Client ID:	MONM-20170508					
Copper	ND	1.0	200.8	5-17-17	5-18-17	
Zinc	12	5.0	200.8	5-17-17	5-18-17	
Lab ID:	05-112-09					
Client ID:	SEIMN-20170508					
Copper	ND	1.0	200.8	5-17-17	5-18-17	
Zinc	ND	5.0	200.8	5-17-17	5-18-17	
Lab ID:	05-112-10					
Client ID:	SEIMS-20170508					
Copper	ND	1.0	200.8	5-17-17	5-18-17	
Zinc	ND	5.0	200.8	5-17-17	5-18-17	
Lab ID:	05-112-11					
Client ID:	TOSMI-20170508					
Copper	3.0	1.0	200.8	5-17-17	5-18-17	
Zinc	25	5.0	200.8	5-17-17	5-18-17	
Lab ID:	05-112-12					
Client ID:	TOSMO-20170508					
Copper	1.4	1.0	200.8	5-17-17	5-18-17	
Zinc	16	5.0	200.8	5-17-17	5-18-17	



Date of Report: June 2, 2017
 Samples Submitted: May 8, 2017
 Laboratory Reference: 1705-112
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-112-13					
Client ID:	TYLMI-20170508					
Copper	2.7	1.0	200.8	5-17-17	5-18-17	
Zinc	13	5.0	200.8	5-17-17	5-18-17	
Lab ID:	05-112-14					
Client ID:	TYLMO-20170508					
Copper	1.8	1.0	200.8	5-17-17	5-18-17	
Zinc	12	5.0	200.8	5-17-17	5-18-17	
Lab ID:	05-112-15					
Client ID:	QA27-20170508					
Copper	1.6	1.0	200.8	5-17-17	5-17-17	
Zinc	18	5.0	200.8	5-17-17	5-17-17	



Date of Report: June 2, 2017
Samples Submitted: May 8, 2017
Laboratory Reference: 1705-112
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 5-17-17
Date Analyzed: 5-17-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0517WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: June 2, 2017
Samples Submitted: May 8, 2017
Laboratory Reference: 1705-112
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 5-17-17

Date Analyzed: 5-17-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 05-112-15

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	1.58	1.54	3	1.0	
Zinc	17.5	18.4	5	5.0	



Date of Report: January 6, 2017
 Samples Submitted: January 6, 2017
 Laboratory Reference: 1705-112
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 5-17-17

Date Analyzed: 5-17-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 05-112-15

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	102	101	103	101	0	
Zinc	100	127	109	127	109	0	



Date of Report: June 2, 2017
 Samples Submitted: May 8, 2017
 Laboratory Reference: 1705-112
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 05-112-01						
Client ID: COLM-20170508						
Copper	ND	1.0	200.8		5-16-17	
Zinc	ND	5.0	200.8		5-16-17	
Lab ID: 05-112-02						
Client ID: COUMI-20170508						
Copper	ND	1.0	200.8		5-16-17	
Zinc	29	5.0	200.8		5-16-17	
Lab ID: 05-112-03						
Client ID: COUMO-20170508						
Copper	ND	1.0	200.8		5-16-17	
Zinc	12	5.0	200.8		5-16-17	
Lab ID: 05-112-04						
Client ID: EVAMS-20170508						
Copper	ND	1.0	200.8		5-16-17	
Zinc	ND	5.0	200.8		5-16-17	
Lab ID: 05-112-05						
Client ID: EVALSS-20170508						
Copper	ND	1.0	200.8		5-16-17	
Zinc	ND	5.0	200.8		5-16-17	
Lab ID: 05-112-06						
Client ID: MONMN-20170508						
Copper	ND	1.0	200.8		5-16-17	
Zinc	ND	5.0	200.8		5-16-17	



Date of Report: June 2, 2017
 Samples Submitted: May 8, 2017
 Laboratory Reference: 1705-112
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-112-07					
Client ID:	MONMS-20170508					
Copper	ND	1.0	200.8		5-16-17	
Zinc	ND	5.0	200.8		5-16-17	
Lab ID:	05-112-08					
Client ID:	MONM-20170508					
Copper	ND	1.0	200.8		5-16-17	
Zinc	8.7	5.0	200.8		5-16-17	
Lab ID:	05-112-09					
Client ID:	SEIMN-20170508					
Copper	ND	1.0	200.8		5-16-17	
Zinc	ND	5.0	200.8		5-16-17	
Lab ID:	05-112-10					
Client ID:	SEIMS-20170508					
Copper	ND	1.0	200.8		5-16-17	
Zinc	ND	5.0	200.8		5-16-17	
Lab ID:	05-112-11					
Client ID:	TOSMI-20170508					
Copper	1.1	1.0	200.8		5-16-17	
Zinc	18	5.0	200.8		5-16-17	
Lab ID:	05-112-12					
Client ID:	TOSMO-20170508					
Copper	ND	1.0	200.8		5-16-17	
Zinc	12	5.0	200.8		5-16-17	



Date of Report: June 2, 2017
 Samples Submitted: May 8, 2017
 Laboratory Reference: 1705-112
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-112-13					
Client ID:	TYLMI-20170508					
Copper	1.6	1.0	200.8		5-16-17	
Zinc	10	5.0	200.8		5-16-17	
Lab ID:	05-112-14					
Client ID:	TYLMO-20170508					
Copper	1.0	1.0	200.8		5-16-17	
Zinc	10	5.0	200.8		5-16-17	
Lab ID:	05-112-15					
Client ID:	QA27-20170508					
Copper	ND	1.0	200.8		5-16-17	
Zinc	12	5.0	200.8		5-16-17	



Date of Report: June 2, 2017
Samples Submitted: May 8, 2017
Laboratory Reference: 1705-112
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 5-16-17
Matrix: Water
Units: ug/L (ppb)
Lab ID: MB0516D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: June 2, 2017
Samples Submitted: May 8, 2017
Laboratory Reference: 1705-112
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 5-16-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-112-15

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	11.6	12.2	5	5.0	



Date of Report: June 2, 2017
 Samples Submitted: May 8, 2017
 Laboratory Reference: 1705-112
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 5-16-17

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 05-112-15

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	72.0	90	68.0	85	6	
Zinc	80.0	94.6	104	87.4	95	8	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

Jun 2 2017
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20170508	Water	17-A006783	Micro, NUT
COUMI-20170508	Water	17-A006784	Micro, NUT
COUMO-20170508	Water	17-A006785	Micro, NUT
EVAMS-20170508	Water	17-A006786	Micro, NUT
EVALSS-20170508	Water	17-A006787	Micro, NUT
MONMN-20170508	Water	17-A006788	Micro, NUT
MONMS-20170508	Water	17-A006789	Micro, NUT
MONM-20170508	Water	17-A006790	Micro, NUT
SEIMN-20170508	Water	17-A006791	Micro, NUT
SEIMS-20170508	Water	17-A006792	Micro, NUT
TOSMI-20170508	Water	17-A006793	Micro, NUT
TOSMO-20170508	Water	17-A006794	Micro, NUT
TYLMI-20170508	Water	17-A006795	Micro, NUT
TYLMO-20170508	Water	17-A006796	Micro, NUT
QA-20170508	Water	17-A006797	Micro, NUT

Your samples were received on Tuesday, May 9, 2017. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

Jun 2 2017
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 05-112

BACT = Bacteriological
CONV = Conventional

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
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Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



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ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
PO Number: 05-112
All results reported on an as received basis.

Date Received: 05/09/17
Date Reported: 6/ 2/17

AMTEST Identification Number 17-A006783
Client Identification COLM-20170508
Sampling Date 05/08/17, 17:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	< 10	CFU/100 ml		10	SM 9222D	JM	05/09/17
Total Nitrogen (NOX&TKN)	0.75	mg/l		0.1			
Total Nitrogen (TKN)	0.695	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.052	mg/l		0.01	SM4500NO3	JC	05/19/17

AMTEST Identification Number 17-A006784
Client Identification COUMI-20170508
Sampling Date 05/08/17, 12:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	20.	CFU/100 ml		10	SM 9222D	JM	05/09/17
Total Nitrogen (NOX&TKN)	0.92	mg/l		0.1			
Total Nitrogen (TKN)	0.536	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.38	mg/l		0.01	SM4500NO3	JC	05/19/17

AMTEST Identification Number 17-A006785
Client Identification COUMO-20170508
Sampling Date 05/08/17, 12:20

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	90.	CFU/100 ml		10	SM 9222D	JM	05/09/17
Total Nitrogen (NOX&TKN)	0.97	mg/l		0.1			
Total Nitrogen (TKN)	0.518	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.45	mg/l		0.01	SM4500NO3	JC	05/19/17

AMTEST Identification Number 17-A006786
Client Identification EVAMS-20170508
Sampling Date 05/08/17, 13:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	70.	CFU/100 ml		10	SM 9222D	JM	05/09/17
Total Nitrogen (NOX&TKN)	2.26	mg/l		0.1			
Total Nitrogen (TKN)	0.562	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	1.7	mg/l		0.01	SM4500NO3	JC	05/19/17

AMTEST Identification Number 17-A006787
Client Identification EVALSS-20170508
Sampling Date 05/08/17, 14:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	50.	CFU/100 ml		10	SM 9222D	JM	05/09/17
Total Nitrogen (NOX&TKN)	1.91	mg/l		0.1			
Total Nitrogen (TKN)	0.506	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	1.4	mg/l		0.01	SM4500NO3	JC	05/31/17

AMTEST Identification Number 17-A006788
Client Identification MONMN-20170508
Sampling Date 05/08/17, 14:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	20.	CFU/100 ml		10	SM 9222D	JM	05/09/17
Total Nitrogen (NOX&TKN)	1.13	mg/l		0.1			
Total Nitrogen (TKN)	0.992	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.14	mg/l		0.01	SM4500NO3	JC	05/19/17

AMTEST Identification Number 17-A006789
Client Identification MONMS-20170508
Sampling Date 05/08/17, 15:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	10.	CFU/100 ml		10	SM 9222D	JM	05/09/17
Total Nitrogen (NOX&TKN)	0.99	mg/l		0.1			
Total Nitrogen (TKN)	0.646	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.34	mg/l		0.01	SM4500NO3	JC	05/19/17

AMTEST Identification Number 17-A006790
Client Identification MONM-20170508
Sampling Date 05/08/17, 15:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	50.	CFU/100 ml		10	SM 9222D	JM	05/09/17
Total Nitrogen (NOX&TKN)	1.00	mg/l		0.1			
Total Nitrogen (TKN)	0.709	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.29	mg/l		0.01	SM4500NO3	JC	05/19/17

AMTEST Identification Number 17-A006791
Client Identification SEIMN-20170508
Sampling Date 05/08/17, 16:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	< 10	CFU/100 ml		10	SM 9222D	JM	05/09/17
Total Nitrogen (NOX&TKN)	0.80	mg/l		0.1			
Total Nitrogen (TKN)	0.575	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.23	mg/l		0.01	SM4500NO3	JC	05/19/17

AMTEST Identification Number 17-A006792
Client Identification SEIMS-20170508
Sampling Date 05/08/17, 15:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	10.	CFU/100 ml		10	SM 9222D	JM	05/09/17
Total Nitrogen (NOX&TKN)	0.73	mg/l		0.1			
Total Nitrogen (TKN)	0.491	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.24	mg/l		0.01	SM4500NO3	JC	05/19/17

AMTEST Identification Number 17-A006793
Client Identification TOSMI-20170508
Sampling Date 05/08/17, 12:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	70.	CFU/100 ml		10	SM 9222D	JM	05/09/17
Total Nitrogen (NOX&TKN)	1.28	mg/l		0.1			
Total Nitrogen (TKN)	0.556	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.72	mg/l		0.01	SM4500NO3	JC	05/19/17

AMTEST Identification Number 17-A006794
Client Identification TOSMO-20170508
Sampling Date 05/08/17, 12:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	180	CFU/100 ml		10	SM 9222D	JM	05/09/17
Total Nitrogen (NOX&TKN)	1.21	mg/l		0.1			
Total Nitrogen (TKN)	0.493	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.72	mg/l		0.01	SM4500NO3	JC	05/19/17

AMTEST Identification Number 17-A006795
Client Identification TYLMI-20170508
Sampling Date 05/08/17, 13:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	60.	CFU/100 ml		10	SM 9222D	JM	05/09/17
Total Nitrogen (NOX&TKN)	1.20	mg/l		0.1			
Total Nitrogen (TKN)	0.641	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.56	mg/l		0.01	SM4500NO3	JC	05/19/17

AMTEST Identification Number 17-A006796
Client Identification TYLMO-20170508
Sampling Date 05/08/17, 13:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	510	CFU/100 ml		10	SM 9222D	JM	05/09/17
Total Nitrogen (NOX&TKN)	1.14	mg/l		0.1			
Total Nitrogen (TKN)	0.621	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.52	mg/l		0.01	SM4500NO3	JC	05/19/17

AMTEST Identification Number 17-A006797
Client Identification QA-20170508
Sampling Date 05/08/17, 14:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	150	CFU/100 ml		10	SM 9222D	JM	05/09/17
Total Nitrogen (NOX&TKN)	1.17	mg/l		0.1			
Total Nitrogen (TKN)	0.448	mg/l		0.1	SM4500N	JC	05/26/17
Nitrate + Nitrite	0.72	mg/l		0.01	SM4500NO3	JC	05/19/17


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 17-A006783 to 17-A006797

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
17-A006796	Fecal Coliform	CFU/100 ml	510	450	12.
17-A006797	Fecal Coliform	CFU/100 ml	150	170	12.
17-A006635	Total Nitrogen (TKN)	mg/l	0.771	0.819	6.0
17-A006643	Total Nitrogen (TKN)	mg/l	0.981	1.02	3.9
17-A006791	Total Nitrogen (TKN)	mg/l	0.575	0.633	9.6
17-A006808	Total Nitrogen (TKN)	mg/l	0.336	0.327	2.7
17-A006764	Nitrate + Nitrite	mg/l	1.2	1.2	0.00
17-A006789	Nitrate + Nitrite	mg/l	0.34	0.32	6.1
17-A006806	Nitrate + Nitrite	mg/l	0.62	0.62	0.00
17-A006817	Nitrate + Nitrite	mg/l	0.32	0.32	0.00
17-A006821	Nitrate + Nitrite	mg/l	0.80	0.76	5.1
17-A007083	Nitrate + Nitrite	mg/l	0.18	0.18	0.00
17-A006905	Nitrate + Nitrite	mg/l	2.2	2.1	4.7
17-A007092	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	
17-A007196	Nitrate + Nitrite	mg/l	0.15	0.15	0.00
17-A007206	Nitrate + Nitrite	mg/l	0.30	0.30	0.00
17-A007534	Nitrate + Nitrite	mg/l	0.086	0.083	3.6
17-A007544	Nitrate + Nitrite	mg/l	0.35	0.34	2.9
17-A007655	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	
17-A007709	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	
17-A007839	Nitrate + Nitrite	mg/l	0.30	0.30	0.00

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPKAMT	RECOVERY
17-A006635	Total Nitrogen (TKN)	mg/l	0.771	2.78	2.00	100.45 %
17-A006643	Total Nitrogen (TKN)	mg/l	0.981	2.87	2.00	94.45 %
17-A006791	Total Nitrogen (TKN)	mg/l	0.575	2.56	2.00	99.25 %
17-A006808	Total Nitrogen (TKN)	mg/l	0.336	2.08	2.00	87.20 %
17-A006764	Nitrate + Nitrite	mg/l	1.2	3.4	2.0	110.00 %
17-A006789	Nitrate + Nitrite	mg/l	0.34	0.77	0.50	86.00 %
17-A006806	Nitrate + Nitrite	mg/l	0.62	1.1	0.50	96.00 %
17-A006817	Nitrate + Nitrite	mg/l	0.32	0.75	0.50	86.00 %
17-A006821	Nitrate + Nitrite	mg/l	0.80	1.2	0.50	80.00 %
17-A007083	Nitrate + Nitrite	mg/l	0.18	0.72	0.50	108.00 %
17-A006905	Nitrate + Nitrite	mg/l	2.2	4.8	2.5	104.00 %
17-A007092	Nitrate + Nitrite	mg/l	< 0.01	0.52	0.50	104.00 %
17-A007196	Nitrate + Nitrite	mg/l	0.15	0.67	0.50	104.00 %
17-A007206	Nitrate + Nitrite	mg/l	0.30	0.80	0.50	100.00 %
17-A007544	Nitrate + Nitrite	mg/l	0.35	0.83	0.50	96.00 %
17-A007655	Nitrate + Nitrite	mg/l	< 0.01	0.48	0.50	96.00 %

QC Summary for sample numbers: 17-A006783 to 17-A006797...

MATRIX SPIKES continued....

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
17-A007709	Nitrate + Nitrite	mg/l	< 0.01	0.49	0.50	98.00 %
17-A007839	Nitrate + Nitrite	mg/l	0.30	0.79	0.50	98.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	1.00	0.942	94.2 %
Total Nitrogen (TKN)	mg/l	1.00	0.939	93.9 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 05-112

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20170508 <i>6783</i>	5/8/17	1700	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20170508 <i>84</i>	5/8/17	1200	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20170508 <i>85</i>	5/8/17	1220	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20170508 <i>86</i>	5/8/17	1330	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20170508 <i>87</i>	5/8/17	1400	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20170508 <i>88</i>	5/8/17	1450	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20170508 <i>89</i>	5/8/17	1510	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20170508 <i>90</i>	5/8/17	1550	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20170508 <i>91</i>	5/8/17	1615	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20170508 <i>92</i>	5/8/17	1515	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company		Date	Time	Comments/Special Instructions
Relinquished by: <i>[Signature]</i>		OSE		5/9/17	10:50	
Received by: <i>[Signature]</i>		AMTEST		5/9/17	10:50	
Relinquished by:		<i>T=8.0</i>				
Received by:						
Relinquished by:						EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:						

CLIENT



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

CHAIN OF CUSTODY

Turnaround Requested:
 1 Day
 2 Day
 3 Day
 Standard

Laboratory No. **05-112**

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2017 0508	5/8/17	17:00	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2017 0508		12:00	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2017 0508		12:20	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2017 0508		13:30	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2017 0508		14:00	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2017 0508		14:50	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2017 0508		15:10	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2017 0508		15:50	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2017 0508		16:15	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2017 0508	15:15	16:50	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2017 0508		12:15	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2017 0508		12:45	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2017 0508		13:25	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2017 0508		13:50	Water	7	X	X	X	X	X	X	X	X	X
15	QA27-20170508	7	14:00	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by George Iftner Date 5/8/17 Received by Valerie Date 5/8/17
 Firm Herrera Time _____ Firm Herrera Time 17:47
 Relinquished by Valerie hu Date 5/8/17 Received by [Signature] Date 5/8/17
 Firm Herrera Time 17:47 Firm [Signature] Time 17:47

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iflner

CHAIN OF CUSTODY

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No. **05-112**

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organic Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *										
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organic Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *				
1	COLM-2017 0508	5/8/17	17:00	Water	7	X	X	X	X	X	X	X	X	X				
2	COUMI-2017 0508		12:00	Water	7	X	X	X	X	X	X	X	X	X				
3	COUMO-2017 0508		12:20	Water	7	X	X	X	X	X	X	X	X	X				
4	EVAMS-2017 0508		13:30	Water	7	X	X	X	X	X	X	X	X	X				
5	EVALSS-2017 0508		14:00	Water	7	X	X	X	X	X	X	X	X	X				
6	MONMN-2017 0508		14:50	Water	7	X	X	X	X	X	X	X	X	X				
7	MONMS-2017 0508		15:10	Water	7	X	X	X	X	X	X	X	X	X				
8	MONM-2017 0508		15:50	Water	7	X	X	X	X	X	X	X	X	X				
9	SEIMN-2017 0508		16:15	Water	7	X	X	X	X	X	X	X	X	X				
10	SEIMS-2017 0508	15:15	12:50	Water	7	X	X	X	X	X	X	X	X	X				
11	TOSMI-2017 0508		12:15	Water	7	X	X	X	X	X	X	X	X	X				
12	TOSMO-2017 0508		12:45	Water	7	X	X	X	X	X	X	X	X	X				
13	TYLMI-2017 0508		13:25	Water	7	X	X	X	X	X	X	X	X	X				
14	TYLMO-2017 0508		13:50	Water	7	X	X	X	X	X	X	X	X	X				
15	QA27-20170508	7	14:00	Water	7	X	X	X	X	X	X	X	X	X				

Relinquished by George Iflner Date 5/8/17 Received by Valerie Date 5/8/17
 Firm Herrera Time 17:47 Firm Herrera Time 17:47
 Relinquished by Valerie hu Date 5/8/17 Received by [Signature] Date 5/8/17
 Firm Herrera Time 17:47 Firm [Signature] Time 17:47

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:		14-05806-000		
Personnel Performing Calibration:		A. SUNDSON		
Meter:		YSI PRODS5 #1		
Date/Time:		5/8/17 10:45		
Barometric Pressure Start of Day:		Inches Hg: 263.8	Time: 10:45	
Barometric Pressure End of Day:		Inches Hg: 262.0	Time: 19:12	

PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	1.5	0	21.6	
Conductivity (µS/cm)	1,001	1,000	22.5	
Conductivity (µS/cm)	101.2	100	22.3	
DO % Saturation	99.9	100	20.5	

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	4.5	0	22.2	Herrera filtered DI water
Conductivity (µS/cm)	107.5	100	21.7	
DO % Saturation	99.8	100	21.4	

Calibration Procedures:

Rinse Multimter Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number: 14-05806-000
Personnel Performing Calibration: A. Svendsen
Meter: YSI PRO DSS #2
Date/Time: 5/8/17 10:45
Barometric Pressure Start of Day: Inches Hg: 764.5 Time: 10:47
Barometric Pressure End of Day: Inches Hg: 762.7 Time: 19:10

Calibration Procedures:

Rinse Multimter Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	1.6	0	21.6	
Conductivity (µS/cm)	999	1,000	22.4	
Conductivity (µS/cm)	101.1	100	22.2	
DO % Saturation	101.0	100	20.1	Calibrated @ 100% Saturation

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	4.4	0	22.1	Herrera filtered DI water
Conductivity (µS/cm)	106.9	100	22.2	
DO % Saturation	99.9	100	20.5	

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: **MM + VW**

Sample Date: **5-8-17**

Sample Time: **17:00**

PDT

SITE ID: **COLM**

Base Flow or Storm Event?

Field Filtered Time: **17:00**

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study



HERRERA

Water Quality Sampling

Sample ID: **COLM 20170508**

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	no
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: **clear**
 Color: **tannin**
 Odor: **no**
 Sheen: **no**
 Floatables: **no**

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: **Sohn**

Signature:

Date Checked: **5-30-17**

Time: **16:45**

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Current Weather and Temp: **62°F + sunny**

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M11466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): **6.70**

Reference Point (description): **@ staff gauge**

Water Quality Measurements

Temperature (°C) **12.9**

Conductivity (µs/cm) **27.5**

Dissolved Oxygen (mg/l.) **9.56**

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Ifsher, A. Sundsen

Sample Date: 5-8-17 Sample Time: 12:00

SITE ID: CouMI

Base Flow or Storm Event? Field Filtered Time: 12:10
(Must filter within 15 minutes of collection)

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: OVERCAST + 58°F

Water Quality Sampling

Sample ID: CouMI-20170508

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: ↓

Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

Clarity: VERY CLEAR

Color: NONE

Odor: ↓

Sheen: ↓

Floatables: ↓

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Louth Signature: [Signature]

Date Checked: 5-30-17 Time: 11:45

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (1SD100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.71

Reference Point (description): STAFF GAGE

Water Quality Measurements

Temperature (°C) 10.4

Specific Conductivity (µs/cm) 228.2

Dissolved Oxygen (mg/L) 10.95

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. SWANSON, G. IFTAGE

Sample Date: 5-8-17

Sample Time: 1220

SITE ID: COUMO

Base Flow or Storm Event?

Field Filtered Time: 1225

PDT

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: COUMO20170508

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity:

Color:

Odor:

Sheen:

Floatables:

clear
colorless
odorless
NA NA

LABORATORY DELIVERY

Date:

Time:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.29'

Reference Point (description): Stream gauge

Water Quality Measurements

Temperature (°C) 10.8 °C

Specific Conductivity (µs/cm) 223 µs/cm

Dissolved Oxygen (mg/L) 10.85

Quality Assurance

Checked By: John Lentz

Signature: [Signature]

Date Checked: 5-30-17

Time: 11:45

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



HERRERA

Field Personnel: **MM, VW**

Sample Date: **5.8.17** Sample Time: **13:30**

SITE ID: **EVAMS**

Base Flow or Storm Event? **base flow** Field Filtered Time: **13:30**
(Must filter within 15 minutes of collection)

Project Number: 14-05806-000

Water Quality Sampling

Sample ID: **EVAMS20170508**

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: **55°, partly cloudy**

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NO
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): **3.93**

Reference Point (description):

Water Quality Measurements

Temperature (°C) **11.0**

Conductivity (µs/cm) **185.2**

Dissolved Oxygen (mg/L) **10.81**

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
Filter blank sample ID: _____
Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: **clear**
Color: **none**
Odor: **none**
Sheen: **none**
Floatables: **none**

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: **Solene Lamb** Signature: *[Signature]*

Date Checked: **5-30-17** Time: **11:45**

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: **MM + VW**

Sample Date: **5-8-17**

Sample Time: **14:00**

PDT

SITE ID: **EVALSS**

Base Flow or Storm Event?

Field Filtered Time: **14:00**

PST

Project Number: 14-05806-000



Water Quality Sampling

Sample ID: **EVALSS20170508**

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NO ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: **clear**
 Color: **none**
 Odor: **no**
 Sheen: **no**
 Floatables: **no**

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: **John Lamb** Signature: *[Signature]*

Date Checked: **5-30-17** Time: **11:45**

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: **55 + partly cloudy**

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): **2.31**

Reference Point (description): **@ Staff gauge**

Water Quality Measurements

Temperature (°C) **10.7**

Conductivity (µs/cm) **172.5**

Dissolved Oxygen (mg/L) **11.10**

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. SWENSON / G. FITNER

Sample Date: 5-8-17

Sample Time: 1450

PDI

SITE ID: MONMN

Base Flow or Storm Event?

Field Filtered Time: 1455

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: MONMN-20170508

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: N/A

Filter blank sample ID: ↓

Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

Clarity: VERY CLEAR

Color: NONE

Odor: ↓

Sheen: ↓

Floatables: ↓

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Leuth Signature: [Signature]

Date Checked: 5-30-17 Time: 11:45

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 9.07

Reference Point (description): STAFF GAGE

Water Quality Measurements

Temperature (°C) 13.1

Specific Conductivity (µs/cm) 131.0

Dissolved Oxygen (mg/L) 10.01

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. SVENDSEN / G. IFTUQL

Sample Date: 5.8.17 Sample Time: 1510

SITE ID: MONMS

Base Flow or Storm Event? Field Filtered Time: 1515
(Must filter within 15 minutes of collection)

PDT

PST

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: PARTLY CLOUDY + 65°F

Water Quality Sampling

Sample ID: MONMS-20170508

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: N/A

Filter blank sample ID: ↓

Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

Clarity: CLEAR
 Color: TANNIN COLOR - YELLOW/RED
 Odor: NONE
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]

Date Checked: 5-30-17 Time: 11:45

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1 _____

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 80 7/8 INCH

Reference Point (description): PVC STILLING WEL

Water Quality Measurements

Temperature (°C) 13.4

Specific Conductivity (µs/cm) 277.5

Dissolved Oxygen (mg/L) 8.61

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel:

A. S. [unclear] / G. [unclear]

Sample Date:

5-2-17

Sample Time:

1550

PDT

SITE

ID:

MONM

Base Flow or Storm Event?

Field Filtered Time: 1555

PST

(Must filter within 15 minutes of collection)

Project Number: 14-05806-000


HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: MOSTLY SUNNY 68°F

Water Quality Sampling

 Sample ID: MONM-20170508

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

 Duplicate sample ID: N/A

 Filter blank sample ID: ↓

 Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

 Clarity: CLEAR

 Color: NONE

 Odor: ↓

 Sheen: ↓

 Floatables: ↓

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By:

[Signature]

Signature:

[Signature]

Date Checked:

5-30-17

Time:

11:45

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

 Stream Stage (ft): 40 7/8 INCH

 Reference Point (description): CULVERT TOP

Water Quality Measurements

 Temperature (°C) 12.6

 Specific Conductivity (µs/cm) 173.5

 Dissolved Oxygen (mg/L) 10.60

*OBSERVED 5-6 JUVENILE SALMONIDS IN UPPER POOL NEAR NOTCHED WEIR
 *INSTALLED STAFF GAGE @ MONM CULVERT @ 1655 40 7/8 INCHES (CULVERT TOP)
 STAFF GAGE: 1.96 FT

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: **MM + VW**

Sample Date: **5/8/17**

Sample Time: **16:15**

PDT

SITE ID: **SEIMN**

Base Flow or Storm Event?

Field Filtered Time: **16:15**

PST

Project Number: 14-05806-000



Water Quality Sampling

Sample ID: **SEIMN20170508**

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NO ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: **clear**
 Color: **light tan in**
 Odor: **no**
 Sheen: **no**
 Floatables: **no**

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: **Solomon** Signature: *[Signature]*

Date Checked: **5-30-17** Time: **11:45**

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: **62° + Sunny**

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): **7.5 inches**

Reference Point (description): **top of bolt to water surface**

Water Quality Measurements

Temperature (°C) **10.5**

Conductivity (µs/cm) **55.3**

Dissolved Oxygen (mg/L) **11.06**

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: **VW, MM**

Sample Date: **5-8-17**

Sample Time: **15:15**

PDT:

SITE ID: **SEIMS**

Base Flow or Storm Event? Base Flow

Field Filtered Time: **15:45**
(Must filter within 15 minutes of collection)

PST:

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: **55° | partly cloudy**

Water Quality Sampling

Sample ID: **SEIMS20170508**

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	No
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: **clear**
 Color: **no**
 Odor: **none**
 Sheen: **no**
 Floatables: **no**

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: **John Leath** Signature: *[Signature]*

Date Checked: **5-30-17** Time: **14:45**

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): **1.81**

Reference Point (description): **@ staff gauge**

Water Quality Measurements

Temperature (°C) **11.0**

Conductivity (µs/cm) **91.4**

Dissolved Oxygen (mg/L) **10.53**

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: MM + VW
 Sample Date: 5.8.17 Sample Time: 12:15 PDT
 Base Flow or Storm Event? Field Filtered Time: 12:15 PST
 (Must filter within 15 minutes of collection)

SITE ID: TOSMI
 Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: 55 + partly cloudy

Water Quality Sampling

Sample ID: TOSMI20170508

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NO ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leuth Signature: [Signature]
 Date Checked: 5.30.17 Time: 11:45
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.77
 Reference Point (description): @ staff gauge

Water Quality Measurements

Temperature (°C) 11.2
 Conductivity (µs/cm) 195.5
 Dissolved Oxygen (mg/L) 10.77

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. S. WOOD / G. J. TNER

Sample Date: 5-8-17

Sample Time: 1245

SITE ID: TOSMO

Base Flow of Storm Event?

Field Filtered Time: 1250

(Must filter within 15 minutes of collection)

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: OVERCAST +

Water Quality Sampling

Sample ID: TOSMO 20170508

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	Y
DOC *	HDPE	250 ml	1	HCL	Y
Fecal Col. Bact	HDPE	250 ml	1	EDTA	Y
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	Y
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	Y
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	Y
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QA 27 - 20170508 (1400)

Filter blank sample ID: N/A

Transfer blank sample ID: Y

Visual and Olfactory Conditions:

Clarity: _____
 Color: _____
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____

Time: _____

Quality Assurance

Checked By: John Lentz

Signature: [Signature]

Date Checked: 5-30-17

Time: 11:45

Data Entered into Database?

YES

NO

initials: _____

Date Entered: _____

Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.60

Reference Point (description): STAFF GAGE

Water Quality Measurements

Temperature (°C) 10.3

Specific Conductivity (µs/cm) 233.8

Dissolved Oxygen (mg/L) 11.18

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. SWANSON / G. J. FINN

Sample Date: 5-8-17

Sample Time: 1325

PDT: _____

SITE ID: TYLMI

Base Flow or Storm Event?

Field Filtered Time: 1330

PST:

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: PARTLY CLOUDY + 61°F

Water Quality Sampling

Sample ID: TYLMI-20170508

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: N/A
 Filter blank sample ID: ↓
 Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

Clarity: CLEAR
 Color: SUBLT TANNIN
 Odor: NO ODR SUBLT MUSTY ODR
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: [Signature] Signature: [Signature]
 Date Checked: 5-30-17 Time: 11:45
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

- YSI 556 (05M1466)
- YSI Pro Plus (15D100020)
- YSI Pro DSS 1
- YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 54 1/8 INCHES
 Reference Point (description): TOP OF CURB

Water Quality Measurements

Temperature (°C) 11.9
 Specific Conductivity (µs/cm) 163.1
 Dissolved Oxygen (mg/L) 10.36

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. SVENDSEN / G. IFTNER

Sample Date: 5-8-17

Sample Time: 1350

SITE ID: TYLMO

Base Flow or Storm Event?

Field Filtered Time: 1355

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: PARTLY CLOUDY + 61°F

Water Quality Sampling

Sample ID: TYLMO-20170508

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC*	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: N/A

Filter blank sample ID: ↓

Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

Clarity: CLEAR
 Color: SLIGHT TANNIN COLOR
 Odor: NONE
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Leach Signature: [Signature]

Date Checked: 5-30-17 Time: 11:45

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15M0020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 34 1/8 INCH

Reference Point (description): TOP OF CULVERT

Water Quality Measurements

Temperature (°C) 12.1

Specific Conductivity (µs/cm) 160.8

Dissolved Oxygen (mg/L) 10.81



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Sample Date/Sample ID: 5/08/2017 / All sites, 1 FD (QA27) at TOSMO

By G. Catarra

Date 6/13/2017 Page 1 of 2

Checked: initials JL

date 7/14/17

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	4	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	82	±20	NC	≤25	NC	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	0	≤25	67	≤25	OK	FLAG TOSMO "J" DUE TO FIELD DUP EXCEEDANCE
Hardness	OK / SM 2340B	NA	NA	7	≤180	≤1.0 mg/L 1.0 mg/L	103,106	±25	103	±15	4	≤20	2.0	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	2	≤28	≤1.0 mg/L 1.0 mg/L	97	±25	111	±15	1	≤20	16	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	9	≤28	≤0.01 mg/L 0.01 mg/L	101	±25	91	±20	NC	≤20	4.8	≤20	OK	NONE
Total Nitrogen (TKN + N+N)	OK/ SM 4500 N-B	NA	NA	18,11	≤28	≤0.1 mg/L 0.1 mg/L	99,86	±25	94-100	±20	9.6,6.1	≤20	9.6 (TKN), 0(N+N)	≤20	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 6/13/2017 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 5/08/2017 / All sites, 1 FD (QA27) at TOSMO

date 7/14/17

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	9	≤180	≤1.0 µg/L 1.0 µg/L	101,101	±25	NR	±15	3	≤20	13	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	9	≤180	≤5.0 µg/L 5.0 µg/L	109,109	±25	NR	±15	5	≤20	12	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	8	≤180	≤1.0 µg/L 1.0 µg/L	90,85	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	8	≤180	≤5.0 µg/L 5.0 µg/L	104,95	±25	NR	±15	5	≤20	0	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	12,12	≤35	18	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

June 2, 2017

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1705-205

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on May 16, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy, handwritten oval scribble.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 2, 2017
Samples Submitted: May 16, 2017
Laboratory Reference: 1705-205
Project: 14-05806-000

Case Narrative

Samples were collected on May 15, 2017 and received by the laboratory on May 16, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170515					
Laboratory ID:	05-205-01					
Total Suspended Solids	6.0	1.0	SM 2540D	5-17-17	5-18-17	

Client ID:	COUMI-20170515					
Laboratory ID:	05-205-02					
Total Suspended Solids	19	1.0	SM 2540D	5-17-17	5-18-17	

Client ID:	COUMO-20170515					
Laboratory ID:	05-205-03					
Total Suspended Solids	11	1.0	SM 2540D	5-17-17	5-18-17	

Client ID:	EVAMS-20170515					
Laboratory ID:	05-205-04					
Total Suspended Solids	9.4	1.0	SM 2540D	5-17-17	5-18-17	

Client ID:	EVALSS-20170515					
Laboratory ID:	05-205-05					
Total Suspended Solids	11	1.0	SM 2540D	5-17-17	5-18-17	

Client ID:	MONMN-20170515					
Laboratory ID:	05-205-06					
Total Suspended Solids	8.4	1.0	SM 2540D	5-17-17	5-18-17	

Client ID:	MONMS-20170515					
Laboratory ID:	05-205-07					
Total Suspended Solids	7.4	1.0	SM 2540D	5-17-17	5-18-17	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170515					
Laboratory ID:	05-205-08					
Total Suspended Solids	18	1.0	SM 2540D	5-17-17	5-18-17	

Client ID:	SEIMN-20170515					
Laboratory ID:	05-205-09					
Total Suspended Solids	21	1.0	SM 2540D	5-17-17	5-18-17	

Client ID:	SEIMS-20170515					
Laboratory ID:	05-205-10					
Total Suspended Solids	26	1.0	SM 2540D	5-17-17	5-18-17	

Client ID:	TOSMI-20170515					
Laboratory ID:	05-205-11					
Total Suspended Solids	44	1.7	SM 2540D	5-17-17	5-18-17	

Client ID:	TOSMO-20170515					
Laboratory ID:	05-205-12					
Total Suspended Solids	22	1.0	SM 2540D	5-17-17	5-18-17	

Client ID:	TYLMI-20170515					
Laboratory ID:	05-205-13					
Total Suspended Solids	9.6	1.0	SM 2540D	5-17-17	5-18-17	

Client ID:	TYLMO-20170515					
Laboratory ID:	05-205-14					
Total Suspended Solids	140	2.5	SM 2540D	5-17-17	5-18-17	



Date of Report: June 2, 2017
Samples Submitted: May 16, 2017
Laboratory Reference: 1705-205
Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA28-20170515					
Laboratory ID:	05-205-15					
Total Suspended Solids	110	2.5	SM 2540D	5-17-17	5-18-17	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0517W1					
Total Suspended Solids	ND	1.0	SM 2540D	5-17-17	5-18-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-205-11							
	ORIG	DUP						
Total Suspended Solids	44.3	45.7	NA	NA	NA	3	20	

SPIKE BLANK								
Laboratory ID:	SB0517W1							
	SB	SB		SB				
Total Suspended Solids	108	100	NA	108	78-113	NA	NA	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170515					
Laboratory ID:	05-205-01					
Turbidity	2.1	0.10	EPA 180.1	5-17-17	5-17-17	

Client ID:	COUMI-20170515					
Laboratory ID:	05-205-02					
Turbidity	6.3	0.10	EPA 180.1	5-17-17	5-17-17	

Client ID:	COUMO-20170515					
Laboratory ID:	05-205-03					
Turbidity	9.8	0.10	EPA 180.1	5-17-17	5-17-17	

Client ID:	EVAMS-20170515					
Laboratory ID:	05-205-04					
Turbidity	4.2	0.10	EPA 180.1	5-17-17	5-17-17	

Client ID:	EVALSS-20170515					
Laboratory ID:	05-205-05					
Turbidity	3.9	0.10	EPA 180.1	5-17-17	5-17-17	

Client ID:	MONMN-20170515					
Laboratory ID:	05-205-06					
Turbidity	4.8	0.10	EPA 180.1	5-17-17	5-17-17	

Client ID:	MONMS-20170515					
Laboratory ID:	05-205-07					
Turbidity	4.7	0.10	EPA 180.1	5-17-17	5-17-17	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170515					
Laboratory ID:	05-205-08					
Turbidity	11	0.10	EPA 180.1	5-17-17	5-17-17	

Client ID:	SEIMN-20170515					
Laboratory ID:	05-205-09					
Turbidity	5.5	0.10	EPA 180.1	5-17-17	5-17-17	

Client ID:	SEIMS-20170515					
Laboratory ID:	05-205-10					
Turbidity	13	0.10	EPA 180.1	5-17-17	5-17-17	

Client ID:	TOSMI-20170515					
Laboratory ID:	05-205-11					
Turbidity	27	0.10	EPA 180.1	5-17-17	5-17-17	

Client ID:	TOSMO-20170515					
Laboratory ID:	05-205-12					
Turbidity	11	0.10	EPA 180.1	5-17-17	5-17-17	

Client ID:	TYLMI-20170515					
Laboratory ID:	05-205-13					
Turbidity	4.8	0.10	EPA 180.1	5-17-17	5-17-17	

Client ID:	TYLMO-20170515					
Laboratory ID:	05-205-14					
Turbidity	59	0.10	EPA 180.1	5-17-17	5-17-17	



Date of Report: June 2, 2017
Samples Submitted: May 16, 2017
Laboratory Reference: 1705-205
Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA28-20170515					
Laboratory ID:	05-205-15					
Turbidity	49	0.10	EPA 180.1	5-17-17	5-17-17	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0517W1					
Turbidity	ND	0.10	EPA 180.1	5-17-17	5-17-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-205-01							
	ORIG	DUP						
Turbidity	2.13	2.13	NA	NA	NA	NA	0	15



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170515					
Laboratory ID:	05-205-01					
Hardness	9.2	1.0	200.7/SM 2340B	5-22-15	5-23-15	

Client ID:	COUMI-20170515					
Laboratory ID:	05-205-02					
Hardness	120	1.0	200.7/SM 2340B	5-22-15	5-23-15	

Client ID:	COUMO-20170515					
Laboratory ID:	05-205-03					
Hardness	100	1.0	200.7/SM 2340B	5-22-15	5-23-15	

Client ID:	EVAMS-20170515					
Laboratory ID:	05-205-04					
Hardness	81	1.0	200.7/SM 2340B	5-22-15	5-23-15	

Client ID:	EVALSS-20170515					
Laboratory ID:	05-205-05					
Hardness	76	1.0	200.7/SM 2340B	5-22-15	5-23-15	

Client ID:	MONMN-20170515					
Laboratory ID:	05-205-06					
Hardness	57	1.0	200.7/SM 2340B	5-22-15	5-23-15	

Client ID:	MONMS-20170515					
Laboratory ID:	05-205-07					
Hardness	110	2.0	200.7/SM 2340B	5-22-15	5-24-17	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170515					
Laboratory ID:	05-205-08					
Hardness	82	1.0	200.7/SM 2340B	5-22-15	5-23-15	

Client ID:	SEIMN-20170515					
Laboratory ID:	05-205-09					
Hardness	25	1.0	200.7/SM 2340B	5-22-15	5-23-15	

Client ID:	SEIMS-20170515					
Laboratory ID:	05-205-10					
Hardness	40	1.0	200.7/SM 2340B	5-22-15	5-23-15	

Client ID:	TOSMI-20170515					
Laboratory ID:	05-205-11					
Hardness	81	1.0	200.7/SM 2340B	5-22-15	5-23-15	

Client ID:	TOSMO-20170515					
Laboratory ID:	05-205-12					
Hardness	100	1.0	200.7/SM 2340B	5-22-15	5-23-15	

Client ID:	TYLMI-20170515					
Laboratory ID:	05-205-13					
Hardness	84	1.0	200.7/SM 2340B	5-22-15	5-23-15	

Client ID:	TYLMO-20170515					
Laboratory ID:	05-205-14					
Hardness	70	1.0	200.7/SM 2340B	5-22-15	5-23-15	



Date of Report: June 2, 2017
Samples Submitted: May 16, 2017
Laboratory Reference: 1705-205
Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA28-20170515					
Laboratory ID:	05-205-15					
Hardness	87	1.0	200.7/SM 2340B	5-22-15	5-23-15	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0522WH2					
Hardness	ND	1.0	200.7/SM 2340B	5-22-15	5-23-15	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-205-01							
	ORIG	DUP						
Hardness	9.16	9.42	NA	NA	NA	3	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	05-205-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	148	146	132	132	9.16	105	104	75-125	1	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK								
Laboratory ID:	SB0522WH2							
	SB	SB			SB			
Hardness	138	132	NA	105	80-120	NA	NA	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170515					
Laboratory ID:	05-205-01					
Dissolved Organic Carbon	13	1.0	SM 5310B	5-22-17	5-22-17	

Client ID:	COUMI-20170515					
Laboratory ID:	05-205-02					
Dissolved Organic Carbon	4.1	1.0	SM 5310B	5-22-17	5-22-17	

Client ID:	COUMO-20170515					
Laboratory ID:	05-205-03					
Dissolved Organic Carbon	4.9	1.0	SM 5310B	5-22-17	5-22-17	

Client ID:	EVAMS-20170515					
Laboratory ID:	05-205-04					
Dissolved Organic Carbon	4.0	1.0	SM 5310B	5-22-17	5-22-17	

Client ID:	EVALSS-20170515					
Laboratory ID:	05-205-05					
Dissolved Organic Carbon	3.3	1.0	SM 5310B	5-22-17	5-22-17	

Client ID:	MONMN-20170515					
Laboratory ID:	05-205-06					
Dissolved Organic Carbon	4.4	1.0	SM 5310B	5-22-17	5-22-17	

Client ID:	MONMS-20170515					
Laboratory ID:	05-205-07					
Dissolved Organic Carbon	5.8	1.0	SM 5310B	5-22-17	5-22-17	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170515					
Laboratory ID:	05-205-08					
Dissolved Organic Carbon	4.1	1.0	SM 5310B	5-22-17	5-22-17	

Client ID:	SEIMN-20170515					
Laboratory ID:	05-205-09					
Dissolved Organic Carbon	8.4	1.0	SM 5310B	5-22-17	5-22-17	

Client ID:	SEIMS-20170515					
Laboratory ID:	05-205-10					
Dissolved Organic Carbon	5.1	1.0	SM 5310B	5-22-17	5-22-17	

Client ID:	TOSMI-20170515					
Laboratory ID:	05-205-11					
Dissolved Organic Carbon	7.7	1.0	SM 5310B	5-22-17	5-22-17	

Client ID:	TOSMO-20170515					
Laboratory ID:	05-205-12					
Dissolved Organic Carbon	4.9	1.0	SM 5310B	5-22-17	5-22-17	

Client ID:	TYLMI-20170515					
Laboratory ID:	05-205-13					
Dissolved Organic Carbon	4.9	1.0	SM 5310B	5-22-17	5-22-17	

Client ID:	TYLMO-20170515					
Laboratory ID:	05-205-14					
Dissolved Organic Carbon	5.3	1.0	SM 5310B	5-22-17	5-22-17	



Date of Report: June 2, 2017
Samples Submitted: May 16, 2017
Laboratory Reference: 1705-205
Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA28-20170515					
Laboratory ID:	05-205-15					
Dissolved Organic Carbon	4.7	1.0	SM 5310B	5-22-17	5-22-17	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0522D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	5-22-17	5-22-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-205-02							
	ORIG	DUP						
Dissolved Organic Carbon	4.13	4.08	NA	NA	NA	1	20	

MATRIX SPIKE

Laboratory ID:	05-205-02							
	MS	MS		MS				
Dissolved Organic Carbon	14.3	10.0	4.13	102	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0522D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.6	10.0	NA	106	75-125	NA	NA	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170515					
Laboratory ID:	05-205-01					
Total Phosphorus	0.023	0.010	EPA 365.1	5-19-17	5-19-17	

Client ID:	COUMI-20170515					
Laboratory ID:	05-205-02					
Total Phosphorus	0.073	0.010	EPA 365.1	5-19-17	5-19-17	

Client ID:	COUMO-20170515					
Laboratory ID:	05-205-03					
Total Phosphorus	0.044	0.010	EPA 365.1	5-19-17	5-19-17	

Client ID:	EVAMS-20170515					
Laboratory ID:	05-205-04					
Total Phosphorus	0.021	0.010	EPA 365.1	5-19-17	5-19-17	

Client ID:	EVALSS-20170515					
Laboratory ID:	05-205-05					
Total Phosphorus	0.032	0.010	EPA 365.1	5-19-17	5-19-17	

Client ID:	MONMN-20170515					
Laboratory ID:	05-205-06					
Total Phosphorus	0.045	0.010	EPA 365.1	5-19-17	5-19-17	

Client ID:	MONMS-20170515					
Laboratory ID:	05-205-07					
Total Phosphorus	0.045	0.010	EPA 365.1	5-19-17	5-19-17	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170515					
Laboratory ID:	05-205-08					
Total Phosphorus	0.063	0.010	EPA 365.1	5-19-17	5-19-17	

Client ID:	SEIMN-20170515					
Laboratory ID:	05-205-09					
Total Phosphorus	0.052	0.010	EPA 365.1	5-19-17	5-19-17	

Client ID:	SEIMS-20170515					
Laboratory ID:	05-205-10					
Total Phosphorus	0.042	0.010	EPA 365.1	5-19-17	5-19-17	

Client ID:	TOSMI-20170515					
Laboratory ID:	05-205-11					
Total Phosphorus	0.076	0.010	EPA 365.1	5-19-17	5-19-17	

Client ID:	TOSMO-20170515					
Laboratory ID:	05-205-12					
Total Phosphorus	0.077	0.010	EPA 365.1	5-19-17	5-19-17	

Client ID:	TYLMI-20170515					
Laboratory ID:	05-205-13					
Total Phosphorus	0.043	0.010	EPA 365.1	5-19-17	5-19-17	

Client ID:	TYLMO-20170515					
Laboratory ID:	05-205-14					
Total Phosphorus	0.24	0.010	EPA 365.1	5-19-17	5-19-17	



Date of Report: June 2, 2017
Samples Submitted: May 16, 2017
Laboratory Reference: 1705-205
Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA28-20170515					
Laboratory ID:	05-205-15					
Total Phosphorus	0.28	0.010	EPA 365.1	5-19-17	5-19-17	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0519W1					
Total Phosphorus	ND	0.010	EPA 365.1	5-19-17	5-19-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-205-01							
	ORIG	DUP						
Total Phosphorus	0.0230	0.0222	NA	NA	NA	4	11	

MATRIX SPIKE								
Laboratory ID:	05-205-01							
	MS	MS		MS				
Total Phosphorus	0.267	0.250	0.0230	98	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0519W1							
	SB	SB		SB				
Total Phosphorus	0.235	0.250	NA	94	86-111	NA	NA	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 05-205-01						
Client ID: COLM-20170515						
Copper	ND	1.0	200.8	5-22-17	5-23-17	
Zinc	ND	5.0	200.8	5-22-17	5-23-17	
Lab ID: 05-205-02						
Client ID: COUMI-20170515						
Copper	2.4	1.0	200.8	5-22-17	5-23-17	
Zinc	25	5.0	200.8	5-22-17	5-23-17	
Lab ID: 05-205-03						
Client ID: COUMO-20170515						
Copper	3.3	1.0	200.8	5-22-17	5-23-17	
Zinc	15	5.0	200.8	5-22-17	5-23-17	
Lab ID: 05-205-04						
Client ID: EVAMS-20170515						
Copper	ND	1.0	200.8	5-22-17	5-23-17	
Zinc	ND	5.0	200.8	5-22-17	5-23-17	
Lab ID: 05-205-05						
Client ID: EVALSS-20170515						
Copper	ND	1.0	200.8	5-22-17	5-23-17	
Zinc	ND	5.0	200.8	5-22-17	5-23-17	
Lab ID: 05-205-06						
Client ID: MONMN-20170515						
Copper	ND	1.0	200.8	5-22-17	5-23-17	
Zinc	ND	5.0	200.8	5-22-17	5-23-17	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-205-07					
Client ID:	MONMS-20170515					
Copper	1.7	1.0	200.8	5-22-17	5-23-17	
Zinc	7.1	5.0	200.8	5-22-17	5-23-17	
Lab ID:	05-205-08					
Client ID:	MONM-20170515					
Copper	1.6	1.0	200.8	5-22-17	5-23-17	
Zinc	15	5.0	200.8	5-22-17	5-23-17	
Lab ID:	05-205-09					
Client ID:	SEIMN-20170515					
Copper	1.5	1.0	200.8	5-22-17	5-23-17	
Zinc	ND	5.0	200.8	5-22-17	5-23-17	
Lab ID:	05-205-10					
Client ID:	SEIMS-20170515					
Copper	ND	1.0	200.8	5-22-17	5-23-17	
Zinc	ND	5.0	200.8	5-22-17	5-23-17	
Lab ID:	05-205-11					
Client ID:	TOSMI-20170515					
Copper	8.5	1.0	200.8	5-22-17	5-23-17	
Zinc	72	5.0	200.8	5-22-17	5-23-17	
Lab ID:	05-205-12					
Client ID:	TOSMO-20170515					
Copper	3.4	1.0	200.8	5-22-17	5-23-17	
Zinc	25	5.0	200.8	5-22-17	5-23-17	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-205-13					
Client ID:	TYLMI-20170515					
Copper	3.2	1.0	200.8	5-22-17	5-23-17	
Zinc	66	5.0	200.8	5-22-17	5-23-17	
Lab ID:	05-205-14					
Client ID:	TYLMO-20170515					
Copper	15	1.0	200.8	5-22-17	5-23-17	
Zinc	110	5.0	200.8	5-22-17	5-23-17	
Lab ID:	05-205-15					
Client ID:	QA28-20170515					
Copper	23	1.0	200.8	5-22-17	5-23-17	
Zinc	230	13	200.8	5-22-17	5-23-17	



Date of Report: June 2, 2017
Samples Submitted: May 16, 2017
Laboratory Reference: 1705-205
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 5-22-17
Date Analyzed: 5-23-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0522WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 DUPLICATE QUALITY CONTROL**

Date Extracted: 5-22-17

Date Analyzed: 5-23-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 05-205-06

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	5.30	NA	5.0	



Date of Report: January 6, 2017
 Samples Submitted: January 6, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 5-22-17

Date Analyzed: 5-23-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 05-205-06

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	96.2	96	93.0	93	3	
Zinc	100	103	103	105	105	2	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 05-205-01						
Client ID: COLM-20170515						
Copper	ND	1.0	200.8		5-22-17	
Zinc	ND	5.0	200.8		5-22-17	
Lab ID: 05-205-02						
Client ID: COUMI-20170515						
Copper	ND	1.0	200.8		5-22-17	
Zinc	12	5.0	200.8		5-22-17	
Lab ID: 05-205-03						
Client ID: COUMO-20170515						
Copper	2.2	1.0	200.8		5-22-17	
Zinc	10	5.0	200.8		5-22-17	
Lab ID: 05-205-04						
Client ID: EVAMS-20170515						
Copper	ND	1.0	200.8		5-22-17	
Zinc	ND	5.0	200.8		5-22-17	
Lab ID: 05-205-05						
Client ID: EVALSS-20170515						
Copper	ND	1.0	200.8		5-22-17	
Zinc	ND	5.0	200.8		5-22-17	
Lab ID: 05-205-06						
Client ID: MONMN-20170515						
Copper	ND	1.0	200.8		5-22-17	
Zinc	ND	5.0	200.8		5-22-17	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-205-07					
Client ID:	MONMS-20170515					
Copper	ND	1.0	200.8		5-22-17	
Zinc	ND	5.0	200.8		5-22-17	
Lab ID:	05-205-08					
Client ID:	MONM-20170515					
Copper	ND	1.0	200.8		5-22-17	
Zinc	5.5	5.0	200.8		5-22-17	
Lab ID:	05-205-09					
Client ID:	SEIMN-20170515					
Copper	ND	1.0	200.8		5-22-17	
Zinc	ND	5.0	200.8		5-22-17	
Lab ID:	05-205-10					
Client ID:	SEIMS-20170515					
Copper	ND	1.0	200.8		5-22-17	
Zinc	ND	5.0	200.8		5-22-17	
Lab ID:	05-205-11					
Client ID:	TOSMI-20170515					
Copper	3.6	1.0	200.8		5-22-17	
Zinc	19	5.0	200.8		5-22-17	
Lab ID:	05-205-12					
Client ID:	TOSMO-20170515					
Copper	1.5	1.0	200.8		5-22-17	
Zinc	12	5.0	200.8		5-22-17	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-205-13					
Client ID:	TYLMI-20170515					
Copper	1.5	1.0	200.8		5-22-17	
Zinc	47	5.0	200.8		5-22-17	
Lab ID:	05-205-14					
Client ID:	TYLMO-20170515					
Copper	4.5	1.0	200.8		5-22-17	
Zinc	7.8	5.0	200.8		5-22-17	
Lab ID:	05-205-15					
Client ID:	QA28-20170515					
Copper	3.0	1.0	200.8		5-22-17	
Zinc	7.5	5.0	200.8		5-22-17	



Date of Report: June 2, 2017
Samples Submitted: May 16, 2017
Laboratory Reference: 1705-205
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 5-22-17
Matrix: Water
Units: ug/L (ppb)
Lab ID: MB0522D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: June 2, 2017
Samples Submitted: May 16, 2017
Laboratory Reference: 1705-205
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 5-22-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-205-15

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	3.02	3.12	3	1.0	
Zinc	7.48	7.50	0	5.0	



Date of Report: June 2, 2017
 Samples Submitted: May 16, 2017
 Laboratory Reference: 1705-205
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 5-22-17

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 05-205-15

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	73.8	88	74.8	90	1	
Zinc	80.0	84.4	96	84.6	96	0	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

Jun 2 2017
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20170515	Water	17-A007199	Micro, NUT
COUMI-20170515	Water	17-A007200	Micro, NUT
COUMO-20170515	Water	17-A007201	Micro, NUT
EVAMS-20170515	Water	17-A007202	Micro, NUT
EVALSS-20170515	Water	17-A007203	Micro, NUT
MONMN-20170515	Water	17-A007204	Micro, NUT
MONMS-20170515	Water	17-A007205	Micro, NUT
MONM-20170515	Water	17-A007206	Micro, NUT
SEIMN-20170515	Water	17-A007207	Micro, NUT
SEIMS-20170515	Water	17-A007208	Micro, NUT
TOSMI-20170515	Water	17-A007209	Micro, NUT
TOSMO-20170515	Water	17-A007210	Micro, NUT
TYLMI-20170515	Water	17-A007211	Micro, NUT
TYLMO-20170515	Water	17-A007212	Micro, NUT
QA-28-20170515	Water	17-A007213	Micro, NUT

Your samples were received on Tuesday, May 16, 2017. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

Jun 2 2017
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 05-205

BACT = Bacteriological
CONV = Conventional

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



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Services*

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
PO Number: 05-205
All results reported on an as received basis.

Date Received: 05/16/17
Date Reported: 6/ 2/17

AMTEST Identification Number 17-A007199
Client Identification COLM-20170515
Sampling Date 05/15/17, 20:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	530	CFU/100 ml		1	SM 9222D	JM	05/16/17
Total Nitrogen (NOX&TKN)	0.85	mg/l		0.1			
Total Nitrogen (TKN)	0.784	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	0.066	mg/l		0.01	SM4500NO3	JC	05/31/17

AMTEST Identification Number 17-A007200
Client Identification COUMI-20170515
Sampling Date 05/15/17, 17:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	160	CFU/100 ml		1	SM 9222D	JM	05/16/17
Total Nitrogen (NOX&TKN)	0.95	mg/l		0.1			
Total Nitrogen (TKN)	0.614	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	0.34	mg/l		0.01	SM4500NO3	JC	05/31/17

AMTEST Identification Number 17-A007201
Client Identification COUMO-20170515
Sampling Date 05/15/17, 17:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	780	CFU/100 ml		1	SM 9222D	JM	05/16/17
Total Nitrogen (NOX&TKN)	1.05	mg/l		0.1			
Total Nitrogen (TKN)	0.627	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	0.42	mg/l		0.01	SM4500NO3	JC	05/31/17

AMTEST Identification Number 17-A007202
Client Identification EVAMS-20170515
Sampling Date 05/15/17, 18:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	66.	CFU/100 ml		1	SM 9222D	JM	05/16/17
Total Nitrogen (NOX&TKN)	2.45	mg/l		0.1			
Total Nitrogen (TKN)	0.747	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	1.7	mg/l		0.01	SM4500NO3	JC	05/31/17

AMTEST Identification Number 17-A007203
Client Identification EVALSS-20170515
Sampling Date 05/15/17, 18:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	23.	CFU/100 ml		1	SM 9222D	JM	05/16/17
Total Nitrogen (NOX&TKN)	1.83	mg/l		0.1			
Total Nitrogen (TKN)	0.526	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	1.3	mg/l		0.01	SM4500NO3	JC	05/31/17

AMTEST Identification Number 17-A007204
Client Identification MONMN-20170515
Sampling Date 05/15/17, 19:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	190	CFU/100 ml		1	SM 9222D	JM	05/16/17
Total Nitrogen (NOX&TKN)	0.73	mg/l		0.1			
Total Nitrogen (TKN)	0.607	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	0.12	mg/l		0.01	SM4500NO3	JC	05/31/17

AMTEST Identification Number 17-A007205
Client Identification MONMS-20170515
Sampling Date 05/15/17, 19:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	30.	CFU/100 ml		1	SM 9222D	JM	05/16/17
Total Nitrogen (NOX&TKN)	0.91	mg/l		0.1			
Total Nitrogen (TKN)	0.636	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	0.27	mg/l		0.01	SM4500NO3	JC	05/31/17

AMTEST Identification Number 17-A007206
Client Identification MONM-20170515
Sampling Date 05/15/17, 19:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	120	CFU/100 ml		1	SM 9222D	JM	05/16/17
Total Nitrogen (NOX&TKN)	1.06	mg/l		0.1			
Total Nitrogen (TKN)	0.757	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	0.30	mg/l		0.01	SM4500NO3	JC	05/31/17

AMTEST Identification Number 17-A007207
Client Identification SEIMN-20170515
Sampling Date 05/15/17, 19:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	28.	CFU/100 ml		1	SM 9222D	JM	05/16/17
Total Nitrogen (NOX&TKN)	0.90	mg/l		0.1			
Total Nitrogen (TKN)	0.677	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	0.22	mg/l		0.01	SM4500NO3	JC	05/31/17

AMTEST Identification Number 17-A007208
Client Identification SEIMS-20170515
Sampling Date 05/15/17, 20:35

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	50.	CFU/100 ml		1	SM 9222D	JM	05/16/17
Total Nitrogen (NOX&TKN)	1.11	mg/l		0.1			
Total Nitrogen (TKN)	0.872	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	0.24	mg/l		0.01	SM4500NO3	JC	05/31/17

AMTEST Identification Number 17-A007209
Client Identification TOSMI-20170515
Sampling Date 05/15/17, 17:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1200	CFU/100 ml		1	SM 9222D	JM	05/16/17
Total Nitrogen (NOX&TKN)	1.60	mg/l		0.1			
Total Nitrogen (TKN)	0.908	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	0.69	mg/l		0.01	SM4500NO3	JC	05/31/17

AMTEST Identification Number 17-A007210
Client Identification TOSMO-20170515
Sampling Date 05/15/17, 17:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	480	CFU/100 ml		1	SM 9222D	JM	05/16/17
Total Nitrogen (NOX&TKN)	1.31	mg/l		0.1			
Total Nitrogen (TKN)	0.664	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	0.65	mg/l		0.01	SM4500NO3	JC	05/31/17

AMTEST Identification Number 17-A007211
Client Identification TYLMI-20170515
Sampling Date 05/15/17, 18:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	92.	CFU/100 ml		1	SM 9222D	JM	05/16/17
Total Nitrogen (NOX&TKN)	1.45	mg/l		0.1			
Total Nitrogen (TKN)	0.661	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	0.79	mg/l		0.01	SM4500NO3	JC	05/31/17

AMTEST Identification Number 17-A007212
Client Identification TYLMO-20170515
Sampling Date 05/15/17, 18:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	670	CFU/100 ml		1	SM 9222D	JM	05/16/17
Total Nitrogen (NOX&TKN)	2.11	mg/l		0.1			
Total Nitrogen (TKN)	1.50	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	0.61	mg/l		0.01	SM4500NO3	JC	05/31/17

AMTEST Identification Number 17-A007213
Client Identification QA-28-20170515
Sampling Date 05/15/17, 18:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	400	CFU/100 ml		1	SM 9222D	JM	05/16/17
Total Nitrogen (NOX&TKN)	5.55	mg/l		0.1			
Total Nitrogen (TKN)	4.90	mg/l		0.1	SM4500N	JC	06/01/17
Nitrate + Nitrite	0.65	mg/l		0.01	SM4500NO3	JC	05/31/17


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 17-A007199 to 17-A007213

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
17-A007204	Fecal Coliform	CFU/100 ml	190	240	23.
17-A007210	Fecal Coliform	CFU/100 ml	480	380	23.
17-A006902	Total Nitrogen (TKN)	mg/l	0.515	0.547	6.0
17-A006948	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
17-A007078	Total Nitrogen (TKN)	mg/l	1.20	1.30	8.0
17-A007171	Total Nitrogen (TKN)	mg/l	0.332	0.341	2.7
17-A007192	Total Nitrogen (TKN)	mg/l	0.527	0.555	5.2
17-A007202	Total Nitrogen (TKN)	mg/l	0.747	0.664	12.
17-A007212	Total Nitrogen (TKN)	mg/l	1.50	1.80	18.
17-A007083	Nitrate + Nitrite	mg/l	0.18	0.18	0.00
17-A006905	Nitrate + Nitrite	mg/l	2.2	2.1	4.7
17-A007092	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	
17-A007196	Nitrate + Nitrite	mg/l	0.15	0.15	0.00
17-A007206	Nitrate + Nitrite	mg/l	0.30	0.30	0.00
17-A007534	Nitrate + Nitrite	mg/l	0.086	0.083	3.6
17-A007544	Nitrate + Nitrite	mg/l	0.35	0.34	2.9
17-A007655	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	
17-A007709	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	
17-A007839	Nitrate + Nitrite	mg/l	0.30	0.30	0.00

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
17-A006902	Total Nitrogen (TKN)	mg/l	0.515	2.53	2.00	100.75 %
17-A006948	Total Nitrogen (TKN)	mg/l	< 0.1	2.07	2.00	103.50 %
17-A007078	Total Nitrogen (TKN)	mg/l	1.20	2.99	2.00	89.50 %
17-A007171	Total Nitrogen (TKN)	mg/l	0.332	2.44	2.00	105.40 %
17-A007192	Total Nitrogen (TKN)	mg/l	0.527	2.62	2.00	104.65 %
17-A007202	Total Nitrogen (TKN)	mg/l	0.747	2.68	2.00	96.65 %
17-A007212	Total Nitrogen (TKN)	mg/l	1.50	3.50	2.00	100.00 %
17-A007083	Nitrate + Nitrite	mg/l	0.18	0.72	0.50	108.00 %
17-A006905	Nitrate + Nitrite	mg/l	2.2	4.8	2.5	104.00 %
17-A007092	Nitrate + Nitrite	mg/l	< 0.01	0.52	0.50	104.00 %
17-A007196	Nitrate + Nitrite	mg/l	0.15	0.67	0.50	104.00 %
17-A007206	Nitrate + Nitrite	mg/l	0.30	0.80	0.50	100.00 %
17-A007544	Nitrate + Nitrite	mg/l	0.35	0.83	0.50	96.00 %
17-A007655	Nitrate + Nitrite	mg/l	< 0.01	0.48	0.50	96.00 %
17-A007709	Nitrate + Nitrite	mg/l	< 0.01	0.49	0.50	98.00 %
17-A007839	Nitrate + Nitrite	mg/l	0.30	0.79	0.50	98.00 %

QC Summary for sample numbers: 17-A007199 to 17-A007213...

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	1.00	1.00	100. %
Total Nitrogen (TKN)	mg/l	1.00	0.948	94.8 %
Total Nitrogen (TKN)	mg/l	20.0	19.1	95.5 %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 05-205

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20170515 7199	5/15/17	20:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20170515 7200	5/15/17	17:25	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20170515 01	5/15/17	17:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20170515 02	5/15/17	18:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20170515 03	5/15/17	18:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20170515 04	5/15/17	19:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20170515 05	5/15/17	19:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20170515 06	5/15/17	19:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20170515 07	5/15/17	19:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20170515 08	5/15/17	20:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company	Date	Time	Comments/Special Instructions	
Relinquished by:		OnSite Env	5/16/17	1450	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L	
Received by:			5/16/17	1450		
Relinquished by:						
Received by:						
Relinquished by:						
Received by:						



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants

Project No.: 14-05806-000

Project Name: Redmond Paired Watershed Study

Project Manager: George Iftner

CHAIN OF CUSTODY

05-205 Page 1 of 1

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No.

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *									
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *				
1	COLM-2017 OSIS	5-15-17	20:30	Water	7	X	X	X	X	X	X	X	X	X				
2	COUMI-2017 OSIS		17:25	Water	7	X	X	X	X	X	X	X	X	X				
3	COUMO-2017 OSIS		17:10	Water	7	X	X	X	X	X	X	X	X	X				
4	EVAMS-2017 OSIS		18:30	Water	7	X	X	X	X	X	X	X	X	X				
5	EVALSS-2017 OSIS		18:50	Water	7	X	X	X	X	X	X	X	X	X				
6	MONMN-2017 OSIS		19:15	Water	7	X	X	X	X	X	X	X	X	X				
7	MONMS-2017 OSIS		19:30	Water	7	X	X	X	X	X	X	X	X	X				
8	MONM-2017 OSIS		19:50	Water	7	X	X	X	X	X	X	X	X	X				
9	SEIMN-2017 OSIS		19:50	Water	7	X	X	X	X	X	X	X	X	X				
10	SEIMS-2017 OSIS		20:35	Water	7	X	X	X	X	X	X	X	X	X				
11	TOSMI-2017 OSIS		17:30	Water	7	X	X	X	X	X	X	X	X	X				
12	TOSMO-2017 OSIS		17:45	Water	7	X	X	X	X	X	X	X	X	X				
13	TYLMI-2017 OSIS		18:50	Water	7	X	X	X	X	X	X	X	X	X				
14	TYLMO-2017 OSIS		18:25	Water	7	X	X	X	X	X	X	X	X	X				
15	QA 28-2017 OSIS		18:30	Water	7	X	X	X	X	X	X	X	X	X				

Relinquished by George Iftner Date 5/16/17 Received by Daniel Clark Date 5/16/17
 Firm Herrera Time 9:30 Firm ALPHA Time 11:00
 Relinquished by Daniel Clark Date 5/16 Received by [Signature] Date 5/16/17
 Firm ALPHA Time 12:40 Firm [Signature] Time 12:40

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Itner

CHAIN OF CUSTODY

05-205 Page 1 of 1

Turnaround Requested:

_____ 1 Day

_____ 2 Day

_____ 3 Day

Standard

Laboratory No.		Requested Analyses												
Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *						

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *					
1	COLM-2017 OSIS	5-15-17	20:30	Water	7	X	X	X	X	X	X	X	X	X					
2	COUMI-2017 OSIS		17:25	Water	7	X	X	X	X	X	X	X	X	X					
3	COUMO-2017 OSIS		17:40	Water	7	X	X	X	X	X	X	X	X	X					
4	EVAMS-2017 OSIS		18:30	Water	7	X	X	X	X	X	X	X	X	X					
5	EVALSS-2017 OSIS		18:50	Water	7	X	X	X	X	X	X	X	X	X					
6	MONMN-2017 OSIS		19:15	Water	7	X	X	X	X	X	X	X	X	X					
7	MONMS-2017 OSIS		19:30	Water	7	X	X	X	X	X	X	X	X	X					
8	MONM-2017 OSIS		19:50	Water	7	X	X	X	X	X	X	X	X	X					
9	SEIMN-2017 OSIS		19:50	Water	7	X	X	X	X	X	X	X	X	X					
10	SEIMS-2017 OSIS		20:35	Water	7	X	X	X	X	X	X	X	X	X					
11	TOSMI-2017 OSIS		17:50	Water	7	X	X	X	X	X	X	X	X	X					
12	TOSMO-2017 OSIS		17:45	Water	7	X	X	X	X	X	X	X	X	X					
13	TYLMI-2017 OSIS		18:50	Water	7	X	X	X	X	X	X	X	X	X					
14	TYLMO-2017 OSIS		18:25	Water	7	X	X	X	X	X	X	X	X	X					
15	QA 28-2017 OSIS		18:30	Water	7	X	X	X	X	X	X	X	X	X					

Relinquished by George Itner Date 5/16/17 Received by Dan Clark Date 5/16/17
 Firm Herrera Time 9:30 Firm ALPHA Time 11:00
 Relinquished by Dan Clark Date 5/16 Received by [Signature] Date 5/17
 Firm ALPHA Time 12:40 Firm [Signature] Time 12:40

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number: 14-05806-000
Personnel Performing Calibration: A. Sverdrup
Meter: YSI ProDSS #2
Date/Time: 5/15/17
Barometric Pressure Start of Day: mmHg: 850.8 / 756.7 Time: 1615
Barometric Pressure End of Day: mmHg: Time:

PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	2.5	0	22.2	
Conductivity (µS/cm)	990	1,000	22.8	
Conductivity (µS/cm)	101.8	100	23.1	
DO % Saturation	89.6	100	21.6	CALIB'D. READS 99.4% DO

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	2.5	0	19.9	
Conductivity (µS/cm)	997	1000	↓	no 100 available
DO % Saturation	100.0%	100	↓	

Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
 Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

- Conductivity Calibration Notes:**
1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
 2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
 3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
 4. Make sure there are no bubbles in the cell; wait 2 minutes.
 5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
 6. Check conductivity using 100 µS/cm standard.

- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.



METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number: 14-05806-000
Personnel Performing Calibration: A. Swanson
Meter: YSI PRO DSS #1
Date/Time: 5/15/17
Barometric Pressure Start of Day: mmHg: 756.0 Time: 1615
Barometric Pressure End of Day: mmHg: Time:

PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	2.5	0	22.0	
Conductivity (µS/cm)	990	1,000	22.6	CALIB'D; READS 1,000 µS AFTER CAL
Conductivity (µS/cm)	102.1	100	22	
DO % Saturation	98.0	100	22	CALIB'D; READS 100% AFTER CAL

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	3.3	0	20.2	
Conductivity (µS/cm)	999	100	6	no 100 available
DO % Saturation	100.4%	100		

Calibration Procedures:
Rinse Multimenter Sonde Between Each Operation
 Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:



1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

6

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: KW + VW

SITE ID: COLM

Sample Date: 5/15/17 Sample Time: 20:30

PDT

Base Flow or Storm Event? Storm Field Filtered Time: 20:30
(Must filter within 15 minutes of collection)

PST

Project Number: 14-05806-000



Water Quality Sampling

Sample ID: COLM20170515

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 46°F + light rain

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>NO</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear
Color: light tanish
Odor: no
Sheen: no
Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS #1 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 6.61

Reference Point (description): @ staff gauge

Water Quality Measurements

Temperature (°C) 10.7

Conductivity (µs/cm) 28.6

Dissolved Oxygen (mg/l.) 10.02

Quality Assurance

Checked By: VW

Signature: NW

Date Checked: 5.16.17

Time: 12:30

Data Entered into Database?

YES NO initials: VW

Date Entered: 5.16.17

Time: 12:30

Notes: None

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: BB NM
 Sample Date: 5/15/17 Sample Time: 17:25 PDT
 Base Flow or Storm Event? Storm Field Filtered Time: 17:30 PST
(Must filter within 15 minutes of collection)

SITE ID: COUN1-20170515
 Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: Rainy @ 48°F

Water Quality Sampling

Sample ID: COUN1 20170515

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: none
 Sheen: none
 Floatables: suspended sediment

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: VW Signature: [Signature]
 Date Checked: 5-15-17 Time: 12:30
 Data Entered into Database? YES NO Initials: VW
 Date Entered: 5-16-17 Time: 12:30
 Notes: None

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.09
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 10.2
 Specific Conductivity (µs/cm) 266.0
 Dissolved Oxygen (mg/L) 10.94

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & MM

Sample Date: 5/15/17

Sample Time: 17:10

PDT

SITE ID: COUMO-20170515

Base Flow or ~~Form~~ Event? 3

Field Filtered Time: 17:15

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rainy ± 48°F

Water Quality Sampling

Sample ID: COUMO20170515

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear

Color: none

Odor: none

Sheen: none

Floatables: SOSP. sed

LABORATORY DELIVERY

Date:

Time:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.28

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 11.2

Specific Conductivity (µs/cm) 228.4

Dissolved Oxygen (mg/L) 10.57

Quality Assurance

Checked By: VW

Signature: VW

Date Checked: 5-16-17

Time: 12:30

Data Entered into Database?

YES NO initials: VW

Date Entered: 5-16-17

Time: 12:30

Notes: none

2

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: KW + VW
 Sample Date: 5.15.17 Sample Time: 18:30 PDT:
 Base Flow or Storm Event? Storm Event? Field Filtered Time: 18:30 PST:
 (Must filter within 15 minutes of collection)

SITE ID: EVAMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 49°F + light rain

Water Quality Sampling

Sample ID: EVAMS20170515

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NO
DOC*	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: light yellow
 Odor: none
 Sheen: none
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: VW Signature: VW
 Date Checked: 5.16.17 Time: 12:30
 Data Entered into Database? YES NO initials: VW
 Date Entered: 5.16.17 Time: 12:30
 Notes: None

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.94

Reference Point (description): at staff gauge

Water Quality Measurements

Temperature (°C) 10.2

Specific Conductivity (µs/cm) 195.2

Dissolved Oxygen (mg/L) 10.90

3

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: KW + VW

Sample Date: 5.15.17

Sample Time: 18:50

PDT: X

SITE ID: EVALSS

Base Flow or Storm Event?

Field Filtered Time: 18:50

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 49°F + light rain

Water Quality Sampling

Sample ID: EVALSS20170575

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>NO</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear

Color: colorless

Odor: no

Sheen: no

Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: VW Signature: [Signature]

Date Checked: 5.16.17 Time: 12:30

Data Entered into Database? YES NO initials: VW

Date Entered: 5.16.17 Time: 12:30

Notes: none

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1 X _____

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.31

Reference Point (description): @ Staff gauge

Water Quality Measurements

Temperature (°C) 10.1

Specific Conductivity (µs/cm) 182.7

Dissolved Oxygen (mg/L) 11.16

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB MM

Sample Date: 5-15-17

Sample Time: 19:15

PDT

SITE

ID: MONMN-20170515

Base Flow or Storm Event?

Field Filtered Time: 19:20

FST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Water Quality Sampling

Sample ID: MONMN20170515

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear

Color: none

Odor: none

Sheen: none

Floatables: none

LABORATORY DELIVERY

Date: _____

Time: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: rainy, 49°

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1 _____

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.05

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 11.1

Specific Conductivity (µs/cm) 157.5

Dissolved Oxygen (mg/L) 10.57

Quality Assurance

Checked By: VW

Signature: [Signature]

Date Checked: 5-16-17

Time: 12:30

Data Entered into Database? YES NO

initials: VW

Date Entered: 5-16-17

Time: 12:30

Notes: none

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB · MM

Sample Date: 5.15.17

Sample Time: 19:30

PDT

SITE ID: MONMS-20150515

Base Flow or Storm Event?

Field Filtered Time: 19:35

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Water Quality Sampling

Sample ID: MONMS 20150515

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input type="checkbox"/>

* field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear

Color: none

Odor: none

Sheen: none

Floatables: none

LABORATORY DELIVERY

Date: _____

Time: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: rainy, 49°

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1 _____

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.70

Reference Point (description): vault

Water Quality Measurements

Temperature (°C) 11.0

Specific Conductivity (µs/cm) ~~200.7~~ 296.5

Dissolved Oxygen (mg/L) ~~10.02~~ 8.13

Quality Assurance

Checked By: VW

Signature: VW

Date Checked: 5.16.17

Time: 12:30

Data Entered into Database? YES NO

initials: VW

Date Entered: 5.16.17

Time: 12:30

Notes: None

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB MM

Sample Date: 5-15-17

Sample Time: 19:50

PDT:

SITE

ID: MONM-20170815

Base Flow or Storm Event?

Field Filtered Time: 19:55

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Water Quality Sampling

Sample ID: MONM20170515

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: VW

Signature: VW

Date Checked: 5-16-17

Time: 12:30

Data Entered into Database?

YES NO initials: VW

Date Entered: 5-16-17

Time: 12:30

Notes: none

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: rainy 49°

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____

YSI Pro Plus (15D100020) _____

YSI DSS 1 _____

YSI DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): NA

Reference Point (description): NA

Water Quality Measurements

Temperature (°C) 10.7

Conductivity (µs/cm) 191.7

Dissolved Oxygen (mg/L) 10.95

5

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: KW + VW

Sample Date: 5.15.17

Sample Time: 19:50

PDT

SITE ID: SEIMN

Base Flow or Storm Event?

Field Filtered Time: 19:50

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study



Water Quality Sampling

Sample ID: SEIMN20170515

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NO
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	
* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump					

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: Clear
Color: NO color
Odor: None
Sheen: None
Floatables: None

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: VW Signature: [Signature]
Date Checked: 5.15.17 Time: 12:30
Data Entered into Database? YES NO initials: VW
Date Entered: 5.16.17 Time: 12:30
Notes: None

Current Weather and Temp:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

YSI Pro DSS #1A

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 7 9/16 inches

Reference Point (description): top of bolt down

Water Quality Measurements

Temperature (°C) 9.5

Conductivity (µs/cm) 63.3

Dissolved Oxygen (mg/l.) ~~11.18~~ 11.18

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB + MM

Sample Date: 5-15-17

Sample Time: 20:35

SITE ID: SEIMS-20170515

Base Flow or Storm Event? (circled)

Field Filtered Time: 20:40

(Must filter within 15 minutes of collection)

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: rainy, 49°

Water Quality Sampling

Sample ID: SEIMS2070515

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M11466)
YSI Pro Plus (15D100020)
YSI DPS #2 X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.83
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 9.3
 Conductivity (µs/cm) 97.6
 Dissolved Oxygen (mg/L) 10.80

Quality Assurance

Checked By: VW Signature: [Signature]
 Date Checked: 5-16-17 Time: 12:30
 Data Entered into Database? (YES) NO initials: VW
 Date Entered: 5-16-17 Time: 12:30
 Notes: None

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: KW + VW

Sample Date: 5-15-17

Sample Time: 17:30

PDT:

SITE ID: TOSMI

Base Flow or Storm Event?

Field Filtered Time: 17:30

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 49°F + light rain

Water Quality Sampling

Sample ID: TOSMI20170515

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NO
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: light turbidity

Color: grey

Odor: no

Sheen: no

Floatables: wraper on log

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: VW

Signature: VW

Date Checked: 5-16-17

Time: 12:30

Data Entered into Database?

YES

NO

initials: VW

Date Entered: 5-16-17

Time: 12:30

Notes: None

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1 _____

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 6.79

Reference Point (description): @ Staff gauge

Water Quality Measurements

Temperature (°C) 11.5

Specific Conductivity (µs/cm) 178.3

Dissolved Oxygen (mg/L) 10.57

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: BB + MM

Sample Date: 5-15-17

Sample Time: 17:45

PDT

SITE ID: TOSMO 20170515

Base Flow or Storm Event?

Field Filtered Time: 17:50

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain 48°F

Water Quality Sampling

Sample ID: TOSMO20170515

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: none
 Sheen: none
 Floatables: suspended sediment

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: VW Signature: [Signature]
 Date Checked: 5-16-17 Time: 12:30
 Data Entered into Database? YES NO Initials: VW
 Date Entered: 5-16-17 Time: 12:30
 Notes: None

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.63
 Reference Point (description): S4

Water Quality Measurements

Temperature (°C) 10.4
 Specific Conductivity (µs/cm) ~~75.7~~ 225.0
 Dissolved Oxygen (mg/L) 11.05

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB MM

Sample Date: 5-15-17

Sample Time: 10:50

PDT:

SITE

ID: TYLMI-20170515

Base Flow or Storm Event?

Field Filtered Time: 10:55

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: raining, 49°

Water Quality Sampling

Sample ID: TYLMI20170515

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear

Color: none

Odor: none

Sheen: none

Floatables: suspended sediment

LABORATORY DELIVERY

Date: _____

Time: _____

Quality Assurance

Checked By: VW

Signature: [Signature]

Date Checked: 5-16-17

Time: 12:30

Data Entered into Database? YES NO

initials: VW

Date Entered: 5-16-17

Time: 12:30

Notes: None

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1 _____

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.50

Reference Point (description): top of culvert down

Water Quality Measurements

Temperature (°C) 11.1

Specific Conductivity (µs/cm) 200.7

Dissolved Oxygen (mg/L) 10.24

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: BB MM
 Sample Date: 5.15.17 Sample Time: 18:25 PDT
 Base Flow or Storm Even? Field Filtered Time: 18:30 PST
(Must filter within 15 minutes of collection)

SITE ID: TYLMO-20170515
 Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain 84°F

Water Quality Sampling

Sample ID: TYLMO20170515

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>yes</u>
DOC *	HDPE	250 ml	1	HCL	<u>yes</u>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>yes</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: GA28-20170515 18:30
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: turbid
 Color: brown
 Odor: none
 Sheen: none
 Floatables: lots of suspended sediment

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: VW Signature: VW
 Date Checked: 5.16.17 Time: 12:30
 Data Entered into Database? YES NO Initials: VW
 Date Entered: 5.16.17 Time: 12:30
 Notes: MM

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)
YSI Pro DSS 1
YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.74
 Reference Point (description): top of culvert down

Water Quality Measurements

Temperature (°C) 11.1
 Specific Conductivity (µs/cm) 153.5
 Dissolved Oxygen (mg/L) 10.57



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Sample Date/Sample ID: 5/15/2017 / All sites, 1 FD (QA28) at TYLMO

By G. Catarra

Date 6/13/2017 Page 1 of 2

Checked: initials JL

date 7/14/17

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	3	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	108	±20	3	≤25	24	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	2	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	0	≤25	18	≤25	OK	NONE
Hardness	OK / SM 2340B	NA	NA	8	≤180	≤1.0 mg/L 1.0 mg/L	105,104	±25	105	±15	3	≤20	22	≤20	OK	FLAG TYLMO "J" DUE TO FIELD DUP EXCEEDANCE
DOC	OK / SM 5310B	<15	≤15	7	≤28	≤1.0 mg/L 1.0 mg/L	102	±25	106	±15	1	≤20	12	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	4	≤28	≤0.01 mg/L 0.01 mg/L	98	±25	94	±20	4	≤20	15	≤20	OK	NONE
Total Nitrogen (TKN + N+N)	OK/ SM 4500 N-B	NA	NA	17,16	≤28	≤0.1 mg/L 0.1 mg/L	97-100	±25	95-100	±20	12,18, 0	≤20	106 (TKN), 6.3(N+N)	≤20	OK	FLAG TKN FOR TYLMO "J" DUE TO FIELD DUP EXCEEDANCE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 6/13/2017 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 5/15/2017 / All sites, 1 FD (QA28) at TYLMO

date 7/14/17

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	8	≤180	≤1.0 µg/L 1.0 µg/L	96,93	±25	NR	±15	NC	≤20	42	≤20	OK	FLAG TYLMO "J" DUE TO FIELD DUP EXCEEDANCE
Total Zinc	OK/ EPA 200.8	NA	NA	8	≤180	≤5.0 µg/L 5.0 µg/L	103,105	±25	NR	±15	NC	≤20	71	≤20	OK	FLAG TYLMO "J" DUE TO FIELD DUP EXCEEDANCE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	7	≤180	≤1.0 µg/L 1.0 µg/L	88,90	±25	NR	±15	3	≤20	D=1.5	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	7	≤180	≤5.0 µg/L 5.0 µg/L	96,96	±25	NR	±15	0	≤20	D=0.3	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	23,23	≤35	50	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

June 29, 2017

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1706-104

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on June 8, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular flourish.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 29, 2017
Samples Submitted: June 8, 2017
Laboratory Reference: 1706-104
Project: 14-05806-000

Case Narrative

Samples were collected on June 8, 2017 and received by the laboratory on June 8, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170608					
Laboratory ID:	06-104-01					
Total Suspended Solids	3.2	1.0	SM 2540D	6-12-17	6-13-17	

Client ID:	COUMI-20170608					
Laboratory ID:	06-104-02					
Total Suspended Solids	37	1.7	SM 2540D	6-12-17	6-13-17	

Client ID:	COUMO-20170608					
Laboratory ID:	06-104-03					
Total Suspended Solids	17	1.7	SM 2540D	6-12-17	6-13-17	

Client ID:	EVAMS-20170608					
Laboratory ID:	06-104-04					
Total Suspended Solids	12	1.0	SM 2540D	6-12-17	6-13-17	

Client ID:	EVALSS-20170608					
Laboratory ID:	06-104-05					
Total Suspended Solids	13	1.0	SM 2540D	6-12-17	6-13-17	

Client ID:	MONMN-20170608					
Laboratory ID:	06-104-06					
Total Suspended Solids	8.2	1.0	SM 2540D	6-12-17	6-13-17	

Client ID:	MONMS-20170608					
Laboratory ID:	06-104-07					
Total Suspended Solids	3.8	1.0	SM 2540D	6-12-17	6-13-17	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170608					
Laboratory ID:	06-104-08					
Total Suspended Solids	15	1.0	SM 2540D	6-12-17	6-13-17	

Client ID:	SEIMN-20170608					
Laboratory ID:	06-104-09					
Total Suspended Solids	38	1.0	SM 2540D	6-12-17	6-13-17	

Client ID:	SEIMS-20170608					
Laboratory ID:	06-104-10					
Total Suspended Solids	31	1.0	SM 2540D	6-12-17	6-13-17	

Client ID:	TOSMI-20170608					
Laboratory ID:	06-104-11					
Total Suspended Solids	74	1.7	SM 2540D	6-12-17	6-13-17	

Client ID:	TOSMO-20170608					
Laboratory ID:	06-104-12					
Total Suspended Solids	47	1.7	SM 2540D	6-12-17	6-13-17	

Client ID:	TYLMI-20170608					
Laboratory ID:	06-104-13					
Total Suspended Solids	16	1.0	SM 2540D	6-12-17	6-13-17	

Client ID:	TYLMO-20170608					
Laboratory ID:	06-104-14					
Total Suspended Solids	11	1.0	SM 2540D	6-12-17	6-13-17	



Date of Report: June 29, 2017
Samples Submitted: June 8, 2017
Laboratory Reference: 1706-104
Project: 14-05806-000

TOTAL SUSPENDED SOLIDS
SM 2540D

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA29-20170608					
Laboratory ID:	06-104-15					
Total Suspended Solids	3.2	1.0	SM 2540D	6-12-17	6-13-17	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0612W1					
Total Suspended Solids	ND	1.0	SM 2540D	6-12-17	6-13-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-104-08							
	ORIG	DUP						
Total Suspended Solids	15.0	15.4	NA	NA	NA	3	20	

SPIKE BLANK								
Laboratory ID:	SB0612W1							
	SB	SB		SB				
Total Suspended Solids	97.0	100	NA	97	78-113	NA	NA	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170608					
Laboratory ID:	06-104-01					
Turbidity	2.2	0.10	EPA 180.1	6-9-17	6-9-17	

Client ID:	COUMI-20170608					
Laboratory ID:	06-104-02					
Turbidity	21	0.10	EPA 180.1	6-9-17	6-9-17	

Client ID:	COUMO-20170608					
Laboratory ID:	06-104-03					
Turbidity	8.2	0.10	EPA 180.1	6-9-17	6-9-17	

Client ID:	EVAMS-20170608					
Laboratory ID:	06-104-04					
Turbidity	6.4	0.10	EPA 180.1	6-9-17	6-9-17	

Client ID:	EVALSS-20170608					
Laboratory ID:	06-104-05					
Turbidity	5.0	0.10	EPA 180.1	6-9-17	6-9-17	

Client ID:	MONMN-20170608					
Laboratory ID:	06-104-06					
Turbidity	3.7	0.10	EPA 180.1	6-9-17	6-9-17	

Client ID:	MONMS-20170608					
Laboratory ID:	06-104-07					
Turbidity	4.7	0.10	EPA 180.1	6-9-17	6-9-17	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170608					
Laboratory ID:	06-104-08					
Turbidity	5.2	0.10	EPA 180.1	6-9-17	6-9-17	

Client ID:	SEIMN-20170608					
Laboratory ID:	06-104-09					
Turbidity	15	0.10	EPA 180.1	6-9-17	6-9-17	

Client ID:	SEIMS-20170608					
Laboratory ID:	06-104-10					
Turbidity	14	0.10	EPA 180.1	6-9-17	6-9-17	

Client ID:	TOSMI-20170608					
Laboratory ID:	06-104-11					
Turbidity	19	0.10	EPA 180.1	6-9-17	6-9-17	

Client ID:	TOSMO-20170608					
Laboratory ID:	06-104-12					
Turbidity	6.9	0.10	EPA 180.1	6-9-17	6-9-17	

Client ID:	TYLMI-20170608					
Laboratory ID:	06-104-13					
Turbidity	7.2	0.10	EPA 180.1	6-9-17	6-9-17	

Client ID:	TYLMO-20170608					
Laboratory ID:	06-104-14					
Turbidity	7.1	0.10	EPA 180.1	6-9-17	6-9-17	



Date of Report: June 29, 2017
Samples Submitted: June 8, 2017
Laboratory Reference: 1706-104
Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA29-20170608					
Laboratory ID:	06-104-15					
Turbidity	3.7	0.10	EPA 180.1	6-9-17	6-9-17	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
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 Project: 14-05806-000

**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0609W1					
Turbidity	ND	0.10	EPA 180.1	6-9-17	6-9-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-104-01							
	ORIG	DUP						
Turbidity	2.18	2.19	NA	NA	NA	NA	0	15



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170608					
Laboratory ID:	06-104-01					
Hardness	14	1.0	200.7/SM 2340B	6-12-17	6-12-17	

Client ID:	COUMI-20170608					
Laboratory ID:	06-104-02					
Hardness	130	1.0	200.7/SM 2340B	6-12-17	6-12-17	

Client ID:	COUMO-20170608					
Laboratory ID:	06-104-03					
Hardness	100	1.0	200.7/SM 2340B	6-12-17	6-12-17	

Client ID:	EVAMS-20170608					
Laboratory ID:	06-104-04					
Hardness	91	1.0	200.7/SM 2340B	6-12-17	6-12-17	

Client ID:	EVALSS-20170608					
Laboratory ID:	06-104-05					
Hardness	85	1.0	200.7/SM 2340B	6-12-17	6-12-17	

Client ID:	MONMN-20170608					
Laboratory ID:	06-104-06					
Hardness	73	1.0	200.7/SM 2340B	6-12-17	6-12-17	

Client ID:	MONMS-20170608					
Laboratory ID:	06-104-07					
Hardness	120	1.0	200.7/SM 2340B	6-12-17	6-12-17	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170608					
Laboratory ID:	06-104-08					
Hardness	95	1.0	200.7/SM 2340B	6-12-17	6-12-17	

Client ID:	SEIMN-20170608					
Laboratory ID:	06-104-09					
Hardness	38	1.0	200.7/SM 2340B	6-12-17	6-12-17	

Client ID:	SEIMS-20170608					
Laboratory ID:	06-104-10					
Hardness	49	1.0	200.7/SM 2340B	6-12-17	6-12-17	

Client ID:	TOSMI-20170608					
Laboratory ID:	06-104-11					
Hardness	52	1.0	200.7/SM 2340B	6-12-17	6-12-17	

Client ID:	TOSMO-20170608					
Laboratory ID:	06-104-12					
Hardness	83	1.0	200.7/SM 2340B	6-12-17	6-12-17	

Client ID:	TYLMI-20170608					
Laboratory ID:	06-104-13					
Hardness	110	1.0	200.7/SM 2340B	6-12-17	6-12-17	

Client ID:	TYLMO-20170608					
Laboratory ID:	06-104-14					
Hardness	64	1.0	200.7/SM 2340B	6-12-17	6-12-17	



Date of Report: June 29, 2017
Samples Submitted: June 8, 2017
Laboratory Reference: 1706-104
Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA29-20170608					
Laboratory ID:	06-104-15					
Hardness	120	1.0	200.7/SM 2340B	6-12-17	6-12-17	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B
QUALITY CONTROL

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0612WH1					
Hardness	ND	1.0	200.7/SM 2340B	6-12-17	6-12-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-104-01							
	ORIG	DUP						
Hardness	14.0	14.4	NA	NA	NA	3	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	06-104-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	156	154	132	132	14.0	108	106	75-125	1	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK								
Laboratory ID:	SB0612WH1							
	SB	SB			SB			
Hardness	137	132	NA	104	80-120	NA	NA	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170608					
Laboratory ID:	06-104-01					
Dissolved Organic Carbon	13	1.0	SM 5310B	6-15-17	6-15-17	

Client ID:	COUMI-20170608					
Laboratory ID:	06-104-02					
Dissolved Organic Carbon	7.1	1.0	SM 5310B	6-15-17	6-15-17	

Client ID:	COUMO-20170608					
Laboratory ID:	06-104-03					
Dissolved Organic Carbon	9.4	1.0	SM 5310B	6-15-17	6-15-17	

Client ID:	EVAMS-20170608					
Laboratory ID:	06-104-04					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	6-15-17	6-15-17	

Client ID:	EVALSS-20170608					
Laboratory ID:	06-104-05					
Dissolved Organic Carbon	3.2	1.0	SM 5310B	6-15-17	6-15-17	

Client ID:	MONMN-20170608					
Laboratory ID:	06-104-06					
Dissolved Organic Carbon	4.3	1.0	SM 5310B	6-15-17	6-15-17	

Client ID:	MONMS-20170608					
Laboratory ID:	06-104-07					
Dissolved Organic Carbon	9.8	1.0	SM 5310B	6-15-17	6-15-17	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170608					
Laboratory ID:	06-104-08					
Dissolved Organic Carbon	5.0	1.0	SM 5310B	6-15-17	6-15-17	

Client ID:	SEIMN-20170608					
Laboratory ID:	06-104-09					
Dissolved Organic Carbon	3.6	1.0	SM 5310B	6-15-17	6-15-17	

Client ID:	SEIMS-20170608					
Laboratory ID:	06-104-10					
Dissolved Organic Carbon	5.1	1.0	SM 5310B	6-15-17	6-15-17	

Client ID:	TOSMI-20170608					
Laboratory ID:	06-104-11					
Dissolved Organic Carbon	15	1.0	SM 5310B	6-15-17	6-15-17	

Client ID:	TOSMO-20170608					
Laboratory ID:	06-104-12					
Dissolved Organic Carbon	11	1.0	SM 5310B	6-15-17	6-15-17	

Client ID:	TYLMI-20170608					
Laboratory ID:	06-104-13					
Dissolved Organic Carbon	3.2	1.0	SM 5310B	6-15-17	6-15-17	

Client ID:	TYLMO-20170608					
Laboratory ID:	06-104-14					
Dissolved Organic Carbon	9.0	1.0	SM 5310B	6-15-17	6-15-17	



Date of Report: June 29, 2017
Samples Submitted: June 8, 2017
Laboratory Reference: 1706-104
Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA29-20170608					
Laboratory ID:	06-104-15					
Dissolved Organic Carbon	9.8	1.0	SM 5310B	6-15-17	6-15-17	

Client ID:	QA30-20170608					
Laboratory ID:	06-104-16					
Dissolved Organic Carbon	ND	1.0	SM 5310B	6-15-17	6-15-17	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0615D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	6-15-17	6-15-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-104-01							
	ORIG	DUP						
Dissolved Organic Carbon	12.9	14.0	NA	NA	NA	8	20	

MATRIX SPIKE

Laboratory ID:	06-104-01							
	MS	MS		MS				
Dissolved Organic Carbon	23.5	10.0	12.9	106	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0615D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.5	10.0	NA	105	75-125	NA	NA	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170608					
Laboratory ID:	06-104-01					
Total Phosphorus	0.043	0.010	EPA 365.1	6-14-17	6-14-17	

Client ID:	COUMI-20170608					
Laboratory ID:	06-104-02					
Total Phosphorus	0.14	0.010	EPA 365.1	6-14-17	6-14-17	

Client ID:	COUMO-20170608					
Laboratory ID:	06-104-03					
Total Phosphorus	0.098	0.010	EPA 365.1	6-14-17	6-14-17	

Client ID:	EVAMS-20170608					
Laboratory ID:	06-104-04					
Total Phosphorus	0.025	0.010	EPA 365.1	6-14-17	6-14-17	

Client ID:	EVALSS-20170608					
Laboratory ID:	06-104-05					
Total Phosphorus	0.024	0.010	EPA 365.1	6-14-17	6-14-17	

Client ID:	MONMN-20170608					
Laboratory ID:	06-104-06					
Total Phosphorus	0.071	0.010	EPA 365.1	6-14-17	6-14-17	

Client ID:	MONMS-20170608					
Laboratory ID:	06-104-07					
Total Phosphorus	0.037	0.010	EPA 365.1	6-14-17	6-14-17	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170608					
Laboratory ID:	06-104-08					
Total Phosphorus	0.048	0.010	EPA 365.1	6-14-17	6-14-17	

Client ID:	SEIMN-20170608					
Laboratory ID:	06-104-09					
Total Phosphorus	0.052	0.010	EPA 365.1	6-14-17	6-14-17	

Client ID:	SEIMS-20170608					
Laboratory ID:	06-104-10					
Total Phosphorus	0.066	0.010	EPA 365.1	6-14-17	6-14-17	

Client ID:	TOSMI-20170608					
Laboratory ID:	06-104-11					
Total Phosphorus	0.13	0.010	EPA 365.1	6-14-17	6-14-17	

Client ID:	TOSMO-20170608					
Laboratory ID:	06-104-12					
Total Phosphorus	0.11	0.010	EPA 365.1	6-14-17	6-14-17	

Client ID:	TYLMI-20170608					
Laboratory ID:	06-104-13					
Total Phosphorus	0.060	0.010	EPA 365.1	6-14-17	6-14-17	

Client ID:	TYLMO-20170608					
Laboratory ID:	06-104-14					
Total Phosphorus	0.070	0.010	EPA 365.1	6-14-17	6-14-17	



Date of Report: June 29, 2017
Samples Submitted: June 8, 2017
Laboratory Reference: 1706-104
Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA29-20170608					
Laboratory ID:	06-104-15					
Total Phosphorus	0.037	0.010	EPA 365.1	6-14-17	6-14-17	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0614W1					
Total Phosphorus	ND	0.010	EPA 365.1	6-14-17	6-14-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-104-01							
	ORIG	DUP						
Total Phosphorus	0.0431	0.0426	NA	NA	NA	NA	1	11

MATRIX SPIKE								
Laboratory ID:	06-104-01							
	MS	MS		MS				
Total Phosphorus	0.301	0.250	0.0431	103	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0614W1							
	SB	SB		SB				
Total Phosphorus	0.236	0.250	NA	94	86-111	NA	NA	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 06-104-01						
Client ID: COLM-20170608						
Copper	ND	1.0	200.8	6-13-17	6-14-17	
Zinc	ND	5.0	200.8	6-13-17	6-14-17	
Lab ID: 06-104-02						
Client ID: COUMI-20170608						
Copper	7.2	1.0	200.8	6-13-17	6-14-17	
Zinc	51	5.0	200.8	6-13-17	6-14-17	
Lab ID: 06-104-03						
Client ID: COUMO-20170608						
Copper	7.5	1.0	200.8	6-13-17	6-14-17	
Zinc	23	5.0	200.8	6-13-17	6-14-17	
Lab ID: 06-104-04						
Client ID: EVAMS-20170608						
Copper	ND	1.0	200.8	6-13-17	6-14-17	
Zinc	ND	5.0	200.8	6-13-17	6-14-17	
Lab ID: 06-104-05						
Client ID: EVALSS-20170608						
Copper	1.4	1.0	200.8	6-13-17	6-14-17	
Zinc	ND	5.0	200.8	6-13-17	6-14-17	
Lab ID: 06-104-06						
Client ID: MONMN-20170608						
Copper	1.3	1.0	200.8	6-13-17	6-14-17	
Zinc	5.2	5.0	200.8	6-13-17	6-14-17	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	06-104-07					
Client ID:	MONMS-20170608					
Copper	6.7	1.0	200.8	6-13-17	6-14-17	
Zinc	5.5	5.0	200.8	6-13-17	6-14-17	
Lab ID:	06-104-08					
Client ID:	MONM-20170608					
Copper	2.0	1.0	200.8	6-13-17	6-14-17	
Zinc	15	5.0	200.8	6-13-17	6-14-17	
Lab ID:	06-104-09					
Client ID:	SEIMN-20170608					
Copper	2.2	1.0	200.8	6-13-17	6-14-17	
Zinc	ND	5.0	200.8	6-13-17	6-14-17	
Lab ID:	06-104-10					
Client ID:	SEIMS-20170608					
Copper	1.3	1.0	200.8	6-13-17	6-14-17	
Zinc	ND	5.0	200.8	6-13-17	6-14-17	
Lab ID:	06-104-11					
Client ID:	TOSMI-20170608					
Copper	21	1.0	200.8	6-13-17	6-14-17	
Zinc	100	5.0	200.8	6-13-17	6-14-17	
Lab ID:	06-104-12					
Client ID:	TOSMO-20170608					
Copper	12	1.0	200.8	6-13-17	6-14-17	
Zinc	52	5.0	200.8	6-13-17	6-14-17	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	06-104-13					
Client ID:	TYLMI-20170608					
Copper	5.5	1.0	200.8	6-13-17	6-14-17	
Zinc	38	5.0	200.8	6-13-17	6-14-17	
Lab ID:	06-104-14					
Client ID:	TYLMO-20170608					
Copper	19	1.0	200.8	6-13-17	6-14-17	
Zinc	21	5.0	200.8	6-13-17	6-14-17	
Lab ID:	06-104-15					
Client ID:	QA29-20170608					
Copper	6.7	1.0	200.8	6-13-17	6-14-17	
Zinc	ND	5.0	200.8	6-13-17	6-14-17	



Date of Report: June 29, 2017
Samples Submitted: June 8, 2017
Laboratory Reference: 1706-104
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 6-13-17
Date Analyzed: 6-14-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0613WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: June 29, 2017
Samples Submitted: June 8, 2017
Laboratory Reference: 1706-104
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 6-13-17

Date Analyzed: 6-14-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 06-104-06

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	1.32	1.23	7	1.0	
Zinc	5.18	5.34	3	5.0	



Date of Report: January 6, 2017
 Samples Submitted: January 6, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 6-13-17

Date Analyzed: 6-14-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 06-104-06

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	104	102	107	106	3	
Zinc	100	115	110	118	113	2	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 06-104-01						
Client ID: COLM-20170608						
Copper	ND	1.0	200.8		6-14-17	
Zinc	ND	5.0	200.8		6-14-17	
Lab ID: 06-104-02						
Client ID: COUMI-20170608						
Copper	3.5	1.0	200.8		6-14-17	
Zinc	20	5.0	200.8		6-14-17	
Lab ID: 06-104-03						
Client ID: COUMO-20170608						
Copper	5.6	1.0	200.8		6-14-17	
Zinc	11	5.0	200.8		6-14-17	
Lab ID: 06-104-04						
Client ID: EVAMS-20170608						
Copper	ND	1.0	200.8		6-14-17	
Zinc	ND	5.0	200.8		6-14-17	
Lab ID: 06-104-05						
Client ID: EVALSS-20170608						
Copper	ND	1.0	200.8		6-14-17	
Zinc	ND	5.0	200.8		6-14-17	
Lab ID: 06-104-06						
Client ID: MONMN-20170608						
Copper	ND	1.0	200.8		6-14-17	
Zinc	ND	5.0	200.8		6-14-17	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	06-104-07					
Client ID:	MONMS-20170608					
Copper	5.1	1.0	200.8		6-14-17	
Zinc	ND	5.0	200.8		6-14-17	
Lab ID:	06-104-08					
Client ID:	MONM-20170608					
Copper	ND	1.0	200.8		6-14-17	
Zinc	6.1	5.0	200.8		6-14-17	
Lab ID:	06-104-09					
Client ID:	SEIMN-20170608					
Copper	ND	1.0	200.8		6-14-17	
Zinc	ND	5.0	200.8		6-14-17	
Lab ID:	06-104-10					
Client ID:	SEIMS-20170608					
Copper	ND	1.0	200.8		6-14-17	
Zinc	ND	5.0	200.8		6-14-17	
Lab ID:	06-104-11					
Client ID:	TOSMI-20170608					
Copper	13	1.0	200.8		6-14-17	
Zinc	41	5.0	200.8		6-14-17	
Lab ID:	06-104-12					
Client ID:	TOSMO-20170608					
Copper	7.4	1.0	200.8		6-14-17	
Zinc	17	5.0	200.8		6-14-17	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	06-104-13					
Client ID:	TYLMI-20170608					
Copper	3.0	1.0	200.8		6-14-17	
Zinc	16	5.0	200.8		6-14-17	
Lab ID:	06-104-14					
Client ID:	TYLMO-20170608					
Copper	15	1.0	200.8		6-14-17	
Zinc	9.6	5.0	200.8		6-14-17	
Lab ID:	06-104-15					
Client ID:	QA29-20170608					
Copper	5.4	1.0	200.8		6-14-17	
Zinc	ND	5.0	200.8		6-14-17	
Lab ID:	06-104-16					
Client ID:	QA30-20170608					
Copper	ND	1.0	200.8		6-14-17	
Zinc	ND	5.0	200.8		6-14-17	



Date of Report: June 29, 2017
Samples Submitted: June 8, 2017
Laboratory Reference: 1706-104
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 6-14-17
Matrix: Water
Units: ug/L (ppb)
Lab ID: MB0614D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: June 29, 2017
Samples Submitted: June 8, 2017
Laboratory Reference: 1706-104
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 6-14-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 06-104-16

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: June 29, 2017
 Samples Submitted: June 8, 2017
 Laboratory Reference: 1706-104
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 6-14-17

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 06-104-16

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	79.6	100	79.0	99	1	
Zinc	80.0	80.6	101	80.2	100	1	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

Jun 29 2017
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: BLAIR GOODROW

Dear BLAIR GOODROW:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20170608	Water	17-A008487	Micro, NUT
COUMI-20170608	Water	17-A008488	Micro, NUT
COUMO-20170608	Water	17-A008489	Micro, NUT
EVAMS-20170608	Water	17-A008490	Micro, NUT
EVALSS-20170608	Water	17-A008491	Micro, NUT
MONMN-20170608	Water	17-A008492	Micro, NUT
MONMS-20170608	Water	17-A008493	Micro, NUT
MONM-20170608	Water	17-A008494	Micro, NUT
SEIMN-20170608	Water	17-A008495	Micro, NUT
SEIMS-20170608	Water	17-A008496	Micro, NUT
TOSMI-20170608	Water	17-A008497	Micro, NUT
TOSMO-20170608	Water	17-A008498	Micro, NUT
TYLMI-20170608	Water	17-A008499	Micro, NUT
TYLMO-20170608	Water	17-A008500	Micro, NUT
QA-29-20170608	Water	17-A008501	Micro, NUT

Your samples were received on Thursday, June 8, 2017. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

Jun 29 2017
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 06-104

BACT = Bacteriological
CONV = Conventional

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



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Services*

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: BLAIR GOODROW
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
PO Number: 06-104
All results reported on an as received basis.

Date Received: 06/08/17
Date Reported: 6/29/17

AMTEST Identification Number 17-A008487
Client Identification COLM-20170608
Sampling Date 06/08/17, 09:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	90.	CFU/100 ml		1	SM 9222D	JM	06/08/17
Total Nitrogen (NOX&TKN)	0.92	mg/l		0.1			
Total Nitrogen (TKN)	0.834	mg/l		0.1	SM4500N	JC	06/28/17
Nitrate + Nitrite	0.089	mg/l		0.01	SM4500NO3	JC	06/20/17

AMTEST Identification Number 17-A008488
Client Identification COUMI-20170608
Sampling Date 06/08/17, 06:05

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2400	CFU/100 ml		1	SM 9222D	JM	06/08/17
Total Nitrogen (NOX&TKN)	1.32	mg/l		0.1			
Total Nitrogen (TKN)	0.853	mg/l		0.1	SM4500N	JC	06/28/17
Nitrate + Nitrite	0.47	mg/l		0.01	SM4500NO3	JC	06/20/17

AMTEST Identification Number 17-A008489
Client Identification COUMO-20170608
Sampling Date 06/08/17, 05:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2200	CFU/100 ml		1	SM 9222D	JM	06/08/17
Total Nitrogen (NOX&TKN)	1.65	mg/l		0.1			
Total Nitrogen (TKN)	0.962	mg/l		0.1	SM4500N	JC	06/28/17
Nitrate + Nitrite	0.69	mg/l		0.01	SM4500NO3	JC	06/20/17

AMTEST Identification Number 17-A008490
Client Identification EVAMS-20170608
Sampling Date 06/08/17, 06:55

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	370	CFU/100 ml		1	SM 9222D	JM	06/08/17
Total Nitrogen (NOX&TKN)	2.57	mg/l		0.1			
Total Nitrogen (TKN)	0.773	mg/l		0.1	SM4500N	JC	06/28/17
Nitrate + Nitrite	1.8	mg/l		0.01	SM4500NO3	JC	06/20/17

AMTEST Identification Number 17-A008491
Client Identification EVALSS-20170608
Sampling Date 06/08/17, 07:20

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	210	CFU/100 ml		1	SM 9222D	JM	06/08/17
Total Nitrogen (NOX&TKN)	2.13	mg/l		0.1			
Total Nitrogen (TKN)	0.633	mg/l		0.1	SM4500N	JC	06/28/17
Nitrate + Nitrite	1.5	mg/l		0.01	SM4500NO3	JC	06/20/17

AMTEST Identification Number 17-A008492
Client Identification MONMN-20170608
Sampling Date 06/08/17, 07:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1300	CFU/100 ml		1	SM 9222D	JM	06/08/17
Total Nitrogen (NOX&TKN)	1.08	mg/l		0.1			
Total Nitrogen (TKN)	0.676	mg/l		0.1	SM4500N	JC	06/28/17
Nitrate + Nitrite	0.40	mg/l		0.01	SM4500NO3	JC	06/20/17

AMTEST Identification Number 17-A008493
Client Identification MONMS-20170608
Sampling Date 06/08/17, 08:05

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	90.	CFU/100 ml		1	SM 9222D	JM	06/08/17
Total Nitrogen (NOX&TKN)	1.29	mg/l		0.1			
Total Nitrogen (TKN)	0.787	mg/l		0.1	SM4500N	JC	06/28/17
Nitrate + Nitrite	0.50	mg/l		0.01	SM4500NO3	JC	06/20/17

AMTEST Identification Number 17-A008494
Client Identification MONM-20170608
Sampling Date 06/08/17, 08:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	700	CFU/100 ml		1	SM 9222D	JM	06/08/17
Total Nitrogen (NOX&TKN)	0.84	mg/l		0.1			
Total Nitrogen (TKN)	0.522	mg/l		0.1	SM4500N	JC	06/28/17
Nitrate + Nitrite	0.32	mg/l		0.01	SM4500NO3	JC	06/20/17

AMTEST Identification Number 17-A008495
Client Identification SEIMN-20170608
Sampling Date 06/08/17, 08:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	370	CFU/100 ml		1	SM 9222D	JM	06/08/17
Total Nitrogen (NOX&TKN)	1.23	mg/l		0.1			
Total Nitrogen (TKN)	0.947	mg/l		0.1	SM4500N	JC	06/28/17
Nitrate + Nitrite	0.28	mg/l		0.01	SM4500NO3	JC	06/20/17

AMTEST Identification Number 17-A008496
Client Identification SEIMS-20170608
Sampling Date 06/08/17, 09:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	400	CFU/100 ml		1	SM 9222D	JM	06/08/17
Total Nitrogen (NOX&TKN)	1.12	mg/l		0.1			
Total Nitrogen (TKN)	0.888	mg/l		0.1	SM4500N	JC	06/28/17
Nitrate + Nitrite	0.23	mg/l		0.01	SM4500NO3	JC	06/20/17

AMTEST Identification Number 17-A008497
Client Identification TOSMI-20170608
Sampling Date 06/08/17, 06:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	3000	CFU/100 ml		1	SM 9222D	JM	06/08/17
Total Nitrogen (NOX&TKN)	5.02	mg/l		0.1			
Total Nitrogen (TKN)	4.20	mg/l		0.1	SM4500N	JC	06/28/17
Nitrate + Nitrite	0.82	mg/l		0.01	SM4500NO3	JC	06/20/17

AMTEST Identification Number 17-A008498
Client Identification TOSMO-20170608
Sampling Date 06/08/17, 06:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2400	CFU/100 ml		1	SM 9222D	JM	06/08/17
Total Nitrogen (NOX&TKN)	2.25	mg/l		0.1			
Total Nitrogen (TKN)	1.40	mg/l		0.1	SM4500N	JC	06/28/17
Nitrate + Nitrite	0.85	mg/l		0.01	SM4500NO3	JC	06/20/17

AMTEST Identification Number 17-A008499
Client Identification TYLMI-20170608
Sampling Date 06/08/17, 07:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	260	CFU/100 ml		1	SM 9222D	JM	06/08/17
Total Nitrogen (NOX&TKN)	1.99	mg/l		0.1			
Total Nitrogen (TKN)	0.790	mg/l		0.1	SM4500N	JC	06/28/17
Nitrate + Nitrite	1.2	mg/l		0.01	SM4500NO3	JC	06/20/17

AMTEST Identification Number 17-A008500
Client Identification TYLMO-20170608
Sampling Date 06/08/17, 06:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2600	CFU/100 ml		1	SM 9222D	JM	06/08/17
Total Nitrogen (NOX&TKN)	1.44	mg/l		0.1			
Total Nitrogen (TKN)	0.847	mg/l		0.1	SM4500N	JC	06/28/17
Nitrate + Nitrite	0.59	mg/l		0.01	SM4500NO3	JC	06/20/17

AMTEST Identification Number 17-A008501
Client Identification QA-29-20170608
Sampling Date 06/08/17, 07:05

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	70.	CFU/100 ml		1	SM 9222D	JM	06/08/17
Total Nitrogen (NOX&TKN)	1.25	mg/l		0.1			
Total Nitrogen (TKN)	0.761	mg/l		0.1	SM4500N	JC	06/28/17
Nitrate + Nitrite	0.49	mg/l		0.01	SM4500NO3	JC	06/20/17


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 17-A008487 to 17-A008501

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
17-A008487	Fecal Coliform	CFU/100 ml	90.	70.	25.
17-A008501	Fecal Coliform	CFU/100 ml	70.	50.	33.
17-A008492	Total Nitrogen (TKN)	mg/l	0.676	0.744	9.6
17-A008606	Total Nitrogen (TKN)	mg/l	5.40	5.20	3.8
17-A008199	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	
17-A008271	Nitrate + Nitrite	mg/l	0.41	0.41	0.00
17-A008374	Nitrate + Nitrite	mg/l	0.57	0.56	1.8
17-A008489	Nitrate + Nitrite	mg/l	0.69	0.68	1.5
17-A008501	Nitrate + Nitrite	mg/l	0.49	0.48	2.1
17-A008578	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
17-A008461	Total Nitrogen (TKN)	mg/l	0.195	2.30	2.00	105.25 %
17-A008492	Total Nitrogen (TKN)	mg/l	0.676	2.75	2.00	103.70 %
17-A008606	Total Nitrogen (TKN)	mg/l	5.40	15.1	10.0	97.00 %
17-A008199	Nitrate + Nitrite	mg/l	< 0.01	0.51	0.50	102.00 %
17-A008271	Nitrate + Nitrite	mg/l	0.41	0.92	0.50	102.00 %
17-A008374	Nitrate + Nitrite	mg/l	0.57	1.1	0.50	106.00 %
17-A008489	Nitrate + Nitrite	mg/l	0.69	1.2	0.50	102.00 %
17-A008501	Nitrate + Nitrite	mg/l	0.49	0.99	0.50	100.00 %
17-A008578	Nitrate + Nitrite	mg/l	< 0.01	0.51	0.50	102.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	1.00	1.02	102. %
Total Nitrogen (TKN)	mg/l	1.00	1.01	101. %
Nitrate + Nitrite	mg/l	0.50	0.51	102. %
Nitrate + Nitrite	mg/l	0.50	0.51	102. %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01

QC Summary for sample numbers: 17-A008487 to 17-A008501...

BLANKS continued....

ANALYTE	UNITS	RESULT
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 06-104

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20170608 8787	6/8/17	0900	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20170608 88	6/8/17	0605	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20170608 89	6/8/17	0545	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20170608 90	6/8/17	0655	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20170608 91	6/8/17	0720	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20170608 92	6/8/17	0740	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20170608 93	6/8/17	0805	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20170608 94	6/8/17	0830	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20170608 95	6/8/17	0815	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20170608 96	6/8/17	0900	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company		Date	Time	Comments/Special Instructions
Relinquished by:				6/8/17	3:15 PM	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:						
Relinquished by:						
Received by:				6/8/17	5:15	
Relinquished by:						
Received by:						



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

CHAIN OF CUSTODY

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No.

06-104

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2017 0608	6-8-17	9:00	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2017 0608		6:05	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2017 0608		5:45	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2017 0608		4:55	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2017 0608		7:20	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2017 0608		7:40	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2017 0608		8:05	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2017 0608		8:30	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2017 0608		8:15	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2017 0608		9:00	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2017 0608		6:00	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2017 0608		6:30	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2017 0608		7:15	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2017 0608		6:50	Water	7	X	X	X	X	X	X	X	X	X
15	QA 29-2017 0608		7:05	Water	7	X	X	X	X	X	X	X	X	X
16	QA 30-2017 0608		9:30	Water	2	X	X	X	X	X	X	X	X	X

Relinquished by M. Vannu Date 6-8-17 Received by [Signature] Date 6/8/17
 Firm Herrera Time 10:15 Firm OSE Time 10:15

Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Itner

CHAIN OF CUSTODY

Turnaround Requested:
 1 Day
 2 Day
 3 Day
 Standard

Laboratory No.

06-104

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2017 0608	6-8-17	9:00	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2017 0608		6:05	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2017 0608		5:45	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2017 0608		6:55	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2017 0608		7:20	Water	7	X	X	X	X	X	X	X	X	X
6	MONMI-2017 0608		7:40	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2017 0608		8:05	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2017 0608		8:30	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2017 0608		8:15	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2017 0608		9:00	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2017 0608		6:00	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2017 0608		6:30	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2017 0608		7:15	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2017 0608		6:50	Water	7	X	X	X	X	X	X	X	X	X
15	QA 29-2017 0608		7:05	Water	7	X	X	X	X	X	X	X	X	X
16	QA 30-2017 0608		9:50	Water	2	X	X	X	X	X	X	X	X	X

Relinquished by M. Herrera Date 6-8-17 Received by [Signature] Date 6/8/17
 Firm Herrera Time 10:15 Firm OSE Time 10:15
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	BB JMV		
Meter:	DSS #2		
Date/Time:	10/7/17 11:40		
Barometric Pressure Start of Day:	mmHg: 752.6	Time:	11:47
Barometric Pressure End of Day:	mmHg: 761.9	Time:	11:17

Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.



Conductivity Calibration Notes:
1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	6.0	0	23.0	
Conductivity (µS/cm)	1000	1,000	23.5	
Conductivity (µS/cm)	100.2	100	23.5	
DO % Saturation	104.4	100	23.0	

Dissolved Oxygen Calibration Notes:
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	4.7	0	23.5	
Conductivity (µS/cm)	101.7	100	23.8	
DO % Saturation	98.5	100	22.9	

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	BB JWA		
Meter:	PM PLUS		
Date/Time:	6/7/17 11:40		
Barometric Pressure Start of Day:	mmHg: 752.5	Time:	11:47
Barometric Pressure End of Day:	mmHg: 751.8	Time:	11:17

Calibration Procedures:

Rinse Multimeter Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	6.8	0	23.5	
Conductivity (µS/cm)	997	1,000	23.5	
Conductivity (µS/cm)	100.4	100	23.5	
DO % Saturation	85.1	100	23.1	Went to 99.5 after
POST Field Run CHECK				
Conductivity (µS/cm)	3.0	0	23.7	
Conductivity (µS/cm)	101.5	100	23.8	
DO % Saturation	122.4	100	22.6	

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: J. Mungert M. Celler
 Sample Date: 6/8/17 Sample Time: 9:00 PDT:
 Base Flow or Storm Event? Storm Field Filtered Time: 9:00 PST:

SITE ID: COLM
 Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: rainy, 60°

Water Quality Sampling

Sample ID: COLM20170608

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: light brown
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Sarah Lentz Signature: _____
 Date Checked: 6-17-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 5.46'
 Reference Point (description): gauge

Water Quality Measurements

Temperature (°C) 13.8
 Specific Conductivity (µs/cm) 36.7
 Dissolved Oxygen (mg/L) 7.71

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

20



Field Personnel: BB

Sample Date: 10-8-17 Sample Time: 10:05 PDT PST

Base Flow or Storm Event? Field Filtered Time: 10:10
(Must filter within 15 minutes of collection)

SITE ID: C00M1

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: rain 35°F

Water Quality Sampling

Sample ID: C00M1-20170608

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input checked="" type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input checked="" type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input checked="" type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear

Color: none

Odor: none

Sheen: none

Floatables: susp Sed

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: _____

Date Checked: 10-15-17 Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.70

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 13.1

Specific Conductivity (µs/cm) 204.6

Dissolved Oxygen (mg/L) 11.99

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: BB
 Sample Date: 6.8.17 Sample Time: 5:45 PDT:
 Base Flow or Storm Event? Field Filtered Time: 5:50 PST:
 (Must filter within 15 minutes of collection)

SITE ID: COUMO
 Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: Rain 55°F

Water Quality Sampling

Sample ID: COUMO-201701008

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: cloudy
 Color: none
 Odor: none
 Sheen: none
 Floatables: susp sed.

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 6-13-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI Pro Plus (15D100020)
 YSI Pro DSS 1
 YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 1.29
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 14.6
 Specific Conductivity (µs/cm) 216.4
 Dissolved Oxygen (mg/L) 11.56

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: J. Munger, M. Feller

SITE ID: EVAMS

Sample Date: 6/8/17 Sample Time: 6:55

PDT

Base Flow or Storm Event? Storm Field Filtered Time: 1:00

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: EVAMS20170608

Current Weather and Temp: rainy, 60°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear
 Color: light brown
 Odor: no
 Sheen: no
 Floatables: light foam

LABORATORY DELIVERY

Date: _____ Time: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1 _____

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.92'

Reference Point (description): gag

Water Quality Measurements

Temperature (°C) 17.7

Specific Conductivity (µs/cm) 216.2

Dissolved Oxygen (mg/L) 10.10

Quality Assurance

Checked By: John Lentz Signature: [Signature]

Date Checked: 6-13-17 Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: J. Mungery M. Keller
Sample Date: 6/18/17 **Sample Time:** 7:15 **PDT:**
Base Flow or Storm Event? Storm **Field Filtered Time:** 7:20 **PST:**
(Must filter within 15 minutes of collection)

SITE ID: EVALSS
Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study
Current Weather and Temp: rainy 60°F

Water Quality Sampling

Sample ID: EVALSS 20170608

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
Filter blank sample ID: _____
Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
Color: light yellow
Odor: no
Sheen: no
Floatables: no

LABORATORY DELIVERY

Date: _____ **Time:** _____

Quality Assurance

Checked By: John Leuth **Signature:** [Signature]
Date Checked: 6-13-17 **Time:** _____
Data Entered into Database? YES NO **initials:** _____
Date Entered: _____ **Time:** _____
Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
YSI Pro DSS 1 _____
YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): ~~25.8~~ (PVE) 2.29 FT (GAGE)
Reference Point (description): ~~PVC PIPE~~ SG

Water Quality Measurements

Temperature (°C) 13.0°
Specific Conductivity (µs/cm) 198.5
Dissolved Oxygen (mg/L) 10.36 mg/L

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: BB
 Sample Date: 6-8-17 Sample Time: 7:40 PDT:
 Base Flow or Storm Event? Field Filtered Time: 7:45 PST:
(Must filter within 15 minutes of collection)

SITE ID: MONMN
 Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: drizzle & 56°F

Water Quality Sampling

Sample ID: MONMN - 20170608

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 6-13-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.08
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 14.1
 Specific Conductivity (µs/cm) 182.1
 Dissolved Oxygen (mg/L) 10.96

a lot of large debris (wood) @ SG

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



HERRERA

Field Personnel: BB

SITE ID: MONMS

Sample Date: 6-8-17

Sample Time: 8:05

PDT: X

Base Flow or Storm Event? Storm

Field Filtered Time: 8:10

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: MONMS-20170608

Current Weather and Temp: Drizzle @ 50°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	Y
DOC *	HDPE	250 ml	1	HCL	Y
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	Y
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	Y
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	Y
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	Y
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QA29-20170608 / time @ 7:05

Filter blank sample ID: NA

Transfer blank sample ID: ~~NA~~ QA30-20170608 / time @ 9:30

Visual and Olfactory Conditions:

Clarity: clear
 Color: _____
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____

Time: _____

Quality Assurance

Checked By: John Leath

Signature: [Signature]

Date Checked: 6-13-17

Time: _____

Data Entered into Database? YES

YES

NO

initials: _____

Date Entered: _____

Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) X

YSI Pro DSS 1 _____

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): _____

Reference Point (description): no water level indicator available

Water Quality Measurements

Temperature (°C) 13.7

Specific Conductivity (µs/cm) 74.7

Dissolved Oxygen (mg/L) 7.23

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



HERRERA

Field Personnel: BK

Sample Date: 6-8-17

Sample Time: 8:30

PDT:

SITE ID: MONM

Base Flow or Storm Event? Storm

Field Filtered Time: 8:35

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: MONM-20170608

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear

Color: none

Odor: _____

Sheen: _____

Floatables: Susp Sed

LABORATORY DELIVERY

Date: _____

Time: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): NA

Reference Point (description): NA

Water Quality Measurements

Temperature (°C) 13.9

Specific Conductivity (µs/cm) 212.7

Dissolved Oxygen (mg/L) 11.01

Quality Assurance

Checked By: John Lenth Signature: [Signature]

Date Checked: 6-13-17 Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



HERRERA

Field Personnel: J. Munger, M. Geller

Sample Date: 6/8/17 Sample Time: 8:10

SITE ID: SEIMN
PDT:

Base Flow or Storm Event? Storm Field Filtered Time: 8:15
(Must filter within 15 minutes of collection)

PST: Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: rainy, 60°F

Water Quality Sampling

Sample ID: SEIMN 20170608

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
Filter blank sample ID: _____
Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
Color: clear
Odor: no
Sheen: no
Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
Date Checked: 6.13.17 Time: _____
Data Entered into Database? YES NO initials: _____
Date Entered: _____ Time: _____
Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
YSI Pro DSS 1 _____
YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 8.02" ~~8~~
Reference Point (description): from top of bolt

Water Quality Measurements

Temperature (°C) 11.5°C
Specific Conductivity (µs/cm) 931
Dissolved Oxygen (mg/L) 10.53

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 6.8.17 Sample Time: 9:00 PDT:
 Base Flow or Storm Event? Field Filtered Time: 9:05 PST:
(Must filter within 15 minutes of collection)

SITE ID: SEIMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: drizzling 56°F

Water Quality Sampling

Sample ID: SEIMS-20170608

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: cloudy
 Color: none
 Odor: none
 Sheen: none
 Floatables: susp sed.

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leach Signature: [Signature]
 Date Checked: 6.13.17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)
 YSI Pro DSS 1
 YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.86
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 11.9
 Specific Conductivity (µs/cm) 111.7
 Dissolved Oxygen (mg/L) 12.13

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: J. Montgomery M. Keller

Sample Date: 6/8/17

Sample Time: 6:05

PDT:

SITE ID: TOSM1 20170608

Base Flow or Storm Event? Storm

Field Filtered Time: 6:10

PST:

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rainy, 65

Water Quality Sampling

Sample ID: TOSM120170608

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear

Color: brownish

Odor: no

Sheen: no

Floatables: foam

LABORATORY DELIVERY

Date: _____

Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]

Date Checked: 6-13-17 Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1 _____

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): _____ (0.88 on gage)

Reference Point (description): _____ SG

Water Quality Measurements

Temperature (°C) 15.0

Specific Conductivity (µs/cm) 148.1

Dissolved Oxygen (mg/L) 9.7

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB

SITE ID: TOSMO

Sample Date: 6-8-17

Sample Time: 6:30

PDT: X

Base Flow or Storm Event?

Field Filtered Time: 6:35

PST:

(Must filter within 15 minutes of collection)

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Drizzle & 50°F

Water Quality Sampling

Sample ID: TOSMO-20170608

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>Y</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear

Color: none

Odor: none

Sheen: foam, no sheen

Floatables: susp. sed

LABORATORY DELIVERY

Date: _____

Time: _____

Quality Assurance

Checked By: John Lentz Signature: _____

Date Checked: 6-13-17 Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) X

YSI Pro DSS 1 _____

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.100

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 13.6

Specific Conductivity (µs/cm) 197.7

Dissolved Oxygen (mg/L) 12.31

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



HERRERA

Field Personnel: BB

Sample Date: 6-8-17

Sample Time: 7:15

PDT

SITE ID: TYLMI

Base Flow or Storm Event? Storm

Field Filtered Time: 7:20

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: TYLMI-20170608

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 6-13-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Current Weather and Temp: Rain 35.0°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.57
 Reference Point (description): top of culvert ↓

Water Quality Measurements

Temperature (°C) 13.3
 Specific Conductivity (µs/cm) 240.3
 Dissolved Oxygen (mg/L) 11.107

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BIB

Sample Date: 6-8-17

Sample Time: 6:50

PDT:

SITE

ID:

TYLMO

Base Flow or Storm Event?

Field Filtered Time: 6:55

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Water Quality Sampling

Sample ID:

TYLMO-20170608

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity:

clear

Color:

none

Odor:

Sheen:

Floatables:

susp sed.

LABORATORY DELIVERY

Date:

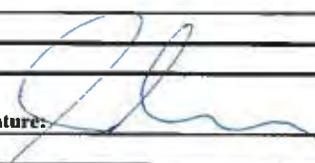
Time:

Quality Assurance

Checked By:

John Lynch

Signature:



Date Checked:

6-13-17

Time:

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain 3 56°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.80

Reference Point (description): top of culvert ↓

Water Quality Measurements

Temperature (°C) 14.4

Specific Conductivity (µs/cm) 147.3

Dissolved Oxygen (mg/L) 11.39

susp Sed high @ normal wQ station sampled to downstream, but upstream of culvert/weir



HERRERA



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Sample Date/Sample ID: 6/08/2017 / All sites, 1 FD (QA29) at MONMS, 1 FB (QA30)

By G. Catarra

Date 7/7/2017 Page 1 of 2

Checked: initials JL

date 7/14/14

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	5	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	97	±20	3	≤25	17	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	0	≤25	24	≤25	OK	NONE
Hardness	OK / SM 2340B	NA	NA	4	≤180	≤1.0 mg/L 1.0 mg/L	108,106	±25	104	±15	3	≤20	0	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	7	≤28	≤1.0 mg/L 1.0 mg/L	106	±25	105	±15	8	≤20	0	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	6	≤28	≤0.01 mg/L 0.01 mg/L	103	±25	94	±20	1	≤20	0	≤20	OK	NONE
Total Nitrogen (TKN + N+N)	OK/ SM 4500 N-B	NA	NA	12,20	≤28	≤0.1 mg/L 0.1 mg/L	104,102, 100	±25	100-102	±20	9.6, 1.5, 2.1	≤20	3.4 (TKN), 2.0 (N+N)	≤20	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 7/7/2017 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 6/08/2017 / All sites, 1 FD (QA29) at MONMS, 1 FB (QA30)

date 7/14/17

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	6	≤180	≤1.0 µg/L 1.0 µg/L	102,106	±25	NR	±15	7	≤20	0	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	6	≤180	≤5.0 µg/L 5.0 µg/L	110,113	±25	NR	±15	3	≤20	NC	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	6	≤180	≤1.0 µg/L 1.0 µg/L	100,99	±25	NR	±15	NC	≤20	5.7	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	6	≤180	≤5.0 µg/L 5.0 µg/L	101,100	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	<1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	25,33	≤35	25	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

July 10, 2017

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1706-182

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on June 15, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular flourish.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: July 10, 2017
Samples Submitted: June 15, 2017
Laboratory Reference: 1706-182
Project: 14-05806-000

Case Narrative

Samples were collected on June 15, 2017 and received by the laboratory on June 15, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
 Laboratory Reference: 1706-182
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170615					
Laboratory ID:	06-182-01					
Total Suspended Solids	5.4	1.0	SM 2540D	6-19-17	6-20-17	

Client ID:	COUMI-20170615					
Laboratory ID:	06-182-02					
Total Suspended Solids	240	2.5	SM 2540D	6-19-17	6-20-17	

Client ID:	COUMO-20170615					
Laboratory ID:	06-182-03					
Total Suspended Solids	120	2.5	SM 2540D	6-19-17	6-20-17	

Client ID:	EVAMS-20170615					
Laboratory ID:	06-182-04					
Total Suspended Solids	25	1.7	SM 2540D	6-19-17	6-20-17	

Client ID:	EVALSS-20170615					
Laboratory ID:	06-182-05					
Total Suspended Solids	27	1.0	SM 2540D	6-19-17	6-20-17	

Client ID:	MONMN-20170615					
Laboratory ID:	06-182-06					
Total Suspended Solids	31	1.7	SM 2540D	6-19-17	6-20-17	

Client ID:	MONMS-20170615					
Laboratory ID:	06-182-07					
Total Suspended Solids	9.6	1.0	SM 2540D	6-19-17	6-20-17	



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
 Laboratory Reference: 1706-182
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170615					
Laboratory ID:	06-182-08					
Total Suspended Solids	34	1.7	SM 2540D	6-19-17	6-20-17	

Client ID:	SEIMN-20170615					
Laboratory ID:	06-182-09					
Total Suspended Solids	28	1.0	SM 2540D	6-19-17	6-20-17	

Client ID:	SEIMS-20170615					
Laboratory ID:	06-182-10					
Total Suspended Solids	43	1.7	SM 2540D	6-19-17	6-20-17	

Client ID:	TOSMI-20170615					
Laboratory ID:	06-182-11					
Total Suspended Solids	380	5.0	SM 2540D	6-19-17	6-20-17	

Client ID:	TOSMO-20170615					
Laboratory ID:	06-182-12					
Total Suspended Solids	740	5.0	SM 2540D	6-19-17	6-20-17	

Client ID:	TYLMI-20170615					
Laboratory ID:	06-182-13					
Total Suspended Solids	31	1.0	SM 2540D	6-19-17	6-20-17	

Client ID:	TYLMO-20170615					
Laboratory ID:	06-182-14					
Total Suspended Solids	50	1.7	SM 2540D	6-19-17	6-20-17	



Date of Report: July 10, 2017
Samples Submitted: June 15, 2017
Laboratory Reference: 1706-182
Project: 14-05806-000

TOTAL SUSPENDED SOLIDS
SM 2540D

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-31-20170615					
Laboratory ID:	06-182-15					
Total Suspended Solids	27	1.0	SM 2540D	6-19-17	6-20-17	



Date of Report: July 10, 2017
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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0619W1					
Total Suspended Solids	ND	1.0	SM 2540D	6-19-17	6-20-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-182-04							
	ORIG	DUP						
Total Suspended Solids	24.7	23.7	NA	NA	NA	4	20	

SPIKE BLANK								
Laboratory ID:	SB0619W1							
	SB	SB		SB				
Total Suspended Solids	102	100	NA	102	78-113	NA	NA	



Date of Report: July 10, 2017
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 Laboratory Reference: 1706-182
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170615					
Laboratory ID:	06-182-01					
Turbidity	2.4	0.10	EPA 180.1	6-16-17	6-16-17	

Client ID:	COUMI-20170615					
Laboratory ID:	06-182-02					
Turbidity	53	0.10	EPA 180.1	6-16-17	6-16-17	

Client ID:	COUMO-20170615					
Laboratory ID:	06-182-03					
Turbidity	47	0.10	EPA 180.1	6-16-17	6-16-17	

Client ID:	EVAMS-20170615					
Laboratory ID:	06-182-04					
Turbidity	8.6	0.10	EPA 180.1	6-16-17	6-16-17	

Client ID:	EVALSS-20170615					
Laboratory ID:	06-182-05					
Turbidity	13	0.10	EPA 180.1	6-16-17	6-16-17	

Client ID:	MONMN-20170615					
Laboratory ID:	06-182-06					
Turbidity	47	0.10	EPA 180.1	6-16-17	6-16-17	

Client ID:	MONMS-20170615					
Laboratory ID:	06-182-07					
Turbidity	4.2	0.10	EPA 180.1	6-16-17	6-16-17	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170615					
Laboratory ID:	06-182-08					
Turbidity	27	0.10	EPA 180.1	6-16-17	6-16-17	

Client ID:	SEIMN-20170615					
Laboratory ID:	06-182-09					
Turbidity	3.0	0.10	EPA 180.1	6-16-17	6-16-17	

Client ID:	SEIMS-20170615					
Laboratory ID:	06-182-10					
Turbidity	23	0.10	EPA 180.1	6-16-17	6-16-17	

Client ID:	TOSMI-20170615					
Laboratory ID:	06-182-11					
Turbidity	95	0.10	EPA 180.1	6-16-17	6-16-17	

Client ID:	TOSMO-20170615					
Laboratory ID:	06-182-12					
Turbidity	260	0.10	EPA 180.1	6-16-17	6-16-17	

Client ID:	TYLMI-20170615					
Laboratory ID:	06-182-13					
Turbidity	12	0.10	EPA 180.1	6-16-17	6-16-17	

Client ID:	TYLMO-20170615					
Laboratory ID:	06-182-14					
Turbidity	31	0.10	EPA 180.1	6-16-17	6-16-17	



Date of Report: July 10, 2017
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Laboratory Reference: 1706-182
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TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-31-20170615					
Laboratory ID:	06-182-15					
Turbidity	11	0.10	EPA 180.1	6-16-17	6-16-17	



Date of Report: July 10, 2017
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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0616W1					
Turbidity	ND	0.10	EPA 180.1	6-16-17	6-16-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-182-01							
	ORIG	DUP						
Turbidity	2.42	2.43	NA	NA	NA	NA	0	15



Date of Report: July 10, 2017
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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170615					
Laboratory ID:	06-182-01					
Hardness	13	1.0	200.7/SM 2340B	6-19-17	6-19-17	

Client ID:	COUMI-20170615					
Laboratory ID:	06-182-02					
Hardness	82	1.0	200.7/SM 2340B	6-19-17	6-19-17	

Client ID:	COUMO-20170615					
Laboratory ID:	06-182-03					
Hardness	71	1.0	200.7/SM 2340B	6-19-17	6-19-17	

Client ID:	EVAMS-20170615					
Laboratory ID:	06-182-04					
Hardness	84	1.0	200.7/SM 2340B	6-19-17	6-19-17	

Client ID:	EVALSS-20170615					
Laboratory ID:	06-182-05					
Hardness	83	1.0	200.7/SM 2340B	6-19-17	6-19-17	

Client ID:	MONMN-20170615					
Laboratory ID:	06-182-06					
Hardness	70	1.0	200.7/SM 2340B	6-19-17	6-19-17	

Client ID:	MONMS-20170615					
Laboratory ID:	06-182-07					
Hardness	100	1.0	200.7/SM 2340B	6-19-17	6-19-17	



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
 Laboratory Reference: 1706-182
 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170615					
Laboratory ID:	06-182-08					
Hardness	75	1.0	200.7/SM 2340B	6-19-17	6-19-17	

Client ID:	SEIMN-20170615					
Laboratory ID:	06-182-09					
Hardness	36	1.0	200.7/SM 2340B	6-19-17	6-19-17	

Client ID:	SEIMS-20170615					
Laboratory ID:	06-182-10					
Hardness	45	1.0	200.7/SM 2340B	6-19-17	6-19-17	

Client ID:	TOSMI-20170615					
Laboratory ID:	06-182-11					
Hardness	49	1.0	200.7/SM 2340B	6-19-17	6-19-17	

Client ID:	TOSMO-20170615					
Laboratory ID:	06-182-12					
Hardness	120	1.0	200.7/SM 2340B	6-19-17	6-19-17	

Client ID:	TYLMI-20170615					
Laboratory ID:	06-182-13					
Hardness	100	1.0	200.7/SM 2340B	6-19-17	6-19-17	

Client ID:	TYLMO-20170615					
Laboratory ID:	06-182-14					
Hardness	28	1.0	200.7/SM 2340B	6-19-17	6-19-17	



Date of Report: July 10, 2017
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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-31-20170615					
Laboratory ID:	06-182-15					
Hardness	34	1.0	200.7/SM 2340B	6-19-17	6-19-17	



Date of Report: July 10, 2017
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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0619WH1					
Hardness	ND	1.0	200.7/SM 2340B	6-19-17	6-19-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-182-01							
	ORIG	DUP						
Hardness	13.1	12.9	NA	NA	NA	NA	2	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	06-182-01									
	MS	MSD	MS	MSD		MS	MSD			
Hardness	137	140	132	132	13.1	94	96	75-125	2	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
SPIKE BLANK										
Laboratory ID:	SB0619WH1									
	SB		SB			SB				
Hardness	123		132		NA	93		80-120	NA	NA



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
 Laboratory Reference: 1706-182
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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170615					
Laboratory ID:	06-182-01					
Dissolved Organic Carbon	14	1.0	SM 5310B	6-21-17	6-21-17	

Client ID:	COUMI-20170615					
Laboratory ID:	06-182-02					
Dissolved Organic Carbon	9.1	1.0	SM 5310B	6-21-17	6-21-17	

Client ID:	COUMO-20170615					
Laboratory ID:	06-182-03					
Dissolved Organic Carbon	12	1.0	SM 5310B	6-21-17	6-21-17	

Client ID:	EVAMS-20170615					
Laboratory ID:	06-182-04					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	6-21-17	6-21-17	

Client ID:	EVALSS-20170615					
Laboratory ID:	06-182-05					
Dissolved Organic Carbon	2.9	1.0	SM 5310B	6-21-17	6-21-17	

Client ID:	MONMN-20170615					
Laboratory ID:	06-182-06					
Dissolved Organic Carbon	6.5	1.0	SM 5310B	6-21-17	6-21-17	

Client ID:	MONMS-20170615					
Laboratory ID:	06-182-07					
Dissolved Organic Carbon	9.7	1.0	SM 5310B	6-21-17	6-21-17	



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
 Laboratory Reference: 1706-182
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170615					
Laboratory ID:	06-182-08					
Dissolved Organic Carbon	6.1	1.0	SM 5310B	6-21-17	6-21-17	

Client ID:	SEIMN-20170615					
Laboratory ID:	06-182-09					
Dissolved Organic Carbon	4.2	1.0	SM 5310B	6-21-17	6-21-17	

Client ID:	SEIMS-20170615					
Laboratory ID:	06-182-10					
Dissolved Organic Carbon	6.2	1.0	SM 5310B	6-21-17	6-21-17	

Client ID:	TOSMI-20170615					
Laboratory ID:	06-182-11					
Dissolved Organic Carbon	17	1.0	SM 5310B	6-21-17	6-21-17	

Client ID:	TOSMO-20170615					
Laboratory ID:	06-182-12					
Dissolved Organic Carbon	15	1.0	SM 5310B	6-21-17	6-21-17	

Client ID:	TYLMI-20170615					
Laboratory ID:	06-182-13					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	6-21-17	6-21-17	

Client ID:	TYLMO-20170615					
Laboratory ID:	06-182-14					
Dissolved Organic Carbon	7.5	1.0	SM 5310B	6-21-17	6-21-17	



Date of Report: July 10, 2017
Samples Submitted: June 15, 2017
Laboratory Reference: 1706-182
Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-31-20170615					
Laboratory ID:	06-182-15					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	6-21-17	6-21-17	



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
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 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0621D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	6-21-17	6-21-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-182-04							
	ORIG	DUP						
Dissolved Organic Carbon	3.94	3.94	NA	NA	NA	0	20	

MATRIX SPIKE

Laboratory ID:	06-182-04							
	MS	MS		MS				
Dissolved Organic Carbon	14.1	10.0	3.94	102	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0621D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.6	10.0	NA	106	75-125	NA	NA	



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
 Laboratory Reference: 1706-182
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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20170615					
Laboratory ID:	06-182-01					
Total Phosphorus	0.046	0.010	EPA 365.1	6-23-17	6-23-17	

Client ID:	COUMI-20170615					
Laboratory ID:	06-182-02					
Total Phosphorus	0.33	0.010	EPA 365.1	6-23-17	6-23-17	

Client ID:	COUMO-20170615					
Laboratory ID:	06-182-03					
Total Phosphorus	0.33	0.010	EPA 365.1	6-23-17	6-23-17	

Client ID:	EVAMS-20170615					
Laboratory ID:	06-182-04					
Total Phosphorus	0.042	0.010	EPA 365.1	6-23-17	6-23-17	

Client ID:	EVALSS-20170615					
Laboratory ID:	06-182-05					
Total Phosphorus	0.052	0.010	EPA 365.1	6-23-17	6-23-17	

Client ID:	MONMN-20170615					
Laboratory ID:	06-182-06					
Total Phosphorus	0.11	0.010	EPA 365.1	6-23-17	6-23-17	

Client ID:	MONMS-20170615					
Laboratory ID:	06-182-07					
Total Phosphorus	0.071	0.010	EPA 365.1	6-23-17	6-23-17	



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
 Laboratory Reference: 1706-182
 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20170615					
Laboratory ID:	06-182-08					
Total Phosphorus	0.086	0.010	EPA 365.1	6-23-17	6-23-17	

Client ID:	SEIMN-20170615					
Laboratory ID:	06-182-09					
Total Phosphorus	0.058	0.010	EPA 365.1	6-23-17	6-23-17	

Client ID:	SEIMS-20170615					
Laboratory ID:	06-182-10					
Total Phosphorus	0.081	0.010	EPA 365.1	6-23-17	6-23-17	

Client ID:	TOSMI-20170615					
Laboratory ID:	06-182-11					
Total Phosphorus	0.45	0.010	EPA 365.1	6-23-17	6-23-17	

Client ID:	TOSMO-20170615					
Laboratory ID:	06-182-12					
Total Phosphorus	0.73	0.010	EPA 365.1	6-23-17	6-23-17	

Client ID:	TYLMI-20170615					
Laboratory ID:	06-182-13					
Total Phosphorus	0.058	0.010	EPA 365.1	6-23-17	6-23-17	

Client ID:	TYLMO-20170615					
Laboratory ID:	06-182-14					
Total Phosphorus	0.15	0.010	EPA 365.1	6-23-17	6-23-17	



Date of Report: July 10, 2017
Samples Submitted: June 15, 2017
Laboratory Reference: 1706-182
Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-31-20170615					
Laboratory ID:	06-182-15					
Total Phosphorus	0.062	0.010	EPA 365.1	6-23-17	6-23-17	



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
 Laboratory Reference: 1706-182
 Project: 14-05806-000

**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0623W1					
Total Phosphorus	ND	0.010	EPA 365.1	6-23-17	6-23-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-182-01							
	ORIG	DUP						
Total Phosphorus	0.0461	0.0427	NA	NA	NA	8	11	

MATRIX SPIKE								
Laboratory ID:	06-182-01							
	MS	MS		MS				
Total Phosphorus	0.297	0.250	0.0461	100	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0623W1							
	SB	SB		SB				
Total Phosphorus	0.242	0.250	NA	97	86-111	NA	NA	



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
 Laboratory Reference: 1706-182
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 06-182-01						
Client ID: COLM-20170615						
Copper	ND	1.0	200.8	6-23-17	6-23-17	
Zinc	ND	5.0	200.8	6-23-17	6-23-17	
Lab ID: 06-182-02						
Client ID: COUMI-20170615						
Copper	15	1.0	200.8	6-23-17	6-23-17	
Zinc	100	5.0	200.8	6-23-17	6-23-17	
Lab ID: 06-182-03						
Client ID: COUMO-20170615						
Copper	16	1.0	200.8	6-23-17	6-23-17	
Zinc	88	5.0	200.8	6-23-17	6-23-17	
Lab ID: 06-182-04						
Client ID: EVAMS-20170615						
Copper	1.1	1.0	200.8	6-23-17	6-23-17	
Zinc	ND	5.0	200.8	6-23-17	6-23-17	
Lab ID: 06-182-05						
Client ID: EVALSS-20170615						
Copper	1.4	1.0	200.8	6-23-17	6-23-17	
Zinc	ND	5.0	200.8	6-23-17	6-23-17	
Lab ID: 06-182-06						
Client ID: MONMN-20170615						
Copper	6.5	1.0	200.8	6-23-17	6-23-17	
Zinc	12	5.0	200.8	6-23-17	6-23-17	



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
 Laboratory Reference: 1706-182
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	06-182-07					
Client ID:	MONMS-20170615					
Copper	5.5	1.0	200.8	6-23-17	6-23-17	
Zinc	6.0	5.0	200.8	6-23-17	6-23-17	
Lab ID:	06-182-08					
Client ID:	MONM-20170615					
Copper	2.4	1.0	200.8	6-23-17	6-23-17	
Zinc	36	5.0	200.8	6-23-17	6-23-17	
Lab ID:	06-182-09					
Client ID:	SEIMN-20170615					
Copper	1.1	1.0	200.8	6-23-17	6-23-17	
Zinc	ND	5.0	200.8	6-23-17	6-23-17	
Lab ID:	06-182-10					
Client ID:	SEIMS-20170615					
Copper	1.2	1.0	200.8	6-23-17	6-23-17	
Zinc	5.3	5.0	200.8	6-23-17	6-23-17	
Lab ID:	06-182-11					
Client ID:	TOSMI-20170615					
Copper	29	2.5	200.8	6-23-17	6-23-17	
Zinc	250	13	200.8	6-23-17	6-23-17	
Lab ID:	06-182-12					
Client ID:	TOSMO-20170615					
Copper	47	5.0	200.8	6-23-17	6-23-17	
Zinc	510	25	200.8	6-23-17	6-23-17	



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
 Laboratory Reference: 1706-182
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	06-182-13					
Client ID:	TYLMI-20170615					
Copper	6.1	1.0	200.8	6-23-17	6-23-17	
Zinc	36	5.0	200.8	6-23-17	6-23-17	
Lab ID:	06-182-14					
Client ID:	TYLMO-20170615					
Copper	16	1.0	200.8	6-23-17	6-23-17	
Zinc	40	5.0	200.8	6-23-17	6-23-17	
Lab ID:	06-182-15					
Client ID:	QA-31-20170615					
Copper	1.2	1.0	200.8	6-23-17	6-23-17	
Zinc	ND	5.0	200.8	6-23-17	6-23-17	



Date of Report: July 10, 2017
Samples Submitted: June 15, 2017
Laboratory Reference: 1706-182
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 6-23-17
Date Analyzed: 6-23-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0623WH2

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: July 10, 2017
Samples Submitted: June 15, 2017
Laboratory Reference: 1706-182
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 6-23-17

Date Analyzed: 6-23-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 06-182-15

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	1.20	1.21	1	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: January 6, 2017
 Samples Submitted: January 6, 2017
 Laboratory Reference: 1706-182
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 6-23-17

Date Analyzed: 6-23-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 06-182-15

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	94.2	93	101	100	7	
Zinc	100	94.8	95	100	100	5	



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
 Laboratory Reference: 1706-182
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 06-182-01						
Client ID: COLM-20170615						
Copper	ND	1.0	200.8		6-23-17	
Zinc	ND	5.0	200.8		6-23-17	
Lab ID: 06-182-02						
Client ID: COUMI-20170615						
Copper	5.5	1.0	200.8		6-23-17	
Zinc	9.5	5.0	200.8		6-23-17	
Lab ID: 06-182-03						
Client ID: COUMO-20170615						
Copper	6.7	1.0	200.8		6-23-17	
Zinc	11	5.0	200.8		6-23-17	
Lab ID: 06-182-04						
Client ID: EVAMS-20170615						
Copper	ND	1.0	200.8		6-23-17	
Zinc	ND	5.0	200.8		6-23-17	
Lab ID: 06-182-05						
Client ID: EVALSS-20170615						
Copper	ND	1.0	200.8		6-23-17	
Zinc	ND	5.0	200.8		6-23-17	
Lab ID: 06-182-06						
Client ID: MONMN-20170615						
Copper	ND	1.0	200.8		6-23-17	
Zinc	ND	5.0	200.8		6-23-17	



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
 Laboratory Reference: 1706-182
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	06-182-07					
Client ID:	MONMS-20170615					
Copper	4.2	1.0	200.8		6-23-17	
Zinc	ND	5.0	200.8		6-23-17	
Lab ID:	06-182-08					
Client ID:	MONM-20170615					
Copper	ND	1.0	200.8		6-23-17	
Zinc	12	5.0	200.8		6-23-17	
Lab ID:	06-182-09					
Client ID:	SEIMN-20170615					
Copper	ND	1.0	200.8		6-23-17	
Zinc	ND	5.0	200.8		6-23-17	
Lab ID:	06-182-10					
Client ID:	SEIMS-20170615					
Copper	ND	1.0	200.8		6-23-17	
Zinc	ND	5.0	200.8		6-23-17	
Lab ID:	06-182-11					
Client ID:	TOSMI-20170615					
Copper	8.6	1.0	200.8		6-23-17	
Zinc	64	5.0	200.8		6-23-17	
Lab ID:	06-182-12					
Client ID:	TOSMO-20170615					
Copper	6.5	1.0	200.8		6-23-17	
Zinc	20	5.0	200.8		6-23-17	



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
 Laboratory Reference: 1706-182
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	06-182-13					
Client ID:	TYLMI-20170615					
Copper	2.8	1.0	200.8		6-23-17	
Zinc	11	5.0	200.8		6-23-17	
Lab ID:	06-182-14					
Client ID:	TYLMO-20170615					
Copper	8.3	1.0	200.8		6-23-17	
Zinc	7.0	5.0	200.8		6-23-17	
Lab ID:	06-182-15					
Client ID:	QA-31-20170615					
Copper	ND	1.0	200.8		6-23-17	
Zinc	ND	5.0	200.8		6-23-17	



Date of Report: July 10, 2017
Samples Submitted: June 15, 2017
Laboratory Reference: 1706-182
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 6-23-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0623D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: July 10, 2017
Samples Submitted: June 15, 2017
Laboratory Reference: 1706-182
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 6-23-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 06-182-15

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: July 10, 2017
 Samples Submitted: June 15, 2017
 Laboratory Reference: 1706-182
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 6-23-17

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 06-182-15

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	71.6	90	69.2	87	3	
Zinc	80.0	75.0	94	73.8	92	2	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
 13600 NE 126TH PL
 Suite C
 Kirkland, WA 98034
 (425) 885-1664

**Professional
 Analytical
 Services**

Jul 9 2017
 On-Site Environmental
 14648 NE 95th ST
 Redmond, WA 98052
 Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20170615	Water	17-A009039	Micro, NUT
COUMI-20170615	Water	17-A009040	Micro, NUT
COUMO-20170615	Water	17-A009041	Micro, NUT
EVAMS-20170615	Water	17-A009042	Micro, NUT
EVALSS-20170615	Water	17-A009043	Micro, NUT
MONMN-20170615	Water	17-A009044	Micro, NUT
MONMS-20170615	Water	17-A009045	Micro, NUT
MONM-20170615	Water	17-A009046	Micro, NUT
SEIMN-20170615	Water	17-A009047	Micro, NUT
SEIMS-20170615	Water	17-A009048	Micro, NUT
TOSMI-20170615	Water	17-A009049	Micro, NUT
TOSMO-20170615	Water	17-A009050	Micro, NUT
TYLMI-20170615	Water	17-A009051	Micro, NUT
TYLMO-20170615	Water	17-A009052	Micro, NUT

Your samples were received on Friday, June 16, 2017. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


 Aaron W. Young
 Laboratory Manager

Project #: 14-05806-000
 PO Number: 06-182

BACT = Bacteriological
 CONV = Conventionals

MET = Metals
 ORG = Organics

NUT=Nutrients
 DEM=Demand

P.1
 MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



*Professional
Analytical
Services*

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
PO Number: 06-182
All results reported on an as received basis.

Date Received: 06/16/17
Date Reported: 7/ 9/17

AMTEST Identification Number 17-A009039
Client Identification COLM-20170615
Sampling Date 06/15/17, 16:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	480	CFU/100 ml		1	SM 9222D	NG	06/16/17
Total Nitrogen (NOX&TKN)	1.12	mg/l		0.1			
Total Nitrogen (TKN)	0.716	mg/l		0.1	SM4500N	SRW	07/05/17
Nitrate + Nitrite	0.40	mg/l		0.01	SM4500NO3	JC	06/29/17

AMTEST Identification Number 17-A009040
Client Identification COUMI-20170615
Sampling Date 06/15/17, 13:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	6100	CFU/100 ml		1	SM 9222D	NG	06/16/17
Total Nitrogen (NOX&TKN)	2.73	mg/l		0.1			
Total Nitrogen (TKN)	2.25	mg/l		0.1	SM4500N	SRW	07/05/17
Nitrate + Nitrite	0.48	mg/l		0.01	SM4500NO3	JC	06/29/17

AMTEST Identification Number 17-A009041
Client Identification COUMO-20170615
Sampling Date 06/15/17, 13:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	14000	CFU/100 ml		1	SM 9222D	NG	06/16/17
Total Nitrogen (NOX&TKN)	3.02	mg/l		0.1			
Total Nitrogen (TKN)	2.50	mg/l		0.1	SM4500N	SRW	07/05/17
Nitrate + Nitrite	0.52	mg/l		0.01	SM4500NO3	JC	06/29/17

AMTEST Identification Number 17-A009042
Client Identification EVAMS-20170615
Sampling Date 06/15/17, 14:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	600	CFU/100 ml		1	SM 9222D	NG	06/16/17
Total Nitrogen (NOX&TKN)	2.90	mg/l		0.1			
Total Nitrogen (TKN)	0.897	mg/l		0.1	SM4500N	SRW	07/05/17
Nitrate + Nitrite	2.0	mg/l		0.01	SM4500NO3	JC	06/29/17

AMTEST Identification Number 17-A009043
Client Identification EVALSS-20170615
Sampling Date 06/15/17, 14:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	940	CFU/100 ml		1	SM 9222D	NG	06/16/17
Total Nitrogen (NOX&TKN)	2.90	mg/l		0.1			
Total Nitrogen (TKN)	1.30	mg/l		0.1	SM4500N	SRW	07/05/17
Nitrate + Nitrite	1.6	mg/l		0.01	SM4500NO3	JC	06/29/17

AMTEST Identification Number 17-A009044
Client Identification MONMN-20170615
Sampling Date 06/15/17, 15:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1700	CFU/100 ml		1	SM 9222D	NG	06/16/17
Total Nitrogen (NOX&TKN)	1.08	mg/l		0.1			
Total Nitrogen (TKN)	0.765	mg/l		0.1	SM4500N	SRW	07/05/17
Nitrate + Nitrite	0.32	mg/l		0.01	SM4500NO3	JC	06/29/17

AMTEST Identification Number 17-A009045
Client Identification MONMS-20170615
Sampling Date 06/15/17, 15:35

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	760	CFU/100 ml		1	SM 9222D	NG	06/16/17
Total Nitrogen (NOX&TKN)	1.06	mg/l		0.1			
Total Nitrogen (TKN)	0.732	mg/l		0.1	SM4500N	SRW	07/05/17
Nitrate + Nitrite	0.33	mg/l		0.01	SM4500NO3	JC	06/29/17

AMTEST Identification Number 17-A009046
Client Identification MONM-20170615
Sampling Date 06/15/17, 16:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	800	CFU/100 ml		1	SM 9222D	NG	06/16/17
Total Nitrogen (NOX&TKN)	1.30	mg/l		0.1			
Total Nitrogen (TKN)	0.950	mg/l		0.1	SM4500N	SRW	07/05/17
Nitrate + Nitrite	0.35	mg/l		0.01	SM4500NO3	JC	06/29/17

AMTEST Identification Number 17-A009047
Client Identification SEIMN-20170615
Sampling Date 06/15/17, 13:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	520	CFU/100 ml		1	SM 9222D	NG	06/16/17
Total Nitrogen (NOX&TKN)	0.90	mg/l		0.1			
Total Nitrogen (TKN)	0.628	mg/l		0.1	SM4500N	SRW	07/05/17
Nitrate + Nitrite	0.27	mg/l		0.01	SM4500NO3	JC	06/29/17

AMTEST Identification Number 17-A009048
Client Identification SEIMS-20170615
Sampling Date 06/15/17, 16:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	760	CFU/100 ml		1	SM 9222D	NG	06/16/17
Total Nitrogen (NOX&TKN)	1.19	mg/l		0.1			
Total Nitrogen (TKN)	0.944	mg/l		0.1	SM4500N	SRW	07/05/17
Nitrate + Nitrite	0.25	mg/l		0.01	SM4500NO3	JC	06/29/17

AMTEST Identification Number 17-A009049
Client Identification TOSMI-20170615
Sampling Date 06/15/17, 13:35

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	22000	CFU/100 ml		1	SM 9222D	NG	06/16/17
Total Nitrogen (NOX&TKN)	2.74	mg/l		0.1			
Total Nitrogen (TKN)	2.10	mg/l		0.1	SM4500N	SRW	07/05/17
Nitrate + Nitrite	0.64	mg/l		0.01	SM4500NO3	JC	06/29/17

AMTEST Identification Number 17-A009050
Client Identification TOSMO-20170615
Sampling Date 06/15/17, 14:05

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	11000	CFU/100 ml		1	SM 9222D	NG	06/16/17
Total Nitrogen (NOX&TKN)	6.08	mg/l		0.1			
Total Nitrogen (TKN)	5.30	mg/l		0.1	SM4500N	SRW	07/05/17
Nitrate + Nitrite	0.78	mg/l		0.01	SM4500NO3	JC	06/29/17

AMTEST Identification Number 17-A009051
Client Identification TYLMI-20170615
Sampling Date 06/15/17, 14:50

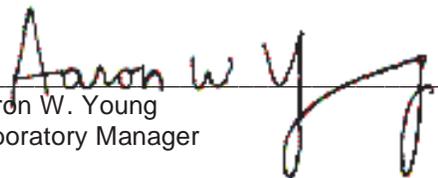
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	840	CFU/100 ml		1	SM 9222D	NG	06/16/17
Total Nitrogen (NOX&TKN)	2.12	mg/l		0.1			
Total Nitrogen (TKN)	0.720	mg/l		0.1	SM4500N	SRW	07/05/17
Nitrate + Nitrite	1.4	mg/l		0.01	SM4500NO3	JC	07/03/17

AMTEST Identification Number 17-A009052
Client Identification TYLMO-20170615
Sampling Date 06/15/17, 14:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	4800	CFU/100 ml		1	SM 9222D	NG	06/16/17
Total Nitrogen (NOX&TKN)	1.40	mg/l		0.1			
Total Nitrogen (TKN)	1.10	mg/l		0.1	SM4500N	SRW	07/05/17
Nitrate + Nitrite	0.30	mg/l		0.01	SM4500NO3	JC	06/29/17


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 17-A009039 to 17-A009052

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
17-A009039	Fecal Coliform	CFU/100 ml	480	440	8.7
17-A009053	Fecal Coliform	CFU/100 ml	110	96.	14.
17-A008616	Total Nitrogen (TKN)	mg/l	5.60	6.40	13.
17-A008915	Total Nitrogen (TKN)	mg/l	0.281	0.284	1.1
17-A008973	Total Nitrogen (TKN)	mg/l	3.30	3.30	0.00
17-A009048	Total Nitrogen (TKN)	mg/l	0.944	1.00	5.8
17-A009112	Total Nitrogen (TKN)	mg/l	0.551	0.468	16.
17-A009260	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
17-A009348	Total Nitrogen (TKN)	mg/l	1.30	1.00	26.
17-A009839	Total Nitrogen (TKN)	mg/l	0.284	0.262	8.1
17-A009905	Total Nitrogen (TKN)	mg/l	0.939	0.889	5.5
17-A008896	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	
17-A008915	Nitrate + Nitrite	mg/l	0.088	0.088	0.00
17-A008581	Nitrate + Nitrite	mg/l	2.5	2.5	0.00
17-A008609	Nitrate + Nitrite	mg/l	4.8	5.3	9.9
17-A008672	Nitrate + Nitrite	mg/l	2.5	2.3	8.3
17-A009050	Nitrate + Nitrite	mg/l	0.78	0.78	0.00
17-A009114	Nitrate + Nitrite	mg/l	0.12	0.12	0.00
17-A009238	Nitrate + Nitrite	mg/l	0.82	0.81	1.2
17-A009248	Nitrate + Nitrite	mg/l	1.2	1.1	8.7
17-A009309	Nitrate + Nitrite	mg/l	0.68	0.70	2.9
17-A009353	Nitrate + Nitrite	mg/l	0.43	0.41	4.8
17-A009382	Nitrate + Nitrite	mg/l	0.85	0.85	0.00
17-A009839	Nitrate + Nitrite	mg/l	0.015	0.014	6.9
17-A009397	Nitrate + Nitrite	mg/l	0.13	0.12	8.0

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPKAMT	RECOVERY
17-A008616	Total Nitrogen (TKN)	mg/l	5.60	26.0	20.0	102.00 %
17-A008915	Total Nitrogen (TKN)	mg/l	0.281	2.55	2.00	113.45 %
17-A008973	Total Nitrogen (TKN)	mg/l	3.30	45.0	40.0	104.25 %
17-A009048	Total Nitrogen (TKN)	mg/l	0.944	3.00	2.00	102.80 %
17-A009112	Total Nitrogen (TKN)	mg/l	0.551	2.68	2.00	106.45 %
17-A009260	Total Nitrogen (TKN)	mg/l	< 0.1	2.21	2.00	110.50 %
17-A009348	Total Nitrogen (TKN)	mg/l	1.30	3.40	2.00	105.00 %
17-A009839	Total Nitrogen (TKN)	mg/l	0.284	2.96	2.00	133.80 %
17-A009905	Total Nitrogen (TKN)	mg/l	0.939	2.64	2.00	85.05 %
17-A008896	Nitrate + Nitrite	mg/l	< 0.01	0.38	0.50	76.00 %
17-A008915	Nitrate + Nitrite	mg/l	0.088	0.60	0.50	102.40 %
17-A009040	Nitrate + Nitrite	mg/l	0.48	0.98	0.50	100.00 %

QC Summary for sample numbers: 17-A009039 to 17-A009052...

MATRIX SPIKES continued....

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
17-A008581	Nitrate + Nitrite	mg/l	2.5	4.8	2.5	92.00 %
17-A008609	Nitrate + Nitrite	mg/l	4.8	9.7	5.0	98.00 %
17-A008672	Nitrate + Nitrite	mg/l	2.5	4.9	2.5	96.00 %
17-A009050	Nitrate + Nitrite	mg/l	0.78	1.3	0.50	104.00 %
17-A009114	Nitrate + Nitrite	mg/l	0.12	0.64	0.50	104.00 %
17-A009238	Nitrate + Nitrite	mg/l	0.82	1.3	0.50	96.00 %
17-A009309	Nitrate + Nitrite	mg/l	0.68	1.2	0.50	104.00 %
17-A009353	Nitrate + Nitrite	mg/l	0.43	0.89	0.50	92.00 %
17-A009382	Nitrate + Nitrite	mg/l	0.85	1.6	1.0	75.00 %
17-A009397	Nitrate + Nitrite	mg/l	0.13	0.70	0.50	114.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	1.00	1.00	100. %
Total Nitrogen (TKN)	mg/l	1.00	0.984	98.4 %
Total Nitrogen (TKN)	mg/l	1.00	0.952	95.2 %
Total Nitrogen (TKN)	mg/l	20.0	19.0	95.0 %
Nitrate + Nitrite	mg/l	0.50	0.47	94.0 %
Nitrate + Nitrite	mg/l	0.50	0.48	96.0 %
Nitrate + Nitrite	mg/l	0.50	0.46	92.0 %
Nitrate + Nitrite	mg/l	0.50	0.45	90.0 %
Nitrate + Nitrite	mg/l	0.50	0.47	94.0 %
Nitrate + Nitrite	mg/l	0.50	0.48	96.0 %
Nitrate + Nitrite	mg/l	0.50	0.46	92.0 %
Nitrate + Nitrite	mg/l	0.50	0.55	110. %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 06-182

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20170615 9039	6/15/17	1610	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20170615 46	6/15/17	1345	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20170615 41	6/15/17	1325	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20170615 42	6/15/17	1430	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20170615 43	6/15/17	1440	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20170615 44	6/15/17	1510	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20170615 45	6/15/17	1535	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20170615 46	6/15/17	1640	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20170615 47	6/15/17	1330	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20170615 48	6/15/17	1615	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company	Date	Time	Comments/Special Instructions	
Relinquished by: <i>[Signature]</i>		OnSite Env	6/16/17	710	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L	
Received by: <i>[Signature]</i>		OnSite Amtest	6/16/17	710		
Relinquished by:						
Received by:						
Relinquished by:						
Received by:						

temp = 2.8 °C



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request
 1 Day 2 Day 3 Day
Standard
 Other: _____

Laboratory Reference #: 06-182
 Project Manager: Blair Goodrow
 email: bgoodrow@onsite-env.com
 Project Number: 14-05806-000
 Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses																															
11	TOSMI-20170615 <i>9049</i>	6/15/17	1335	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N																															
12	TOSMO-20170615 <i>50</i>	6/15/17	1405	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N																															
13	TYLMI-20170615 <i>51</i>	6/15/17	1450	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N																															
14	TYLMO-20170615 <i>52</i>	6/15/17	1430	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N																															
15	QA-31-20170615 <i>52</i>	6/15/17	1325	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N																															
<table border="1"> <thead> <tr> <th>Signature</th> <th>Company</th> <th>Date</th> <th>Time</th> <th>Comments/Special Instructions</th> </tr> </thead> <tbody> <tr> <td>Relinquished by: <i>[Signature]</i></td> <td><i>OSV-14 EU</i></td> <td><i>6/16/17</i></td> <td><i>710</i></td> <td rowspan="5"> EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L </td> </tr> <tr> <td>Received by: <i>[Signature]</i></td> <td><i>Amtest</i></td> <td><i>6/16/17</i></td> <td><i>710</i></td> </tr> <tr> <td>Relinquished by:</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Received by:</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Relinquished by:</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Received by:</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>							Signature	Company	Date	Time	Comments/Special Instructions	Relinquished by: <i>[Signature]</i>	<i>OSV-14 EU</i>	<i>6/16/17</i>	<i>710</i>	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L	Received by: <i>[Signature]</i>	<i>Amtest</i>	<i>6/16/17</i>	<i>710</i>	Relinquished by:				Received by:				Relinquished by:				Received by:				
Signature	Company	Date	Time	Comments/Special Instructions																																	
Relinquished by: <i>[Signature]</i>	<i>OSV-14 EU</i>	<i>6/16/17</i>	<i>710</i>	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L																																	
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Received by:																																					



CHAIN OF CUSTODY

14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

Turnaround Requested:
 1 Day
 2 Day
 3 Day
 Standard

Laboratory No.

06-182

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								
X	X	X	X	X	X	X	X	X								

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.
1	COLM-2017 0615	6-15-17	16:10	Water	7
2	COUMI-2017 0615		13:45	Water	7
3	COUMO-2017 0615		13:25	Water	7
4	EVAMS-2017 0615		14:30	Water	7
5	EVALSS-2017 0615		14:40	Water	7
6	MONMN-2017 0615		15:10	Water	7
7	MONMS-2017 0615		15:35	Water	7
8	MONM-2017 0615		16:40	Water	7
9	SEIMN-2017 0615		13:30	Water	7
10	SEIMS-2017 0615		16:15	Water	7
11	TOSMI-2017 0615		13:35	Water	7
12	TOSMO-2017 0615		14:05	Water	7
13	TYLMI-2017 0615		14:50	Water	7
14	TYLMO-2017 0615		14:30	Water	7
15	QA 31-2017 0615		13:25	Water	7

Relinquished by Brianna Black Date 6-15-17 Received by [Signature] Date 6/15/17
 Firm Herrera Time 17:15 Firm OBE Time 1715
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants
 Project No.: 14-05806-000
 Project Name: Redmond Paired Watershed Study
 Project Manager: George Illner

CHAIN OF CUSTODY

Turnaround Requested:

1 Day

2 Day

3 Day

Standard

Laboratory No. **06-182**

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2017 0615	6/15/17	16:10	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2017 0615		13:43	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2017 0615		13:25	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2017 0615		14:30	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2017 0615		14:40	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2017 0615		15:10	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2017 0615		15:35	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2017 0615		16:40	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2017 0615		13:30	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2017 0615		16:15	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2017 0615		13:35	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2017 0615		14:05	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2017 0615		14:50	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2017 0615		14:30	Water	7	X	X	X	X	X	X	X	X	X
15	QA 31-2017 0615		13:25	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by Brianna Blair Date 6/15/17 Received by [Signature] Date 6/15/17

Firm Herrera Time 17:15 Firm OBE Time 1715

Relinquished by _____ Date _____ Received by _____ Date _____

Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	DB B MM B VW		
Meter:	YSI PROPLUS		
Date/Time:	10/15/17 11:30		
Barometric Pressure Start of Day:	mmHg: 755.4	Time:	11:30
Barometric Pressure End of Day:	mmHg: 755.2	Time:	19:05

Calibration Procedures:

Rinse Multimeter Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	6.1	0	23.3	
Conductivity (µS/cm)	999	1,000	23.3	
Conductivity (µS/cm)	102.2	100	23.1	
DO % Saturation	123.3	100	21.6	
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	4.0	0	23.0	
Conductivity (µS/cm)	102.3	100	23.0	
DO % Saturation	99.8	100	23.0	

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	BBS & MM & VW		
Meter:	YSI PWDSS #1		
Date/Time:	01/15/17		
Barometric Pressure Start of Day:	mmHg: 754.8	Time: 11:30	
Barometric Pressure End of Day:	mmHg: 754.4	Time: 19:05	

Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	5.1	0	23.2	
Conductivity (µS/cm)	993	1,000	23.1	
Conductivity (µS/cm)	1019	100	23.0	
DO % Saturation	100	100	22.1	

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	2.3	0	22.8	
Conductivity (µS/cm)	101.6	100	22.8	
DO % Saturation	100.1	100	22.8	

- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: VW + MM

Sample Date: 6-15-17

Sample Time: 16:10

PDT: X

SITE

ID: COLM

Base Flow or Storm Event?

Field Filtered Time: 16:10

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: rainy 60°

Water Quality Sampling

Sample ID: COLM20170615

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>NO</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	
Filter blank sample ID:	
Transfer blank sample ID:	

Visual and Olfactory Conditions:

Clarity:	<u>clear</u>
Color:	<u>tannin-y</u>
Odor:	<u>none</u>
Sheen:	<u>none</u>
Floatables:	<u>none</u>

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Brian Lovell Signature: [Signature]

Date Checked: 7-14-17 Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1 _____

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 5.46

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 12.4

Specific Conductivity (µs/cm) 35.8

Dissolved Oxygen (mg/L) 8.75

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: PAB

Sample Date: 6.15.17

Sample Time: 13:45

PDT

SITE ID: COUM1

Base Flow or Storm Event? Storm

Field Filtered Time: 13:50

PST:

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain 80°F

Water Quality Sampling

Sample ID: COUM1-20170615

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: cloudy
 Color: light brown
 Odor: none
 Sheen: none
 Floatables: org deb, susp sed

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Tina Leath Signature: _____
 Date Checked: 7-14-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)
 YSI Pro DSS 1
 YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.78
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 13.7
 Specific Conductivity (µs/cm) 9.89
 Dissolved Oxygen (mg/L) 100.1

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

 Field Personnel: BB

 Sample Date: 01/15/17

 Sample Time: 13:25

 PDT

SITE ID:

COUMO

Base Flow or Storm Event?

 Field Filtered Time: 13:30

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

 Current Weather and Temp: Rain 85°F

Water Quality Sampling

 Sample ID: COUMO-20170115

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

 Clarity: cloudy
 Color: brown
 Odor: none
 Sheen: none
 Floatables: ova det, suspended

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By:

John Leath Signature:

Date Checked:

7-14-17 Time:

Data Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

 YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

 Stream Stage (ft): 1.30

 Reference Point (description): SG

Water Quality Measurements

 Temperature (°C) 15.2

 Specific Conductivity (µs/cm) 152.1

 Dissolved Oxygen (mg/L) 10.30

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: VW + MM

Sample Date: 10-15-17

Sample Time: 14:30

PDT:

SITE ID: EVAMS

Base Flow or Storm Event?

Field Filtered Time: 14:30

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: rainy 60°

Water Quality Sampling

Sample ID: EVAMS 20170613

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>NO</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: none
 Sheen: none
 Floatables: foam

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: [Signature] Signature: [Signature]

Date Checked: 7-19-17 Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)
YSI Pro DSS 1
YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.92

Reference Point (description): SC

Water Quality Measurements

Temperature (°C) 12.2

Specific Conductivity (µs/cm) 201.9

Dissolved Oxygen (mg/L) 10.39

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: VW + MM

Sample Date: 10.15.17

Sample Time: 14:40

PDT:

SITE ID: EVALLS

Base Flow or Storm Event?

Field Filtered Time: 14:40

PST:

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: rainy 60°

Water Quality Sampling

Sample ID: EVALLS20170615

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>NO</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear light turbidity
 Color: none
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 7-14-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.31
 Reference Point (description): JG

Water Quality Measurements

Temperature (°C) 12.1
 Specific Conductivity (µs/cm) 187.4
 Dissolved Oxygen (mg/L) 10.61

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB

Sample Date: 10.15.17

Sample Time: 15:10

PDT

SITE ID:

MONMN

Base Flow or Storm Event? Storm

Field Filtered Time: 15:15

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: drizzling 35.9-F

Water Quality Sampling

Sample ID: MONMN-20170615

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: cloudy
 Color: light gray
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____

Time: _____

Quality Assurance

Checked By: John Conth Signature: [Signature]

Date Checked: 7-19-17 Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.03 (before move debris); 0.02 (after move debris)

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 13.2

Specific Conductivity (µs/cm) 1101.4

Dissolved Oxygen (mg/L) 9.22

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 10-15-17 Sample Time: 15:35 PDT
 Base Flow or Storm Event? Field Filtered Time: 15:40 PST
(Must filter within 15 minutes of collection)

SITE ID: MONMS

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: drizzle 85°F

Water Quality Sampling

Sample ID: MONWS-20170015

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↑
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: [Signature] Signature: [Signature]
 Date Checked: 7-14-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)
 YSI Pro DSS 1
 YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 10.70
 Reference Point (description): vault

Water Quality Measurements

Temperature (°C) 13.5
 Specific Conductivity (µs/cm) 254.4
 Dissolved Oxygen (mg/L) 10.87

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BD

Sample Date: 10.15.17

Base Flow or Storm Event?

Sample Time: 10:40

Field Filtered Time: 10:45

(Must filter within 15 minutes of collection)

SITE ID:

MONM

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study



Current Weather and Temp: Rain @ 60°F

Water Quality Sampling

Sample ID: MONM-20170015

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Kevin Lenth Signature: _____

Date Checked: 7-14-17 Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) X

YSI Pro DSS 1 ~~X~~

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): NA

Reference Point (description): NA

Water Quality Measurements

Temperature (°C) 13.3

Specific Conductivity (µs/cm) 200.7

Dissolved Oxygen (mg/L) 9.77

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: VW + MM

Sample Date: 10-15-17

Sample Time: 13:30 / 13:25

PDT: X

SITE ID: SEIMN

Base Flow or Storm Event? 0

Field Filtered Time: 13:30/13:25

PST:

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: raining 60°

Water Quality Sampling

Sample ID: SEIMN 20170615

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	yes ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QA31-20170615
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: light turbidity
 Color: none
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lamb Signature: [Signature]
 Date Checked: _____ Time: _____
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 7 13/16 inches

Reference Point (description): from top of bank down

Water Quality Measurements

Temperature (°C) 11.0

Specific Conductivity (µs/cm) 91.3

Dissolved Oxygen (mg/L) 10.71

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

 Field Personnel: BB

 Sample Date: 6.15.17

 Sample Time: 10:15

 PDT

SITE ID:

SEIMS

 Base Flow or Storm Event? Storm

 Field Filtered Time: 10:20

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

 Current Weather and Temp: Drizzle 35°F

Water Quality Sampling

 Sample ID: SEIMS-20170615

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	
Filter blank sample ID:	
Transfer blank sample ID:	

Visual and Olfactory Conditions:

 Clarity: clear
 Color: none
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

 Checked By: Susan Smith

 Signature: [Signature]

 Date Checked: 7-14-17

Time:

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)

 YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft):

0.88

Reference Point (description):

SG

Water Quality Measurements

Temperature (°C)

11.4

Specific Conductivity (µs/cm)

107.0

Dissolved Oxygen (mg/L)

10.11

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

080508

Field Personnel: VW + MM

Sample Date: 6/15/17

Sample Time: 13:35

PDT

SITE ID: TOSMI

Base Flow or Storm Event? Storm

Field Filtered Time: 15:35

PST

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 60° + Rain.

Water Quality Sampling

Sample ID: TOSMI20170615

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>NO</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: turbid
 Color: brown grey
 Odor: faint sweet odor
 Sheen: none
 Floatables: foam

LABORATORY DELIVERY

Date: _____ Time: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1 _____

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.98

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 16.0

Specific Conductivity (µs/cm) 92.3

Dissolved Oxygen (mg/L) 9.74

Quality Assurance

Checked By: John Lenth Signature: _____

Date Checked: 7-14-17 Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

 Field Personnel: BB

 Sample Date: 0.15.17

 Sample Time: 14:05

 PDT:

SITE ID:

TOSMO

 Base Flow or ~~Form~~ Event?

 Field Filtered Time: 14:10

PST:

(Must filter within 15 minutes of collection)

Project Number: 14-05806-000


HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

 Sample ID: TOSMO-20170615

 Current Weather and Temp: Rain 89°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

 Clarity: cloudy
 Color: dark brown
 Odor: none
 Sheen: bubble foam
 Floatables: org deb, suspended

LABORATORY DELIVERY

Date:

Time:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

 YSI Pro Plus (15D100020) X

YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

 Stream Stage (ft): 0.84

 Reference Point (description): SG

Water Quality Measurements

 Temperature (°C) 13.4

 Specific Conductivity (µs/cm) 187.3

 Dissolved Oxygen (mg/L) 10.110

Quality Assurance

 Checked By: John Lent

 Signature: [Signature]

 Date Checked: 7-14-17

Time:

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 6.15.17 Sample Time: 14:50 PDT:
 Base Flow or Storm Event? Field Filtered Time: 14:55 PST:
(Must filter within 15 minutes of collection)

SITE ID: TYLMI

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain @ 60°F

Water Quality Sampling

Sample ID: TYLMI-20170615

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: _____
 Date Checked: 7-14-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) X

YSI Pro DSS 1 _____

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.50

Reference Point (description): top of culvert ↓

Water Quality Measurements

Temperature (°C) 13.4

Specific Conductivity (µs/cm) 234.0

Dissolved Oxygen (mg/L) 9.34

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BAB

Sample Date: 10.15.17

Sample Time: 14:30

PDTX

SITE

ID: TYLMO

Base Flow or Storm Event? Storm

Field Filtered Time: 14:35

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain & 59°F

Water Quality Sampling

Sample ID: TYLMO-20170615

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↕
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>Y</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: light brown
 Odor: none
 Sheen: none
 Floatables: org debris suspended

LABORATORY DELIVERY

Date: _____

Time: _____

Quality Assurance

Checked By: John Lenth Signature: _____

Date Checked: 7-14-17 Time: _____

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) X

YSI Pro DSS 1 _____

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.69

Reference Point (description): top of culvert +

Water Quality Measurements

Temperature (°C) 15.3

Specific Conductivity (µs/cm) 72.8

Dissolved Oxygen (mg/L) 9.10



Data Quality Assurance Worksheet

HERRERA

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Sample Date/Sample ID: 6/15/2017 / All sites, 1 FD (QA31) at SEIMN

By G. Catarra

Date 8/28/2017 Page 1 of 2

Checked: initials

date _____

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	5	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	102	±20	4	≤25	3.6	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	0	≤25	114	≤25	OK	"J" FLAG SEIMN DUE TO F.D. RPD.
Hardness	OK / SM 2340B	NA	NA	4	≤180	≤1.0 mg/L 1.0 mg/L	94,96	±25	93	±15	2	≤20	5.7	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	6	≤28	≤1.0 mg/L 1.0 mg/L	102	±25	106	±15	0	≤20	7.4	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	8	≤28	≤0.01 mg/L 0.01 mg/L	100	±25	97	±20	8	≤20	6.7	≤20	OK	NONE
Total Nitrogen (TKN + N+N)	OK/ SM 4500 N-B	NA	NA	14,20	≤28	≤0.1 mg/L 0.1 mg/L	103,100	±25	90-110	±20	5,8,0	≤20	NOT ANALYZED	≤20	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 8/28/2017 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials

Sample Date/Sample ID: 6/15/2017 / All sites, 1 FD (QA31) at SEIMN

date _____

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	8	≤180	≤1.0 µg/L 1.0 µg/L	93,100	±25	NR	±15	1	≤20	D=0.1	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	8	≤180	≤5.0 µg/L 5.0 µg/L	95,100	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	8	≤180	≤1.0 µg/L 1.0 µg/L	90,87	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	8	≤180	≤5.0 µg/L 5.0 µg/L	94,92	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	8.7	≤35	NOT ANALYZED	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

August 26, 2017

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1708-126

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on August 9, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular flourish.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: August 26, 2017
Samples Submitted: August 9, 2017
Laboratory Reference: 1708-126
Project: 14-05806-000

Case Narrative

Samples were collected on August 9, 2017 and received by the laboratory on August 9, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COUMI-20170809					
Laboratory ID:	08-126-01					
Total Suspended Solids	19	1.0	SM 2540D	8-15-17	8-16-17	

Client ID:	COUMO20170809					
Laboratory ID:	08-126-02					
Total Suspended Solids	3.8	1.0	SM 2540D	8-15-17	8-16-17	

Client ID:	EVAMS-20170809					
Laboratory ID:	08-126-03					
Total Suspended Solids	8.4	1.0	SM 2540D	8-15-17	8-16-17	

Client ID:	EVALSS-20170809					
Laboratory ID:	08-126-04					
Total Suspended Solids	6.6	1.0	SM 2540D	8-15-17	8-16-17	

Client ID:	MONMN-20170809					
Laboratory ID:	08-126-05					
Total Suspended Solids	3.2	1.0	SM 2540D	8-15-17	8-16-17	

Client ID:	MONMS-20170809					
Laboratory ID:	08-126-06					
Total Suspended Solids	2.8	1.0	SM 2540D	8-15-17	8-16-17	

Client ID:	MONM-20170809					
Laboratory ID:	08-126-07					
Total Suspended Solids	4.0	1.0	SM 2540D	8-15-17	8-16-17	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SEIMN-20170809					
Laboratory ID:	08-126-08					
Total Suspended Solids	3.8	1.0	SM 2540D	8-15-17	8-16-17	

Client ID:	SEIMS20170809					
Laboratory ID:	08-126-09					
Total Suspended Solids	6.8	1.0	SM 2540D	8-15-17	8-16-17	

Client ID:	TOSMI-20170809					
Laboratory ID:	08-126-10					
Total Suspended Solids	1.4	1.0	SM 2540D	8-15-17	8-16-17	

Client ID:	TOSMO-20170809					
Laboratory ID:	08-126-11					
Total Suspended Solids	2.6	1.0	SM 2540D	8-15-17	8-16-17	

Client ID:	TYLMI-20170809					
Laboratory ID:	08-126-12					
Total Suspended Solids	1.0	1.0	SM 2540D	8-15-17	8-16-17	

Client ID:	TYLMO-20170809					
Laboratory ID:	08-126-13					
Total Suspended Solids	6.6	1.0	SM 2540D	8-15-17	8-16-17	

Client ID:	QA32-20170809					
Laboratory ID:	08-126-14					
Total Suspended Solids	1.2	1.0	SM 2540D	8-15-17	8-16-17	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0815W1					
Total Suspended Solids	ND	1.0	SM 2540D	8-15-17	8-16-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-126-11							
	ORIG	DUP						
Total Suspended Solids	2.60	2.80	NA	NA	NA	7	20	

SPIKE BLANK								
Laboratory ID:	SB0815W1							
	SB	SB		SB				
Total Suspended Solids	92.0	100	NA	92	78-113	NA	NA	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COUMI-20170809					
Laboratory ID:	08-126-01					
Turbidity	3.9	0.10	EPA 180.1	8-11-17	8-11-17	

Client ID:	COUMO20170809					
Laboratory ID:	08-126-02					
Turbidity	1.7	0.10	EPA 180.1	8-11-17	8-11-17	

Client ID:	EVAMS-20170809					
Laboratory ID:	08-126-03					
Turbidity	3.4	0.10	EPA 180.1	8-11-17	8-11-17	

Client ID:	EVALSS-20170809					
Laboratory ID:	08-126-04					
Turbidity	1.6	0.10	EPA 180.1	8-11-17	8-11-17	

Client ID:	MONMN-20170809					
Laboratory ID:	08-126-05					
Turbidity	1.5	0.10	EPA 180.1	8-11-17	8-11-17	

Client ID:	MONMS-20170809					
Laboratory ID:	08-126-06					
Turbidity	0.49	0.10	EPA 180.1	8-11-17	8-11-17	

Client ID:	MONM-20170809					
Laboratory ID:	08-126-07					
Turbidity	0.81	0.10	EPA 180.1	8-11-17	8-11-17	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SEIMN-20170809					
Laboratory ID:	08-126-08					
Turbidity	3.0	0.10	EPA 180.1	8-11-17	8-11-17	

Client ID:	SEIMS20170809					
Laboratory ID:	08-126-09					
Turbidity	0.99	0.10	EPA 180.1	8-11-17	8-11-17	

Client ID:	TOSMI-20170809					
Laboratory ID:	08-126-10					
Turbidity	1.7	0.10	EPA 180.1	8-11-17	8-11-17	

Client ID:	TOSMO-20170809					
Laboratory ID:	08-126-11					
Turbidity	0.75	0.10	EPA 180.1	8-11-17	8-11-17	

Client ID:	TYLMI-20170809					
Laboratory ID:	08-126-12					
Turbidity	1.2	0.10	EPA 180.1	8-11-17	8-11-17	

Client ID:	TYLMO-20170809					
Laboratory ID:	08-126-13					
Turbidity	2.3	0.10	EPA 180.1	8-11-17	8-11-17	

Client ID:	QA32-20170809					
Laboratory ID:	08-126-14					
Turbidity	1.1	0.10	EPA 180.1	8-11-17	8-11-17	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0811W1					
Turbidity	ND	0.10	EPA 180.1	8-11-17	8-11-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-126-01							
	ORIG	DUP						
Turbidity	3.87	3.88	NA	NA	NA	NA	0	15



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COUMI-20170809					
Laboratory ID:	08-126-01					
Hardness	170	5.0	200.7/SM 2340B	8-15-17	8-15-17	

Client ID:	COUMO20170809					
Laboratory ID:	08-126-02					
Hardness	130	1.0	200.7/SM 2340B	8-15-17	8-15-17	

Client ID:	EVAMS-20170809					
Laboratory ID:	08-126-03					
Hardness	99	1.0	200.7/SM 2340B	8-15-17	8-15-17	

Client ID:	EVALSS-20170809					
Laboratory ID:	08-126-04					
Hardness	88	1.0	200.7/SM 2340B	8-15-17	8-15-17	

Client ID:	MONMN-20170809					
Laboratory ID:	08-126-05					
Hardness	94	1.0	200.7/SM 2340B	8-15-17	8-15-17	

Client ID:	MONMS-20170809					
Laboratory ID:	08-126-06					
Hardness	170	5.0	200.7/SM 2340B	8-16-17	8-16-17	

Client ID:	MONM-20170809					
Laboratory ID:	08-126-07					
Hardness	95	1.0	200.7/SM 2340B	8-15-17	8-15-17	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SEIMN-20170809					
Laboratory ID:	08-126-08					
Hardness	47	1.0	200.7/SM 2340B	8-15-17	8-15-17	

Client ID:	SEIMS20170809					
Laboratory ID:	08-126-09					
Hardness	53	1.0	200.7/SM 2340B	8-15-17	8-15-17	

Client ID:	TOSMI-20170809					
Laboratory ID:	08-126-10					
Hardness	130	5.0	200.7/SM 2340B	8-15-17	8-16-17	

Client ID:	TOSMO-20170809					
Laboratory ID:	08-126-11					
Hardness	120	1.0	200.7/SM 2340B	8-15-17	8-15-17	

Client ID:	TYLMI-20170809					
Laboratory ID:	08-126-12					
Hardness	110	1.0	200.7/SM 2340B	8-15-17	8-15-17	

Client ID:	TYLMO-20170809					
Laboratory ID:	08-126-13					
Hardness	98	1.0	200.7/SM 2340B	8-15-17	8-15-17	

Client ID:	QA32-20170809					
Laboratory ID:	08-126-14					
Hardness	110	1.0	200.7/SM 2340B	8-15-17	8-15-17	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0815WH1					
Hardness	ND	1.0	200.7/SM 2340B	8-15-17	8-15-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-126-01							
	ORIG	DUP						
Hardness	174	165	NA	NA	NA	5	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	08-126-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	290	296	132	132	174	88	92	75-125	2	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK								
Laboratory ID:	SB0815WH1							
	SB	SB			SB			
Hardness	137	132	NA	104	80-120	NA	NA	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COUMI-20170809					
Laboratory ID:	08-126-01					
Dissolved Organic Carbon	2.8	1.0	SM 5310B	8-16-17	8-16-17	

Client ID:	COUMO20170809					
Laboratory ID:	08-126-02					
Dissolved Organic Carbon	3.2	1.0	SM 5310B	8-16-17	8-16-17	

Client ID:	EVAMS-20170809					
Laboratory ID:	08-126-03					
Dissolved Organic Carbon	2.3	1.0	SM 5310B	8-16-17	8-16-17	

Client ID:	EVALSS-20170809					
Laboratory ID:	08-126-04					
Dissolved Organic Carbon	1.9	1.0	SM 5310B	8-16-17	8-16-17	

Client ID:	MONMN-20170809					
Laboratory ID:	08-126-05					
Dissolved Organic Carbon	3.2	1.0	SM 5310B	8-16-17	8-16-17	

Client ID:	MONMS-20170809					
Laboratory ID:	08-126-06					
Dissolved Organic Carbon	4.7	1.0	SM 5310B	8-16-17	8-16-17	

Client ID:	MONM-20170809					
Laboratory ID:	08-126-07					
Dissolved Organic Carbon	2.8	1.0	SM 5310B	8-16-17	8-16-17	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SEIMN-20170809					
Laboratory ID:	08-126-08					
Dissolved Organic Carbon	1.7	1.0	SM 5310B	8-16-17	8-16-17	

Client ID:	SEIMS20170809					
Laboratory ID:	08-126-09					
Dissolved Organic Carbon	2.8	1.0	SM 5310B	8-16-17	8-16-17	

Client ID:	TOSMI-20170809					
Laboratory ID:	08-126-10					
Dissolved Organic Carbon	2.5	1.0	SM 5310B	8-16-17	8-16-17	

Client ID:	TOSMO-20170809					
Laboratory ID:	08-126-11					
Dissolved Organic Carbon	1.7	1.0	SM 5310B	8-16-17	8-16-17	

Client ID:	TYLMI-20170809					
Laboratory ID:	08-126-12					
Dissolved Organic Carbon	2.7	1.0	SM 5310B	8-16-17	8-16-17	

Client ID:	TYLMO-20170809					
Laboratory ID:	08-126-13					
Dissolved Organic Carbon	3.7	1.0	SM 5310B	8-16-17	8-16-17	

Client ID:	QA32-20170809					
Laboratory ID:	08-126-14					
Dissolved Organic Carbon	2.2	1.0	SM 5310B	8-16-17	8-16-17	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0816D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	8-16-17	8-16-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-126-01							
	ORIG	DUP						
Dissolved Organic Carbon	2.83	2.89	NA	NA	NA	NA	2	20

MATRIX SPIKE

Laboratory ID:	08-126-01							
	MS	MS		MS				
Dissolved Organic Carbon	12.9	10.0	2.83	101	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0816D1							
	SB	SB		SB				
Dissolved Organic Carbon	11.0	10.0	NA	110	75-125	NA	NA	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COUMI-20170809					
Laboratory ID:	08-126-01					
Total Phosphorus	0.14	0.010	EPA 365.1	8-18-17	8-18-17	

Client ID:	COUMO20170809					
Laboratory ID:	08-126-02					
Total Phosphorus	0.082	0.010	EPA 365.1	8-18-17	8-18-17	

Client ID:	EVAMS-20170809					
Laboratory ID:	08-126-03					
Total Phosphorus	0.016	0.010	EPA 365.1	8-18-17	8-18-17	

Client ID:	EVALSS-20170809					
Laboratory ID:	08-126-04					
Total Phosphorus	0.036	0.010	EPA 365.1	8-18-17	8-18-17	

Client ID:	MONMN-20170809					
Laboratory ID:	08-126-05					
Total Phosphorus	0.076	0.010	EPA 365.1	8-18-17	8-18-17	

Client ID:	MONMS-20170809					
Laboratory ID:	08-126-06					
Total Phosphorus	0.039	0.010	EPA 365.1	8-18-17	8-18-17	

Client ID:	MONM-20170809					
Laboratory ID:	08-126-07					
Total Phosphorus	0.050	0.010	EPA 365.1	8-18-17	8-18-17	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SEIMN-20170809					
Laboratory ID:	08-126-08					
Total Phosphorus	0.041	0.010	EPA 365.1	8-18-17	8-18-17	

Client ID:	SEIMS20170809					
Laboratory ID:	08-126-09					
Total Phosphorus	0.037	0.010	EPA 365.1	8-18-17	8-18-17	

Client ID:	TOSMI-20170809					
Laboratory ID:	08-126-10					
Total Phosphorus	0.066	0.010	EPA 365.1	8-18-17	8-18-17	

Client ID:	TOSMO-20170809					
Laboratory ID:	08-126-11					
Total Phosphorus	0.055	0.010	EPA 365.1	8-18-17	8-18-17	

Client ID:	TYLMI-20170809					
Laboratory ID:	08-126-12					
Total Phosphorus	0.025	0.010	EPA 365.1	8-18-17	8-18-17	

Client ID:	TYLMO-20170809					
Laboratory ID:	08-126-13					
Total Phosphorus	0.074	0.010	EPA 365.1	8-18-17	8-18-17	

Client ID:	QA32-20170809					
Laboratory ID:	08-126-14					
Total Phosphorus	0.023	0.010	EPA 365.1	8-18-17	8-18-17	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0818W1					
Total Phosphorus	ND	0.010	EPA 365.1	8-18-17	8-18-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-126-01							
	ORIG	DUP						
Total Phosphorus	0.144	0.149	NA	NA	NA	NA	3	11

MATRIX SPIKE								
Laboratory ID:	08-126-01							
	MS	MS		MS				
Total Phosphorus	0.403	0.250	0.144	104	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0818W1							
	SB	SB		SB				
Total Phosphorus	0.250	0.250	NA	100	86-111	NA	NA	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 08-126-01						
Client ID: COUMI-20170809						
Copper	ND	1.0	200.8	8-16-17	8-16-17	
Zinc	5.4	5.0	200.8	8-16-17	8-16-17	
Lab ID: 08-126-02						
Client ID: COUMO20170809						
Copper	ND	1.0	200.8	8-16-17	8-16-17	
Zinc	ND	5.0	200.8	8-16-17	8-16-17	
Lab ID: 08-126-03						
Client ID: EVAMS-20170809						
Copper	ND	1.0	200.8	8-16-17	8-16-17	
Zinc	ND	5.0	200.8	8-16-17	8-16-17	
Lab ID: 08-126-04						
Client ID: EVALSS-20170809						
Copper	ND	1.0	200.8	8-16-17	8-16-17	
Zinc	ND	5.0	200.8	8-16-17	8-16-17	
Lab ID: 08-126-05						
Client ID: MONMN-20170809						
Copper	ND	1.0	200.8	8-16-17	8-16-17	
Zinc	ND	5.0	200.8	8-16-17	8-16-17	
Lab ID: 08-126-06						
Client ID: MONMS-20170809						
Copper	ND	1.0	200.8	8-16-17	8-16-17	
Zinc	ND	5.0	200.8	8-16-17	8-16-17	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-126-07					
Client ID:	MONM-20170809					
Copper	ND	1.0	200.8	8-16-17	8-16-17	
Zinc	6.7	5.0	200.8	8-16-17	8-16-17	
Lab ID:	08-126-08					
Client ID:	SEIMN-20170809					
Copper	ND	1.0	200.8	8-16-17	8-16-17	
Zinc	ND	5.0	200.8	8-16-17	8-16-17	
Lab ID:	08-126-09					
Client ID:	SEIMS20170809					
Copper	ND	1.0	200.8	8-16-17	8-16-17	
Zinc	ND	5.0	200.8	8-16-17	8-16-17	
Lab ID:	08-126-10					
Client ID:	TOSMI-20170809					
Copper	1.3	1.0	200.8	8-16-17	8-16-17	
Zinc	12	5.0	200.8	8-16-17	8-16-17	
Lab ID:	08-126-11					
Client ID:	TOSMO-20170809					
Copper	ND	1.0	200.8	8-16-17	8-16-17	
Zinc	ND	5.0	200.8	8-16-17	8-16-17	
Lab ID:	08-126-12					
Client ID:	TYLMI-20170809					
Copper	1.0	1.0	200.8	8-16-17	8-16-17	
Zinc	ND	5.0	200.8	8-16-17	8-16-17	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-126-13					
Client ID:	TYLMO-20170809					
Copper	ND	1.0	200.8	8-16-17	8-16-17	
Zinc	ND	5.0	200.8	8-16-17	8-16-17	

Lab ID:	08-126-14					
Client ID:	QA32-20170809					
Copper	1.2	1.0	200.8	8-16-17	8-16-17	
Zinc	ND	5.0	200.8	8-16-17	8-16-17	



Date of Report: August 26, 2017
Samples Submitted: August 9, 2017
Laboratory Reference: 1708-126
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 8-16-17
Date Analyzed: 8-16-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0816WM1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: August 26, 2017
Samples Submitted: August 9, 2017
Laboratory Reference: 1708-126
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 8-16-17

Date Analyzed: 8-16-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 08-126-14

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	1.20	1.12	7	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: January 6, 2017
 Samples Submitted: January 6, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 8-16-17

Date Analyzed: 8-16-17

Matrix: Water

Units: ug/L (ppb)

Lab ID: 08-126-14

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	95.2	94	95.6	94	0	
Zinc	100	111	111	112	112	0	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 08-126-01						
Client ID: COUMI-20170809						
Copper	ND	1.0	200.8		8-16-17	
Zinc	ND	5.0	200.8		8-16-17	
Lab ID: 08-126-02						
Client ID: COUMO20170809						
Copper	ND	1.0	200.8		8-16-17	
Zinc	ND	5.0	200.8		8-16-17	
Lab ID: 08-126-03						
Client ID: EVAMS-20170809						
Copper	ND	1.0	200.8		8-16-17	
Zinc	ND	5.0	200.8		8-16-17	
Lab ID: 08-126-04						
Client ID: EVALSS-20170809						
Copper	ND	1.0	200.8		8-16-17	
Zinc	ND	5.0	200.8		8-16-17	
Lab ID: 08-126-05						
Client ID: MONMN-20170809						
Copper	ND	1.0	200.8		8-16-17	
Zinc	ND	5.0	200.8		8-16-17	
Lab ID: 08-126-06						
Client ID: MONMS-20170809						
Copper	ND	1.0	200.8		8-16-17	
Zinc	ND	5.0	200.8		8-16-17	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-126-07					
Client ID:	MONM-20170809					
Copper	ND	1.0	200.8		8-16-17	
Zinc	ND	5.0	200.8		8-16-17	
Lab ID:	08-126-08					
Client ID:	SEIMN-20170809					
Copper	ND	1.0	200.8		8-16-17	
Zinc	ND	5.0	200.8		8-16-17	
Lab ID:	08-126-09					
Client ID:	SEIMS20170809					
Copper	ND	1.0	200.8		8-16-17	
Zinc	ND	5.0	200.8		8-16-17	
Lab ID:	08-126-10					
Client ID:	TOSMI-20170809					
Copper	ND	1.0	200.8		8-16-17	
Zinc	8.2	5.0	200.8		8-16-17	
Lab ID:	08-126-11					
Client ID:	TOSMO-20170809					
Copper	ND	1.0	200.8		8-16-17	
Zinc	ND	5.0	200.8		8-16-17	
Lab ID:	08-126-12					
Client ID:	TYLMI-20170809					
Copper	ND	1.0	200.8		8-16-17	
Zinc	ND	5.0	200.8		8-16-17	



Date of Report: August 26, 2017
 Samples Submitted: August 9, 2017
 Laboratory Reference: 1708-126
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-126-13					
Client ID:	TYLMO-20170809					
Copper	ND	1.0	200.8		8-16-17	
Zinc	ND	5.0	200.8		8-16-17	

Lab ID:	08-126-14					
Client ID:	QA32-20170809					
Copper	ND	1.0	200.8		8-16-17	
Zinc	ND	5.0	200.8		8-16-17	



Date of Report: August 26, 2017
Samples Submitted: August 9, 2017
Laboratory Reference: 1708-126
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 8-16-17
Matrix: Water
Units: ug/L (ppb)
Lab ID: MB0816D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: August 26, 2017
Samples Submitted: August 9, 2017
Laboratory Reference: 1708-126
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 8-16-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-126-14

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: August 26, 2017
Samples Submitted: August 9, 2017
Laboratory Reference: 1708-126
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
MS/MSD QUALITY CONTROL**

Date Analyzed: 8-16-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-126-14

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	74.4	93	75.4	94	1	
Zinc	80.0	81.2	102	81.6	102	0	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
 13600 NE 126TH PL
 Suite C
 Kirkland, WA 98034
 (425) 885-1664

**Professional
 Analytical
 Services**

Aug 22 2017
 On-Site Environmental
 14648 NE 95th ST
 Redmond, WA 98052
 Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COUMI-20170809	Water	17-A013134	Micro, NUT
COUMO-20170809	Water	17-A013135	Micro, NUT
EVAMS-20170809	Water	17-A013136	Micro, NUT
EVALSS-20170809	Water	17-A013137	Micro, NUT
MONMN-20170809	Water	17-A013138	Micro, NUT
MONMS-20170809	Water	17-A013139	Micro, NUT
MONM-20170809	Water	17-A013140	Micro, NUT
SEIMN-20170809	Water	17-A013141	Micro, NUT
SEIMS-20170809	Water	17-A013142	Micro, NUT
TOSMI-20170809	Water	17-A013143	Micro, NUT
TOSMO-20170809	Water	17-A013144	Micro, NUT
TYLMI-20170809	Water	17-A013145	Micro, NUT
TYLMO-20170809	Water	17-A013146	Micro, NUT
QA-20170809	Water	17-A013147	Micro, NUT

Your samples were received on Thursday, August 10, 2017. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


 Aaron W. Young
 Laboratory Manager

Project #: 14-05806-000
 PO Number: 08-126

BACT = Bacteriological
 CONV = Conventionals

MET = Metals
 ORG = Organics

NUT=Nutrients
 DEM=Demand

P.1
 MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



*Professional
Analytical
Services*

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
PO Number: 08-126
All results reported on an as received basis.

Date Received: 08/10/17
Date Reported: 8/22/17

AMTEST Identification Number 17-A013134
Client Identification COUMI-20170809
Sampling Date 08/09/17, 14:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	200	CFU/100 ml		1	SM 9222D	JM	08/10/17
Total Nitrogen (NOX&TKN)	0.69	mg/l		0.1			
Total Nitrogen (TKN)	0.329	mg/l		0.1	SM4500N	JC	08/16/17
Nitrate + Nitrite	0.36	mg/l		0.01	SM4500NO3	JC	08/11/17

AMTEST Identification Number 17-A013135
Client Identification COUMO-20170809
Sampling Date 08/09/17, 15:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	400	CFU/100 ml		1	SM 9222D	JM	08/10/17
Total Nitrogen (NOX&TKN)	0.77	mg/l		0.1			
Total Nitrogen (TKN)	0.304	mg/l		0.1	SM4500N	JC	08/16/17
Nitrate + Nitrite	0.47	mg/l		0.01	SM4500NO3	JC	08/11/17

AMTEST Identification Number 17-A013136
Client Identification EVAMS-20170809
Sampling Date 08/09/17, 13:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	110	CFU/100 ml		1	SM 9222D	JM	08/10/17
Total Nitrogen (NOX&TKN)	2.38	mg/l		0.1			
Total Nitrogen (TKN)	0.476	mg/l		0.1	SM4500N	JC	08/16/17
Nitrate + Nitrite	1.9	mg/l		0.01	SM4500NO3	JC	08/11/17

AMTEST Identification Number 17-A013137
Client Identification EVALSS-20170809
Sampling Date 08/09/17, 14:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	160	CFU/100 ml		1	SM 9222D	JM	08/10/17
Total Nitrogen (NOX&TKN)	1.91	mg/l		0.1			
Total Nitrogen (TKN)	0.407	mg/l		0.1	SM4500N	JC	08/16/17
Nitrate + Nitrite	1.5	mg/l		0.01	SM4500NO3	JC	08/11/17

AMTEST Identification Number 17-A013138
Client Identification MONMN-20170809
Sampling Date 08/09/17, 12:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	330	CFU/100 ml		1	SM 9222D	JM	08/10/17
Total Nitrogen (NOX&TKN)	0.53	mg/l		0.1			
Total Nitrogen (TKN)	0.373	mg/l		0.1	SM4500N	JC	08/16/17
Nitrate + Nitrite	0.16	mg/l		0.01	SM4500NO3	JC	08/11/17

AMTEST Identification Number 17-A013139
Client Identification MONMS-20170809
Sampling Date 08/09/17, 12:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	80.	CFU/100 ml		1	SM 9222D	JM	08/10/17
Total Nitrogen (NOX&TKN)	0.68	mg/l		0.1			
Total Nitrogen (TKN)	0.655	mg/l		0.1	SM4500N	JC	08/16/17
Nitrate + Nitrite	0.023	mg/l		0.01	SM4500NO3	JC	08/11/17

AMTEST Identification Number 17-A013140
Client Identification MONM-20170809
Sampling Date 08/09/17, 10:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2600	CFU/100 ml		1	SM 9222D	JM	08/10/17
Total Nitrogen (NOX&TKN)	0.81	mg/l		0.1			
Total Nitrogen (TKN)	0.430	mg/l		0.1	SM4500N	JC	08/16/17
Nitrate + Nitrite	0.38	mg/l		0.01	SM4500NO3	JC	08/11/17

AMTEST Identification Number 17-A013141
Client Identification SEIMN-20170809
Sampling Date 08/09/17, 11:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	370	CFU/100 ml		1	SM 9222D	JM	08/10/17
Total Nitrogen (NOX&TKN)	0.78	mg/l		0.1			
Total Nitrogen (TKN)	0.375	mg/l		0.1	SM4500N	JC	08/16/17
Nitrate + Nitrite	0.41	mg/l		0.01	SM4500NO3	JC	08/11/17

AMTEST Identification Number 17-A013142
Client Identification SEIMS-20170809
Sampling Date 08/09/17, 10:05

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	180	CFU/100 ml		1	SM 9222D	JM	08/10/17
Total Nitrogen (NOX&TKN)	0.59	mg/l		0.1			
Total Nitrogen (TKN)	0.346	mg/l		0.1	SM4500N	JC	08/16/17
Nitrate + Nitrite	0.24	mg/l		0.01	SM4500NO3	JC	08/11/17

AMTEST Identification Number 17-A013143
Client Identification TOSMI-20170809
Sampling Date 08/09/17, 14:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1400	CFU/100 ml		1	SM 9222D	JM	08/10/17
Total Nitrogen (NOX&TKN)	1.44	mg/l		0.1			
Total Nitrogen (TKN)	0.470	mg/l		0.1	SM4500N	JC	08/16/17
Nitrate + Nitrite	0.97	mg/l		0.01	SM4500NO3	JC	08/11/17

AMTEST Identification Number 17-A013144
Client Identification TOSMO-20170809
Sampling Date 08/09/17, 15:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	820	CFU/100 ml		1	SM 9222D	JM	08/10/17
Total Nitrogen (NOX&TKN)	0.91	mg/l		0.1			
Total Nitrogen (TKN)	0.371	mg/l		0.1	SM4500N	JC	08/16/17
Nitrate + Nitrite	0.54	mg/l		0.01	SM4500NO3	JC	08/11/17

AMTEST Identification Number 17-A013145
Client Identification TYLMI-20170809
Sampling Date 08/09/17, 13:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	380	CFU/100 ml		1	SM 9222D	JM	08/10/17
Total Nitrogen (NOX&TKN)	1.54	mg/l		0.1			
Total Nitrogen (TKN)	0.343	mg/l		0.1	SM4500N	JC	08/16/17
Nitrate + Nitrite	1.2	mg/l		0.01	SM4500NO3	JC	08/11/17

AMTEST Identification Number 17-A013146
Client Identification TYLMO-20170809
Sampling Date 08/09/17, 13:00

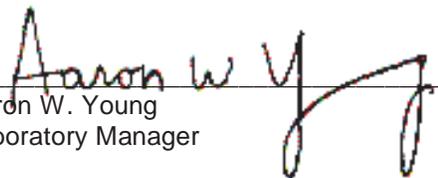
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	8800	CFU/100 ml		1	SM 9222D	JM	08/10/17
Total Nitrogen (NOX&TKN)	0.80	mg/l		0.1			
Total Nitrogen (TKN)	0.470	mg/l		0.1	SM4500N	JC	08/16/17
Nitrate + Nitrite	0.33	mg/l		0.01	SM4500NO3	JC	08/11/17

AMTEST Identification Number 17-A013147
Client Identification QA-20170809
Sampling Date 08/09/17, 12:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	420	CFU/100 ml		1	SM 9222D	JM	08/10/17
Total Nitrogen (NOX&TKN)	1.53	mg/l		0.1			
Total Nitrogen (TKN)	0.432	mg/l		0.1	SM4500N	JC	08/16/17
Nitrate + Nitrite	1.1	mg/l		0.01	SM4500NO3	JC	08/11/17


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 17-A013134 to 17-A013147

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
17-A013131	Fecal Coliform	CFU/100 ml	150	240	46.
17-A013134	Fecal Coliform	CFU/100 ml	200	210	4.9
17-A013113	Total Nitrogen (TKN)	mg/l	0.316	0.306	3.2
17-A013138	Total Nitrogen (TKN)	mg/l	0.373	0.403	7.7
17-A013147	Total Nitrogen (TKN)	mg/l	0.432	0.437	1.2
17-A013336	Total Nitrogen (TKN)	mg/l	0.449	0.414	8.1
17-A013027	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	
17-A013031	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	
17-A013125	Nitrate + Nitrite	mg/l	0.66	0.68	3.0
17-A013131	Nitrate + Nitrite	mg/l	0.64	0.65	1.6
17-A013145	Nitrate + Nitrite	mg/l	1.2	1.2	0.00

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
17-A012828	Total Nitrogen (TKN)	mg/l	0.469	2.48	2.00	100.55 %
17-A013113	Total Nitrogen (TKN)	mg/l	0.316	2.39	2.50	82.96 %
17-A013138	Total Nitrogen (TKN)	mg/l	0.373	3.03	2.50	106.28 %
17-A013147	Total Nitrogen (TKN)	mg/l	0.432	2.45	2.50	80.72 %
17-A013336	Total Nitrogen (TKN)	mg/l	0.449	2.54	2.50	83.64 %
17-A013027	Nitrate + Nitrite	mg/l	< 0.01	2.5	2.5	100.00 %
17-A013031	Nitrate + Nitrite	mg/l	< 0.01	2.4	2.5	96.00 %
17-A013125	Nitrate + Nitrite	mg/l	0.66	3.2	2.5	101.60 %
17-A013131	Nitrate + Nitrite	mg/l	0.64	3.1	2.5	98.40 %
17-A013145	Nitrate + Nitrite	mg/l	1.2	3.7	2.5	100.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	1.00	0.997	99.7 %
Total Nitrogen (TKN)	mg/l	1.00	1.04	104. %
Nitrate + Nitrite	mg/l	2.5	2.5	100. %
Nitrate + Nitrite	mg/l	2.5	2.5	100. %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1

QC Summary for sample numbers: 17-A013134 to 17-A013147...

BLANKS continued....

ANALYTE	UNITS	RESULT
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3381

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 08-126

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COUMI-20170809 13134	8/9/17	14:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMO-20170809 35	8/9/17	15:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	EVAMS-20170809 36	8/9/17	14:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVALSS-20170809 37	8/9/17	13:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	MONMN-20170809 38	8/9/17	12:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMS-20170809 39	8/9/17	12:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONM-20170809 40	8/9/17	10:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	SEIMN-20170809 41	8/9/17	11:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMS-20170809 42	8/9/17	10:05	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company	Date	Time	Comments/Special Instructions	
Relinquished by:		OnSite Env	8/10/17	700	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L	
Received by:		Amtest T=4.5	8/10/17	700		
Relinquished by:						
Received by:						
Relinquished by:						
Received by:						

times for EVAMS & EVALSS are switched on the bottles M.



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

CHAIN OF CUSTODY

Turnaround Requested:

 1 Day
 2 Day
 3 Day
 Standard

Laboratory No.

08-126

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2017 No Sample	8-9-17	N/A	Water	7	X	X	X	X	X	X	X	X	X
12	COUMI-2017 0809	8-9-17	1445	Water	7	X	X	X	X	X	X	X	X	X
23	COUMO-2017 0809		1500	Water	7	X	X	X	X	X	X	X	X	X
34	EVAMS-2017 0809		1400	Water	7	X	X	X	X	X	X	X	X	X
54	EVALSS-2017 0809		1345	Water	7	X	X	X	X	X	X	X	X	X
65	MONMN-2017 0809		1215	Water	7	X	X	X	X	X	X	X	X	X
76	MONMS-2017 0809		1240	Water	7	X	X	X	X	X	X	X	X	X
87	MONM-2017 0809		1040	Water	7	X	X	X	X	X	X	X	X	X
98	SEIMN-2017 0809		1115	Water	7	X	X	X	X	X	X	X	X	X
9	10 SEIMS-2017 0809		1005	Water	7	X	X	X	X	X	X	X	X	X
10	TOSMI-2017 0809		1430	Water	7	X	X	X	X	X	X	X	X	X
11	112 TOSMO-2017 0809		1510	Water	7	X	X	X	X	X	X	X	X	X
12	12 TYLMI-2017 0809		1315	Water	7	X	X	X	X	X	X	X	X	X
13	14 TYLMO-2017 0809		1300	Water	7	X	X	X	X	X	X	X	X	X
14	18 QA 32-20170809		1230	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by miamthw Date 8/9/17 Received by [Signature] Date 8/9/17
 Firm Herrera Time 1545 Firm [Signature] Time 1545
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants
 Project No.: 14-05806-000
 Project Name: Redmond Paired Watershed Study
 Project Manager: George Itner

CHAIN OF CUSTODY

Turnaround Requested:

1 Day

2 Day

3 Day

Standard

Laboratory No. **08-126**

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2017 No Sample	8.9.17	NA	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2017 0809	8.9.17	1445	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2017 0809		1500	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2017 0809		1400	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2017 0809		1345	Water	7	X	X	X	X	X	X	X	X	X
10	MONMN-2017 0809		1215	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2017 0809		1240	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2017 0809		1040	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2017 0809		1115	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2017 0809		1006	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2017 0809		1430	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2017 0809		1510	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2017 0809		1315	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2017 0809		1300	Water	7	X	X	X	X	X	X	X	X	X
16	QA 32-2017089		1230	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by Miaun Date 8.9.17 Received by [Signature] Date 8/9/17

Firm Herrera Time 1545 Firm [Signature] Time 1545

Relinquished by _____ Date _____ Received by _____ Date _____

Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number: 14-05806-000
Personnel Performing Calibration: A. SVENDSEN
Meter: YSI Pro DSS
Date/Time: 2/9/17 0835
Barometric Pressure Start of Day: mmHg: 757.5 Time: 0835
Barometric Pressure End of Day: mmHg: ~~757.6~~ 755.6 Time: 1843

Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
 Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:



1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	4.1	0	24.7	
Conductivity (µS/cm)	98.8	1,000	24.6	CALIB'D SENSOR READS 1000 µS/cm AFTER CAL
Conductivity (µS/cm)	101.0	100	24.6	
DO % Saturation	98.6	100	24.5	CALIB'D SENSOR READS 100% AFTER CAL
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	4.3	0	24.7	
Conductivity (µS/cm)	100.4	100	24.6	
DO % Saturation	100.1	100	26.4	

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB AS		SITE ID: COLM	
Sample Date: 8.9.17	Sample Time: 1145	PDT: <input checked="" type="checkbox"/>	Project Number: 14-05806-000
Base Flow or Storm Event? Base	Field Filtered Time: 1150	PST: <input type="checkbox"/>	

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY / smoky 77°F

Water Quality Sampling

Sample ID: **COLM · 20170809**

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: _____

Color: _____

Odor: _____

Sheen: _____

Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Fran Leub Signature: [Signature]

Date Checked: 9-19-17 Time: 7

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1 _____

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): _____

Reference Point (description): _____

Water Quality Measurements

Temperature (°C) _____

Specific Conductivity (µs/cm) _____

Dissolved Oxygen (mg/L) _____

No water - dry channel

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

 Field Personnel: BB AS

 Sample Date: 8.9.17

 Sample Time: 1445

 PDT

SITE ID:

COUM1

 Base Flow or Storm Event? Base

 Field Filtered Time: 1430

PST:

Project Number: 14-05806-000


HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp:

sunny/smoky 89°F

Water Quality Sampling

 Sample ID: COUM1-20170809

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	✓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

 Clarity: clear

 Color: none

Odor:

Sheen:

Floatables:

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

 Checked By: J. Cook

 Signature: [Signature]

 Date Checked: 9-19-17

Time:

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020)

 YSI Pro DSS 1

YSI Pro DSS 2

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

 Stream Stage (ft): 2.08

 Reference Point (description): SG

Water Quality Measurements

 Temperature (°C) 17.0

 Specific Conductivity (µs/cm) 346.3

 Dissolved Oxygen (mg/L) 9.43

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB AS
 Sample Date: 8.9.17 Sample Time: 1500 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 1506 PST:
(Must filter within 15 minutes of collection)

SITE ID: LOUMD
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: sunny / smoky 88°F

Water Quality Sampling

Sample ID: LOUMD-20170809

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: S. L. [Signature] Signature: [Signature]
 Date Checked: 9-19-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.25
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 18.3
 Specific Conductivity (µs/cm) 328.5
 Dissolved Oxygen (mg/L) 9.14

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB AS
 Sample Date: 8.9.17 Sample Time: 1345 PDT
 Base Flow or Storm Event? BASE Field Filtered Time: 1350 PST:
(Must filter within 15 minutes of collection)

SITE ID: EVAMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny/Smoky 86°F

Water Quality Sampling

Sample ID: EVAMS - 20170809

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: None
 Odor: L
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: S. Leitch Signature: [Signature]
 Date Checked: 9-19-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.90
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 15.7
 Specific Conductivity (µs/cm) 237.0
 Dissolved Oxygen (mg/L) 9.67

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: MB AS
 Sample Date: 8.9.17 Sample Time: 1400 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 1405 PST:
(Must filter within 15 minutes of collection)

SITE ID: EVALSS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: Sunny/Smoky 88°F

Water Quality Sampling

Sample ID: EVALSS-20170809

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input checked="" type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input checked="" type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input checked="" type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: S. Leath Signature: [Signature]
 Date Checked: 9-19-17 Time: _____
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.20
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 15.9
 Specific Conductivity (µs/cm) 216.6
 Dissolved Oxygen (mg/L) 9.82

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB AS
 Sample Date: 8.9.17 Sample Time: 12:15 PDT:
 Base Flow or Storm Event? BASE Field Filtered Time: 12:20 PST:
(Must filter within 15 minutes of collection)

SITE ID: MONMN
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: MONMN-20170809

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input checked="" type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input checked="" type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input checked="" type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Z. Lenth Signature: [Signature]
 Date Checked: 9/19/17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny/smoky 82°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 8.89
 Reference Point (description): sq

Water Quality Measurements

Temperature (°C) 16.9
 Specific Conductivity (µs/cm) 213.6
 Dissolved Oxygen (mg/L) 8.63

SAW ~5 fm (spp?)

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB AS
 Sample Date: 8.9.17 Sample Time: 1240 PDT:
 Base Flow or Storm Event? BASE Field Filtered Time: 1245 PST:
(Must filter within 15 minutes of collection)

SITE ID: MONMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny/smoky 82°F

Water Quality Sampling

Sample ID: MONMS-20170809

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	}
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: silty
 Color: light yellow
 Odor: none
 Sheen: none
 Floatables: fine silt

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. Leavelle Signature: [Signature]
 Date Checked: 8-10-17 Time: _____
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 6.86
 Reference Point (description): vault

Water Quality Measurements

Temperature (°C) 19.3
 Specific Conductivity (µs/cm) 419.8
 Dissolved Oxygen (mg/L) 4.84

Samples B mm ~6' upstream from culvert

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB AS
 Sample Date: 8-9-17 Sample Time: 10:40 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 10:45 PST:
(Must filter within 15 minutes of collection)

SITE ID: MONM
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny/Smoky 73°F

Water Quality Sampling

Sample ID: MONM-20170809

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: _____
 Sheen: ✓
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: S. Leuth Signature: [Signature]
 Date Checked: 9-19-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 X
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): NA
 Reference Point (description): NA

Water Quality Measurements

Temperature (°C) 15.7
 Specific Conductivity (µs/cm) 240.2
 Dissolved Oxygen (mg/L) 9.08

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB AS
 Sample Date: 8.9.17 Sample Time: 11:15 PDT
 Base Flow or Storm Event? Base Field Filtered Time: 11:20 PST:
(Must filter within 15 minutes of collection)

SITE ID: SEIMN
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny/Smoky 75°F

Water Quality Sampling

Sample ID: SEIMN-20170809

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: S. Leuth Signature: _____
 Date Checked: 8-19-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 21 cm = 0.689'
 Reference Point (description): bottom of volt → H₂O

Water Quality Measurements

Temperature (°C) 13.6
 Specific Conductivity (µs/cm) 122.1
 Dissolved Oxygen (mg/L) 10.17

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AB AS
 Sample Date: 8.9.17 Sample Time: 10:05 PDT
 Base Flow or Storm Event? BASE Field Filtered Time: 10:10 PST
(Must filter within 15 minutes of collection)

SITE ID: SEIMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny / smoky @ 73°F

Water Quality Sampling

Sample ID: SEIMS-20170809

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: _____
 Sheen: _____
 Floatables: big debris (wght)

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. Lumb Signature: [Signature]
 Date Checked: 9-19-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): .073
 Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 13.9
 Specific Conductivity (µs/cm) 130.8
 Dissolved Oxygen (mg/L) 9.80

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB AS
 Sample Date: 8.9.17 Sample Time: 1430 PDT
 Base Flow or Storm Event? Base Field Filtered Time: 1435 PST:
(Must filter within 15 minutes of collection)

SITE ID: TOSMI
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: TOSMI-20170809

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. Lenth Signature: [Signature]
 Date Checked: 9-19-17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny/Smoky 90°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.90
 Reference Point (description): SK

Water Quality Measurements

Temperature (°C) 17.0
 Specific Conductivity (µs/cm) 312.9
 Dissolved Oxygen (mg/L) 9.31

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB AS

Sample Date: 8-9-17

Sample Time: 1510

PDT

SITE ID: TOSMO

Base Flow or Storm Event? Base

Field Filtered Time: 1515

PST:

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny / smoky 89°F

Water Quality Sampling

Sample ID: TOSMO-20170809

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: ✓
 Sheen: ✓
 Floatables: _____

LABORATORY DELIVERY

Date: _____

Time: _____

Quality Assurance

Checked By: S. Leuth

Signature: [Signature]

Date Checked: 9-19-17

Time: _____

Data Entered into Database? _____

YES NO initials: _____

Date Entered: _____

Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.55

Reference Point (description): SG

Water Quality Measurements

Temperature (°C) 16.3

Specific Conductivity (µs/cm) 255.40

Dissolved Oxygen (mg/L) 9.70

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



HERRERA

Field Personnel: BB AS

SITE

ID: TYLMI

Sample Date: 8-9-17

Sample Time: 1315

PDT

Base Flow or Storm Event? BASE

Field Filtered Time: 1320

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: TYLMI-20170809

Current Weather and Temp: Sunny / smoky 85°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	Y
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QA 32 - 20170809 @ 12:30

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor:
 Sheen:
 Floatables:

LABORATORY DELIVERY

Date: _____ Time: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____

YSI Pro DSS 1 _____

YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 55.5 inches = 4.625'

Reference Point (description): TOP OF CULVERT TO H₂O SURFACE

Water Quality Measurements

Temperature (°C) 18.2

Specific Conductivity (µs/cm) 251.4

Dissolved Oxygen (mg/L) 8.80

Quality Assurance

Checked By: [Signature]

Signature: [Signature]

Date Checked: 9-19-17

Time: _____

Data Entered into Database? _____

YES NO initials: _____

Date Entered: _____

Time: _____

Notes: _____

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: BB AS
 Sample Date: 8.9.17 Sample Time: 1300 PDT
 Base Flow or Storm Event? Base Field Filtered Time: 1305 PST:
(Must filter within 15 minutes of collection)

SITE ID: TYLMO
 Project Number: 14-05806-000

Water Quality Sampling

Sample ID: TYLMO-20170809

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: _____
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: S. Lenth Signature: _____
 Date Checked: 9.19.17 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny/Smoky 85°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI Pro Plus (15D100020) _____
 YSI Pro DSS 1 _____
 YSI Pro DSS 2 _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 89 cm = 2.92'
 Reference Point (description): culvert ↓

Water Quality Measurements

Temperature (°C) 16.8
 Specific Conductivity (µs/cm) 224.3
 Dissolved Oxygen (mg/L) 9.36



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Sample Date/Sample ID: 8/09/2017 / All sites, 1 FD (QA32) at TYLMI

By G. Catarra

Date 8/30/2017 Page 1 of 2

Checked: initials JL

date 8/19/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	7	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	92	±20	7	≤25	D=0.2	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	2	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	0	≤25	8.7	≤25	OK	NONE
Hardness	OK / SM 2340B	NA	NA	6	≤180	≤1.0 mg/L 1.0 mg/L	88,92	±25	104	±15	5	≤20	0	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	7	≤28	≤1.0 mg/L 1.0 mg/L	101	±25	110	±15	2	≤20	D=0.5	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	9	≤28	≤0.01 mg/L 0.01 mg/L	104	±25	100	±20	3	≤20	D=0.002	≤20	OK	NONE
Total Nitrogen (TKN + N+N)	OK/ SM 4500 N-B	NA	NA	2,7	≤28	≤0.1 mg/L 0.1 mg/L	81-106	±25	100-104	±20	0-7.7	≤20	D=0.089, 8.7	≤20	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 8/30/2017 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 8/09/2017 / All sites, 1 FD (QA32) at TYLMI

date 8/19/2017

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	7	≤180	≤1.0 µg/L 1.0 µg/L	94,94	±25	NR	±15	7	≤20	D=0.2	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	7	≤180	≤5.0 µg/L 5.0 µg/L	111,112	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	7	≤180	≤1.0 µg/L 1.0 µg/L	93,94	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	7	≤180	≤5.0 µg/L 5.0 µg/L	102,102	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	4.9	≤35	10	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.

APPENDIX G

Data Validation Memorandum for Water Quality Monitoring

Herrera Environmental Consultants, Inc.

Memorandum

To Project File 14-05806-000
From Gina Catarra, Herrera Environmental Consultants
Date December 21, 2017
Subject Data Quality Assurance Review of the Redmond Paired Watershed Stormwater Retrofit Effectiveness Water Quality Monitoring Data

This memorandum presents a review of data quality for 244 water samples (including 16 field duplicates, 3 filter blanks, and 1 transfer blank) collected for the Redmond Paired Watershed Stormwater Retrofit Effectiveness Study between November 5, 2016, and August 9, 2017. OnSite Environmental, Inc., of Redmond, Washington analyzed the samples for:

- Total suspended solids (TSS) by Standard Method 2540D
- Turbidity by EPA method 180.1
- Hardness by Standard Method 2340B
- Dissolved organic carbon (DOC) by Standard Method 5310B
- Total phosphorus by EPA method 365.1
- Total and dissolved metals (copper and zinc) by EPA method 200.8.

In addition, Am Test Inc., of Kirkland, Washington analyzed the samples for:

- Total nitrogen (total Kjeldahl nitrogen [TKN] and nitrate + nitrite nitrogen) by Standard Methods 4500-N and 4500-NO₃, respectively
- Fecal coliform by Standard Method 9222D.

Results for the following samples were validated.

Date Collected	Lab SDG	Samples Collected	QC Samples Collected
11/05/2016	1611-079	All 14 stations	1 field duplicate
11/18/2016	1611-198	All 14 stations	1 field duplicates, 1 filter blank, 1 transfer blank
12/09/2016	1612-083	All 14 stations	1 field duplicate
1/05/2017	1701-013	All 14 stations	1 field duplicate
1/08/2017	1701-030	All 14 stations	1 field duplicate

Date Collected	Lab SDG	Samples Collected	QC Samples Collected
1/17/2017	1701-094	All 14 stations	1 field duplicate, 1 filter blank
2/03/2017	1702-036	All 14 stations	1 field duplicate
2/08/2017	1702-068	All 14 stations	1 field duplicate
3/07/2017	1703-054	All 14 stations	1 field duplicate
4/12/2017	1704-114	All 14 stations	1 field duplicate
5/04/2017	1705-081	All 14 stations	1 field duplicate
5/08/2017	1705-112	All 14 stations	1 field duplicate
5/15/2017	1705-205	All 14 stations	1 field duplicate
6/08/2017	1706-104	All 14 stations	1 field duplicate, 1 filter blank
6/15/2017	1706-182	All 14 stations	1 field duplicate
8/09/2017	1708-126	All except COLM	1 field duplicate

The laboratory's performance was reviewed in accordance with quality control (QC) criteria established in the *Redmond Paired Watershed Study Quality Assurance Project Plan (QAPP)* (Herrera 2015), by the laboratory, and in the specified methods.

Quality control data summaries submitted by the laboratories were reviewed; raw data were not submitted by the laboratories. Data Quality Assurance Worksheets were completed for each laboratory report and are included as an Attachment to this memorandum. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below, followed by definitions of data qualifiers.

Custody, Preservation, Holding Times, and Completeness—Acceptable with Qualification

The samples were properly preserved and sample custody was maintained from sample collection to receipt at the laboratories. With the exception noted below, samples were analyzed within the required method holding times. The laboratory report was complete and contained results for all samples and tests requested on the chain-of-custody (COC) forms.

The holding time (1 day) was exceeded by 1 day for all samples collected on 11/05/2016 for fecal coliform bacteria analysis. Samples were qualified as estimated (flagged J) due to the holding time exceedance, as shown in the table below.

Date Collected	Lab SDG	Sample Location	Parameter	Reason for Qualification	Data Flag
11/05/2016	1611-079	All locations	Fecal coliform bacteria	Holding time exceedance	J

Laboratory Reporting Limits—Acceptable

The laboratory reporting limits met those established in the QAPP. No data were qualified based on laboratory reporting limits.

Method Blank Analysis—Acceptable

Method blanks were analyzed at the required frequency. Method blanks did not contain levels of target analytes above the laboratory reporting limits.

Filter Blank Analysis—Acceptable with Qualification

Filter blanks were collected on 11/18/2016, 1/17/2017 and 6/08/2017, and analyzed for DOC and dissolved copper and zinc, as required by the QAPP. With the exception noted below, the filter blanks did not contain levels of target analytes above the laboratory reporting limits.

For the filter blank collected on 1/17/2017, dissolved zinc (6.5 µg/L) was detected above the reporting limit (5.0 µg/L). Dissolved zinc was detected in only one sample (TYLMO) above the reporting limit but less than 5 times the filter blank result. The dissolved zinc result for sample TYLMO collected on 1/17/2017 was qualified as estimated (J) due to the filter blank exceedance.

Date Collected	Lab SDG	Sample Location	Parameter	Reason for Qualification	Data Flag
11/17/2016	1611-198	TYLMO	Dissolved zinc	Filter blank exceedance	J

Transfer Blank Analysis—Acceptable with Qualification

A transfer blank (TB) was collected on 11/18/2016 and analyzed for all parameters as required by the QAPP. With the exceptions noted below, the transfer blank did not contain levels of target analytes above the laboratory reporting limits.

Turbidity (0.20 NTU), DOC (1.0 mg/L), total nitrogen (0.28 mg/L), total copper (1.3 µg/L) and dissolved copper (1.6 µg/L) were detected in the transfer blank above the reporting limits. Data were qualified as estimated (J) for any of the parameters listed above when detected above the reporting limit but less than 5 times the transfer blank result, as shown in the table below.

Date Collected	Lab SDG	Sample Location	Parameter	Reason for Qualification	Data Flag
11/18/2016	1611-198	EVAMS	Turbidity	TB exceedance	J
11/18/2016	1611-198	COUMI	DOC, total nitrogen, total copper	TB exceedance	J
11/18/2016	1611-198	COUMO	DOC, total nitrogen	TB exceedance	J
11/18/2016	1611-198	COLM	Total nitrogen	TB exceedance	J
11/18/2016	1611-198	MONMN	Total nitrogen	TB exceedance	J
11/18/2016	1611-198	MONMS	Total nitrogen, total copper	TB exceedance	J
11/18/2016	1611-198	MONM	Total nitrogen	TB exceedance	J
11/18/2016	1611-198	SEIMN	Total nitrogen	TB exceedance	J
11/18/2016	1611-198	SEIMS	Total nitrogen	TB exceedance	J
11/18/2016	1611-198	TOSMI	Total nitrogen, total and dissolved copper	TB exceedance	J
11/18/2016	1611-198	TOSMO	DOC, total nitrogen, total copper	TB exceedance	J
11/18/2016	1611-198	TYLMI	Total nitrogen, total and dissolved copper	TB exceedance	J
11/18/2016	1611-198	TYLMO	Total nitrogen, total copper	TB exceedance	J

Laboratory Control Sample Analysis—Acceptable

Blank spike samples were analyzed with project samples for TSS, hardness, DOC, total phosphorus, and total nitrogen at the required frequency. The percent recovery values for all compounds met the criteria established in the QAPP.

Matrix Spike Analysis—Acceptable

Matrix spike samples were analyzed for hardness, DOC, total phosphorus, total nitrogen, total copper and zinc, and dissolved copper and zinc. The percent recovery values for all parameters met the control limits established in the QAPP.

Laboratory Duplicate Analysis—Acceptable with Qualification

Laboratory duplicates were analyzed for all parameters. The relative percent difference (RPD) was calculated for each analyte where both duplicate values were greater than five times the reporting limit (RL). The difference between duplicate values was calculated if the detected compound concentration was less than five times the RL in either the sample or the field duplicate. With the exceptions noted below, the relative percent difference (RPD) values or difference values met the control limits established by the laboratory.

As shown in the table below, several laboratory duplicate RPD values did not meet the criteria established in the QAPP. The sample was qualified as estimated (flagged J) due to the laboratory duplicate exceedance.

Date Collected	Lab SDG	Sample Location	Parameter	Reason for Qualification	Data Flag
11/18/2016	1611-198	COUMO	Fecal coliform	Lab duplicate exceedance	J
12/09/2016	1612-083	MONMS	Total nitrogen	Lab duplicate exceedance	J
2/03/2017	1702-036	TYLMO	Fecal coliform	Lab duplicate exceedance	J
2/08/2017	1702-068	TYLMO	Fecal coliform	Lab duplicate exceedance	J
2/08/2017	1702-068	EVALS	Total nitrogen	Lab duplicate exceedance	J

Field Duplicate Analysis—Acceptable with Qualification

Field duplicates were analyzed for all parameters at the required frequency (16 field duplicates analyzed in total). The relative percent difference (RPD) was calculated for each analyte where both duplicate values were greater than five times the reporting limit (RL). The difference between duplicate values was calculated if the detected compound concentration was less than five times the RL in either the sample or the field duplicate. With the exceptions noted below, the relative percent difference (RPD) values or difference values met the control limits established in the QAPP.

As shown in the table below, several field duplicate values did not meet the criteria established in the QAPP. The sample and associated duplicate were qualified as estimated (flagged J) due to the field duplicate exceedance.

Date Collected	Lab SDG	Sample Location	Duplicate ID	Parameter	Reason for Qualification	Data Flag
11/05/2016	1611-079	TYLMI	QA13	TSS	Field duplicate exceedance	J
12/09/2016	1612-083	COUMI	QA17	Total nitrogen	Field duplicate exceedance	J
1/05/2017	1701-013	MONMS	QA18	Total nitrogen	Field duplicate exceedance	J
1/08/2017	1701-030	EVALSS	QA19	TSS and turbidity	Field duplicate exceedance	J
1/17/2017	1701-094	MONM	QA21	Turbidity and total nitrogen	Field duplicate exceedance	J
2/03/2017	1702-036	EVAMS	QA22	Total nitrogen and fecal coliform	Field duplicate exceedance	J
2/08/2017	1702-068	COUMO	QA23	Total phosphorus and total nitrogen	Field duplicate exceedance	J
4/12/2017	1704-114	COLM	QA25	TKN and fecal coliform	Field duplicate exceedance	J
5/04/2017	1705-081	TOSMI	QA26	TSS, turbidity, hardness, total phosphorus, TKN, total copper and zinc	Field duplicate exceedance	J
5/08/2017	1705-112	TOSMO	QA27	Turbidity	Field duplicate exceedance	J
5/15/2017	1705-205	TYLMO	QA28	Hardness, TKN, total copper and zinc	Field duplicate exceedance	J
6/15/2017	1706-182	SEIMN	QA31	Turbidity	Field duplicate exceedance	J

Definition of Data Qualifiers

The following data qualifier definitions are taken from the QAPP (Herrera 2015).

- U** Value is below the reporting limit.
- J** Value is an estimate based on analytical results.
- UJ** Value is below the reporting limit and is an estimate based on analytical results.
- R** Value is rejected based on analytical results.

References

Herrera. 2015. Redmond Paired Watershed Study Quality Assurance Project Plan. Herrera Environmental Consultants, Seattle, Washington. December 31.

APPENDIX H

Summary Statistics for Pollutant Concentrations Measured in Storm Event and Base Flow Samples

Table H-1. Summary Statistics for Total Suspended Solids Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (mg/L)	25th Percentile (mg/L)	Median (mg/L)	75th Percentile (mg/L)	Maximum (mg/L)	Interquartile Range (mg/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVALSS	4	<1.0	2.8	4.8	6.6	7.0	3.7	75%	NA
EVAMS	4	<1.0	2.1	2.6	4.1	8.4	1.9	75%	NA
MONM	4	<1.0	1.2	2.1	3.1	4.0	1.9	75%	NA
MONMN	4	<1.0	1.4	1.8	2.3	3.2	0.9	75%	NA
MONMS	4	<1.0	1.2	1.5	1.9	2.8	0.7	75%	NA
TOSMO	4	<1.0	2.2	2.5	2.8	3.4	0.6	75%	NA
TOSMI	4	<1.0	1.2	1.5	2.1	3.4	0.9	75%	NA
COLM	3	<1.0	1.4	1.4	1.4	1.4	0.0	33%	NA
SEIMN	4	3.6	3.9	4.8	5.8	6.2	1.9	100%	NA
SEIMS	4	3.0	4.1	4.9	5.8	6.8	1.7	100%	NA
COUMO	4	2.8	3.3	3.6	4.0	4.6	0.8	100%	NA
COUMI	4	3.2	5.5	6.8	10.3	19.0	4.9	100%	NA
TYLMO	4	<1.0	1.1	1.7	3.3	7.0	2.1	75%	NA
TYLMI	4	<1.0	<1.0	2.6	5.5	9.2	>4.5	100%	NA
Storm Event Samples									
EVALSS	12	3.0	9.6	13.5	24.0	90.0	14.4	100%	NA
EVAMS	12	4.4	11.4	15.5	19.5	150.0	8.2	100%	NA
MONM	12	3.6	10.8	18.5	31.8	38.0	21.0	100%	NA
MONMN	12	1.6	7.2	10.2	19.3	31.0	12.1	100%	NA
MONMS	12	3.8	5.4	8.2	10.1	18.0	4.7	100%	NA
TOSMO	12	6.2	18.6	47.0	475.0	740.0	456.4	100%	NA
TOSMI	12	7.8	38.5	102.0	187.5	440.0	149.0	100%	NA
COLM	12	1.0	1.2	2.8	3.8	6.0	2.6	100%	NA
SEIMN	12	4.8	12.8	21.0	30.5	110.0	17.8	100%	NA
SEIMS	12	5.6	26.8	33.0	42.3	61.0	15.5	100%	NA
COUMO	12	3.2	10.3	14.0	56.0	130.0	45.7	100%	NA
COUMI	12	4.4	17.0	37.5	157.5	2800.0	140.5	100%	NA
TYLMO	12	7.8	12.5	30.5	37.8	140.0	25.3	100%	NA
TYLMI	12	2.4	7.2	15.5	21.3	32.0	14.1	100%	NA

mg/L: milligram/liter

Table H-2. Summary Statistics for Total Turbidity Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (NTU)	25th Percentile (NTU)	Median (NTU)	75th Percentile (NTU)	Maximum (NTU)	Interquartile Range (NTU)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVASS	4	0.9	1.0	1.4	1.7	1.8	0.6	100%	NA
EVAMS	4	0.9	1.2	1.9	2.7	3.4	1.5	100%	NA
MONM	4	0.8	1.5	2.4	3.3	4.0	1.8	100%	NA
MONMN	4	1.4	1.5	1.6	1.9	2.6	0.4	100%	NA
MONMS	4	0.5	1.2	1.6	2.0	2.9	0.8	100%	NA
TOSMO	4	0.8	1.4	1.9	2.3	2.4	0.9	100%	NA
TOSMI	4	1.2	1.6	1.7	2.0	2.8	0.4	100%	NA
COLM	3	0.8	0.9	0.9	1.1	1.2	0.2	100%	NA
SEIMN	4	1.4	1.4	1.8	2.4	3.0	1.0	100%	NA
SEIMS	4	1.0	1.3	1.8	2.4	2.8	1.1	100%	NA
COUMO	4	1.2	1.6	1.9	2.2	2.7	0.6	100%	NA
COUMI	4	1.9	2.4	3.3	3.9	4.0	1.5	100%	NA
TYLMO	4	1.3	1.7	1.9	2.4	3.4	0.7	100%	NA
TYLMI	4	1.2	1.9	2.3	2.9	3.9	1.0	100%	NA
Storm Event Samples									
EVASS	12	1.0	3.2	4.9	6.4	22.0	3.2	100%	NA
EVAMS	12	1.3	3.8	5.5	7.0	63.0	3.3	100%	NA
MONM	12	2.9	6.0	9.3	11.0	27.0	5.0	100%	NA
MONMN	12	2.0	3.9	4.5	7.0	47.0	3.1	100%	NA
MONMS	12	2.5	4.7	5.0	8.1	33.0	3.4	100%	NA
TOSMO	12	1.7	6.2	18.0	81.3	260.0	75.1	100%	NA
TOSMI	12	4.6	17.0	25.0	36.3	95.0	19.3	100%	NA
COLM	12	0.4	1.0	1.2	1.9	2.4	0.9	100%	NA
SEIMN	12	2.9	4.1	6.3	9.7	26.0	5.6	100%	NA
SEIMS	12	1.5	5.3	9.9	13.3	23.0	7.9	100%	NA
COUMO	12	2.1	5.5	9.0	13.0	47.0	7.6	100%	NA
COUMI	12	2.0	6.2	16.0	31.8	650.0	25.5	100%	NA
TYLMO	12	4.5	6.9	8.0	13.5	59.0	6.6	100%	NA
TYLMI	12	2.9	4.4	7.1	10.4	13.0	5.9	100%	NA

NTU: Nephelometric Turbidity Unit

Table H-3. Summary Statistics for Total Hardness Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (mg/L)	25th Percentile (mg/L)	Median (mg/L)	75th Percentile (mg/L)	Maximum (mg/L)	Interquartile Range (mg/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVALSS	4	74	79	82	84	88	5	100%	NA
EVAMS	4	81	83	87	92	99	9	100%	NA
MONM	4	65	70	78	87	95	17	100%	NA
MONMN	4	50	54	57	68	94	14	100%	NA
MONMS	4	110	110	135	163	170	53	100%	NA
TOSMO	4	98	107	115	120	120	13	100%	NA
TOSMI	4	82	118	130	130	130	12	100%	NA
COLM	3	8	9	11	12	12	2	100%	NA
SEIMN	4	22	24	25	31	47	6	100%	NA
SEIMS	4	40	42	44	47	53	6	100%	NA
COUMO	4	97	99	105	115	130	17	100%	NA
COUMI	4	110	110	125	148	170	38	100%	NA
TYLMO	4	67	69	77	87	98	18	100%	NA
TYLMI	4	64	71	81	94	110	23	100%	NA
Storm Event Samples									
EVALSS	12	61	68	73	77	85	9	100%	NA
EVAMS	12	42	68	78	85	91	18	100%	NA
MONM	12	49	57	73	81	95	25	100%	NA
MONMN	12	35	41	51	60	73	19	100%	NA
MONMS	12	64	74	88	103	120	29	100%	NA
TOSMO	12	18	49	89	103	120	54	100%	NA
TOSMI	12	9	28	58	89	140	61	100%	NA
COLM	12	7	9	10	12	14	3	100%	NA
SEIMN	12	18	21	25	31	130	10	100%	NA
SEIMS	12	32	35	41	44	220	9	100%	NA
COUMO	12	42	62	94	103	130	41	100%	NA
COUMI	12	49	69	91	130	140	62	100%	NA
TYLMO	12	20	31	36	72	85	42	100%	NA
TYLMI	12	46	63	77	85	110	22	100%	NA

mg/L: milligram/liter

Table H-4. Summary Statistics for Dissolved Organic Carbon Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (mg/L)	25th Percentile (mg/L)	Median (mg/L)	75th Percentile (mg/L)	Maximum (mg/L)	Interquartile Range (mg/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVASS	4	2.0	2.7	3.4	4.5	6.6	1.8	100%	NA
EVAMS	4	2.3	2.9	3.8	5.0	6.6	2.1	100%	NA
MONM	4	2.8	3.1	3.6	4.3	5.1	1.2	100%	NA
MONMN	4	3.2	3.6	4.1	4.6	5.2	1.0	100%	NA
MONMS	4	4.7	4.7	5.4	6.4	7.4	1.7	100%	NA
TOSMO	4	1.7	2.5	3.1	3.8	4.8	1.2	100%	NA
TOSMI	4	2.5	3.1	3.5	4.1	5.5	1.0	100%	NA
COLM	3	11.0	11.5	12.0	14.5	17.0	3.0	100%	NA
SEIMN	4	2.0	4.3	6.0	7.4	9.0	3.2	100%	NA
SEIMS	4	2.8	3.1	3.6	4.5	6.1	1.4	100%	NA
COUMO	4	3.0	3.2	3.6	4.2	4.9	1.0	100%	NA
COUMI	4	2.8	3.1	3.5	4.0	4.8	0.9	100%	NA
TYLMO	4	3.5	3.7	3.9	4.4	5.1	0.7	100%	NA
TYLMI	4	2.7	4.0	5.0	6.0	7.2	2.0	100%	NA
Storm Event Samples									
EVASS	12	2.9	3.1	3.7	4.7	6.5	1.6	100%	NA
EVAMS	12	3.2	3.9	4.3	4.9	7.2	1.0	100%	NA
MONM	12	4.0	4.2	4.5	5.5	6.8	1.3	100%	NA
MONMN	12	3.7	4.2	4.4	5.2	6.7	1.1	100%	NA
MONMS	12	4.8	5.2	6.0	9.2	10.0	4.0	100%	NA
TOSMO	12	2.4	3.4	4.4	8.0	15.0	4.6	100%	NA
TOSMI	12	2.7	3.3	4.9	7.9	17.0	4.7	100%	NA
COLM	12	9.0	9.9	11.5	13.3	20.0	3.4	100%	NA
SEIMN	12	4.0	5.2	6.9	7.7	11.0	2.5	100%	NA
SEIMS	12	3.7	4.9	6.1	6.1	9.6	1.2	100%	NA
COUMO	12	2.8	3.6	4.4	6.0	12.0	2.5	100%	NA
COUMI	12	3.2	3.9	4.1	7.0	11.0	3.2	100%	NA
TYLMO	12	2.9	3.6	4.4	5.5	9.0	1.9	100%	NA
TYLMI	12	3.2	4.5	5.3	6.4	8.5	1.9	100%	NA

mg/L: milligram/liter

Table H-5. Summary Statistics for Fecal Coliform Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (CFU/100 mL)	25th Percentile (CFU/100 mL)	Median (CFU/100 mL)	75th Percentile (CFU/100 mL)	Maximum (CFU/100 mL)	Interquartile Range (CFU/100 mL)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVASS	4	20	28	40	78	160	50	100%	0%
EVAMS	4	<10	<10	41	80	110	>70	75%	0%
MONM	4	14	41	65	710	2600	669	100%	25%
MONMN	4	<10	16	30	113	330	97	100%	25%
MONMS	4	<10	<10	<10	28	80	>18	100%	0%
TOSMO	4	36	129	170	340	820	211	100%	25%
TOSMI	4	70	90	193	568	1400	478	100%	50%
COLM	3	<10	<10	<10	<10	<10	NA	33%	0%
SEIMN	4	<10	<10	17	115	370	>105	75%	25%
SEIMS	4	<10	<10	<10	53	180	>43	75%	0%
COUMO	4	14	71	215	355	400	284	100%	50%
COUMI	4	<10	16	110	233	330	217	100%	25%
TYLMO	4	<10	<10	256	2583	8800	>2573	75%	50%
TYLMI	4	14	26	45	140	380	114	100%	25%
Storm Event Samples									
EVASS	12	17	31	90	243	3600	212	100%	33%
EVAMS	12	4	27	55	303	2200	276	100%	33%
MONM	12	20	118	190	378	800	260	100%	42%
MONMN	12	10	19	106	490	1700	471	100%	33%
MONMS	12	16	42	123	788	1400	746	100%	42%
TOSMO	12	50	148	1170	3200	11000	3053	100%	67%
TOSMI	12	110	523	1200	2625	22000	2103	100%	92%
COLM	12	20	59	69	173	530	114	100%	25%
SEIMN	12	6	45	95	225	520	180	100%	33%
SEIMS	12	4	19	85	385	760	366	100%	33%
COUMO	12	16	129	265	1135	14000	1007	100%	58%
COUMI	12	52	100	405	2700	17000	2600	100%	50%
TYLMO	12	48	130	435	1153	4800	1023	100%	58%
TYLMI	12	2	15	71	200	3700	185	100%	25%

CFU/100 mL: Coliform forming units per 100 milliliter

^a Percentage of samples exceeding recreational use criteria for bacteria from Washington Administrative Code 173-201A.

Table H-6. Summary Statistics for Total Phosphorus Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (mg/L)	25th Percentile (mg/L)	Median (mg/L)	75th Percentile (mg/L)	Maximum (mg/L)	Interquartile Range (mg/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVASS	4	0.017	0.017	0.020	0.026	0.036	0.009	100%	NA
EVAMS	4	<0.010	0.011	0.013	0.014	0.016	0.003	75%	NA
MONM	4	0.017	0.023	0.026	0.033	0.050	0.010	100%	NA
MONMN	4	0.019	0.019	0.021	0.036	0.076	0.017	100%	NA
MONMS	4	0.012	0.018	0.022	0.027	0.039	0.009	100%	NA
TOSMO	4	0.041	0.042	0.048	0.054	0.055	0.012	100%	NA
TOSMI	4	0.033	0.038	0.046	0.056	0.066	0.017	100%	NA
COLM	3	<0.01	<0.01	0.011	0.014	0.016	>0.004	67%	NA
SEIMN	4	0.014	0.025	0.029	0.032	0.041	0.007	100%	NA
SEIMS	4	0.021	0.024	0.026	0.029	0.037	0.005	100%	NA
COUMO	4	0.028	0.036	0.043	0.056	0.082	0.020	100%	NA
COUMI	4	0.053	0.061	0.067	0.088	0.140	0.028	100%	NA
TYLMO	4	0.023	0.025	0.026	0.038	0.074	0.013	100%	NA
TYLMI	4	0.012	0.022	0.026	0.028	0.032	0.006	100%	NA
Storm Event Samples									
EVASS	12	0.016	0.023	0.029	0.046	0.120	0.024	100%	NA
EVAMS	12	0.011	0.020	0.027	0.049	0.240	0.029	100%	NA
MONM	12	0.030	0.042	0.048	0.071	0.095	0.029	100%	NA
MONMN	12	0.023	0.034	0.051	0.068	0.110	0.034	100%	NA
MONMS	12	0.027	0.036	0.053	0.060	0.071	0.024	100%	NA
TOSMO	12	0.036	0.057	0.115	0.630	0.750	0.573	100%	NA
TOSMI	12	0.036	0.075	0.140	0.300	0.980	0.225	100%	NA
COLM	12	<0.010	0.011	0.015	0.020	0.046	0.009	83%	NA
SEIMN	12	0.027	0.035	0.046	0.054	0.130	0.019	100%	NA
SEIMS	12	0.032	0.047	0.063	0.083	0.130	0.036	100%	NA
COUMO	12	0.030	0.043	0.071	0.111	0.330	0.068	100%	NA
COUMI	12	0.062	0.071	0.117	0.210	2.300	0.139	100%	NA
TYLMO	12	0.029	0.042	0.073	0.111	0.240	0.070	100%	NA
TYLMI	12	0.014	0.034	0.047	0.059	0.084	0.025	100%	NA

mg/L: milligram/liter

Table H-7. Summary Statistics for Total Nitrogen (NOX & TKN) Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (mg/L)	25th Percentile (mg/L)	Median (mg/L)	75th Percentile (mg/L)	Maximum (mg/L)	Interquartile Range (mg/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVASS	4	1.91	1.91	1.99	2.37	3.30	0.46	100%	NA
EVAMS	4	2.06	2.21	2.32	2.41	2.51	0.20	100%	NA
MONM	4	0.64	0.77	0.83	0.88	1.00	0.11	100%	NA
MONMN	4	0.53	0.56	0.73	0.94	1.13	0.38	100%	NA
MONMS	4	0.68	0.91	1.03	2.96	8.62	2.05	100%	NA
TOSMO	4	0.90	0.91	0.96	1.05	1.21	0.15	100%	NA
TOSMI	4	1.09	1.23	1.29	1.33	1.44	0.10	100%	NA
COLM	3	0.71	0.73	0.75	0.90	1.04	0.17	100%	NA
SEIMN	4	0.71	0.76	0.79	0.85	0.98	0.08	100%	NA
SEIMS	4	0.59	0.70	0.77	1.06	1.84	0.37	100%	NA
COUMO	4	0.77	0.85	0.93	0.99	1.06	0.14	100%	NA
COUMI	4	0.69	0.86	0.97	4.77	16.00	3.90	100%	NA
TYLMO	4	0.80	0.82	0.84	0.92	1.14	0.11	100%	NA
TYLMI	4	1.06	1.17	1.24	1.34	1.54	0.17	100%	NA
Storm Event Samples									
EVASS	12	1.19	1.85	2.04	2.14	2.90	0.30	100%	NA
EVAMS	12	1.59	2.14	2.44	2.69	2.90	0.55	100%	NA
MONM	12	0.39	0.78	0.93	0.99	3.63	0.22	100%	NA
MONMN	12	0.29	0.71	0.84	1.00	1.08	0.29	100%	NA
MONMS	12	0.80	0.96	1.11	1.33	2.49	0.38	100%	NA
TOSMO	12	0.47	0.84	1.62	2.26	6.08	1.43	100%	NA
TOSMI	12	0.52	1.30	1.52	2.84	5.02	1.54	100%	NA
COLM	12	0.39	0.67	0.84	0.97	1.53	0.30	100%	NA
SEIMN	12	0.56	0.85	0.94	1.24	3.66	0.39	100%	NA
SEIMS	12	0.80	0.99	1.12	1.31	1.91	0.32	100%	NA
COUMO	12	0.51	0.86	1.11	1.73	3.02	0.87	100%	NA
COUMI	12	0.36	0.70	1.04	1.88	12.00	1.18	100%	NA
TYLMO	12	0.79	0.83	1.32	1.46	2.11	0.63	100%	NA
TYLMI	12	0.93	1.15	1.28	2.02	3.08	0.88	100%	NA

mg/L: milligram/liter

Table H-8. Summary Statistics for Nitrate + Nitrite Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (mg/L)	25th Percentile (mg/L)	Median (mg/L)	75th Percentile (mg/L)	Maximum (mg/L)	Interquartile Range (mg/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVASS	4	1.40	1.48	1.50	1.53	1.60	0.05	100%	NA
EVAMS	4	1.50	1.65	1.80	1.93	2.00	0.28	100%	NA
MONM	4	0.29	0.36	0.38	0.40	0.47	0.05	100%	NA
MONMN	4	0.14	0.16	0.24	0.36	0.47	0.20	100%	NA
MONMS	4	0.02	0.25	0.34	0.39	0.52	0.13	100%	NA
TOSMO	4	0.54	0.56	0.58	0.62	0.72	0.06	100%	NA
TOSMI	4	0.72	0.78	0.82	0.87	0.97	0.09	100%	NA
COLM	3	0.05	0.06	0.07	0.09	0.11	0.03	100%	NA
SEIMN	4	0.23	0.37	0.41	0.42	0.43	0.05	100%	NA
SEIMS	4	0.24	0.24	0.29	0.34	0.34	0.10	100%	NA
COUMO	4	0.45	0.47	0.52	0.58	0.64	0.12	100%	NA
COUMI	4	0.36	0.38	0.40	0.43	0.49	0.06	100%	NA
TYLMO	4	0.33	0.39	0.47	0.56	0.68	0.17	100%	NA
TYLMI	4	0.40	0.52	0.69	0.92	1.20	0.40	100%	NA
Storm Event Samples									
EVASS	12	0.52	1.23	1.45	1.50	1.60	0.28	100%	NA
EVAMS	12	0.69	1.23	1.70	1.90	2.00	0.68	100%	NA
MONM	12	0.14	0.30	0.32	0.40	0.50	0.11	100%	NA
MONMN	12	0.09	0.20	0.29	0.34	0.40	0.14	100%	NA
MONMS	12	0.20	0.27	0.36	0.51	0.77	0.24	100%	NA
TOSMO	12	0.12	0.26	0.51	0.66	0.85	0.40	100%	NA
TOSMI	12	0.14	0.37	0.49	0.71	0.92	0.34	100%	NA
COLM	12	<0.01	0.07	0.09	0.11	0.40	0.04	83%	NA
SEIMN	12	0.16	0.24	0.30	0.35	0.53	0.11	100%	NA
SEIMS	12	0.18	0.23	0.25	0.29	0.37	0.06	100%	NA
COUMO	12	0.04	0.30	0.44	0.51	0.69	0.22	100%	NA
COUMI	12	0.03	0.29	0.35	0.40	0.48	0.11	100%	NA
TYLMO	12	0.18	0.27	0.34	0.60	0.81	0.33	100%	NA
TYLMI	12	0.22	0.37	0.70	0.79	1.40	0.43	100%	NA

mg/L: milligram/liter

Table H-9. Summary Statistics for Total Nitrogen (TKN) Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (mg/L)	25th Percentile (mg/L)	Median (mg/L)	75th Percentile (mg/L)	Maximum (mg/L)	Interquartile Range (mg/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVASS	4	0.4	0.5	0.5	0.8	1.7	0.4	100%	NA
EVAMS	4	0.5	0.5	0.5	0.6	0.6	0.1	100%	NA
MONM	4	0.2	0.4	0.4	0.5	0.7	0.2	100%	NA
MONMN	4	0.3	0.3	0.4	0.6	1.0	0.2	100%	NA
MONMS	4	0.6	0.7	0.7	2.6	8.1	1.9	100%	NA
TOSMO	4	0.3	0.4	0.4	0.4	0.5	0.1	100%	NA
TOSMI	4	0.3	0.4	0.5	0.5	0.6	0.1	100%	NA
COLM	3	0.6	0.6	0.7	0.8	1.0	0.2	100%	NA
SEIMN	4	0.3	0.4	0.5	0.6	0.6	0.2	100%	NA
SEIMS	4	0.3	0.4	0.5	0.7	1.5	0.3	100%	NA
COUMO	4	0.3	0.3	0.4	0.4	0.5	0.1	100%	NA
COUMI	4	0.3	0.5	0.5	4.3	15.6	3.8	100%	NA
TYLMO	4	0.1	0.4	0.5	0.5	0.6	0.1	100%	NA
TYLMI	4	0.3	0.4	0.5	0.6	0.7	0.2	100%	NA
Storm Event Samples									
EVASS	12	0.1	0.5	0.7	0.8	1.3	0.3	100%	NA
EVAMS	12	<0.1	0.5	0.7	0.9	2.0	0.4	100%	NA
MONM	12	<0.1	0.4	0.6	0.8	3.2	0.3	92%	NA
MONMN	12	<0.1	0.4	0.6	0.7	0.8	0.3	92%	NA
MONMS	12	0.4	0.6	0.7	0.8	2.1	0.2	100%	NA
TOSMO	12	<0.1	0.5	1.0	1.8	5.3	1.3	83%	NA
TOSMI	12	<0.1	0.8	1.1	2.2	4.2	1.4	92%	NA
COLM	12	0.3	0.6	0.7	0.8	1.3	0.2	100%	NA
SEIMN	12	0.2	0.5	0.7	0.8	3.5	0.3	100%	NA
SEIMS	12	0.4	0.8	0.9	1.0	1.7	0.3	100%	NA
COUMO	12	<0.1	0.5	0.9	1.2	2.5	0.7	92%	NA
COUMI	12	0.2	0.3	0.7	1.7	11.6	1.3	100%	NA
TYLMO	12	0.1	0.5	0.9	1.1	1.8	0.6	100%	NA
TYLMI	12	0.1	0.6	0.7	0.9	2.4	0.3	100%	NA

mg/L: milligram/liter

Table H-10. Summary Statistics for Dissolved Copper Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (ug/L)	25th Percentile (ug/L)	Median (ug/L)	75th Percentile (ug/L)	Maximum (ug/L)	Interquartile Range (ug/L)	Percent Detected	Percent Exceeding Standard ^a
Base Flow Samples									
EVASS	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
EVAMS	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
MONM	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
MONMN	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
MONMS	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
TOSMO	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
TOSMI	4	<1.0	<1.0	<1.0	1.2	1.3	>0.2	50%	0%
COLM	3	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
SEIMN	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
SEIMS	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
COUMO	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
COUMI	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
TYLMO	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	25%	0%
TYLMI	4	<1.0	<1.0	1.3	1.8	2.2	>0.8	75%	0%
Storm Event Samples									
EVASS	12	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
EVAMS	12	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
MONM	12	<1.0	<1.0	<1.0	<1.0	<1.0	NA	8%	0%
MONMN	12	<1.0	1.1	1.1	1.1	1.1	0.0	8%	0%
MONMS	12	<1.0	<1.0	<1.0	1.4	5.1	>0.4	33%	0%
TOSMO	12	<1.0	1.2	1.6	2.4	7.4	1.3	75%	0%
TOSMI	12	<1.0	1.8	2.7	4.6	13.0	2.7	83%	25%
COLM	12	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
SEIMN	12	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
SEIMS	12	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	0%
COUMO	12	<1.0	<1.0	1.7	2.4	7.0	>1.4	67%	0%
COUMI	12	<1.0	<1.0	<1.0	1.6	6.0	>0.6	25%	0%
TYLMO	12	<1.0	1.5	2.2	5.4	15.0	3.9	75%	25%
TYLMI	12	<1.0	1.4	1.6	2.4	3.3	1.0	75%	0%

ug/L: microgram/liter

^a Percentage of base flow and storm event samples exceeding acute and chronic freshwater aquatic life protection criteria, respectively, for dissolved copper from Ecology (2016). Criterion were derived using measured hardness at each station (see Table H-3)

Table H-11. Summary Statistics for Total Copper Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (ug/L)	25th Percentile (ug/L)	Median (ug/L)	75th Percentile (ug/L)	Maximum (ug/L)	Interquartile Range (ug/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVASS	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	NA
EVAMS	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	NA
MONM	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	NA
MONMN	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	25%	NA
MONMS	4	<1.0	<1.0	<1.0	1.2	1.3	>0.2	50%	NA
TOSMO	4	<1.0	<1.0	<1.0	1.1	1.4	>0.1	50%	NA
TOSMI	4	<1.0	1.1	1.5	2.0	3.0	0.8	75%	NA
COLM	3	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	NA
SEIMN	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	NA
SEIMS	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	NA
COUMO	4	<1.0	<1.0	<1.0	<1.0	<1.0	NA	0%	NA
COUMI	4	<1.0	<1.0	1.0	1.1	1.2	>0.1	50%	NA
TYLMO	4	<1.0	<1.0	1.2	1.5	1.8	>0.5	50%	NA
TYLMI	4	<1.0	1.2	1.9	2.6	2.7	1.4	100%	NA
Storm Event Samples									
EVASS	12	<1.0	<1.0	<1.0	1.2	2.7	>0.2	33%	NA
EVAMS	12	<1.0	<1.0	<1.0	<1.0	5.0	NA	25%	NA
MONM	12	<1.0	1.7	2.0	2.0	2.6	0.4	92%	NA
MONMN	12	<1.0	<1.0	1.4	1.6	6.5	>0.6	67%	NA
MONMS	12	1.7	2.1	2.6	3.1	6.7	1.0	100%	NA
TOSMO	12	<1.0	2.9	10.0	22.0	51.0	19.1	83%	NA
TOSMI	12	1.5	7.7	14.5	20.0	29.0	12.3	100%	NA
COLM	12	<1.0	1.1	1.1	1.1	1.1	0.0	8%	NA
SEIMN	12	<1.0	<1.0	1.2	1.6	3.0	>0.6	75%	NA
SEIMS	12	<1.0	<1.0	<1.0	1.2	1.5	>0.2	42%	NA
COUMO	12	<1.0	2.6	4.2	7.1	16.0	4.4	83%	NA
COUMI	12	<1.0	1.8	4.2	7.9	44.0	6.1	83%	NA
TYLMO	12	1.4	3.4	5.5	13.5	19.0	10.2	100%	NA
TYLMI	12	<1.0	3.0	3.6	4.1	6.0	1.0	100%	NA

ug/L: microgram/liter

Table H-12. Summary Statistics for Dissolved Zinc Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (ug/L)	25th Percentile (ug/L)	Median (ug/L)	75th Percentile (ug/L)	Maximum (ug/L)	Interquartile Range (ug/L)	Percent Detected	Percent Exceeding Standard ^a
Base Flow Samples									
EVALSS	4	<5.0	<5.0	<5.0	<5.0	<5.0	NA	0%	0%
EVAMS	4	<5.0	<5.0	<5.0	<5.0	<5.0	NA	0%	0%
MONM	4	<5.0	8.0	8.7	9.5	12.0	1.5	75%	0%
MONMN	4	<5.0	<5.0	<5.0	<5.0	<5.0	NA	0%	0%
MONMS	4	<5.0	6.1	6.1	6.1	6.1	0.0	25%	0%
TOSMO	4	<5.0	5.7	9.6	18.3	37.0	12.5	75%	0%
TOSMI	4	8.2	11.1	15.0	34.5	84.0	23.5	100%	0%
COLM	3	<5.0	<5.0	<5.0	<5.0	<5.0	NA	0%	0%
SEIMN	4	<5.0	<5.0	<5.0	<5.0	<5.0	NA	0%	0%
SEIMS	4	<5.0	<5.0	<5.0	<5.0	<5.0	NA	0%	0%
COUMO	4	<5.0	<5.0	6.8	9.0	12.0	>4	75%	0%
COUMI	4	<5.0	5.7	8.0	13.9	29.0	8.1	75%	0%
TYLMO	4	<5.0	8.4	9.0	9.6	10.0	1.2	50%	0%
TYLMI	4	<5.0	10.0	10.0	10.0	10.0	0.0	25%	0%
Storm Event Samples									
EVALSS	12	<5.0	<5.0	<5.0	<5.0	<5.0	NA	0%	0%
EVAMS	12	<5.0	<5.0	<5.0	<5.0	<5.0	NA	0%	0%
MONM	12	5.1	6.0	8.4	11.3	16.0	5.3	100%	0%
MONMN	12	<5.0	6.8	6.8	6.8	6.8	0.0	8%	0%
MONMS	12	<5.0	<5.0	<5.0	5.4	6.0	>0.4	33%	0%
TOSMO	12	6.4	15.8	19.5	21.0	32.0	5.3	100%	8%
TOSMI	12	17.0	26.8	35.0	42.8	84.0	16.0	100%	17%
COLM	12	<5.0	<5.0	<5.0	<5.0	<5.0	NA	0%	0%
SEIMN	12	<5.0	<5.0	<5.0	<5.0	<5.0	NA	0%	0%
SEIMS	12	<5.0	<5.0	<5.0	<5.0	<5.0	NA	0%	0%
COUMO	12	<5.0	7.5	11.0	12.8	36.0	5.3	83%	0%
COUMI	12	<5.0	<5.0	<5.0	10.5	20.0	>5.5	50%	0%
TYLMO	12	<5.0	5.8	7.4	9.7	190.0	3.9	92%	8%
TYLMI	12	<5.0	<5.0	6.9	11.8	47.0	>6.8	58%	0%

ug/L: microgram/liter

^a Percentage of base flow and storm event samples exceeding acute and chronic freshwater aquatic life protection criteria, respectively, for dissolved zinc from Ecology (2016). Criterion were derived using measured hardness at each station (see Table H-3)

Table H-13. Summary Statistics for Total Zinc Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (ug/L)	25th Percentile (ug/L)	Median (ug/L)	75th Percentile (ug/L)	Maximum (ug/L)	Interquartile Range (ug/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVASS	4	<5	<5	<5	<5	<5	NA	0%	NA
EVAMS	4	<5	<5	<5	<5	<5	NA	0%	NA
MONM	4	6.7	8.3	10.4	13.8	19.0	5.5	100%	NA
MONMN	4	<5	<5	<5	<5	<5	NA	0%	NA
MONMS	4	<5	<5	<5	5.6	6.7	>0.6	50%	NA
TOSMO	4	<5	9.0	13.5	21.8	39.0	12.7	75%	NA
TOSMI	4	12.0	12.0	18.5	40.0	85.0	28.0	100%	NA
COLM	3	<5	<5	<5	<5	<5	NA	0%	NA
SEIMN	4	<5	<5	<5	<5	<5	NA	0%	NA
SEIMS	4	<5	<5	<5	<5	<5	NA	0%	NA
COUMO	5	<5	<5	6.5	8.6	17.0	>3.6	60%	NA
COUMI	4	5.4	8.9	10.5	18.0	39.0	9.2	100%	NA
TYLMO	4	<5	<5	8.6	12.0	12.0	>7	75%	NA
TYLMI	4	<5	<5	5.4	7.5	13.0	>2.5	75%	NA
Storm Event Samples									
EVASS	12	<5	14.0	14.0	14.0	14.0	0.0	8%	NA
EVAMS	12	<5	<5	<5	<5	20.0	NA	25%	NA
MONM	12	11.0	14.8	18.0	24.5	36.0	9.8	100%	NA
MONMN	12	<5	5.1	7.3	9.9	12.0	4.8	75%	NA
MONMS	12	5.5	6.8	8.9	10.0	15.0	3.3	100%	NA
TOSMO	12	12.0	25.8	70.0	277.5	760.0	251.8	100%	NA
TOSMI	12	30.0	65.0	120.0	255.0	340.0	190.0	100%	NA
COLM	12	<5	7.7	7.7	7.7	7.7	0.0	8%	NA
SEIMN	12	<5	5.7	5.7	5.7	5.7	0.0	8%	NA
SEIMS	12	<5	<5	<5	<5	7.9	NA	25%	NA
COUMO	12	6.1	14.8	23.5	52.0	95.0	37.3	100%	NA
COUMI	12	7.2	10.3	26.0	54.5	370.0	44.3	100%	NA
TYLMO	12	7.2	18.3	23.0	31.8	250.0	13.5	100%	NA
TYLMI	12	<5	8.8	9.9	29.3	66.0	20.5	92%	NA

ug/L: microgram/liter

APPENDIX I

Box and Whisker Plots Showing Pollutant Concentrations Measured in Storm Event and Base Flow Samples

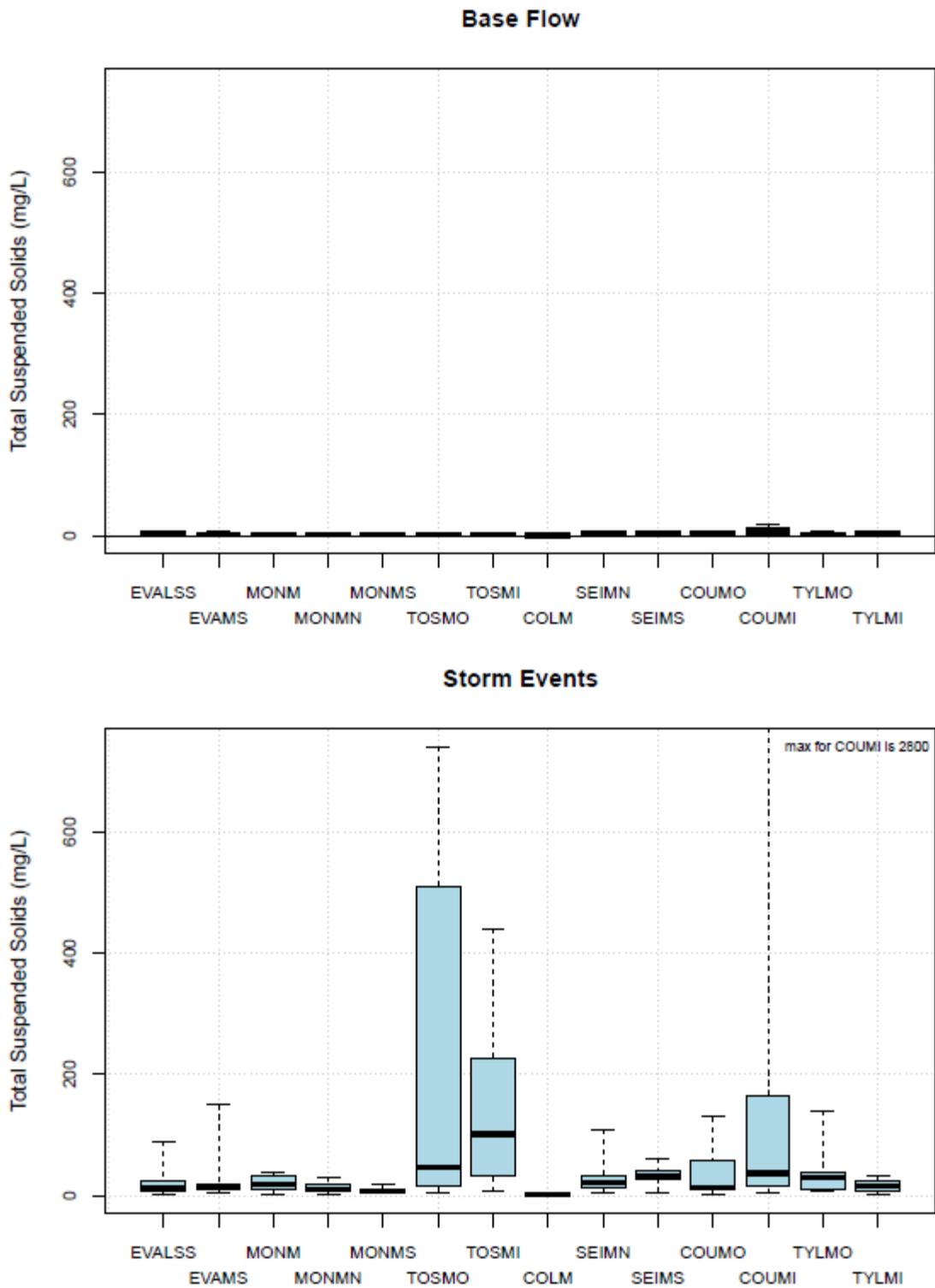


Figure I-1. Total Suspended Solids Concentrations Measured in Base Flow and Storm Event Samples.

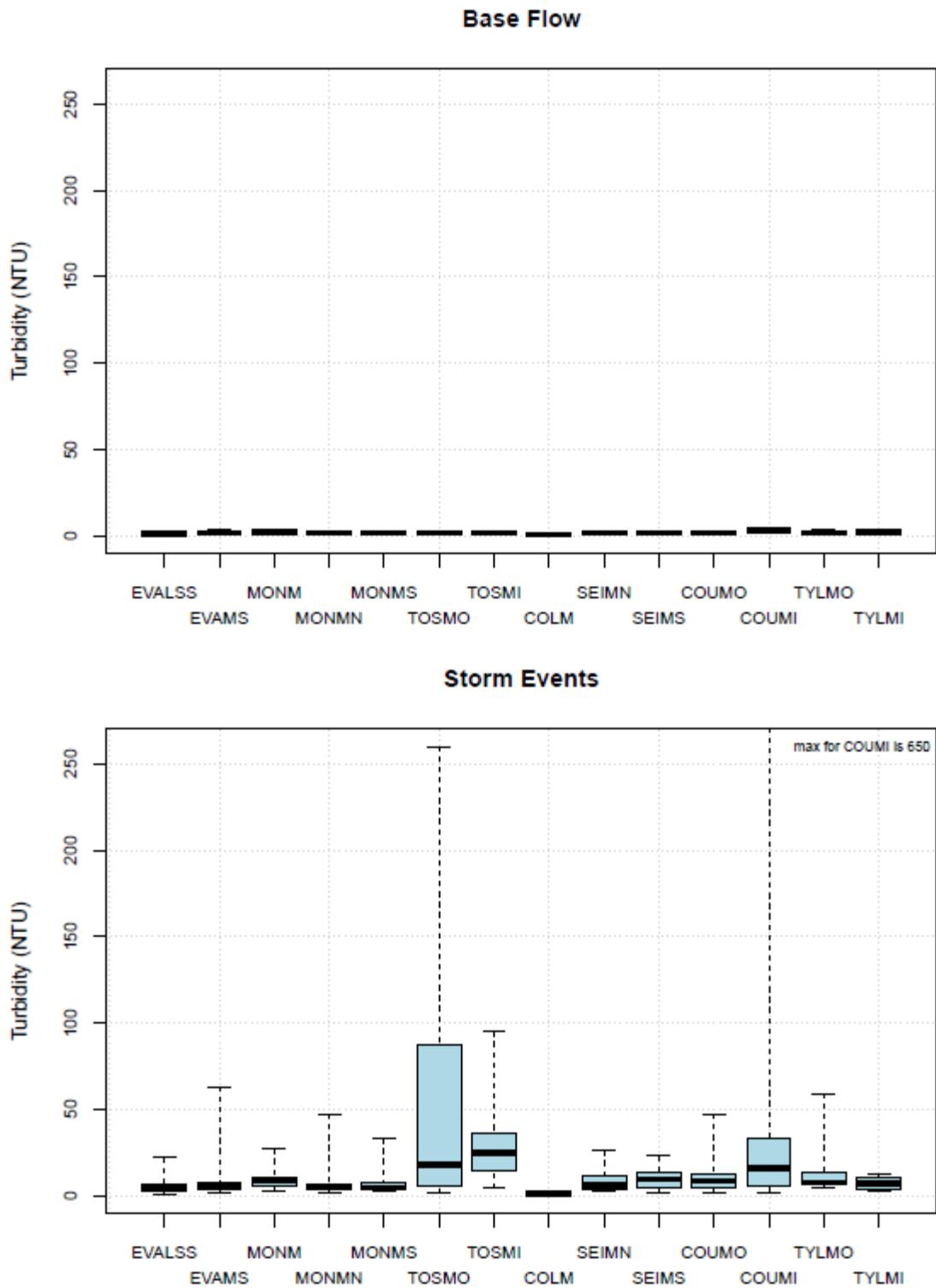


Figure I-2. Turbidity Levels Measured in Base Flow and Storm Event Samples.

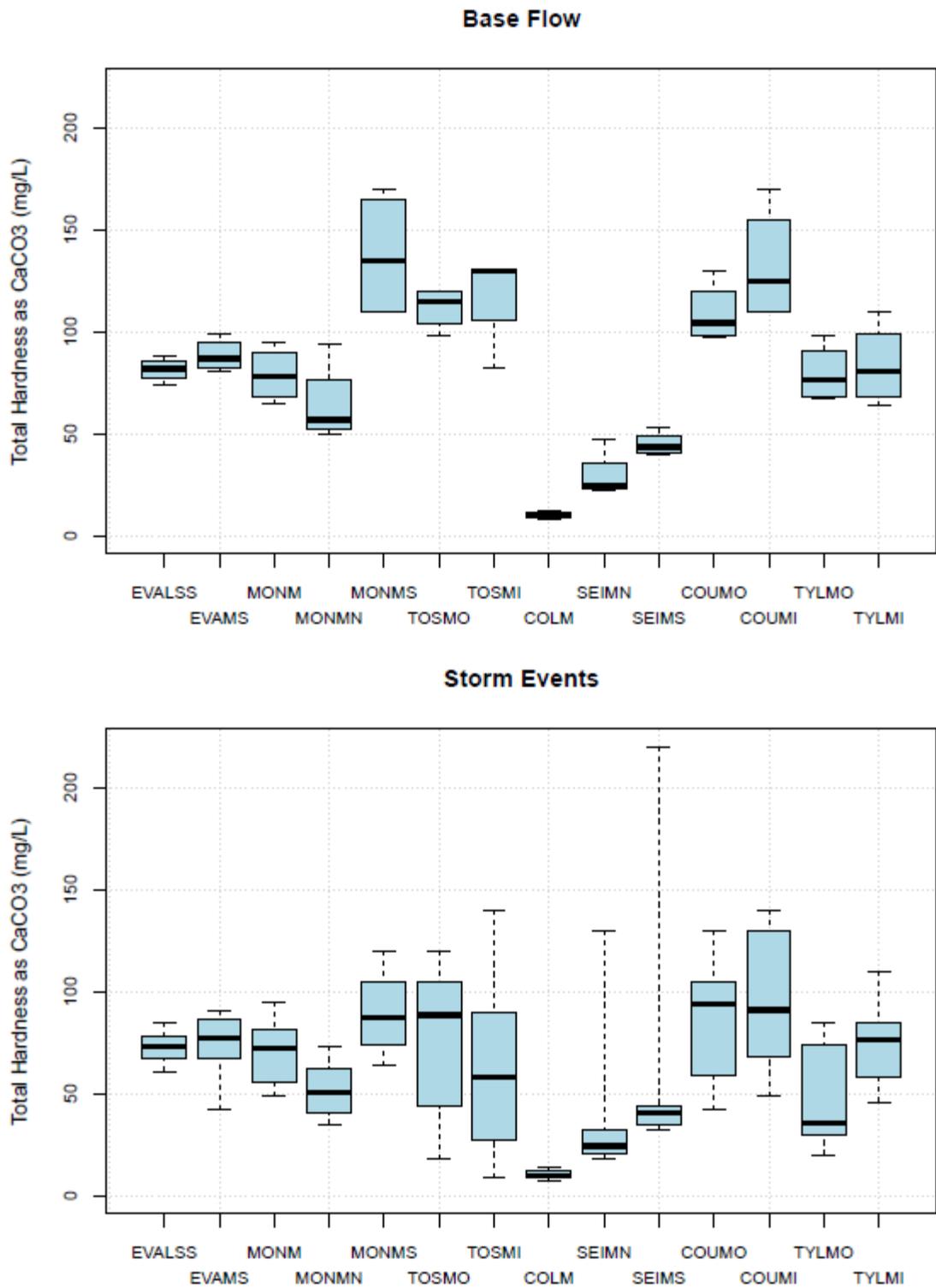


Figure I-3. Total Hardness Concentrations Measured in Base Flow and Storm Event Samples.

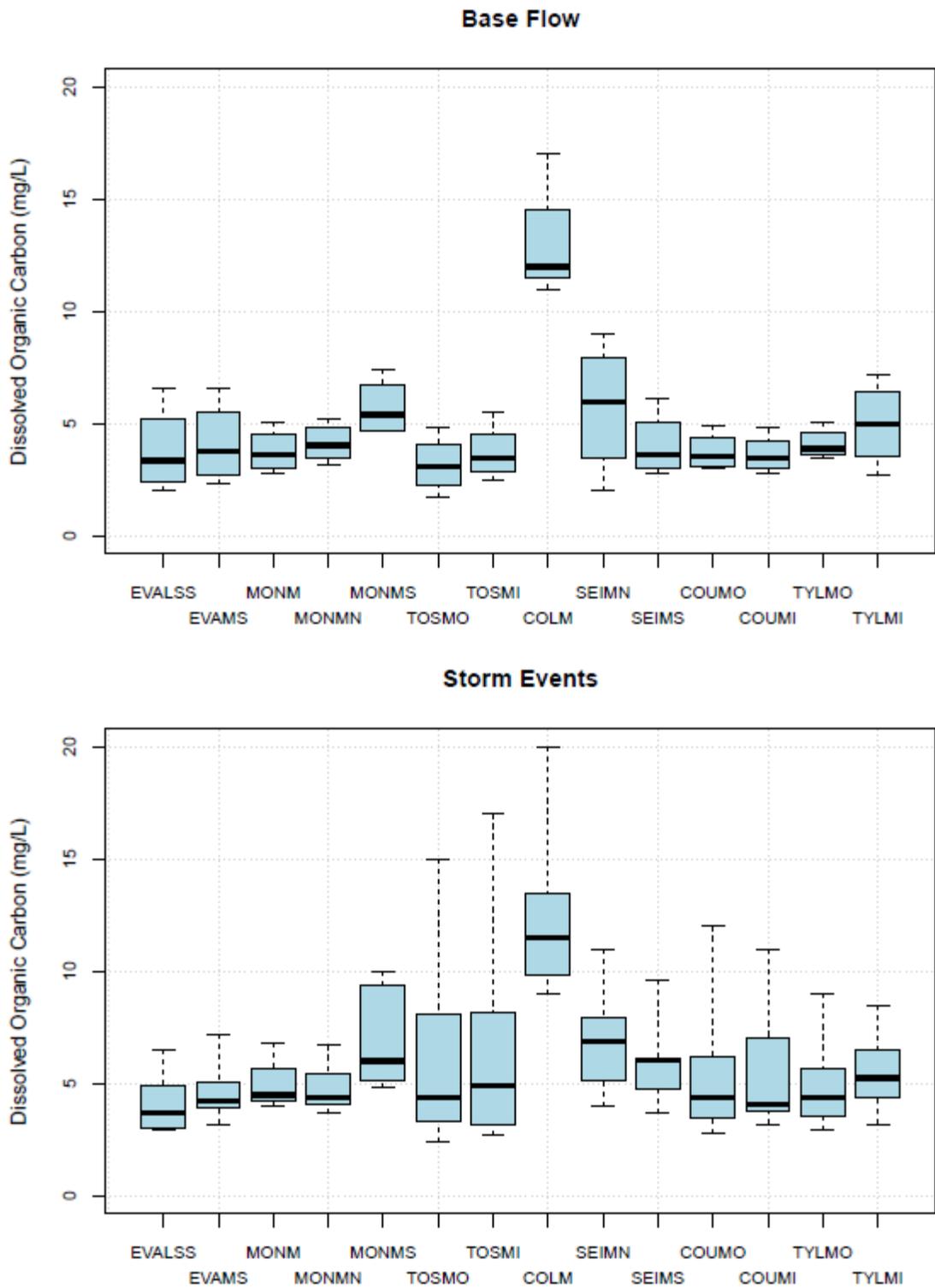


Figure I-4. Dissolved Organic Carbon Concentrations Measured in Base Flow and Storm Event Samples.

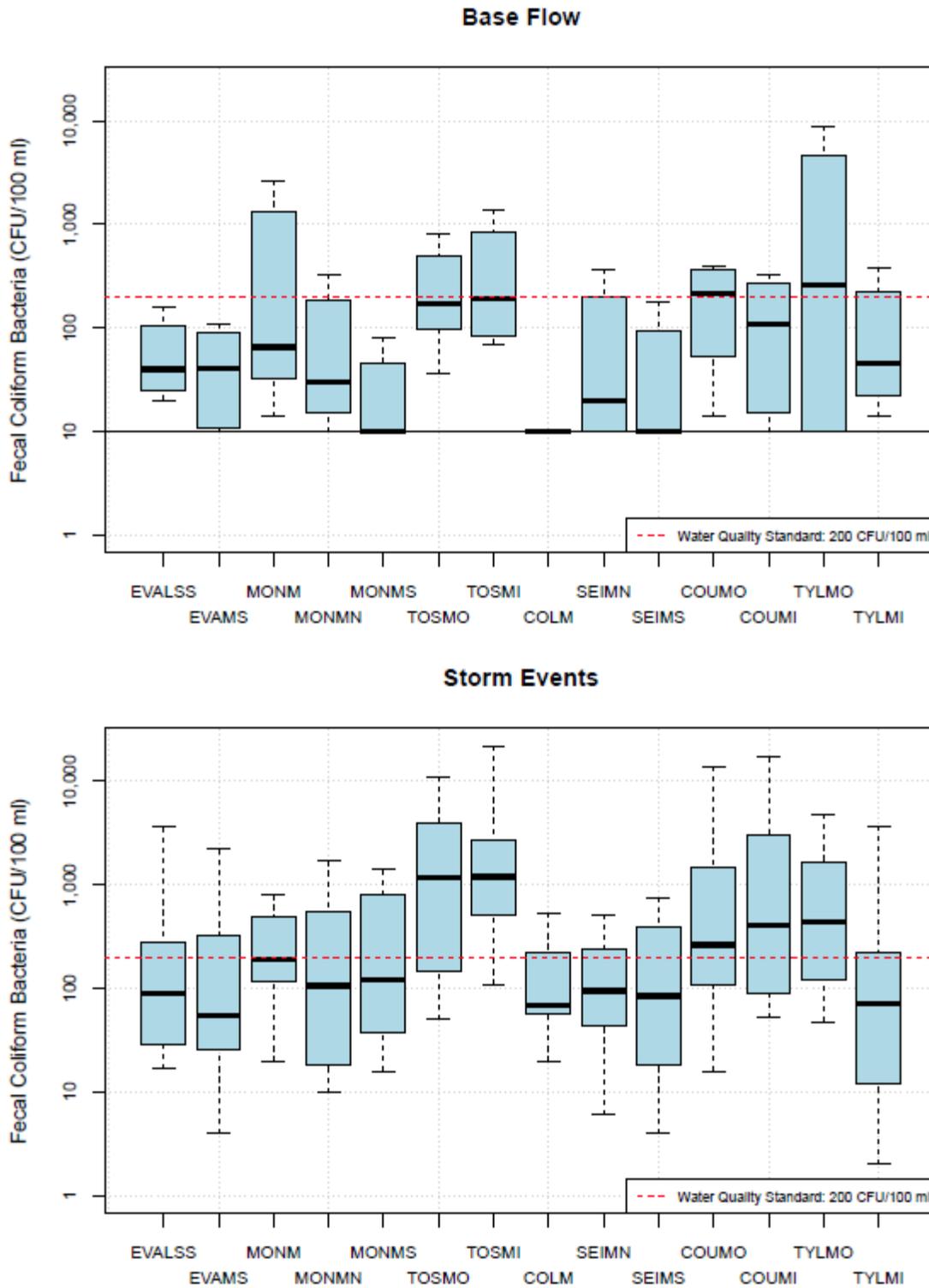


Figure I-5. Fecal Coliform Bacteria Concentrations Measured in Base Flow and Storm Event Samples.

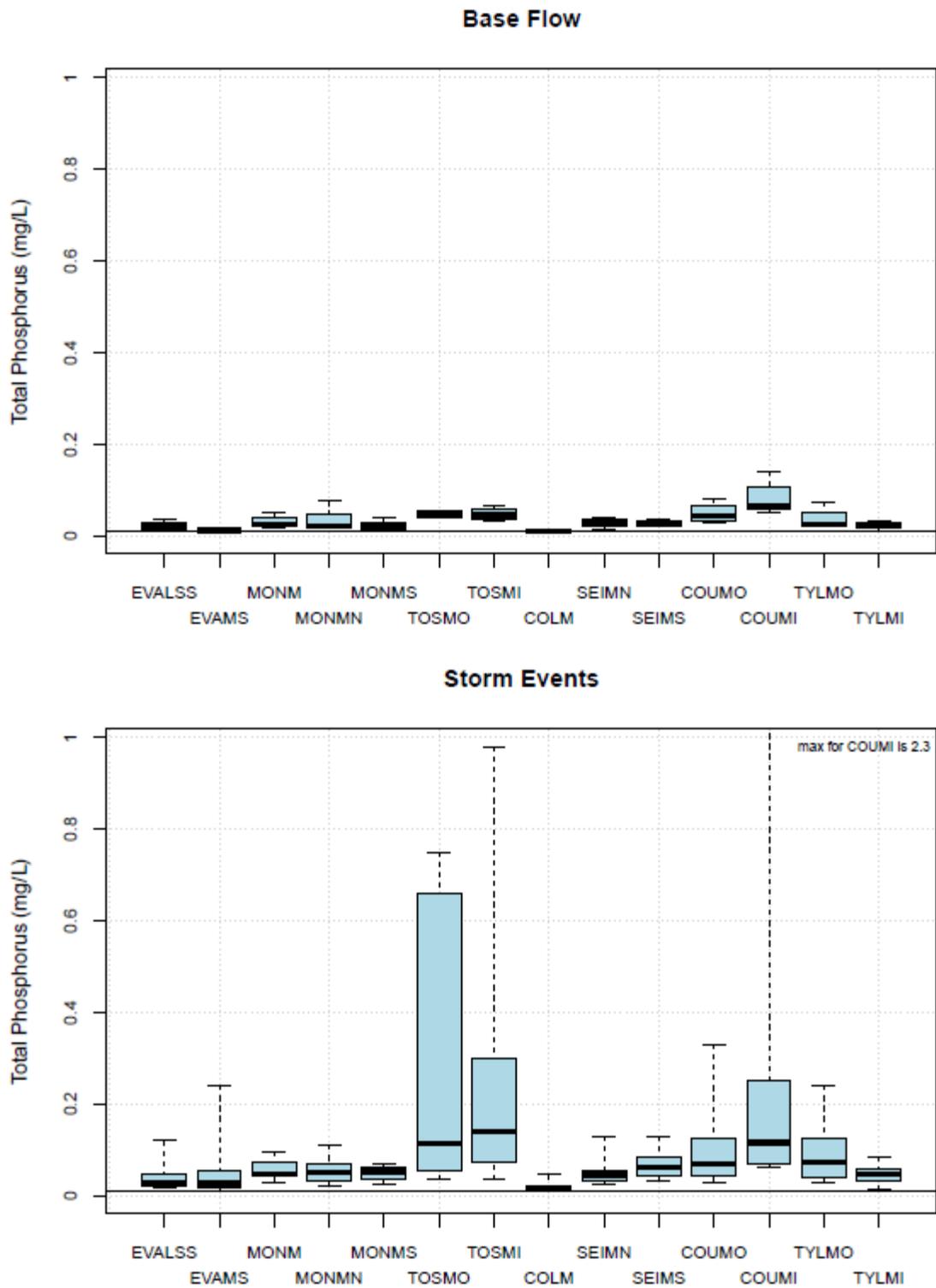


Figure I-6. Total Phosphorus Concentrations Measured in Base Flow and Storm Event Samples.

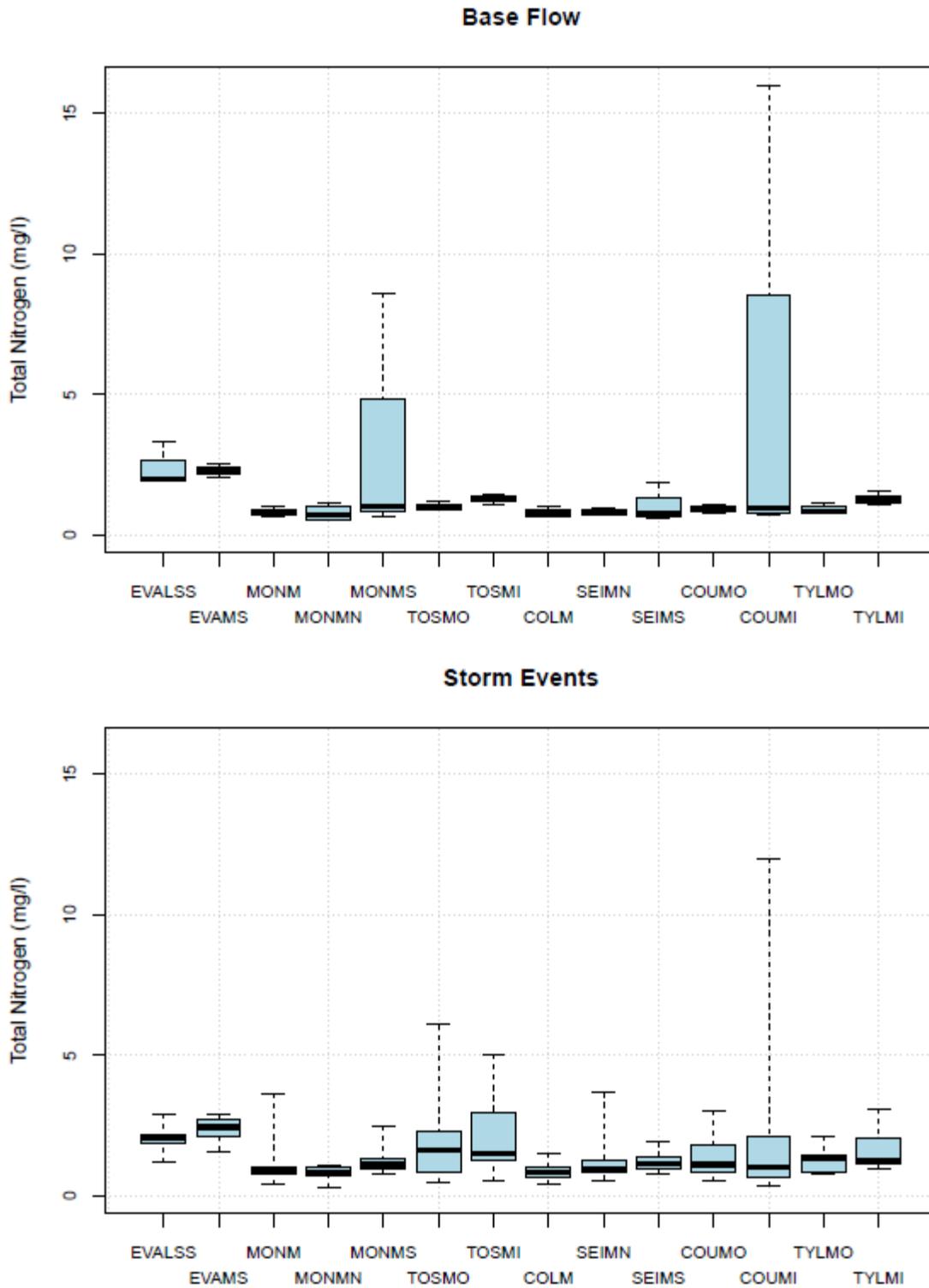


Figure I-7. Total Nitrogen Concentrations Measured in Base Flow and Storm Event Samples.

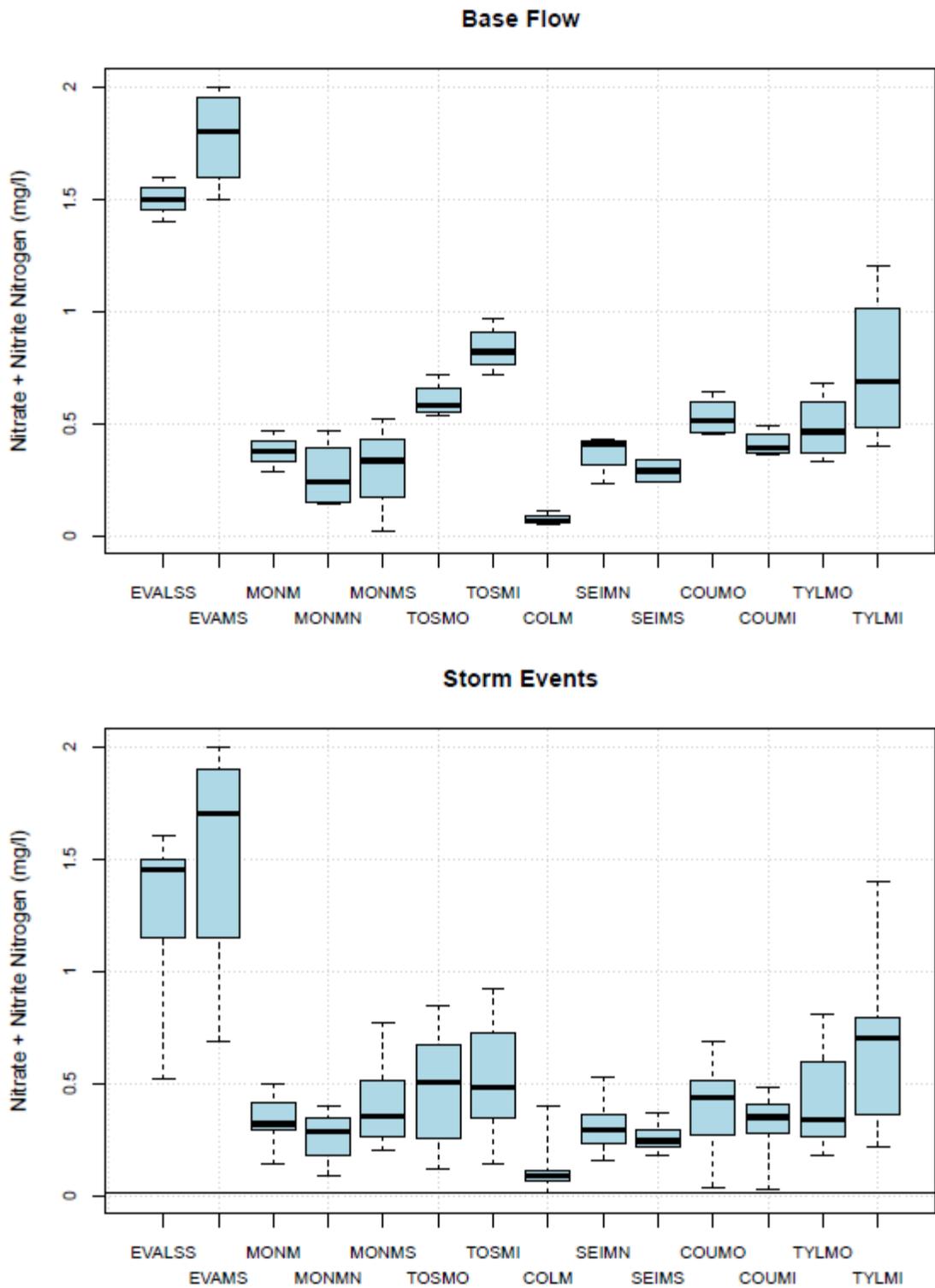


Figure I-8. Nitrate + Nitrite Nitrogen Concentrations Measured in Base Flow and Storm Event Samples.

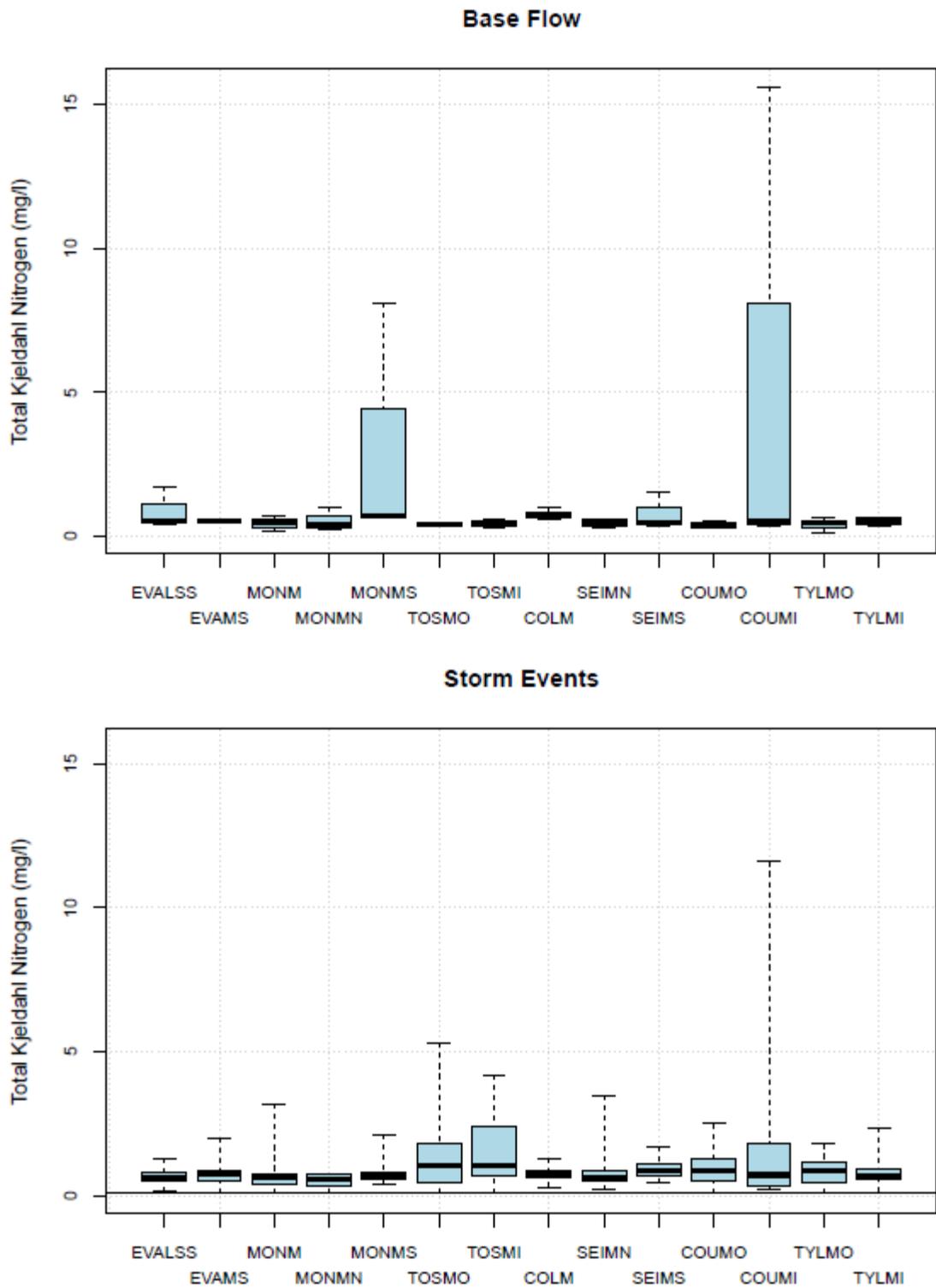


Figure I-9. Total Kjeldahl Nitrogen Concentrations Measured in Base Flow and Storm Event Samples.

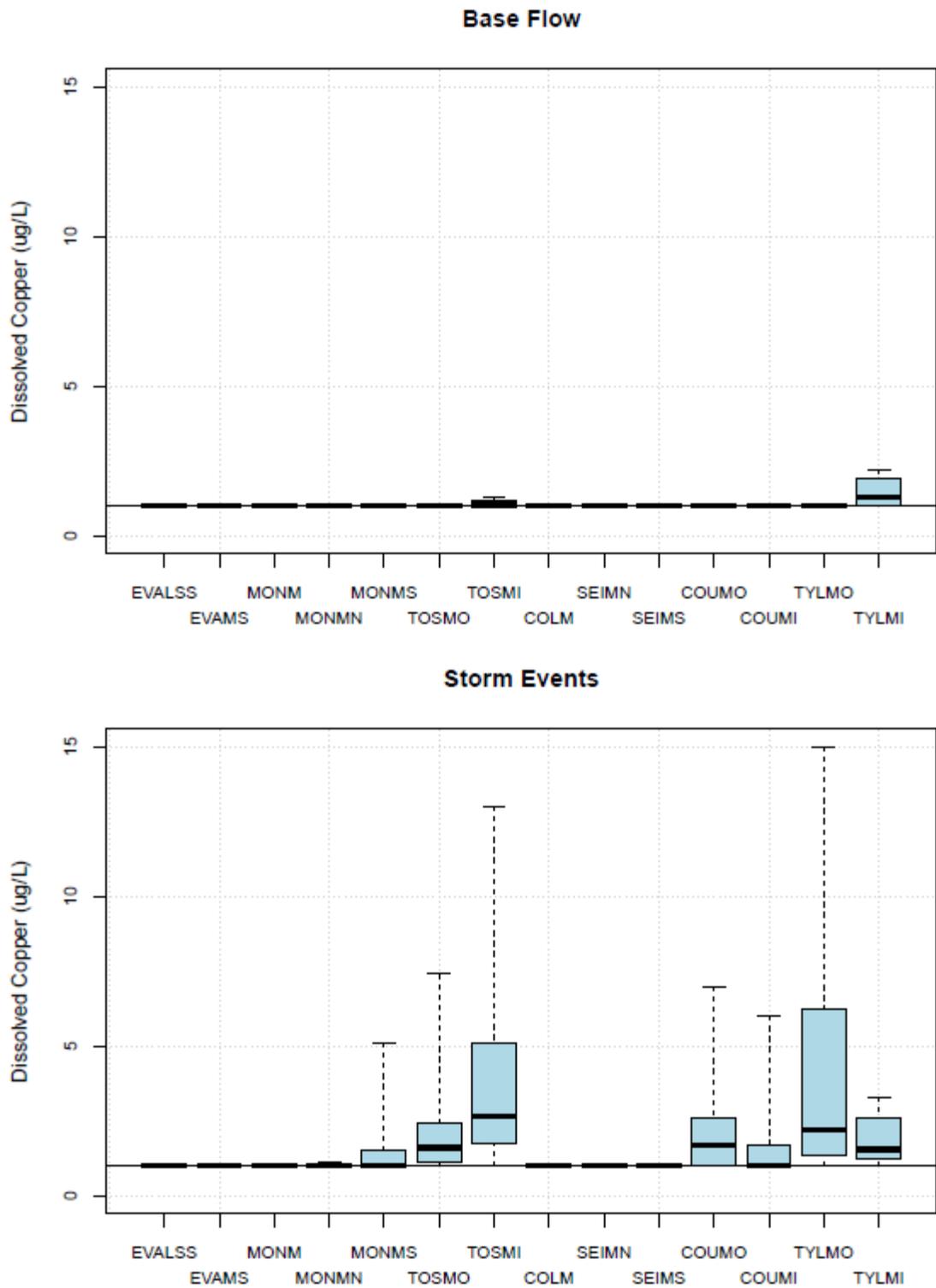


Figure I-10. Dissolved Copper Concentrations Measured in Base Flow and Storm Event Samples.

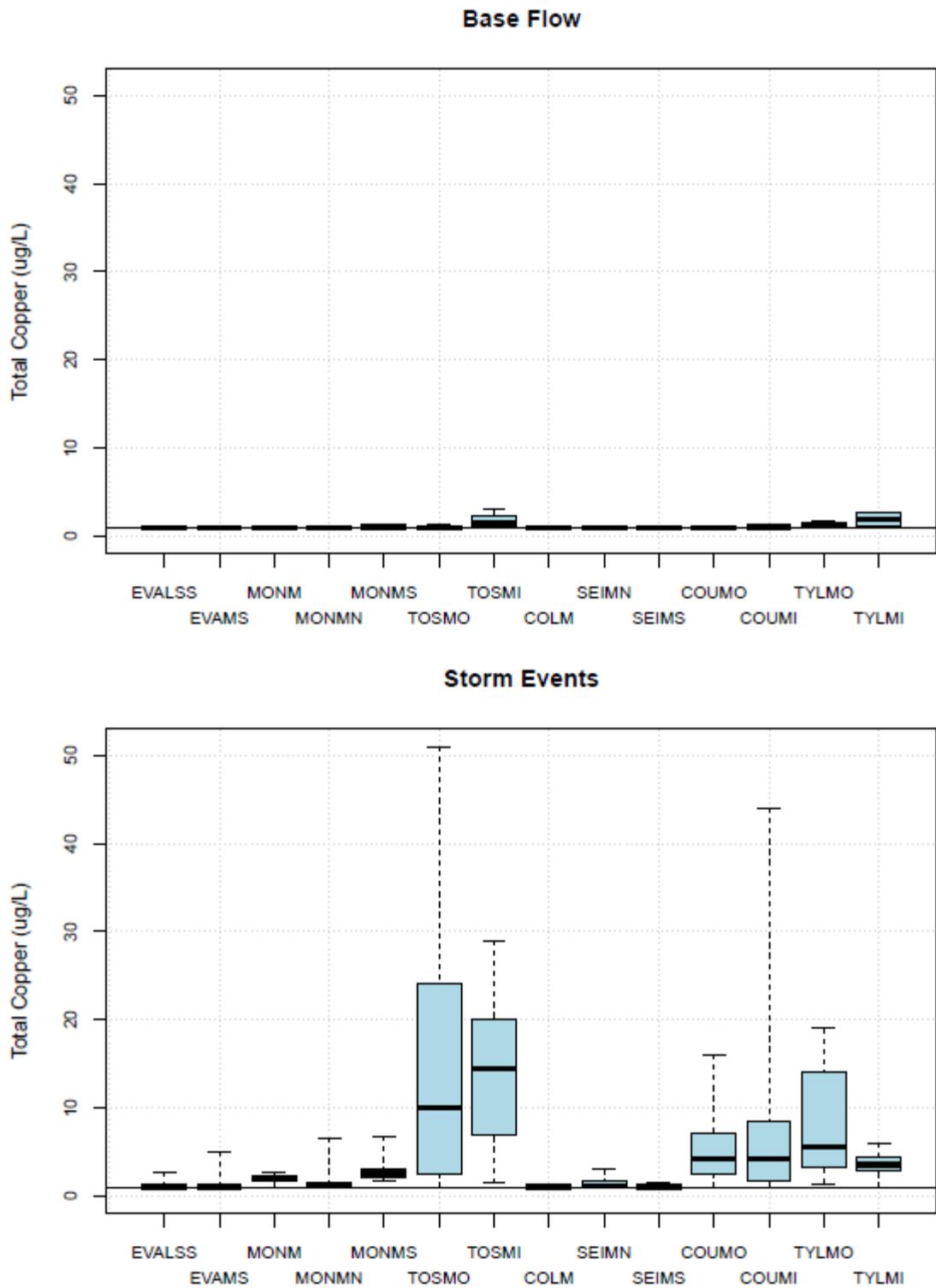


Figure I-11. Total Copper Concentrations Measured in Base Flow and Storm Event Samples.

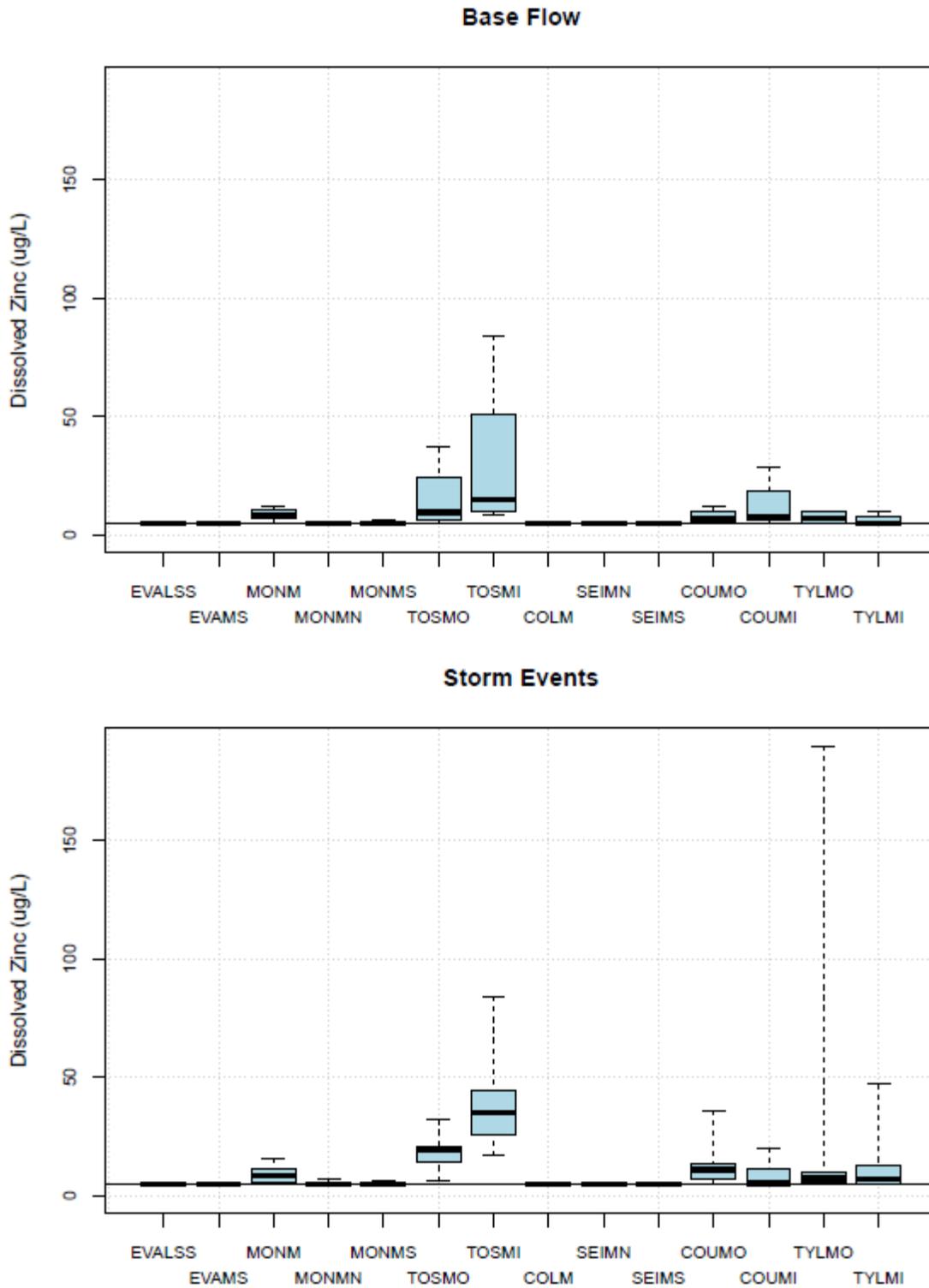


Figure I-12. Dissolved Zinc Concentrations Measured in Base Flow and Storm Event Samples.

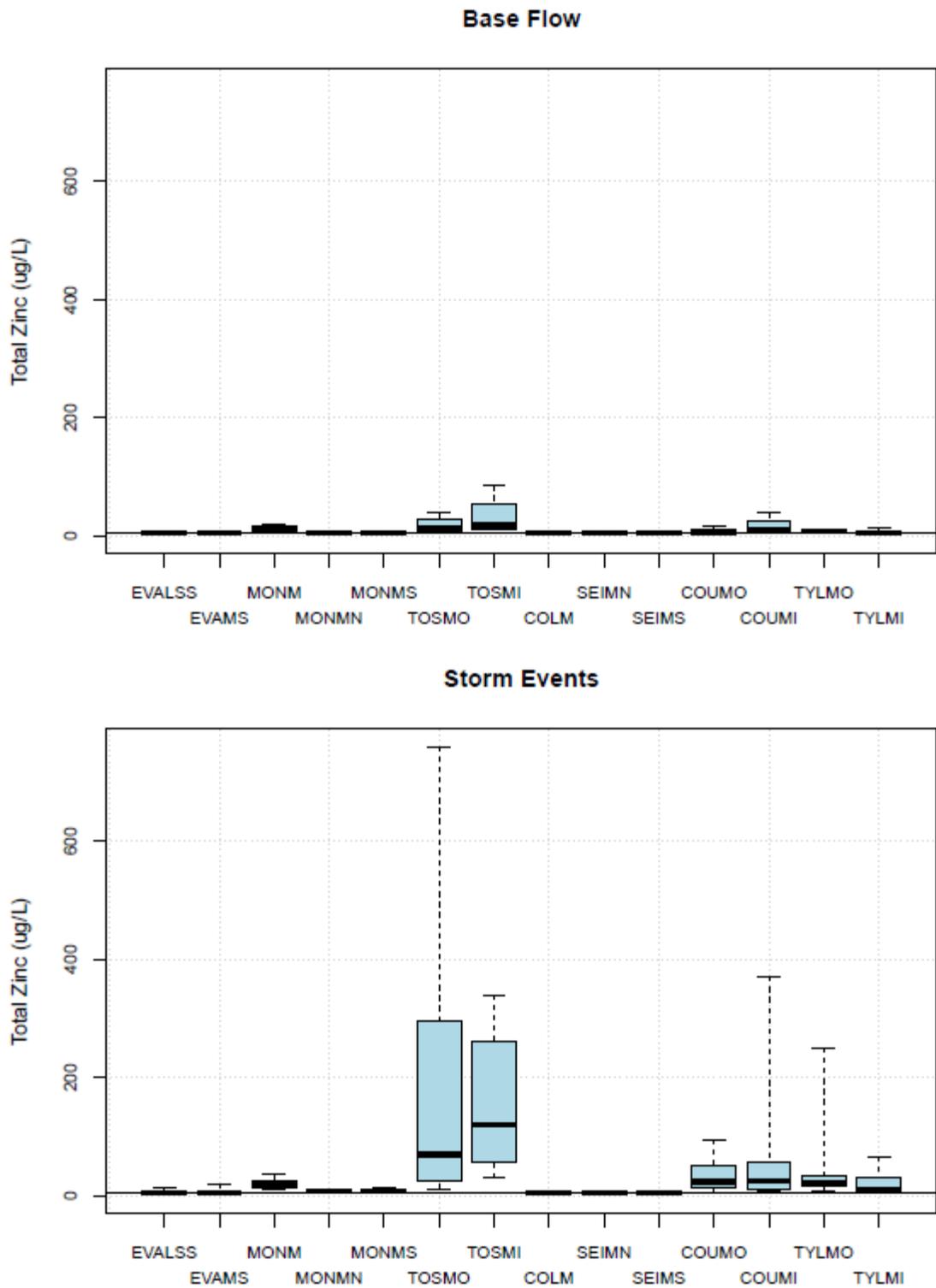


Figure I-13. Total Zinc Concentrations Measured in Base Flow and Storm Event Samples.

APPENDIX J

Line Plots Showing Continuous Temperature Data

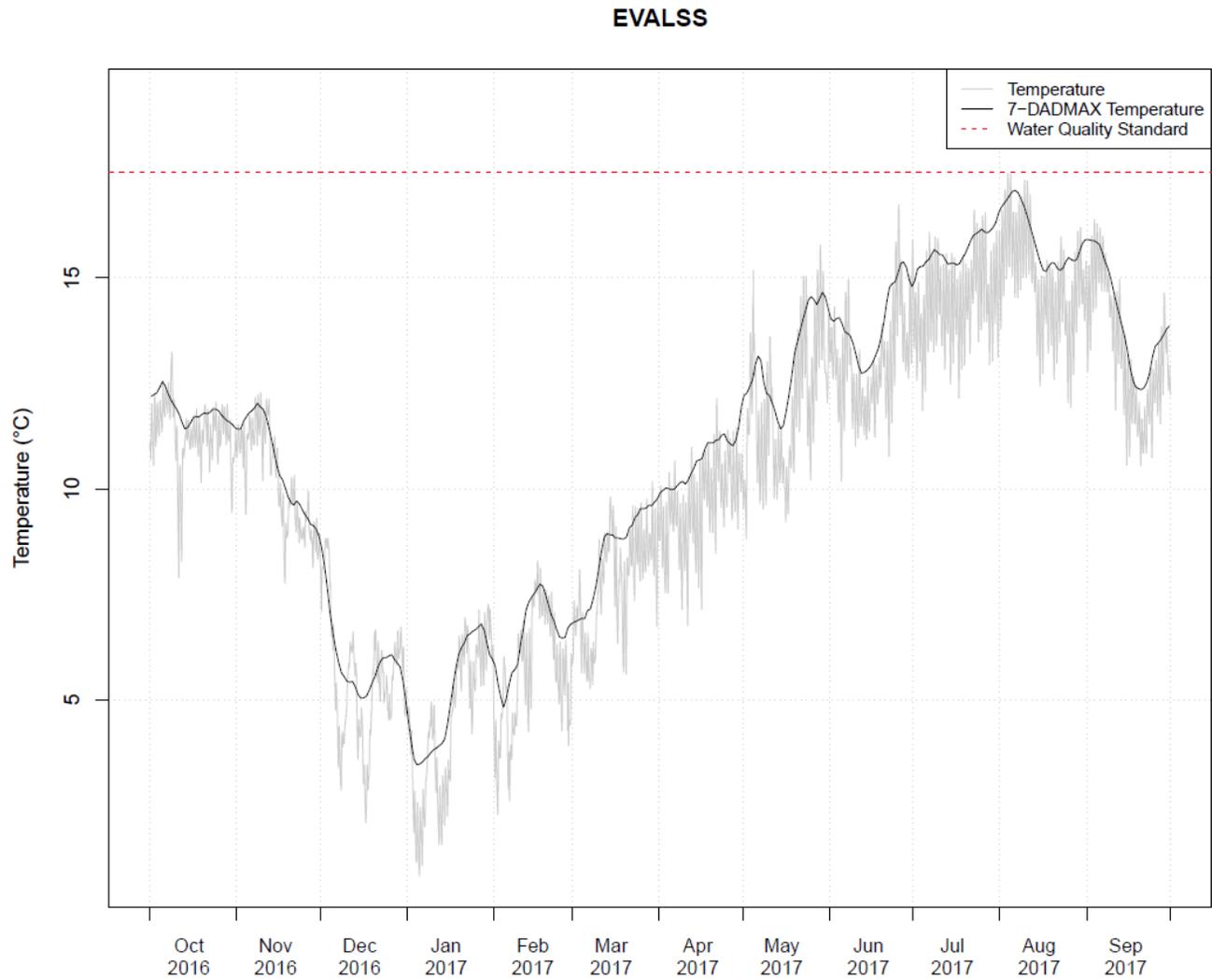


Figure J-1. Continuous Temperature and 7-DADMAX Measured at the EVALSS Station.

EVAMS

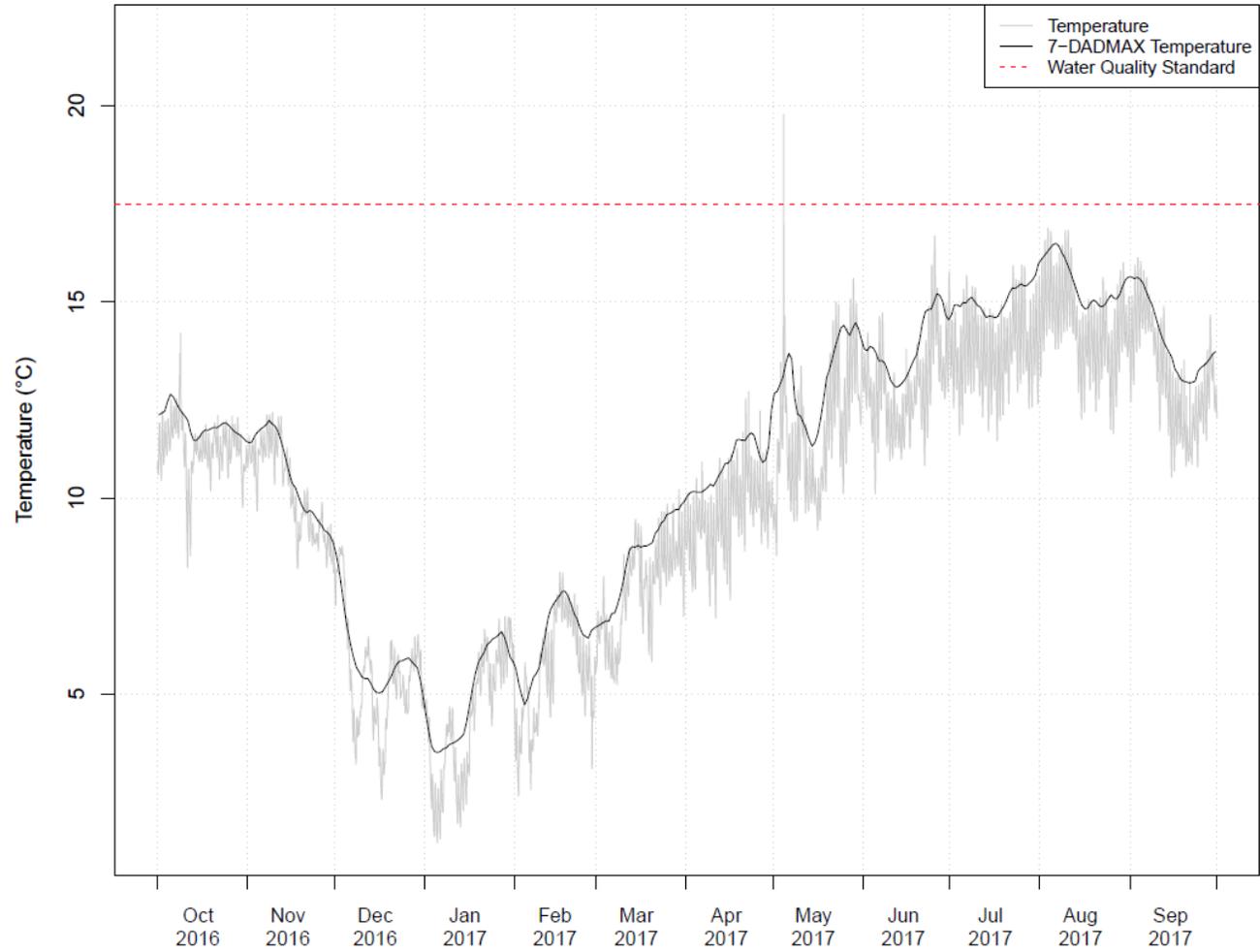


Figure J-2. Continuous Temperature and 7-DADMAX Measured at the EVAMS Station.

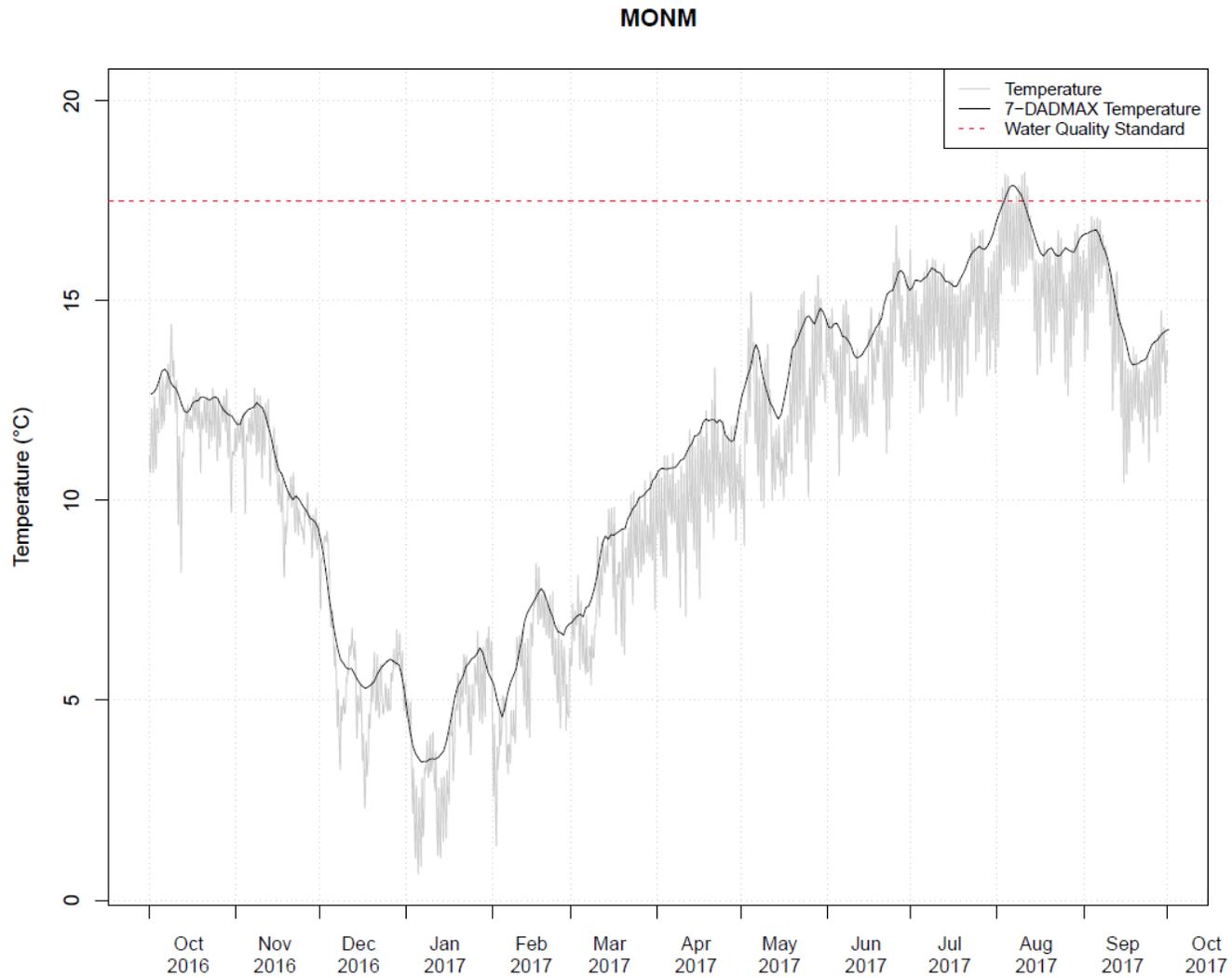


Figure J-3. Continuous Temperature and 7-DADMAX Measured at the MONM Station.

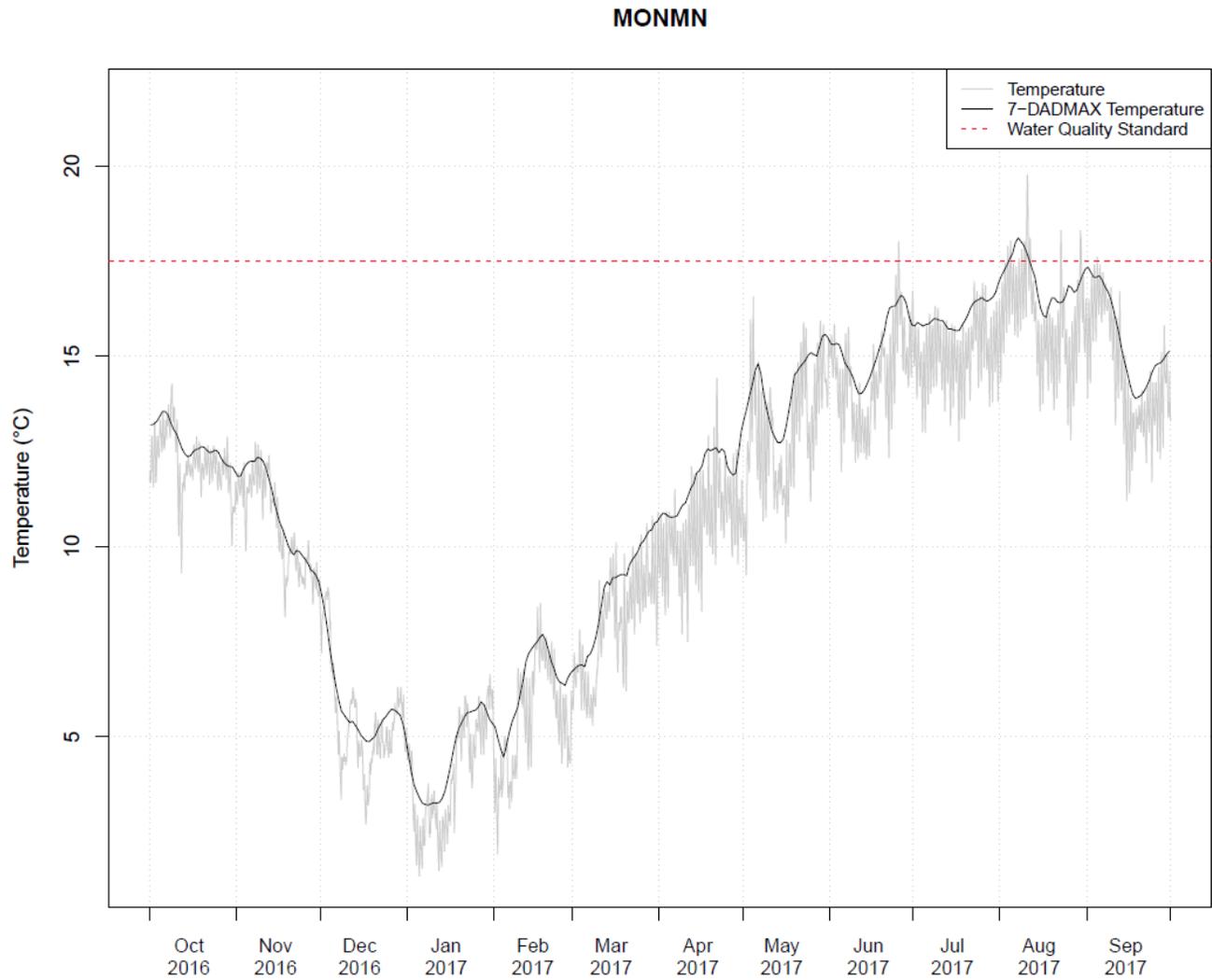


Figure J-4. Continuous Temperature and 7-DADMAX Measured at the MONMN Station.

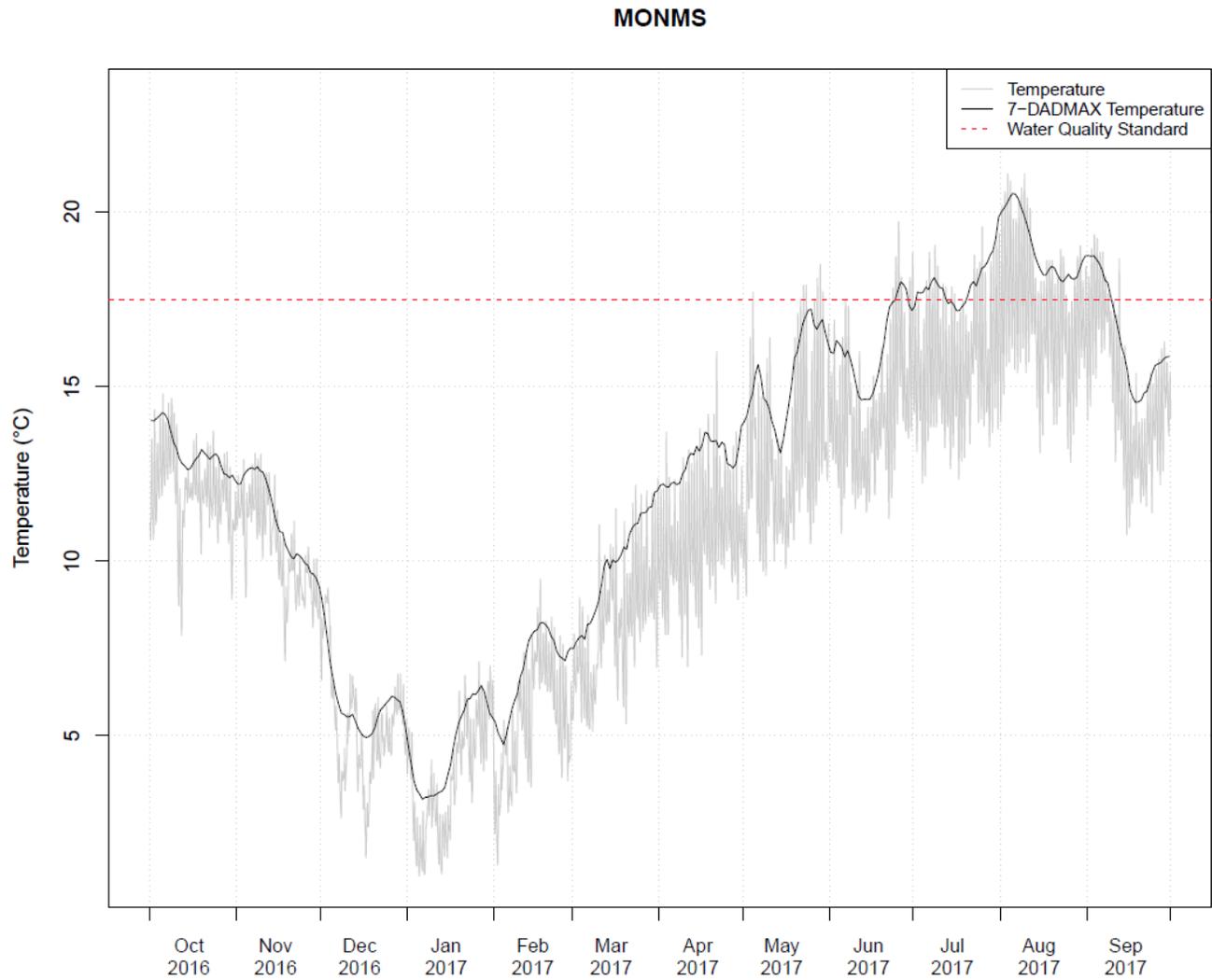


Figure J-5. Continuous Temperature and 7-DADMAX Measured at the MONMS Station.

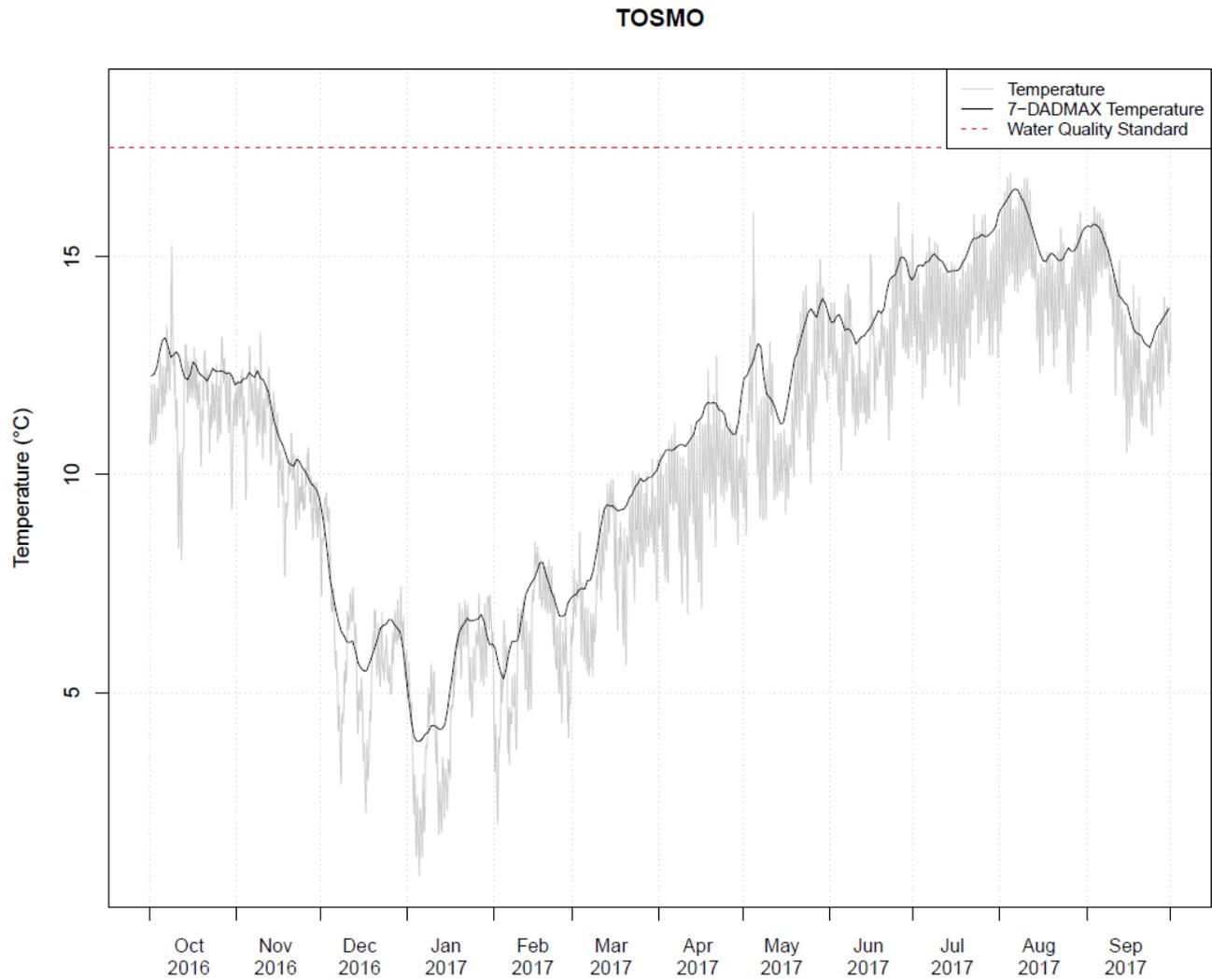


Figure J-6. Continuous Temperature and 7-DADMAX Measured at the TOSMO Station.

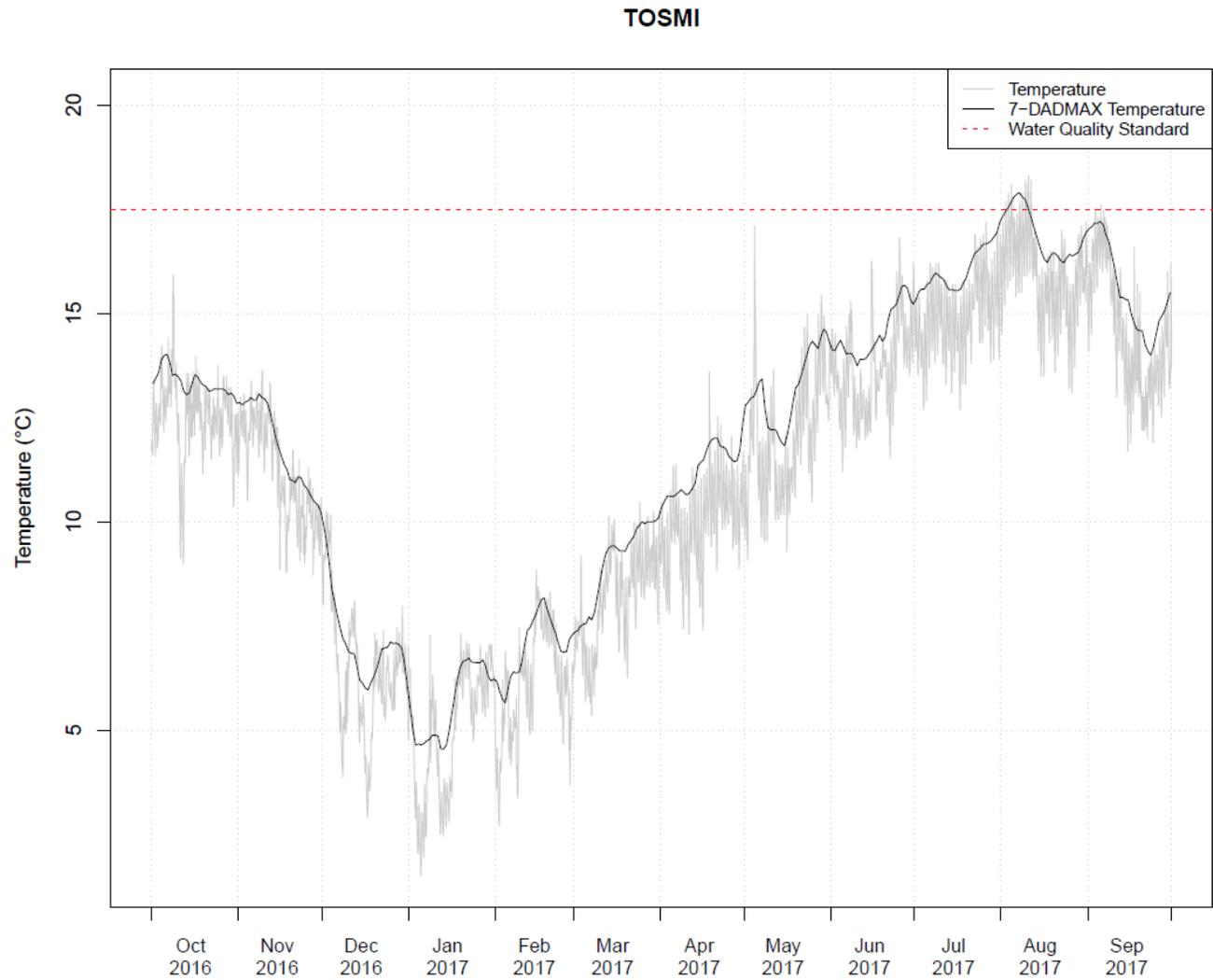


Figure J-7. Continuous Temperature and 7-DADMAX Measured at the TOSMI Station.

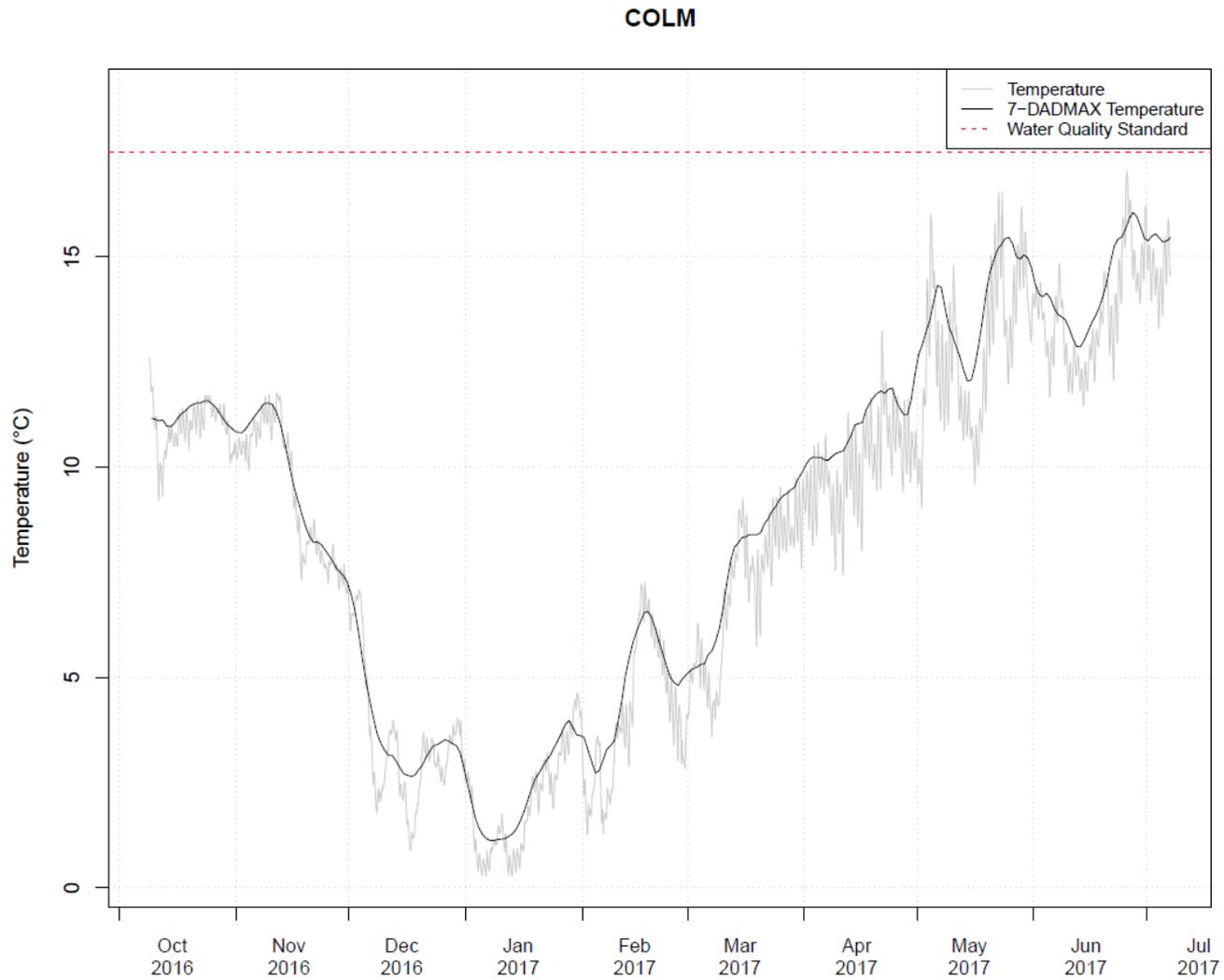


Figure J-8. Continuous Temperature and 7-DADMAX Measured at the COLM Station.

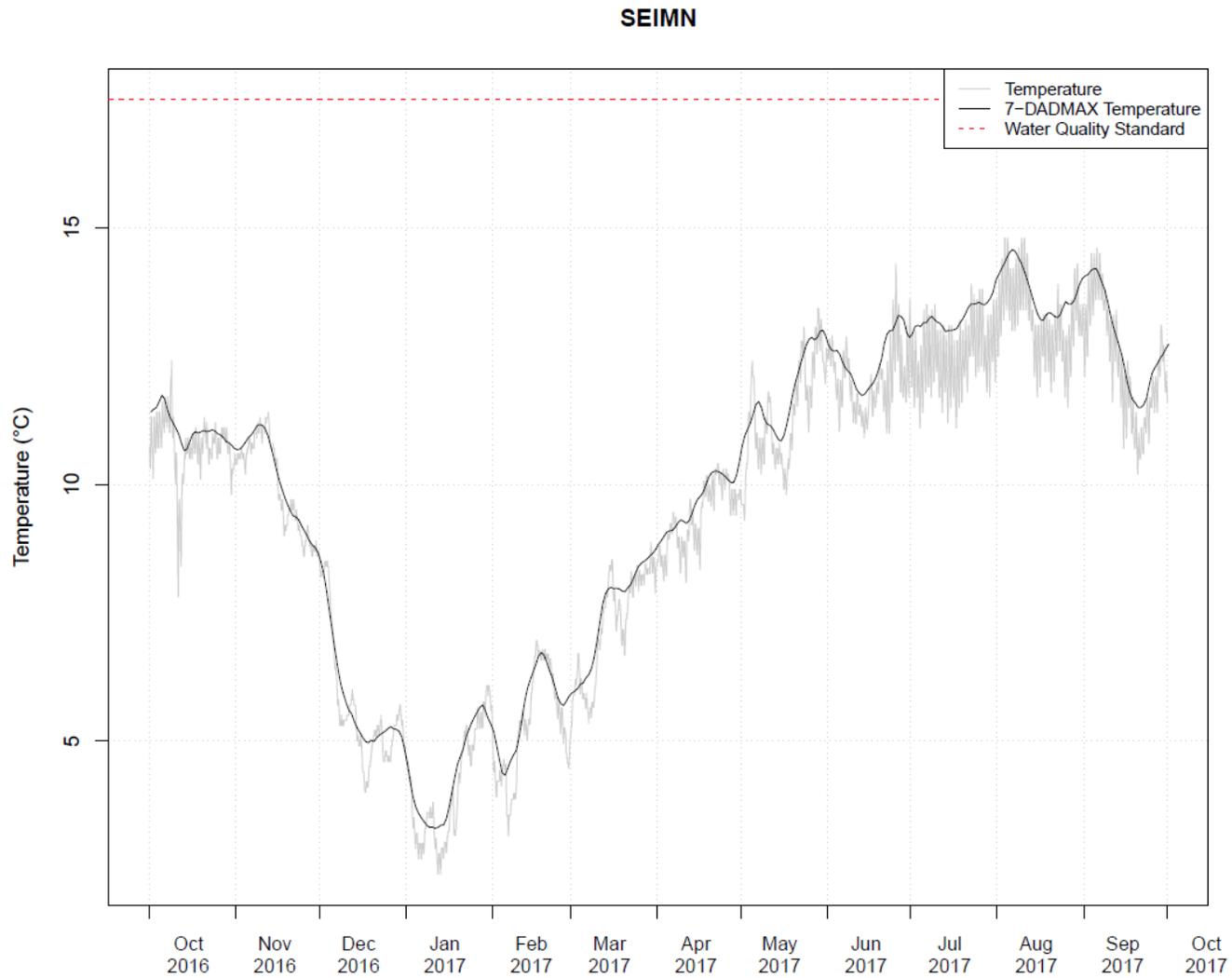


Figure J-9. Continuous Temperature and 7-DADMAX Measured at the SEIMN Station.

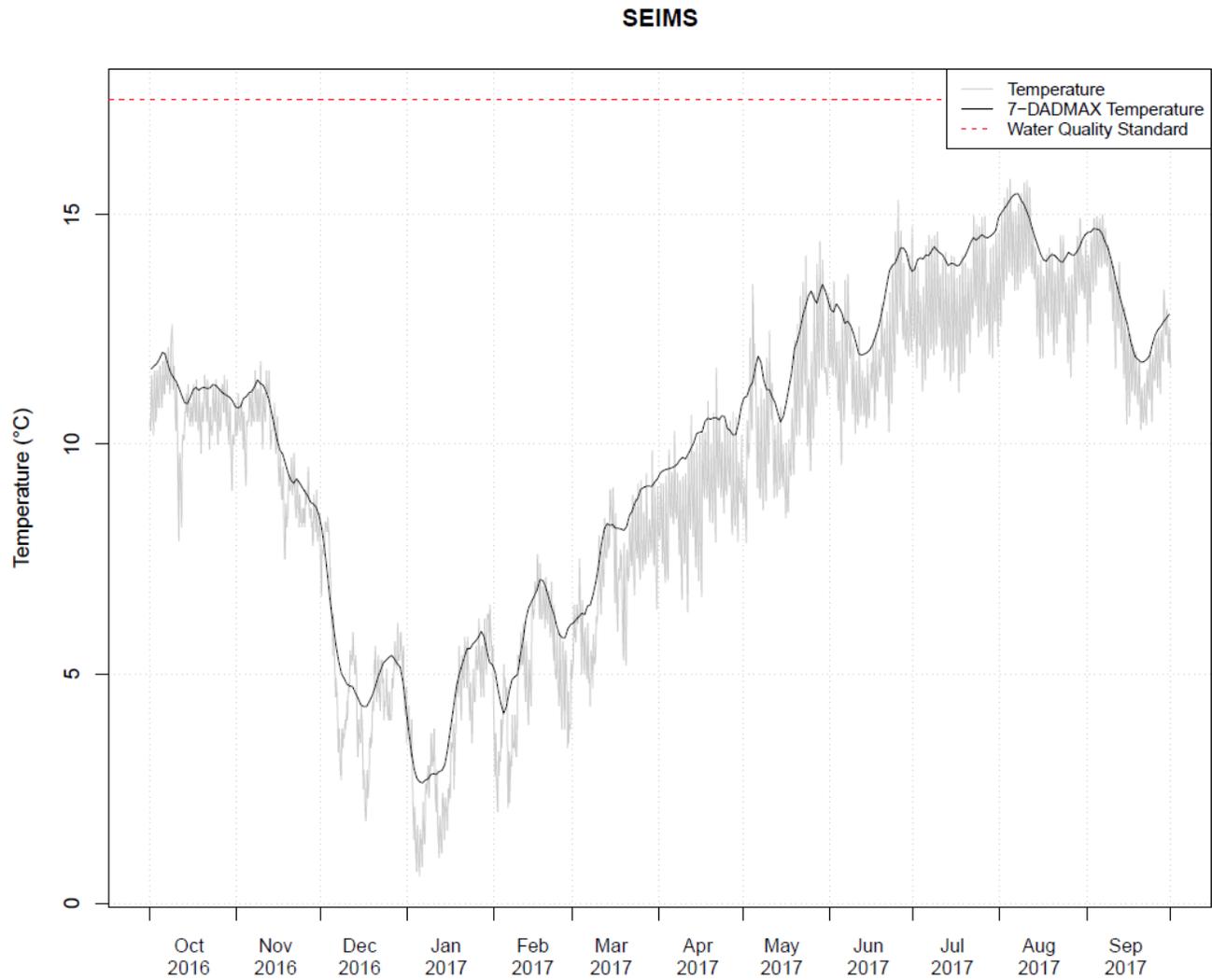


Figure J-10. Continuous Temperature and 7-DADMAX Measured at the SEIMS Station.

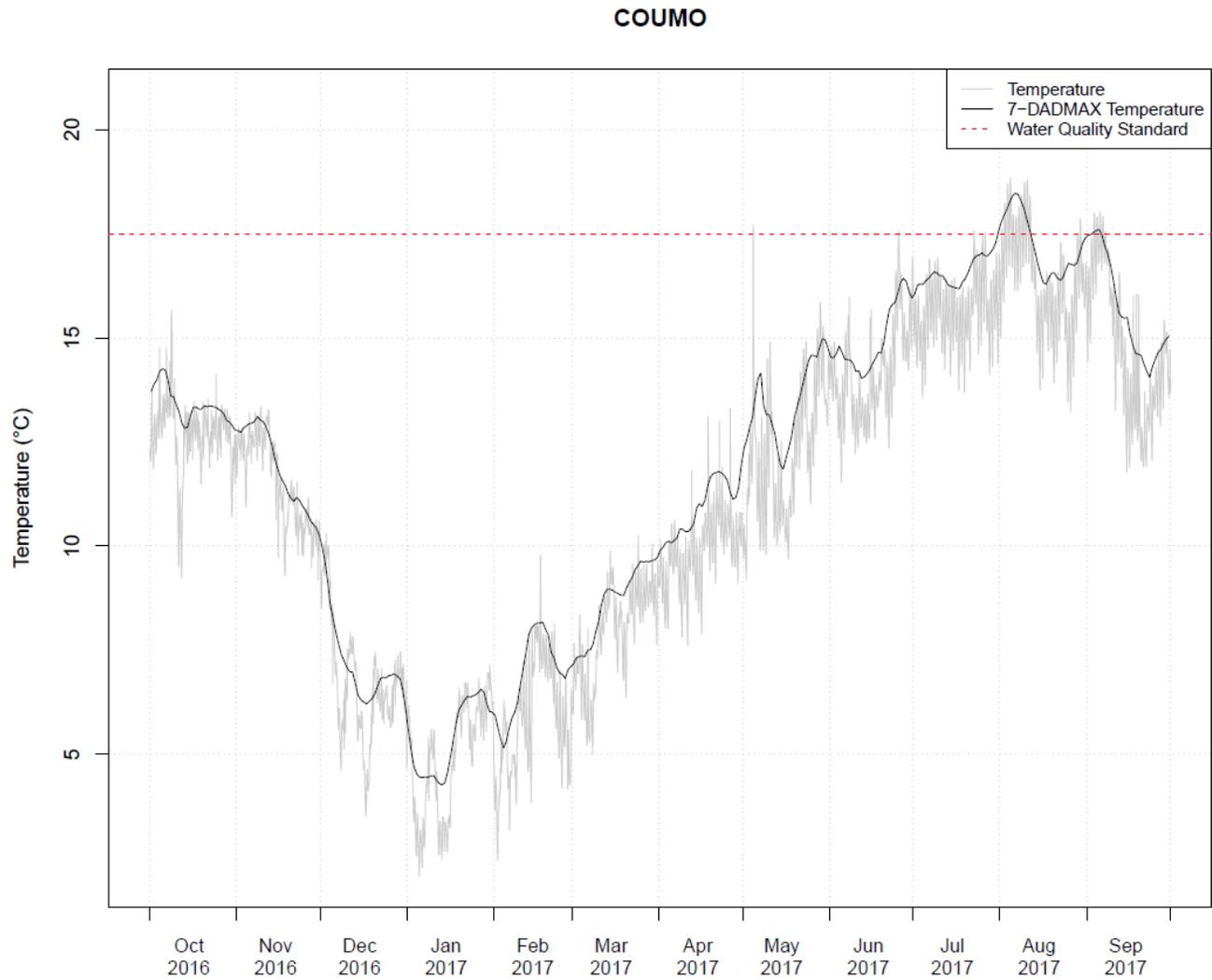


Figure J-11. Continuous Temperature and 7-DADMAX Measured at the COUMO Station.

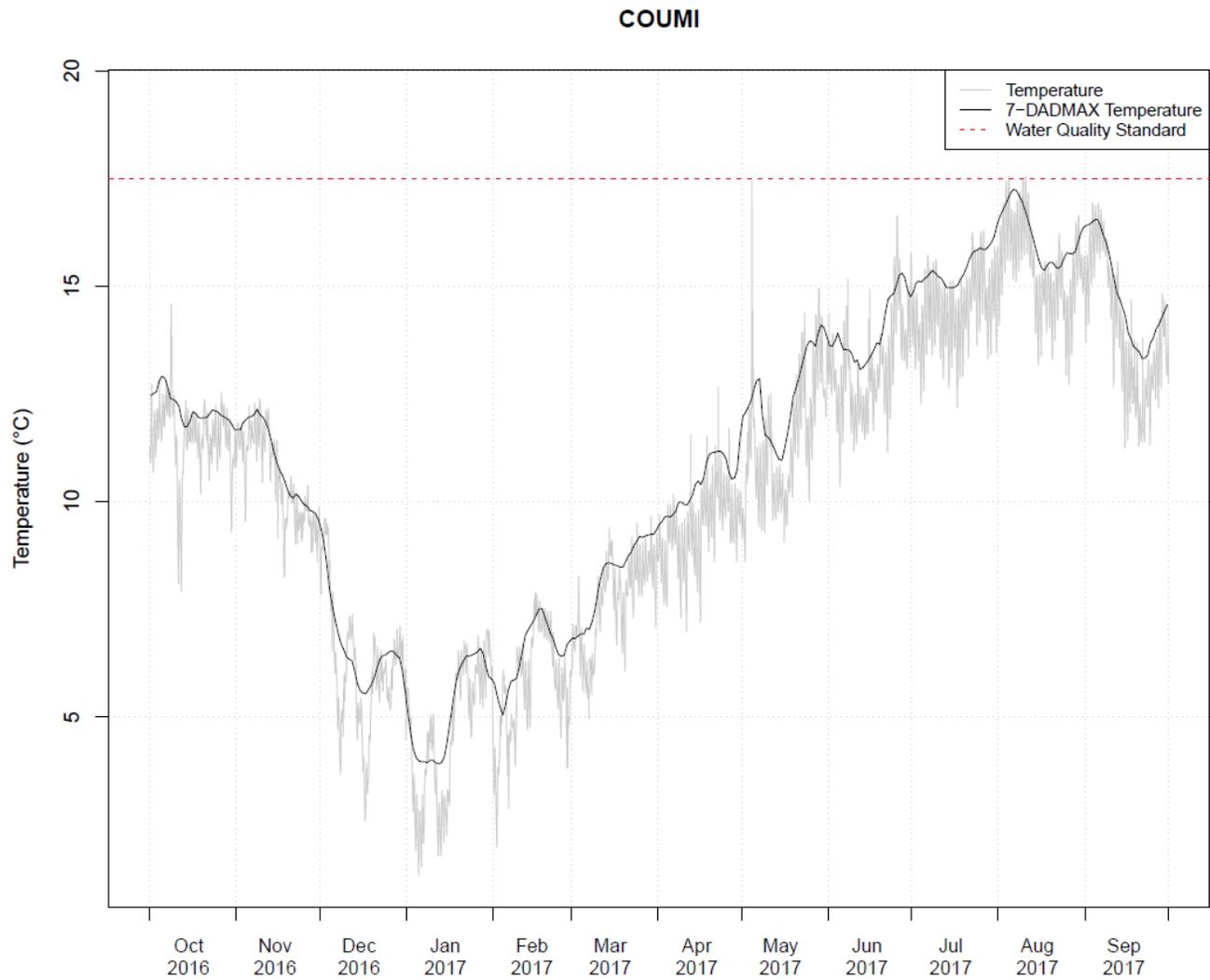


Figure J-12. Continuous Temperature and 7-DADMAX Measured at the COUMI Station.

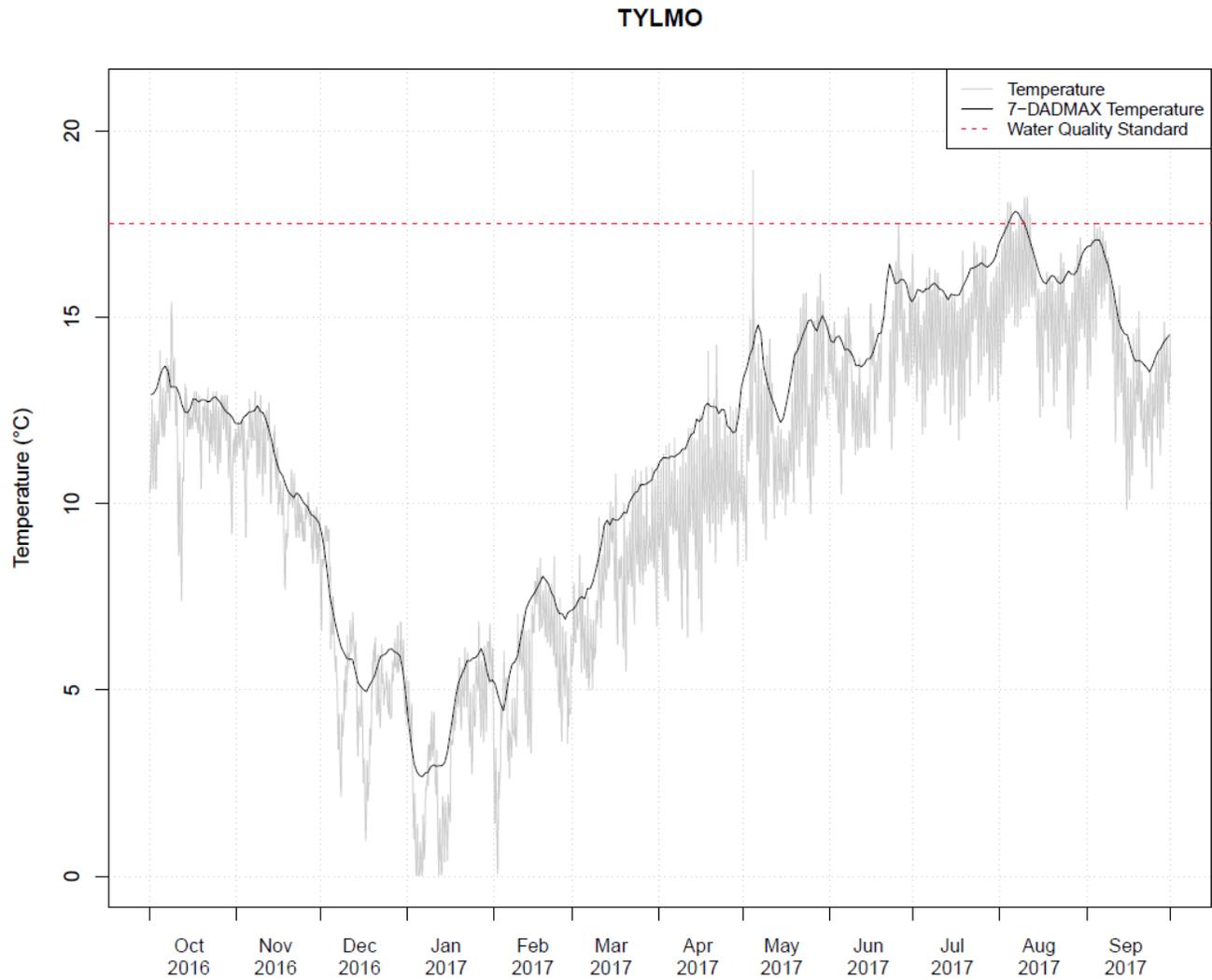


Figure J-13. Continuous Temperature and 7-DADMAX Measured at the TYLMO Station.

TYLMI

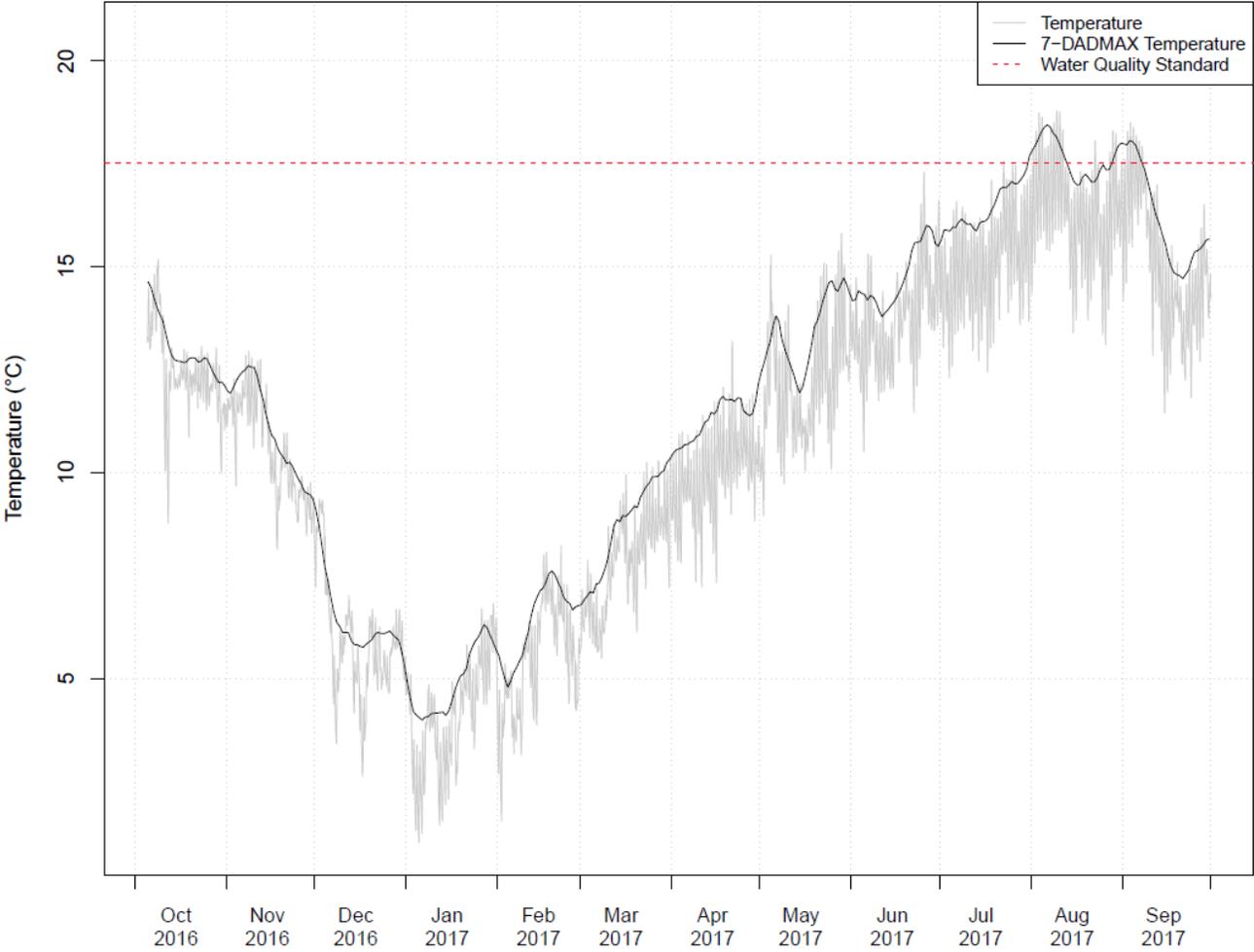


Figure J-14. Continuous Temperature and 7-DADMAX Measured at the TYLMI Station.

APPENDIX K

Line Plots Showing Continuous Conductivity Data

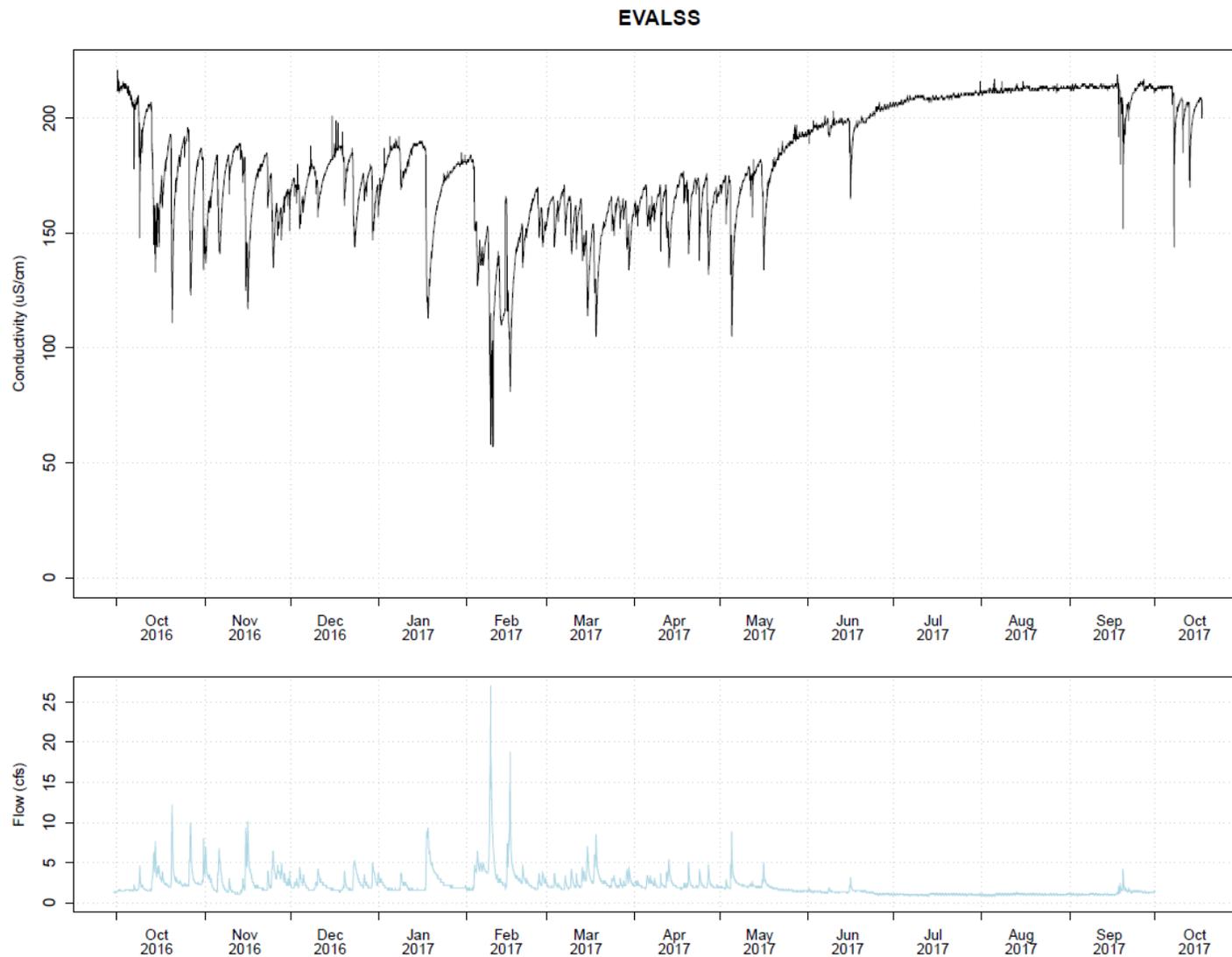


Figure K-1. Continuous Conductivity Measured at the EVALSS Station.

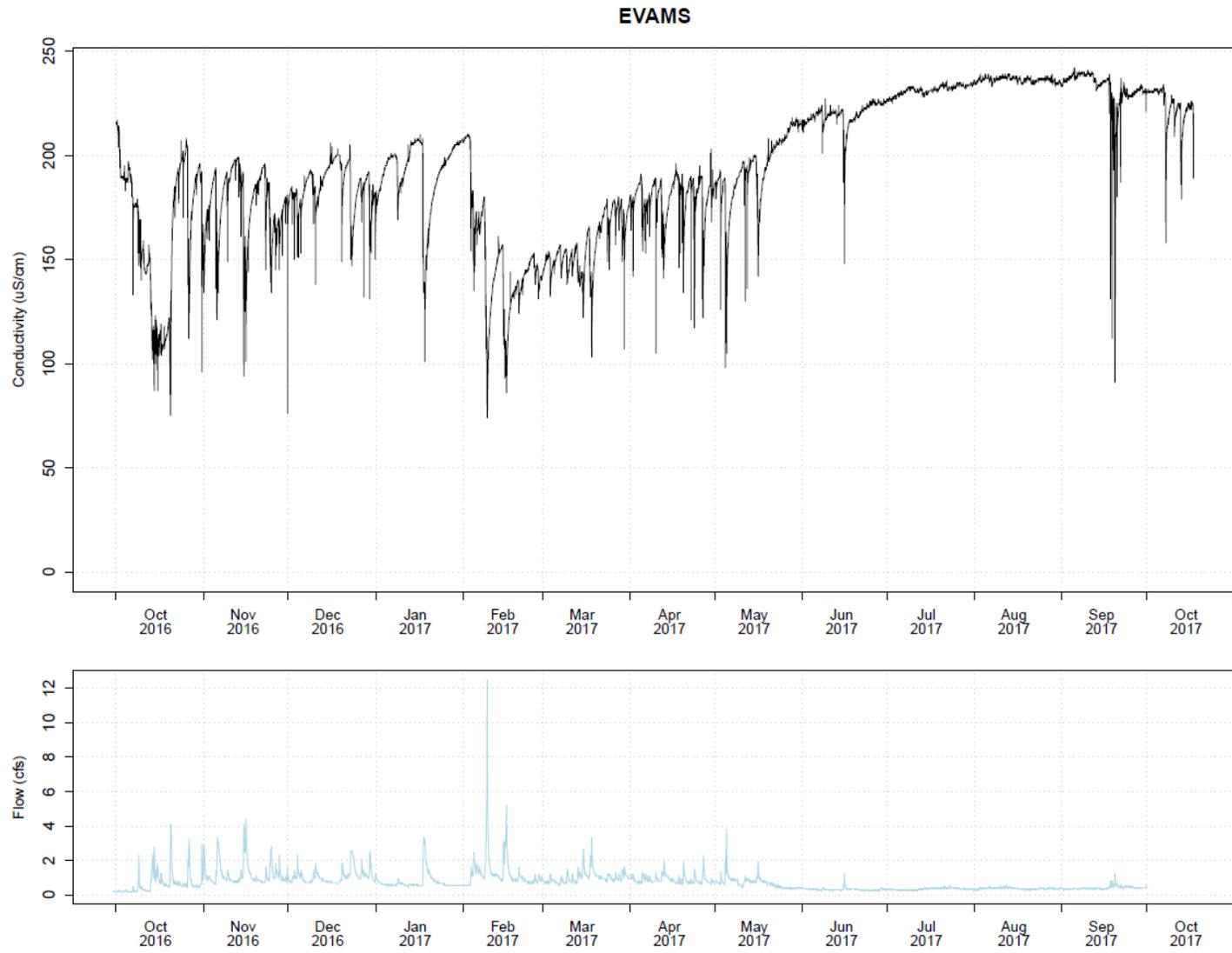


Figure K-2. Continuous Conductivity Measured at the EVAMS Station.

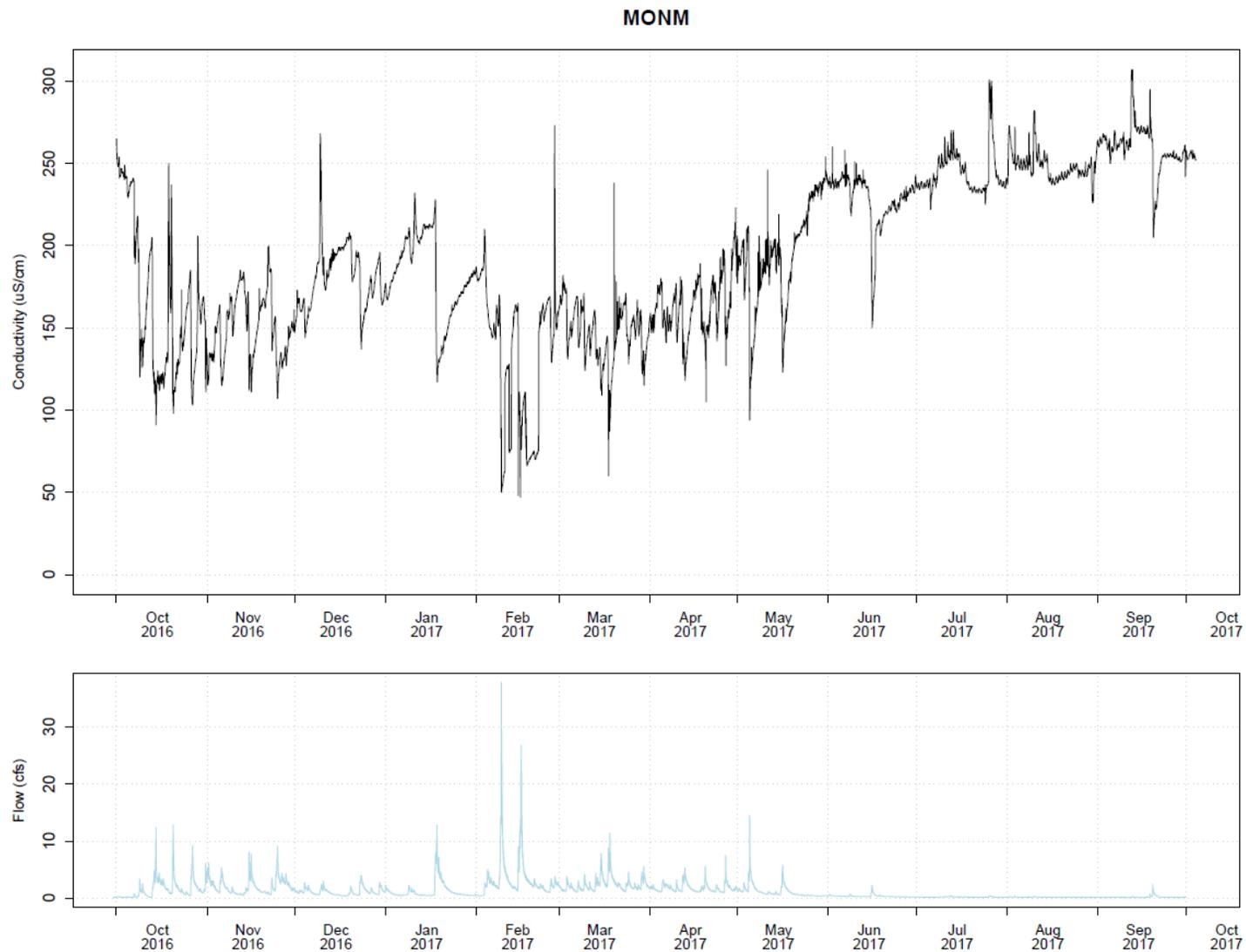


Figure K-3. Continuous Conductivity Measured at the MONM Station.

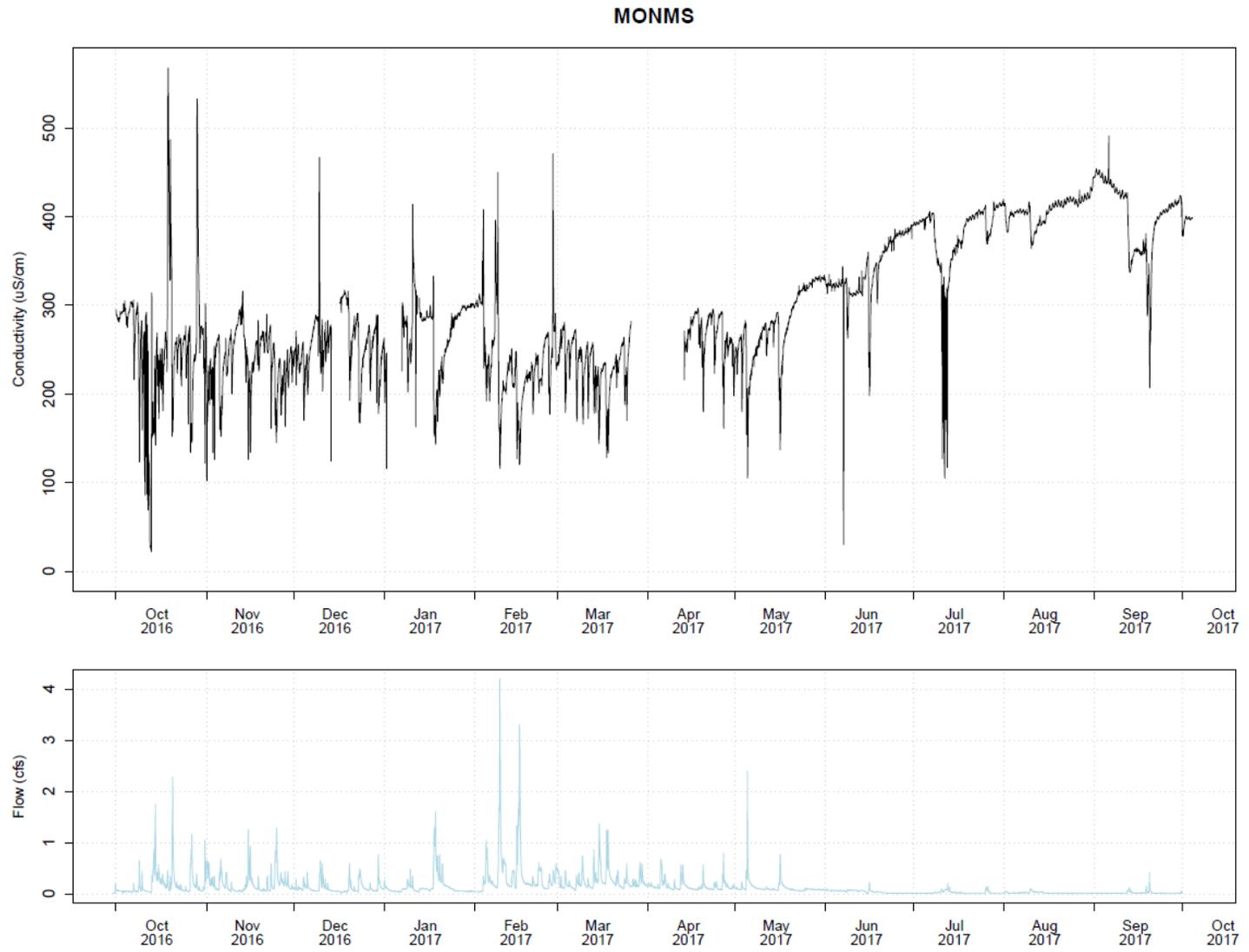


Figure K-4. Continuous Conductivity Measured at the MONMS Station.

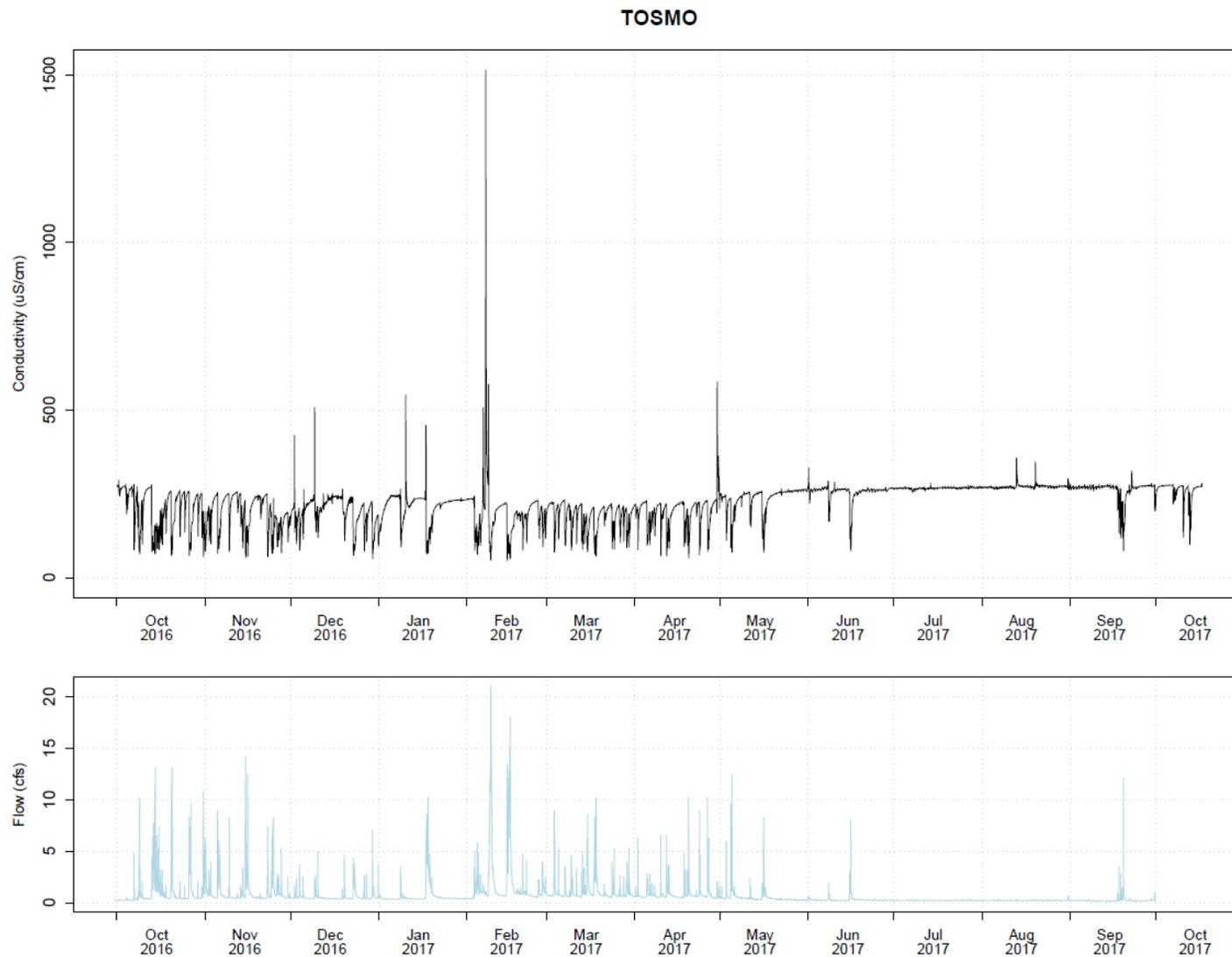


Figure K-5. Continuous Conductivity Measured at the TOSMO Station.

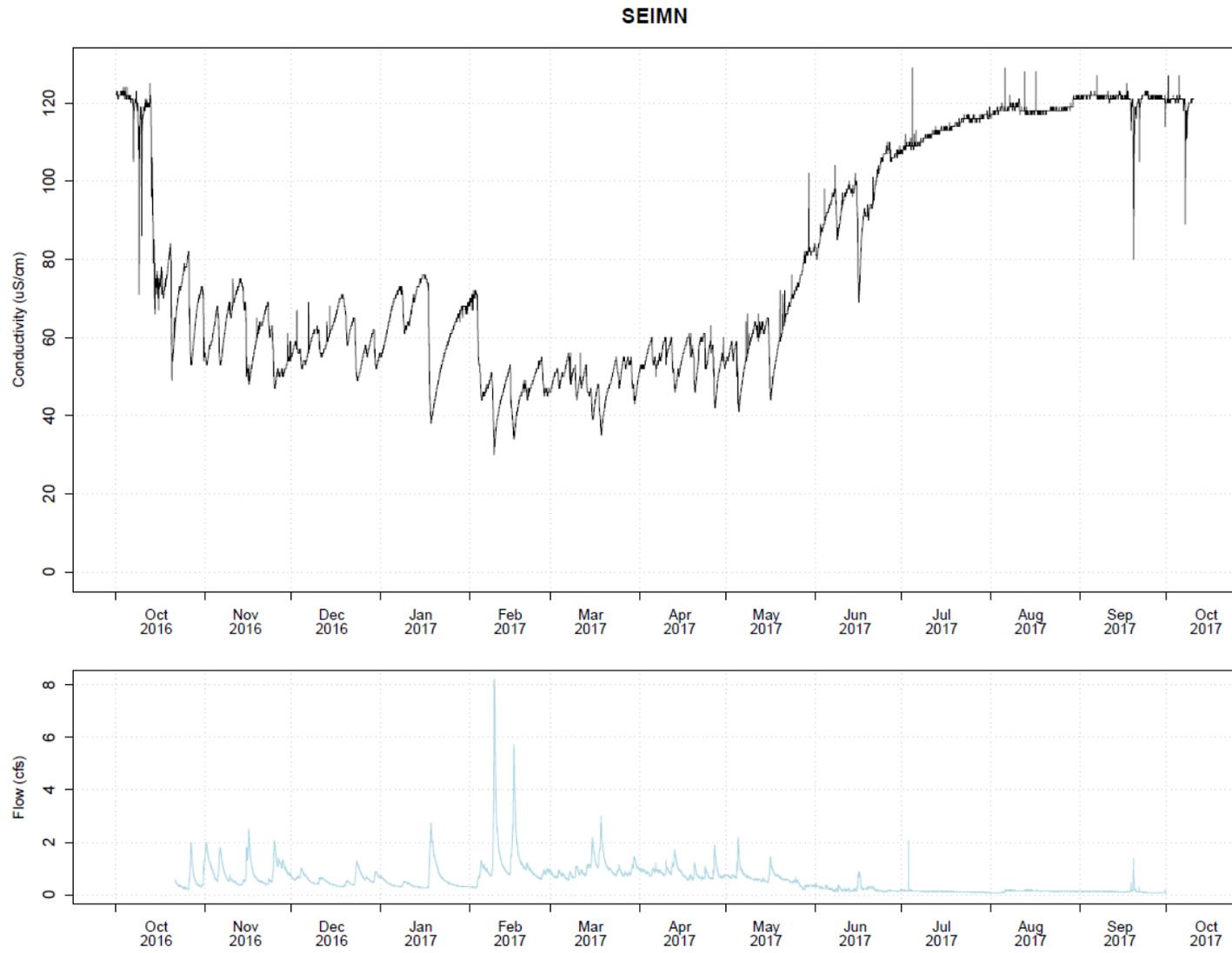


Figure K-6. Continuous Conductivity Measured at the SEIMN Station.

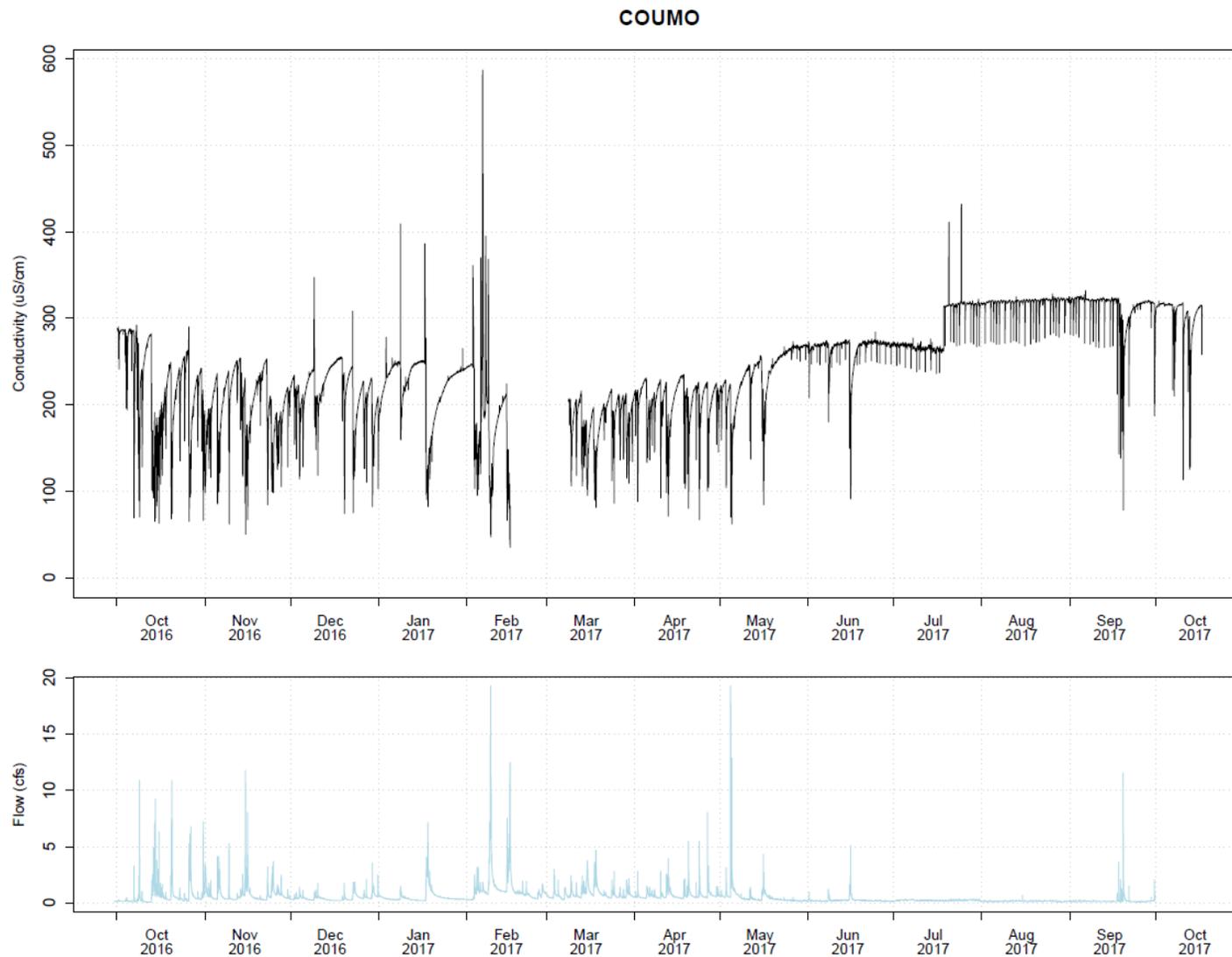


Figure K-7. Continuous Conductivity Measured at the COUMO Station.

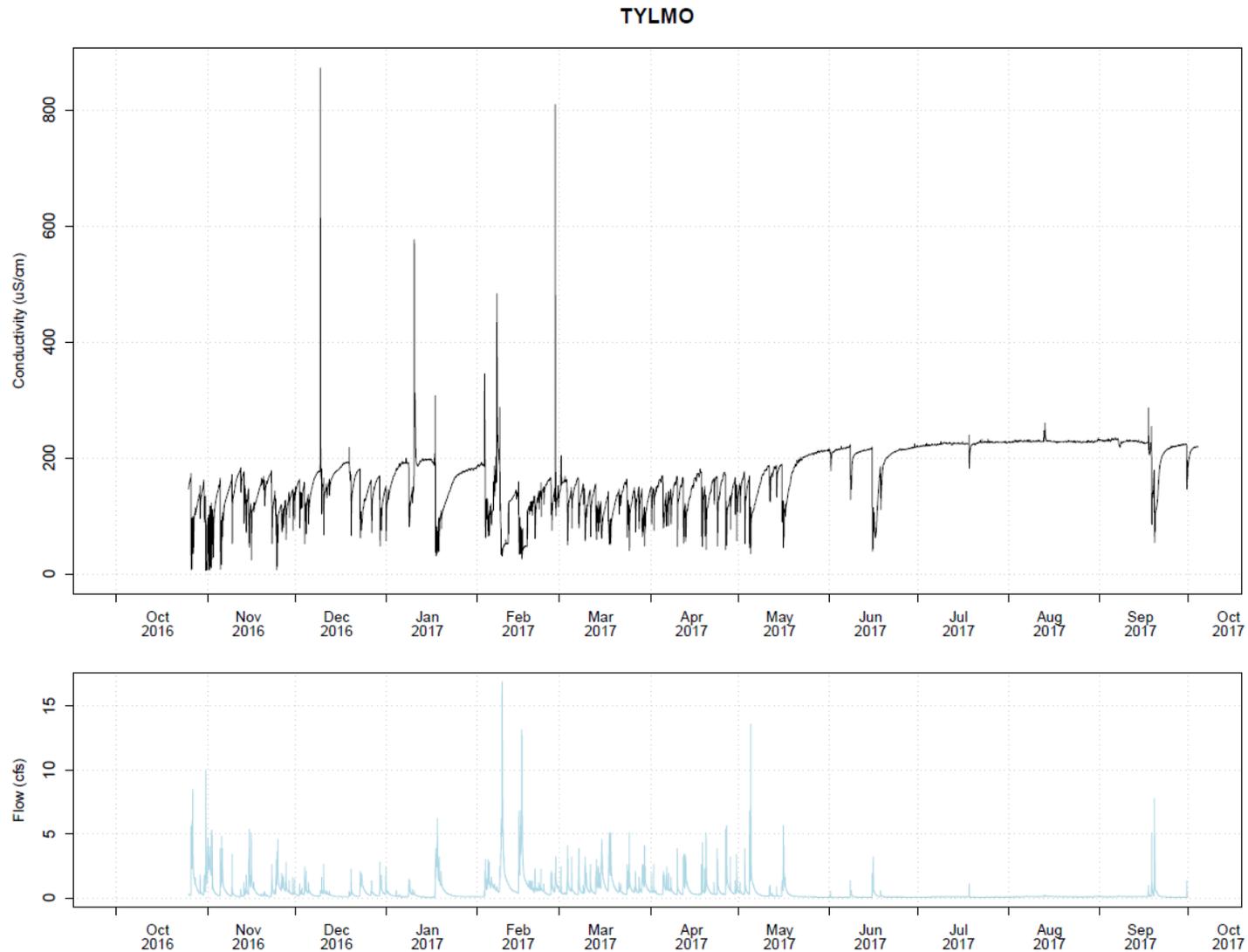


Figure K-8. Continuous Conductivity Measured at the TYLMO Station.

APPENDIX L

Compiled Field Data from Physical Habitat Monitoring

The contents of this appendix are provided in an electronic file only.

APPENDIX M

Computed Physical Habitat Quality Indicators

The contents of this appendix are provided in an electronic file only.

APPENDIX N

Summary Statistics for Evaluating Physical Habitat Quality Indicators

The contents of this appendix are provided in an electronic file only.

APPENDIX O

Laboratory Reports and Data Quality Assurance Audit Forms for Sediment Quality Monitoring



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 10, 2017

John Lenth
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1708-332

Dear John:

Enclosed are the analytical results and associated quality control data for samples submitted on August 28, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 10, 2017
Samples Submitted: August 28, 2017
Laboratory Reference: 1708-332
Project: 14-05806-000

Case Narrative

Samples were collected on August 28, 2017 and received by the laboratory on August 28, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Total Metals EPA 6010C Analysis

The liquid portion of the sample was decanted and only the solid portion was analyzed.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.



Date of Report: October 10, 2017
Samples Submitted: August 28, 2017
Laboratory Reference: 1708-332
Project: 14-05806-000

TOTAL ORGANIC CARBON
EPA 9060A

Matrix: Sediment
Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TOSH-2R-2017					
Laboratory ID:	08-332-01					
Total Organic Carbon	2.0	0.10	EPA 9060	9-14-17	9-14-17	

Client ID:	TOSH-3R-2017					
Laboratory ID:	08-332-03					
Total Organic Carbon	3.7	0.13	EPA 9060	9-14-17	9-14-17	



Date of Report: October 10, 2017
 Samples Submitted: August 28, 2017
 Laboratory Reference: 1708-332
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0914S1					
Total Organic Carbon	ND	0.042	EPA 9060	9-14-17	9-14-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-124-07							
	ORIG	DUP						
Total Organic Carbon	2.56	2.41	NA	NA	NA	NA	6	29

SPIKE BLANK								
Laboratory ID:	SB0914S1							
	SB	SB		SB				
Total Organic Carbon	41.7	42.1	NA	99	86-130	NA	NA	



Date of Report: October 10, 2017
 Samples Submitted: August 28, 2017
 Laboratory Reference: 1708-332
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C**

Matrix: Sediment
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 08-332-02						
Client ID: TOSH-2M-2017						
Copper	41	3.4	6010C	10-5-17	10-5-17	
Zinc	380	8.5	6010C	10-5-17	10-5-17	
Lab ID: 08-332-04						
Client ID: TOSH-3M-2017						
Copper	35	2.7	6010C	10-5-17	10-5-17	
Zinc	440	6.7	6010C	10-5-17	10-5-17	



Date of Report: October 10, 2017
Samples Submitted: August 28, 2017
Laboratory Reference: 1708-332
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 10-5-17
Date Analyzed: 10-5-17

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB1005SM2

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 10, 2017
 Samples Submitted: August 28, 2017
 Laboratory Reference: 1708-332
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 DUPLICATE QUALITY CONTROL**

Date Extracted: 10-5-17

Date Analyzed: 10-5-17

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-125-03

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	9.70	9.40	3	1.0	
Zinc	76.5	74.3	3	2.5	



Date of Report: October 10, 2017
 Samples Submitted: August 28, 2017
 Laboratory Reference: 1708-332
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 10-5-17

Date Analyzed: 10-5-17

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-125-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	60.2	101	60.0	101	0	
Zinc	100	169	92	168	91	1	



Date of Report: October 10, 2017
 Samples Submitted: August 28, 2017
 Laboratory Reference: 1708-332
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TOSH-2R-2017					
Laboratory ID:	08-332-01					
Naphthalene	ND	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
2-Methylnaphthalene	ND	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
1-Methylnaphthalene	ND	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
Dimethylphthalate	ND	0.40	EPA 8270D	9-5-17	9-6-17	
Acenaphthylene	ND	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
Acenaphthene	ND	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
Diethylphthalate	ND	2.0	EPA 8270D	9-5-17	9-6-17	
Fluorene	ND	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
Phenanthrene	0.033	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
Anthracene	ND	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
Di-n-butylphthalate	ND	2.0	EPA 8270D	9-5-17	9-6-17	
Fluoranthene	0.056	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
Pyrene	0.045	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
Butylbenzylphthalate	ND	2.0	EPA 8270D	9-5-17	9-6-17	
Benzo[a]anthracene	0.020	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
Chrysene	0.024	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
bis(2-Ethylhexyl)phthalate	ND	2.0	EPA 8270D	9-5-17	9-6-17	
Di-n-octylphthalate	ND	2.0	EPA 8270D	9-5-17	9-6-17	
Benzo[b]fluoranthene	0.030	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
Benzo(j,k)fluoranthene	ND	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
Benzo[a]pyrene	0.021	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
Indeno[1,2,3-cd]pyrene	0.017	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
Dibenz[a,h]anthracene	ND	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
Benzo[g,h,i]perylene	ND	0.016	EPA 8270D/SIM	9-5-17	9-6-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>63</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>73</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>73</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>63</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>61</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>71</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: August 28, 2017
 Laboratory Reference: 1708-332
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TOSH-3R-2017					
Laboratory ID:	08-332-03					
Naphthalene	ND	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
2-Methylnaphthalene	ND	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
1-Methylnaphthalene	ND	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
Dimethylphthalate	ND	0.51	EPA 8270D	9-5-17	9-6-17	
Acenaphthylene	ND	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
Acenaphthene	ND	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
Diethylphthalate	ND	2.5	EPA 8270D	9-5-17	9-6-17	
Fluorene	ND	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
Phenanthrene	0.026	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
Anthracene	ND	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
Di-n-butylphthalate	ND	2.5	EPA 8270D	9-5-17	9-6-17	
Fluoranthene	0.062	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
Pyrene	0.052	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
Butylbenzylphthalate	ND	2.5	EPA 8270D	9-5-17	9-6-17	
Benzo[a]anthracene	0.024	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
Chrysene	0.031	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
bis(2-Ethylhexyl)phthalate	ND	2.5	EPA 8270D	9-5-17	9-6-17	
Di-n-octylphthalate	ND	2.5	EPA 8270D	9-5-17	9-6-17	
Benzo[b]fluoranthene	0.045	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
Benzo(j,k)fluoranthene	ND	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
Benzo[a]pyrene	0.029	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
Indeno[1,2,3-cd]pyrene	0.026	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
Dibenz[a,h]anthracene	ND	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
Benzo[g,h,i]perylene	0.027	0.020	EPA 8270D/SIM	9-5-17	9-6-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>51</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>65</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>62</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>63</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>61</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>68</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: August 28, 2017
 Laboratory Reference: 1708-332
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0905S2					
Naphthalene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Dimethylphthalate	ND	0.020	EPA 8270D	9-5-17	9-6-17	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Diethylphthalate	ND	0.10	EPA 8270D	9-5-17	9-6-17	
Fluorene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Anthracene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Di-n-butylphthalate	ND	0.10	EPA 8270D	9-5-17	9-6-17	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Pyrene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Butylbenzylphthalate	ND	0.10	EPA 8270D	9-5-17	9-6-17	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Chrysene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
bis(2-Ethylhexyl)phthalate	ND	0.10	EPA 8270D	9-5-17	9-6-17	
Di-n-octylphthalate	ND	0.10	EPA 8270D	9-5-17	9-6-17	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Benzo(j,k)fluoranthene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>50</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>65</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>58</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>67</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>86</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>90</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: August 28, 2017
 Laboratory Reference: 1708-332
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery	RPD	RPD	Flags
					Recovery	Limits	Limit			
SPIKE BLANKS										
Laboratory ID:	SB0905S2									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	0.595	0.521	0.800	0.800	74	65	37 - 107	13	39	
2-Chlorophenol	0.619	0.522	0.800	0.800	77	65	36 - 107	17	40	
1,4-Dichlorobenzene	0.291	0.236	0.400	0.400	73	59	28 - 108	21	41	
n-Nitroso-di-n-propylamine	0.302	0.267	0.400	0.400	76	67	28 - 113	12	33	
1,2,4-Trichlorobenzene	0.298	0.254	0.400	0.400	75	64	33 - 106	16	38	
4-Chloro-3-methylphenol	0.664	0.619	0.800	0.800	83	77	52 - 106	7	30	
Acenaphthene	0.320	0.298	0.400	0.400	80	75	52 - 90	7	30	
4-Nitrophenol	0.642	0.614	0.800	0.800	80	77	30 - 109	4	32	
2,4-Dinitrotoluene	0.311	0.306	0.400	0.400	78	77	50 - 101	2	32	
Pentachlorophenol	0.750	0.671	0.800	0.800	94	84	21 - 114	11	40	
Pyrene	0.332	0.317	0.400	0.400	83	79	52 - 104	5	30	
<i>Surrogate:</i>										
<i>2-Fluorophenol</i>					<i>70</i>	<i>63</i>	<i>18 - 109</i>			
<i>Phenol-d6</i>					<i>79</i>	<i>73</i>	<i>25 - 111</i>			
<i>Nitrobenzene-d5</i>					<i>76</i>	<i>69</i>	<i>22 - 113</i>			
<i>2-Fluorobiphenyl</i>					<i>77</i>	<i>74</i>	<i>30 - 114</i>			
<i>2,4,6-Tribromophenol</i>					<i>84</i>	<i>78</i>	<i>22 - 116</i>			
<i>Terphenyl-d14</i>					<i>82</i>	<i>81</i>	<i>33 - 114</i>			



Date of Report: October 10, 2017
 Samples Submitted: August 28, 2017
 Laboratory Reference: 1708-332
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TOSH-2R-2017					
Laboratory ID:	08-332-01					
Total Solids	53	0.50	SM 2540G	9-5-17	9-6-17	

Client ID:	TOSH-2M-2017					
Laboratory ID:	08-332-02					
Total Solids	29	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	TOSH-3R-2017					
Laboratory ID:	08-332-03					
Total Solids	43	0.50	SM 2540G	9-5-17	9-6-17	

Client ID:	TOSH-3M-2017					
Laboratory ID:	08-332-04					
Total Solids	38	0.50	SM 2540G	10-5-17	10-6-17	



Date of Report: October 10, 2017
 Samples Submitted: August 28, 2017
 Laboratory Reference: 1708-332
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	08-332-03								
	ORIG	DUP							
Total Solids	43.0	42.0	NA	NA	NA	NA	2	20	
DUPLICATE									
Laboratory ID:	08-377-05								
	ORIG	DUP							
Total Solids	11.5	11.8	NA	NA	NA	NA	3	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 8/28/2017 / TOSH2, TOSH3

By G. Catarra
 Date 11/13/2017 Page 1 of 1
 Checked: initials JL
 date 11/17/2017

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	17	≤14	≤0.1% 0.1 %	NA	NA	99	±20	6	≤20	NS	≤35	OK	NONE. EPA HOLDING TIME 28 DAYS
Copper	OK / EPA 6020	NA	NA	38	≤180	≤1.0 MG/KG 1.0 MG/KG	101,101	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6020	NA	NA	38	≤180	≤2.5 mg/kg 2.5 MG/KG	92,91	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
PAHs	OK / EPA 8270D/SIM	8	≤14	1	≤40	≤20 ug/kg 16-20 UG/KG	NR	NA / 21- 120	59-94	25- 141	BS/BSD 2-21	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	8	≤14	1	≤40	≤0.1 MG/KG 2-2.5 MG/KG	NR	NA / 21- 120	59-94	25- 141	BS/BSD 2-21	≤400	NS	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 10, 2017

John Lenth
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1708-377

Dear John:

Enclosed are the analytical results and associated quality control data for samples submitted on August 30, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular flourish.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 10, 2017
Samples Submitted: August 30, 2017
Laboratory Reference: 1708-377
Project: 14-05806-000

Case Narrative

Samples were collected on August 30, 2017 and received by the laboratory on August 30, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Total Metals EPA 6010C Analysis

The liquid portion of the sample was decanted and only the solid portion was analyzed.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.



Date of Report: October 10, 2017
 Samples Submitted: August 30, 2017
 Laboratory Reference: 1708-377
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TYLR-1R-2017					
Laboratory ID:	08-377-02					
Total Organic Carbon	1.9	0.071	EPA 9060	9-14-17	9-14-17	
Client ID:	TYLR-2R-2017					
Laboratory ID:	08-377-04					
Total Organic Carbon	4.6	0.13	EPA 9060	9-14-17	9-14-17	
Client ID:	MONT-2R-2017					
Laboratory ID:	08-377-06					
Total Organic Carbon	9.6	0.046	EPA 9060	9-14-17	9-14-17	



Date of Report: October 10, 2017
 Samples Submitted: August 30, 2017
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 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0914S1					
Total Organic Carbon	ND	0.042	EPA 9060	9-14-17	9-14-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-124-07							
	ORIG	DUP						
Total Organic Carbon	2.56	2.41	NA	NA	NA	6	29	

SPIKE BLANK								
Laboratory ID:	SB0914S1							
	SB	SB		SB				
Total Organic Carbon	41.7	42.1	NA	99	86-130	NA	NA	



Date of Report: October 10, 2017
 Samples Submitted: August 30, 2017
 Laboratory Reference: 1708-377
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C**

Matrix: Sediment
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
<hr/>						
Lab ID:	08-377-01					
Client ID:	TYLR-1M-2017					
Copper	37	4.3	6010C	10-5-17	10-5-17	
Zinc	270	11	6010C	10-5-17	10-5-17	
<hr/>						
<hr/>						
Lab ID:	08-377-03					
Client ID:	TYLR-2M-2017					
Copper	94	5.7	6010C	10-5-17	10-5-17	
Zinc	520	14	6010C	10-5-17	10-5-17	
<hr/>						
<hr/>						
Lab ID:	08-377-05					
Client ID:	MONT-2M-2017					
Copper	61	8.7	6010C	10-5-17	10-5-17	
Zinc	370	22	6010C	10-5-17	10-5-17	
<hr/>						



Date of Report: October 10, 2017
Samples Submitted: August 30, 2017
Laboratory Reference: 1708-377
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 10-5-17
Date Analyzed: 10-5-17

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB1005SM2

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 10, 2017
 Samples Submitted: August 30, 2017
 Laboratory Reference: 1708-377
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 DUPLICATE QUALITY CONTROL**

Date Extracted: 10-5-17

Date Analyzed: 10-5-17

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-125-03

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	9.70	9.40	3	1.0	
Zinc	76.5	74.3	3	2.5	



Date of Report: October 10, 2017
 Samples Submitted: August 30, 2017
 Laboratory Reference: 1708-377
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 10-5-17

Date Analyzed: 10-5-17

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-125-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	60.2	101	60.0	101	0	
Zinc	100	169	92	168	91	1	



Date of Report: October 10, 2017
 Samples Submitted: August 30, 2017
 Laboratory Reference: 1708-377
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TYLR-1R-2017					
Laboratory ID:	08-377-02					
Naphthalene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
2-Methylnaphthalene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
1-Methylnaphthalene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
Dimethylphthalate	ND	0.14	EPA 8270D	9-5-17	9-7-17	
Acenaphthylene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
Acenaphthene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
Diethylphthalate	ND	0.71	EPA 8270D	9-5-17	9-7-17	
Fluorene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
Phenanthrene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
Anthracene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
Di-n-butylphthalate	ND	0.71	EPA 8270D	9-5-17	9-7-17	
Fluoranthene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
Pyrene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
Butylbenzylphthalate	ND	0.71	EPA 8270D	9-5-17	9-7-17	
Benzo[a]anthracene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
Chrysene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
bis(2-Ethylhexyl)phthalate	ND	0.71	EPA 8270D	9-5-17	9-7-17	
Di-n-octylphthalate	ND	0.71	EPA 8270D	9-5-17	9-7-17	
Benzo[b]fluoranthene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
Benzo(j,k)fluoranthene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
Benzo[a]pyrene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
Indeno[1,2,3-cd]pyrene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
Dibenz[a,h]anthracene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
Benzo[g,h,i]perylene	ND	0.0057	EPA 8270D/SIM	9-5-17	9-9-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>52</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>62</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>57</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>61</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>61</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>66</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: August 30, 2017
 Laboratory Reference: 1708-377
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TYLR-2R-2017					
Laboratory ID:	08-377-04					
Naphthalene	ND	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
2-Methylnaphthalene	ND	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
1-Methylnaphthalene	ND	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
Dimethylphthalate	ND	0.23	EPA 8270D	9-5-17	9-7-17	
Acenaphthylene	ND	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
Acenaphthene	ND	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
Diethylphthalate	ND	1.2	EPA 8270D	9-5-17	9-7-17	
Fluorene	ND	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
Phenanthrene	0.023	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
Anthracene	ND	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
Di-n-butylphthalate	ND	1.2	EPA 8270D	9-5-17	9-7-17	
Fluoranthene	0.038	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
Pyrene	0.027	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
Butylbenzylphthalate	ND	1.2	EPA 8270D	9-5-17	9-7-17	
Benzo[a]anthracene	0.018	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
Chrysene	0.015	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
bis(2-Ethylhexyl)phthalate	ND	1.2	EPA 8270D	9-5-17	9-7-17	
Di-n-octylphthalate	ND	1.2	EPA 8270D	9-5-17	9-7-17	
Benzo[b]fluoranthene	0.028	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
Benzo(j,k)fluoranthene	ND	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
Benzo[a]pyrene	0.018	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
Indeno[1,2,3-cd]pyrene	0.018	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
Dibenz[a,h]anthracene	ND	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
Benzo[g,h,i]perylene	0.011	0.0093	EPA 8270D/SIM	9-5-17	9-9-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>56</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>68</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>62</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>67</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>67</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>74</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: August 30, 2017
 Laboratory Reference: 1708-377
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-2R-2017					
Laboratory ID:	08-377-06					
Naphthalene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
2-Methylnaphthalene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
1-Methylnaphthalene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
Dimethylphthalate	ND	0.44	EPA 8270D	9-5-17	9-7-17	
Acenaphthylene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
Acenaphthene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
Diethylphthalate	ND	2.2	EPA 8270D	9-5-17	9-7-17	
Fluorene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
Phenanthrene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
Anthracene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
Di-n-butylphthalate	ND	2.2	EPA 8270D	9-5-17	9-7-17	
Fluoranthene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
Pyrene	0.028	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
Butylbenzylphthalate	ND	2.2	EPA 8270D	9-5-17	9-7-17	
Benzo[a]anthracene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
Chrysene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
bis(2-Ethylhexyl)phthalate	ND	2.2	EPA 8270D	9-5-17	9-7-17	
Di-n-octylphthalate	ND	2.2	EPA 8270D	9-5-17	9-7-17	
Benzo[b]fluoranthene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
Benzo(j,k)fluoranthene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
Benzo[a]pyrene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
Indeno[1,2,3-cd]pyrene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
Dibenz[a,h]anthracene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
Benzo[g,h,i]perylene	ND	0.018	EPA 8270D/SIM	9-5-17	9-10-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>49</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>63</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>57</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>61</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>67</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>75</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: August 30, 2017
 Laboratory Reference: 1708-377
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0905S2					
Naphthalene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Dimethylphthalate	ND	0.020	EPA 8270D	9-5-17	9-6-17	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Diethylphthalate	ND	0.10	EPA 8270D	9-5-17	9-6-17	
Fluorene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Anthracene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Di-n-butylphthalate	ND	0.10	EPA 8270D	9-5-17	9-6-17	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Pyrene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Butylbenzylphthalate	ND	0.10	EPA 8270D	9-5-17	9-6-17	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Chrysene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
bis(2-Ethylhexyl)phthalate	ND	0.10	EPA 8270D	9-5-17	9-6-17	
Di-n-octylphthalate	ND	0.10	EPA 8270D	9-5-17	9-6-17	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Benzo(j,k)fluoranthene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>50</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>65</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>58</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>67</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>86</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>90</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: August 30, 2017
 Laboratory Reference: 1708-377
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery	RPD	RPD	Flags
					Recovery	Limits	Limit			
SPIKE BLANKS										
Laboratory ID:	SB0905S2									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	0.595	0.521	0.800	0.800	74	65	37 - 107	13	39	
2-Chlorophenol	0.619	0.522	0.800	0.800	77	65	36 - 107	17	40	
1,4-Dichlorobenzene	0.291	0.236	0.400	0.400	73	59	28 - 108	21	41	
n-Nitroso-di-n-propylamine	0.302	0.267	0.400	0.400	76	67	28 - 113	12	33	
1,2,4-Trichlorobenzene	0.298	0.254	0.400	0.400	75	64	33 - 106	16	38	
4-Chloro-3-methylphenol	0.664	0.619	0.800	0.800	83	77	52 - 106	7	30	
Acenaphthene	0.320	0.298	0.400	0.400	80	75	52 - 90	7	30	
4-Nitrophenol	0.642	0.614	0.800	0.800	80	77	30 - 109	4	32	
2,4-Dinitrotoluene	0.311	0.306	0.400	0.400	78	77	50 - 101	2	32	
Pentachlorophenol	0.750	0.671	0.800	0.800	94	84	21 - 114	11	40	
Pyrene	0.332	0.317	0.400	0.400	83	79	52 - 104	5	30	
<i>Surrogate:</i>										
<i>2-Fluorophenol</i>					<i>70</i>	<i>63</i>	<i>18 - 109</i>			
<i>Phenol-d6</i>					<i>79</i>	<i>73</i>	<i>25 - 111</i>			
<i>Nitrobenzene-d5</i>					<i>76</i>	<i>69</i>	<i>22 - 113</i>			
<i>2-Fluorobiphenyl</i>					<i>77</i>	<i>74</i>	<i>30 - 114</i>			
<i>2,4,6-Tribromophenol</i>					<i>84</i>	<i>78</i>	<i>22 - 116</i>			
<i>Terphenyl-d14</i>					<i>82</i>	<i>81</i>	<i>33 - 114</i>			



Date of Report: October 10, 2017
 Samples Submitted: August 30, 2017
 Laboratory Reference: 1708-377
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TYLR-1M-2017					
Laboratory ID:	08-377-01					
Total Solids	23	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	TYLR-1R-2017					
Laboratory ID:	08-377-02					
Total Solids	70	0.50	SM 2540G	9-6-17	9-8-17	

Client ID:	TYLR-2M-2017					
Laboratory ID:	08-377-03					
Total Solids	18	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	TYLR-2R-2017					
Laboratory ID:	08-377-04					
Total Solids	43	0.50	SM 2540G	9-6-17	9-8-17	

Client ID:	MONT-2M-2017					
Laboratory ID:	08-377-05					
Total Solids	11	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	MONT-2R-2017					
Laboratory ID:	08-377-06					
Total Solids	23	0.50	SM 2540G	9-6-17	9-8-17	



Date of Report: October 10, 2017
 Samples Submitted: August 30, 2017
 Laboratory Reference: 1708-377
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	09-014-06								
	ORIG	DUP							
Total Solids	40.2	46.2	NA	NA	NA	NA	14	20	
DUPLICATE									
Laboratory ID:	08-377-05								
	ORIG	DUP							
Total Solids	11.5	11.8	NA	NA	NA	NA	3	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 8/30/2017 / TYLR-1, TYLR-2, MONT-2

By G. Catarra
 Date 11/13/2017 Page 1 of 1
 Checked: initials JL
 date 11/17/2017

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	15	≤14	≤0.1% 0.1 %	NA	NA	99	±20	6	≤20	NS	≤35	OK	NONE. EPA HOLDING TIME 28 DAYS
Copper	OK / EPA 6020	NA	NA	36	≤180	≤1.0 MG/KG 1.0 MG/KG	101,101	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6020	NA	NA	36	≤180	≤2.5 mg/kg 2.5 MG/KG	92,91	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
PAHs	OK / EPA 8270D/SIM	6	≤14	4	≤40	≤4 ug/kg 5.7-18 UG/KG	NR	NA / 21- 120	59-94	25- 141	BS/BSD 2-21	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	6	≤14	2	≤40	≤0.1 MG/KG 0.71-2.2 MG/KG	NR	NA / 21- 120	59-94	25- 141	BS/BSD 2-21	≤400	NS	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
 NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 10, 2017

John Lenth
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1709-014

Dear John:

Enclosed are the analytical results and associated quality control data for samples submitted on September 1, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 10, 2017
Samples Submitted: September 1, 2017
Laboratory Reference: 1709-014
Project: 14-05806-000

Case Narrative

Samples were collected on September 1, 2017 and received by the laboratory on September 1, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Total Metals EPA 6010C Analysis

The liquid portion of the sample was decanted and only the solid portion was analyzed.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.



Date of Report: October 10, 2017
 Samples Submitted: September 1, 2017
 Laboratory Reference: 1709-014
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TOSH-4R-2017					
Laboratory ID:	09-014-02					
Total Organic Carbon	4.5	0.20	EPA 9060	9-21-17	9-21-17	
Client ID:	EVAMSS-1R-2017					
Laboratory ID:	09-014-04					
Total Organic Carbon	20	1.3	EPA 9060	9-21-17	9-21-17	
Client ID:	EVALSS-1R-2017					
Laboratory ID:	09-014-06					
Total Organic Carbon	4.1	0.25	EPA 9060	9-21-17	9-21-17	



Date of Report: October 10, 2017
 Samples Submitted: September 1, 2017
 Laboratory Reference: 1709-014
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0921S1					
Total Organic Carbon	ND	0.042	EPA 9060	9-21-17	9-21-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-317-03							
	ORIG	DUP						
Total Organic Carbon	ND	ND	NA	NA	NA	NA	29	

SPIKE BLANK								
Laboratory ID:	SB0921S1							
	SB	SB		SB				
Total Organic Carbon	41.5	42.1	NA	99	86-130	NA	NA	



Date of Report: October 10, 2017
 Samples Submitted: September 1, 2017
 Laboratory Reference: 1709-014
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C**

Matrix: Sediment
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-014-01					
Client ID:	TOSH-4M-2017					
Copper	44	4.1	6010C	10-5-17	10-5-17	
Zinc	880	10	6010C	10-5-17	10-5-17	
Lab ID:	09-014-03					
Client ID:	EVAMSS-1M-2017					
Copper	22	8.4	6010C	10-5-17	10-5-17	
Zinc	86	21	6010C	10-5-17	10-5-17	
Lab ID:	09-014-05					
Client ID:	EVALSS-1M-2017					
Copper	34	8.0	6010C	10-5-17	10-5-17	
Zinc	86	20	6010C	10-5-17	10-5-17	



Date of Report: October 10, 2017
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Laboratory Reference: 1709-014
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 10-5-17
Date Analyzed: 10-5-17

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB1005SM2

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 10, 2017
Samples Submitted: September 1, 2017
Laboratory Reference: 1709-014
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL**

Date Extracted: 10-5-17
Date Analyzed: 10-5-17

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: 09-125-03

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	9.70	9.40	3	1.0	
Zinc	76.5	74.3	3	2.5	



Date of Report: October 10, 2017
 Samples Submitted: September 1, 2017
 Laboratory Reference: 1709-014
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 10-5-17

Date Analyzed: 10-5-17

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-125-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	60.2	101	60.0	101	0	
Zinc	100	169	92	168	91	1	



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 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TOSH-4R-2017					
Laboratory ID:	09-014-02					
Naphthalene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
2-Methylnaphthalene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
1-Methylnaphthalene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
Dimethylphthalate	ND	0.26	EPA 8270D	9-5-17	9-7-17	
Acenaphthylene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
Acenaphthene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
Diethylphthalate	ND	1.3	EPA 8270D	9-5-17	9-7-17	
Fluorene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
Phenanthrene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
Anthracene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
Di-n-butylphthalate	ND	1.3	EPA 8270D	9-5-17	9-7-17	
Fluoranthene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
Pyrene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
Butylbenzylphthalate	ND	1.3	EPA 8270D	9-5-17	9-7-17	
Benzo[a]anthracene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
Chrysene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
bis(2-Ethylhexyl)phthalate	ND	1.3	EPA 8270D	9-5-17	9-7-17	
Di-n-octylphthalate	ND	1.3	EPA 8270D	9-5-17	9-7-17	
Benzo[b]fluoranthene	0.011	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
Benzo(j,k)fluoranthene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
Benzo[a]pyrene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
Indeno[1,2,3-cd]pyrene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
Dibenz[a,h]anthracene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
Benzo[g,h,i]perylene	ND	0.010	EPA 8270D/SIM	9-5-17	9-10-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>46</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>61</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>54</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>53</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>62</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>61</i>	<i>33 - 114</i>				



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SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	EVAMSS-1R-2017					
Laboratory ID:	09-014-04					
Naphthalene	ND	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
2-Methylnaphthalene	ND	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
1-Methylnaphthalene	ND	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
Dimethylphthalate	ND	0.49	EPA 8270D	9-5-17	9-7-17	
Acenaphthylene	ND	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
Acenaphthene	ND	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
Diethylphthalate	ND	2.5	EPA 8270D	9-5-17	9-7-17	
Fluorene	ND	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
Phenanthrene	ND	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
Anthracene	ND	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
Di-n-butylphthalate	ND	2.5	EPA 8270D	9-5-17	9-7-17	
Fluoranthene	0.029	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
Pyrene	0.027	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
Butylbenzylphthalate	ND	2.5	EPA 8270D	9-5-17	9-7-17	
Benzo[a]anthracene	ND	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
Chrysene	ND	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
bis(2-Ethylhexyl)phthalate	ND	2.5	EPA 8270D	9-5-17	9-7-17	
Di-n-octylphthalate	ND	2.5	EPA 8270D	9-5-17	9-7-17	
Benzo[b]fluoranthene	0.030	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
Benzo(j,k)fluoranthene	ND	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
Benzo[a]pyrene	0.022	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
Indeno[1,2,3-cd]pyrene	ND	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
Dibenz[a,h]anthracene	ND	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
Benzo[g,h,i]perylene	ND	0.020	EPA 8270D/SIM	9-5-17	9-9-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>49</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>66</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>51</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>45</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>55</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>62</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
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SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	EVALSS-1R-2017					
Laboratory ID:	09-014-06					
Naphthalene	ND	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
2-Methylnaphthalene	ND	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
1-Methylnaphthalene	ND	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
Dimethylphthalate	ND	0.25	EPA 8270D	9-5-17	9-7-17	
Acenaphthylene	ND	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
Acenaphthene	ND	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
Diethylphthalate	ND	1.2	EPA 8270D	9-5-17	9-7-17	
Fluorene	ND	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
Phenanthrene	ND	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
Anthracene	ND	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
Di-n-butylphthalate	ND	1.2	EPA 8270D	9-5-17	9-7-17	
Fluoranthene	0.044	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
Pyrene	0.065	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
Butylbenzylphthalate	ND	1.2	EPA 8270D	9-5-17	9-7-17	
Benzo[a]anthracene	0.054	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
Chrysene	0.054	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
bis(2-Ethylhexyl)phthalate	ND	1.2	EPA 8270D	9-5-17	9-7-17	
Di-n-octylphthalate	ND	1.2	EPA 8270D	9-5-17	9-7-17	
Benzo[b]fluoranthene	0.085	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
Benzo(j,k)fluoranthene	0.022	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
Benzo[a]pyrene	0.056	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
Indeno[1,2,3-cd]pyrene	0.029	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
Dibenz[a,h]anthracene	ND	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
Benzo[g,h,i]perylene	0.017	0.0099	EPA 8270D/SIM	9-5-17	9-9-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>60</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>73</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>64</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>57</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>65</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>68</i>	<i>33 - 114</i>				



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 Samples Submitted: September 1, 2017
 Laboratory Reference: 1709-014
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0905S2					
Naphthalene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Dimethylphthalate	ND	0.020	EPA 8270D	9-5-17	9-6-17	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Diethylphthalate	ND	0.10	EPA 8270D	9-5-17	9-6-17	
Fluorene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Anthracene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Di-n-butylphthalate	ND	0.10	EPA 8270D	9-5-17	9-6-17	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Pyrene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Butylbenzylphthalate	ND	0.10	EPA 8270D	9-5-17	9-6-17	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Chrysene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
bis(2-Ethylhexyl)phthalate	ND	0.10	EPA 8270D	9-5-17	9-6-17	
Di-n-octylphthalate	ND	0.10	EPA 8270D	9-5-17	9-6-17	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Benzo(j,k)fluoranthene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	9-5-17	9-6-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>50</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>65</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>58</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>67</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>86</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>90</i>	<i>33 - 114</i>				



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 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery	RPD	RPD	Flags
					Recovery	Limits	Limit			
SPIKE BLANKS										
Laboratory ID:	SB0905S2									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	0.595	0.521	0.800	0.800	74	65	37 - 107	13	39	
2-Chlorophenol	0.619	0.522	0.800	0.800	77	65	36 - 107	17	40	
1,4-Dichlorobenzene	0.291	0.236	0.400	0.400	73	59	28 - 108	21	41	
n-Nitroso-di-n-propylamine	0.302	0.267	0.400	0.400	76	67	28 - 113	12	33	
1,2,4-Trichlorobenzene	0.298	0.254	0.400	0.400	75	64	33 - 106	16	38	
4-Chloro-3-methylphenol	0.664	0.619	0.800	0.800	83	77	52 - 106	7	30	
Acenaphthene	0.320	0.298	0.400	0.400	80	75	52 - 90	7	30	
4-Nitrophenol	0.642	0.614	0.800	0.800	80	77	30 - 109	4	32	
2,4-Dinitrotoluene	0.311	0.306	0.400	0.400	78	77	50 - 101	2	32	
Pentachlorophenol	0.750	0.671	0.800	0.800	94	84	21 - 114	11	40	
Pyrene	0.332	0.317	0.400	0.400	83	79	52 - 104	5	30	
<i>Surrogate:</i>										
<i>2-Fluorophenol</i>					<i>70</i>	<i>63</i>	<i>18 - 109</i>			
<i>Phenol-d6</i>					<i>79</i>	<i>73</i>	<i>25 - 111</i>			
<i>Nitrobenzene-d5</i>					<i>76</i>	<i>69</i>	<i>22 - 113</i>			
<i>2-Fluorobiphenyl</i>					<i>77</i>	<i>74</i>	<i>30 - 114</i>			
<i>2,4,6-Tribromophenol</i>					<i>84</i>	<i>78</i>	<i>22 - 116</i>			
<i>Terphenyl-d14</i>					<i>82</i>	<i>81</i>	<i>33 - 114</i>			



Date of Report: October 10, 2017
 Samples Submitted: September 1, 2017
 Laboratory Reference: 1709-014
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TOSH-4M-2017					
Laboratory ID:	09-014-01					
Total Solids	24	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	TOSH-4R-2017					
Laboratory ID:	09-014-02					
Total Solids	38	0.50	SM 2540G	9-6-17	9-8-17	

Client ID:	EVAMSS-1M-2017					
Laboratory ID:	09-014-03					
Total Solids	12	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	EVAMSS-1R-2017					
Laboratory ID:	09-014-04					
Total Solids	20	0.50	SM 2540G	9-6-17	9-8-17	

Client ID:	EVALSS-1M-2017					
Laboratory ID:	09-014-05					
Total Solids	13	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	EVALSS-1R-2017					
Laboratory ID:	09-014-06					
Total Solids	40	0.50	SM 2540G	9-6-17	9-8-17	



Date of Report: October 10, 2017
 Samples Submitted: September 1, 2017
 Laboratory Reference: 1709-014
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	09-014-06								
	ORIG	DUP							
Total Solids	40.2	46.2	NA	NA	NA	NA	14	20	
DUPLICATE									
Laboratory ID:	08-377-05								
	ORIG	DUP							
Total Solids	11.5	11.8	NA	NA	NA	NA	3	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: John Lenth

CHAIN OF CUSTODY

Turnaround Requested:
 1 Day
 2 Day
 3 Day
 Standard

Laboratory No. **09-014**
 Requested Analyses

Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates	Total Solids													
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates	Total Solids							
1	TOSH-4M-2017	9-1-17	10:40	Sediment	1		X	X			X							
2	TOSH-4R-2017		10:40	Sediment	1	X			X	X	X							
3	EVAMSS-1M-2017		12:10	Sediment	1		X	X			X							
4	EVAMSS-1R-2017		12:10	Sediment	1	X			X	X	X							
5	EVALSS-1M-2017		13:35	Sediment	1		X	X			X							
6	EVALSS-1R-2017		13:35	Sediment	1	X			X	X	X							
					Sediment	1												
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													

Relinquished by Miamm Date 9-1-17 Received by We Date 9-1-17
 Firm Herrera Time 14:00 Firm Onsite Time 1400
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 9/01/2017 / TOSH-4, EVAMSS-1, EVALSS-1

By G. Catarra
 Date 11/13/2017 Page 1 of 1
 Checked: initials JL
 date 11/17/2017

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	20	≤14	≤0.1% 0.1 %	NA	NA	99	±20	NC	≤20	NS	≤35	OK	NONE. EPA HOLDING TIME 28 DAYS
Copper	OK / EPA 6020	NA	NA	34	≤180	≤1.0 MG/KG 1.0 MG/KG	101,101	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6020	NA	NA	34	≤180	≤2.5 mg/kg 2.5 MG/KG	92,91	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
PAHs	OK / EPA 8270D/SIM	4	≤14	5	≤40	≤4 ug/kg 9.9 -20 UG/KG	NR	NA / 21- 120	59-94	25- 141	BS/BSD 2-21	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	4	≤14	2	≤40	≤0.02-0.10 MG/KG 0.25-2.5 MG/KG	NR	NA / 21- 120	59-94	25- 141	BS/BSD 2-21	≤400	NS	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
 NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 10, 2017

John Lenth
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1709-096

Dear John:

Enclosed are the analytical results and associated quality control data for samples submitted on September 11, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 10, 2017
Samples Submitted: September 11, 2017
Laboratory Reference: 1709-096
Project: 14-05806-000

Case Narrative

Samples were collected on September 11, 2017 and received by the laboratory on September 11, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Total Metals EPA 6010C Analysis

The liquid portion of the sample was decanted and only the solid portion was analyzed.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.



Date of Report: October 10, 2017
 Samples Submitted: September 11, 2017
 Laboratory Reference: 1709-096
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	CTRY-2R-2017					
Laboratory ID:	09-096-02					
Total Organic Carbon	5.1	0.17	EPA 9060	9-21-17	9-21-17	
Client ID:	CTRY-1R-2017					
Laboratory ID:	09-096-04					
Total Organic Carbon	2.3	0.16	EPA 9060	9-21-17	9-21-17	
Client ID:	TOSH-1R -2017					
Laboratory ID:	09-096-06					
Total Organic Carbon	1.0	0.14	EPA 9060	9-21-17	9-21-17	



Date of Report: October 10, 2017
 Samples Submitted: September 11, 2017
 Laboratory Reference: 1709-096
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0921S1					
Total Organic Carbon	ND	0.042	EPA 9060	9-21-17	9-21-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-317-03							
	ORIG	DUP						
Total Organic Carbon	ND	ND	NA	NA	NA	NA	29	

SPIKE BLANK

Laboratory ID:	SB0921S1							
	SB	SB		SB				
Total Organic Carbon	41.5	42.1	NA	99	86-130	NA	NA	



Date of Report: October 10, 2017
 Samples Submitted: September 11, 2017
 Laboratory Reference: 1709-096
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C**

Matrix: Sediment
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-096-01					
Client ID:	CTRY-2M-2017					
Copper	26	3.6	6010C	10-5-17	10-5-17	
Zinc	94	8.9	6010C	10-5-17	10-5-17	

Lab ID:	09-096-03					
Client ID:	CTRY-1M-2017					
Copper	40	5.7	6010C	10-5-17	10-5-17	
Zinc	350	14	6010C	10-5-17	10-5-17	

Lab ID:	09-096-05					
Client ID:	TOSH-1M -2017					
Copper	39	3.4	6010C	10-5-17	10-5-17	
Zinc	340	8.4	6010C	10-5-17	10-5-17	



Date of Report: October 10, 2017
Samples Submitted: September 11, 2017
Laboratory Reference: 1709-096
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 10-5-17
Date Analyzed: 10-5-17

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB1005SM2

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 10, 2017
Samples Submitted: September 11, 2017
Laboratory Reference: 1709-096
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL**

Date Extracted: 10-5-17
Date Analyzed: 10-5-17

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: 09-125-03

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	9.70	9.40	3	1.0	
Zinc	76.5	74.3	3	2.5	



Date of Report: October 10, 2017
 Samples Submitted: September 11, 2017
 Laboratory Reference: 1709-096
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 10-5-17

Date Analyzed: 10-5-17

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-125-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	60.2	101	60.0	101	0	
Zinc	100	169	92	168	91	1	



Date of Report: October 10, 2017
 Samples Submitted: September 11, 2017
 Laboratory Reference: 1709-096
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	CTRY-2R-2017					
Laboratory ID:	09-096-02					
Naphthalene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
2-Methylnaphthalene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
1-Methylnaphthalene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
Dimethylphthalate	ND	0.053	EPA 8270D	9-19-17	9-19-17	
Acenaphthylene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
Acenaphthene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
Diethylphthalate	ND	0.27	EPA 8270D	9-19-17	9-19-17	
Fluorene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
Phenanthrene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
Anthracene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
Di-n-butylphthalate	ND	0.27	EPA 8270D	9-19-17	9-19-17	
Fluoranthene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
Pyrene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
Butylbenzylphthalate	ND	0.27	EPA 8270D	9-19-17	9-19-17	
Benzo[a]anthracene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
Chrysene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
bis(2-Ethylhexyl)phthalate	ND	0.27	EPA 8270D	9-19-17	9-19-17	
Di-n-octylphthalate	ND	0.27	EPA 8270D	9-19-17	9-19-17	
Benzo[b]fluoranthene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo(j,k)fluoranthene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo[a]pyrene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
Indeno[1,2,3-cd]pyrene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
Dibenz[a,h]anthracene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo[g,h,i]perylene	ND	0.011	EPA 8270D/SIM	9-19-17	9-22-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>41</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>53</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>46</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>49</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>66</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>60</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: September 11, 2017
 Laboratory Reference: 1709-096
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	CTRY-1R-2017					
Laboratory ID:	09-096-04					
Naphthalene	ND	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
2-Methylnaphthalene	ND	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
1-Methylnaphthalene	ND	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
Dimethylphthalate	ND	0.18	EPA 8270D	9-19-17	9-19-17	
Acenaphthylene	ND	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
Acenaphthene	ND	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
Diethylphthalate	ND	0.89	EPA 8270D	9-19-17	9-19-17	
Fluorene	ND	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
Phenanthrene	0.086	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
Anthracene	0.017	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
Di-n-butylphthalate	ND	0.89	EPA 8270D	9-19-17	9-19-17	
Fluoranthene	0.25	0.18	EPA 8270D	9-19-17	9-19-17	
Pyrene	0.21	0.18	EPA 8270D	9-19-17	9-19-17	
Butylbenzylphthalate	ND	0.89	EPA 8270D	9-19-17	9-19-17	
Benzo[a]anthracene	0.075	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
Chrysene	0.083	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
bis(2-Ethylhexyl)phthalate	ND	0.89	EPA 8270D	9-19-17	9-19-17	
Di-n-octylphthalate	ND	0.89	EPA 8270D	9-19-17	9-19-17	
Benzo[b]fluoranthene	0.11	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo(j,k)fluoranthene	0.034	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo[a]pyrene	0.074	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
Indeno[1,2,3-cd]pyrene	0.055	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
Dibenz[a,h]anthracene	0.012	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo[g,h,i]perylene	0.047	0.0071	EPA 8270D/SIM	9-19-17	9-22-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>59</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>72</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>70</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>71</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>77</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>71</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: September 11, 2017
 Laboratory Reference: 1709-096
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TOSH-1R -2017					
Laboratory ID:	09-096-06					
Naphthalene	ND	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
2-Methylnaphthalene	ND	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
1-Methylnaphthalene	ND	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
Dimethylphthalate	ND	0.032	EPA 8270D	9-19-17	9-19-17	
Acenaphthylene	ND	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
Acenaphthene	ND	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
Diethylphthalate	ND	0.16	EPA 8270D	9-19-17	9-19-17	
Fluorene	ND	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
Phenanthrene	0.012	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
Anthracene	ND	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
Di-n-butylphthalate	ND	0.16	EPA 8270D	9-19-17	9-19-17	
Fluoranthene	0.025	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
Pyrene	0.021	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
Butylbenzylphthalate	ND	0.16	EPA 8270D	9-19-17	9-19-17	
Benzo[a]anthracene	0.0085	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
Chrysene	0.011	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
bis(2-Ethylhexyl)phthalate	ND	0.16	EPA 8270D	9-19-17	9-19-17	
Di-n-octylphthalate	ND	0.16	EPA 8270D	9-19-17	9-19-17	
Benzo[b]fluoranthene	0.013	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo(j,k)fluoranthene	ND	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo[a]pyrene	0.010	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
Indeno[1,2,3-cd]pyrene	0.0075	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
Dibenz[a,h]anthracene	ND	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo[g,h,i]perylene	ND	0.0064	EPA 8270D/SIM	9-19-17	9-22-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>45</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>57</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>46</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>55</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>73</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>64</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: September 11, 2017
 Laboratory Reference: 1709-096
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0919S5					
Naphthalene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Dimethylphthalate	ND	0.020	EPA 8270D	9-19-17	9-19-17	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Diethylphthalate	ND	0.10	EPA 8270D	9-19-17	9-19-17	
Fluorene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Anthracene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Di-n-butylphthalate	ND	0.10	EPA 8270D	9-19-17	9-19-17	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Pyrene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Butylbenzylphthalate	ND	0.10	EPA 8270D	9-19-17	9-19-17	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Chrysene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
bis(2-Ethylhexyl)phthalate	ND	0.10	EPA 8270D	9-19-17	9-19-17	
Di-n-octylphthalate	ND	0.10	EPA 8270D	9-19-17	9-19-17	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo(j,k)fluoranthene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>60</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>64</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>63</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>66</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>73</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>69</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: September 11, 2017
 Laboratory Reference: 1709-096
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0919S5									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	0.441	0.443	0.800	0.800	55	55	37 - 107	0	39	
2-Chlorophenol	0.454	0.440	0.800	0.800	57	55	36 - 107	3	40	
1,4-Dichlorobenzene	0.210	0.204	0.400	0.400	53	51	28 - 108	3	41	
n-Nitroso-di-n-propylamine	0.225	0.228	0.400	0.400	56	57	28 - 113	1	33	
1,2,4-Trichlorobenzene	0.232	0.226	0.400	0.400	58	57	33 - 106	3	38	
4-Chloro-3-methylphenol	0.522	0.519	0.800	0.800	65	65	52 - 106	1	30	
Acenaphthene	0.266	0.253	0.400	0.400	67	63	52 - 90	5	30	
4-Nitrophenol	0.584	0.560	0.800	0.800	73	70	30 - 109	4	32	
2,4-Dinitrotoluene	0.266	0.250	0.400	0.400	67	63	50 - 101	6	32	
Pentachlorophenol	0.667	0.637	0.800	0.800	83	80	21 - 114	5	40	
Pyrene	0.286	0.283	0.400	0.400	72	71	52 - 104	1	30	
<i>Surrogate:</i>										
<i>2-Fluorophenol</i>					<i>57</i>	<i>54</i>	<i>18 - 109</i>			
<i>Phenol-d6</i>					<i>61</i>	<i>59</i>	<i>25 - 111</i>			
<i>Nitrobenzene-d5</i>					<i>58</i>	<i>57</i>	<i>22 - 113</i>			
<i>2-Fluorobiphenyl</i>					<i>63</i>	<i>60</i>	<i>30 - 114</i>			
<i>2,4,6-Tribromophenol</i>					<i>74</i>	<i>69</i>	<i>22 - 116</i>			
<i>Terphenyl-d14</i>					<i>71</i>	<i>70</i>	<i>33 - 114</i>			



Date of Report: October 10, 2017
 Samples Submitted: September 11, 2017
 Laboratory Reference: 1709-096
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	CTRY-2M-2017					
Laboratory ID:	09-096-01					
Total Solids	28	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	CTRY-2R-2017					
Laboratory ID:	09-096-02					
Total Solids	38	0.50	SM 2540G	9-19-17	9-20-17	

Client ID:	CTRY-1M-2017					
Laboratory ID:	09-096-03					
Total Solids	17	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	CTRY-1R-2017					
Laboratory ID:	09-096-04					
Total Solids	56	0.50	SM 2540G	9-19-17	9-20-17	

Client ID:	TOSH-1M -2017					
Laboratory ID:	09-096-05					
Total Solids	30	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	TOSH-1R -2017					
Laboratory ID:	09-096-06					
Total Solids	63	0.50	SM 2540G	9-19-17	9-20-17	



Date of Report: October 10, 2017
 Samples Submitted: September 11, 2017
 Laboratory Reference: 1709-096
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	09-125-04								
	ORIG	DUP							
Total Solids	67.0	67.1	NA	NA	NA	NA	0	20	
DUPLICATE									
Laboratory ID:	09-125-03								
	ORIG	DUP							
Total Solids	27.9	27.2	NA	NA	NA	NA	3	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants
 Project No.: 14-05806-000
 Project Name: Redmond Paired Watershed Study
 Project Manager: John Lenth

CHAIN OF CUSTODY

Turnaround Requested:
 _____ 1 Day
 _____ 2 Day
 _____ 3 Day
 Standard

Laboratory No. **09-096**
 Requested Analyses

Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates	<i>total solids 2540G</i>													
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates	<i>total solids 2540G</i>							
1	CTRY-2M-2017	9.11.17	11:00	Sediment	1		X	X			X							
2	CTRY-2R-2017		11:00	Sediment	1	X			X	X	X							
3	CTRY-1M-2017		12:25	Sediment	1		X	X			X							
4	CTRY-1R-2017		12:25	Sediment	1	X			X	X	X							
5	TOSH-1M-2017		14:10	Sediment	1		X	X			X							
6	TOSH-1R-2017		14:10	Sediment	1	X			X	X	X							
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													

Relinquished by Brianna Klau Date 9.11.17 Received by [Signature] Date 9/11/17
 Firm Herrera Time 4:30 Firm [Signature] Time 4:30
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 9/11/2017 / CTRY-2, CTRY-1, TOSH-1

By G. Catarra
 Date 11/13/2017 Page 1 of 1
 Checked: initials JL
 date 11/17/2017

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	10	≤14	≤0.1% 0.1 %	NA	NA	99	±20	NC	≤20	NS	≤35	OK	NONE.
Copper	OK / EPA 6020	NA	NA	24	≤180	≤1.0 MG/KG 1.0 MG/KG	101,101	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6020	NA	NA	24	≤180	≤2.5 mg/kg 2.5 MG/KG	92,91	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
PAHs	OK / EPA 8270D/SIM	8	≤14	3	≤40	≤4 ug/kg 7.1-180 UG/KG	NR	NA / 21- 120	51-83	25- 141	BS/BSD 0-6	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	8	≤14	<1	≤40	≤0.02-0.10 MG/KG 0.032-0.89 MG/KG	NR	NA / 21- 120	51-83	25- 141	BS/BSD 0-6	≤400	NS	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
 NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 10, 2017

John Lenth
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1709-125

Dear John:

Enclosed are the analytical results and associated quality control data for samples submitted on September 13, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 10, 2017
Samples Submitted: September 13, 2017
Laboratory Reference: 1709-125
Project: 14-05806-000

Case Narrative

Samples were collected on September 13, 2017 and received by the laboratory on September 13, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Total Metals EPA 6010C Analysis

The liquid portion of the sample was decanted and only the solid portion was analyzed.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.



Date of Report: October 10, 2017
 Samples Submitted: September 13, 2017
 Laboratory Reference: 1709-125
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SIDL-3R-2017					
Laboratory ID:	09-125-02					
Total Organic Carbon	11	0.36	EPA 9060	9-21-17	9-21-17	

Client ID:	MONT-1R-2017					
Laboratory ID:	09-125-04					
Total Organic Carbon	1.9	0.14	EPA 9060	9-21-17	9-21-17	



Date of Report: October 10, 2017
 Samples Submitted: September 13, 2017
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**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0921S1					
Total Organic Carbon	ND	0.042	EPA 9060	9-21-17	9-21-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-317-03							
	ORIG	DUP						
Total Organic Carbon	ND	ND	NA	NA	NA	NA	29	

SPIKE BLANK								
Laboratory ID:	SB0921S1							
	SB	SB		SB				
Total Organic Carbon	41.5	42.1	NA	99	86-130	NA	NA	



Date of Report: October 10, 2017
 Samples Submitted: September 13, 2017
 Laboratory Reference: 1709-125
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C**

Matrix: Sediment
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-125-01					
Client ID:	SIDL-3M-2017					
Copper	22	9.2	6010C	10-5-17	10-5-17	
Zinc	80	23	6010C	10-5-17	10-5-17	
Lab ID:	09-125-03					
Client ID:	MONT-1M-2017					
Copper	35	3.6	6010C	10-5-17	10-5-17	
Zinc	270	9.0	6010C	10-5-17	10-5-17	



Date of Report: October 10, 2017
Samples Submitted: September 13, 2017
Laboratory Reference: 1709-125
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 10-5-17
Date Analyzed: 10-5-17

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB1005SM2

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 10, 2017
Samples Submitted: September 13, 2017
Laboratory Reference: 1709-125
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL**

Date Extracted: 10-5-17
Date Analyzed: 10-5-17

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: 09-125-03

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	9.70	9.40	3	1.0	
Zinc	76.5	74.3	3	2.5	



Date of Report: October 10, 2017
 Samples Submitted: September 13, 2017
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 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 10-5-17

Date Analyzed: 10-5-17

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-125-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	60.2	101	60.0	101	0	
Zinc	100	169	92	168	91	1	



Date of Report: October 10, 2017
 Samples Submitted: September 13, 2017
 Laboratory Reference: 1709-125
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SIDL-3R-2017					
Laboratory ID:	09-125-02					
Naphthalene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
2-Methylnaphthalene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
1-Methylnaphthalene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
Dimethylphthalate	ND	0.068	EPA 8270D	9-19-17	9-19-17	
Acenaphthylene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
Acenaphthene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
Diethylphthalate	ND	0.34	EPA 8270D	9-19-17	9-19-17	
Fluorene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
Phenanthrene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
Anthracene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
Di-n-butylphthalate	ND	0.34	EPA 8270D	9-19-17	9-19-17	
Fluoranthene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
Pyrene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
Butylbenzylphthalate	ND	0.34	EPA 8270D	9-19-17	9-19-17	
Benzo[a]anthracene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
Chrysene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
bis(2-Ethylhexyl)phthalate	ND	0.34	EPA 8270D	9-19-17	9-19-17	
Di-n-octylphthalate	ND	0.34	EPA 8270D	9-19-17	9-19-17	
Benzo[b]fluoranthene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo(j,k)fluoranthene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo[a]pyrene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
Indeno[1,2,3-cd]pyrene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
Dibenz[a,h]anthracene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo[g,h,i]perylene	ND	0.014	EPA 8270D/SIM	9-19-17	9-22-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>47</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>57</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>48</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>36</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>60</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>52</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: September 13, 2017
 Laboratory Reference: 1709-125
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-1R-2017					
Laboratory ID:	09-125-04					
Naphthalene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
2-Methylnaphthalene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
1-Methylnaphthalene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
Dimethylphthalate	ND	0.030	EPA 8270D	9-19-17	9-19-17	
Acenaphthylene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
Acenaphthene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
Diethylphthalate	ND	0.15	EPA 8270D	9-19-17	9-19-17	
Fluorene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
Phenanthrene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
Anthracene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
Di-n-butylphthalate	ND	0.15	EPA 8270D	9-19-17	9-19-17	
Fluoranthene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
Pyrene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
Butylbenzylphthalate	ND	0.15	EPA 8270D	9-19-17	9-19-17	
Benzo[a]anthracene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
Chrysene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
bis(2-Ethylhexyl)phthalate	ND	0.15	EPA 8270D	9-19-17	9-19-17	
Di-n-octylphthalate	ND	0.15	EPA 8270D	9-19-17	9-19-17	
Benzo[b]fluoranthene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo(j,k)fluoranthene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo[a]pyrene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
Indeno[1,2,3-cd]pyrene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
Dibenz[a,h]anthracene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo[g,h,i]perylene	ND	0.0060	EPA 8270D/SIM	9-19-17	9-22-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>35</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>48</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>39</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>56</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>75</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>68</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
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 Laboratory Reference: 1709-125
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0919S5					
Naphthalene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Dimethylphthalate	ND	0.020	EPA 8270D	9-19-17	9-19-17	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Diethylphthalate	ND	0.10	EPA 8270D	9-19-17	9-19-17	
Fluorene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Anthracene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Di-n-butylphthalate	ND	0.10	EPA 8270D	9-19-17	9-19-17	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Pyrene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Butylbenzylphthalate	ND	0.10	EPA 8270D	9-19-17	9-19-17	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Chrysene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
bis(2-Ethylhexyl)phthalate	ND	0.10	EPA 8270D	9-19-17	9-19-17	
Di-n-octylphthalate	ND	0.10	EPA 8270D	9-19-17	9-19-17	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo(j,k)fluoranthene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	9-19-17	9-22-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>60</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>64</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>63</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>66</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>73</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>69</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: September 13, 2017
 Laboratory Reference: 1709-125
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0919S5									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	0.441	0.443	0.800	0.800	55	55	37 - 107	0	39	
2-Chlorophenol	0.454	0.440	0.800	0.800	57	55	36 - 107	3	40	
1,4-Dichlorobenzene	0.210	0.204	0.400	0.400	53	51	28 - 108	3	41	
n-Nitroso-di-n-propylamine	0.225	0.228	0.400	0.400	56	57	28 - 113	1	33	
1,2,4-Trichlorobenzene	0.232	0.226	0.400	0.400	58	57	33 - 106	3	38	
4-Chloro-3-methylphenol	0.522	0.519	0.800	0.800	65	65	52 - 106	1	30	
Acenaphthene	0.266	0.253	0.400	0.400	67	63	52 - 90	5	30	
4-Nitrophenol	0.584	0.560	0.800	0.800	73	70	30 - 109	4	32	
2,4-Dinitrotoluene	0.266	0.250	0.400	0.400	67	63	50 - 101	6	32	
Pentachlorophenol	0.667	0.637	0.800	0.800	83	80	21 - 114	5	40	
Pyrene	0.286	0.283	0.400	0.400	72	71	52 - 104	1	30	
<i>Surrogate:</i>										
2-Fluorophenol					57	54	18 - 109			
Phenol-d6					61	59	25 - 111			
Nitrobenzene-d5					58	57	22 - 113			
2-Fluorobiphenyl					63	60	30 - 114			
2,4,6-Tribromophenol					74	69	22 - 116			
Terphenyl-d14					71	70	33 - 114			



Date of Report: October 10, 2017
 Samples Submitted: September 13, 2017
 Laboratory Reference: 1709-125
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SIDL-3M-2017					
Laboratory ID:	09-125-01					
Total Solids	11	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	SIDL-3R-2017					
Laboratory ID:	09-125-02					
Total Solids	30	0.50	SM 2540G	9-19-17	9-20-17	

Client ID:	MONT-1M-2017					
Laboratory ID:	09-125-03					
Total Solids	28	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	MONT-1R-2017					
Laboratory ID:	09-125-04					
Total Solids	67	0.50	SM 2540G	9-19-17	9-20-17	



Date of Report: October 10, 2017
 Samples Submitted: September 13, 2017
 Laboratory Reference: 1709-125
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	09-125-04								
	ORIG	DUP							
Total Solids	67.0	67.1	NA	NA	NA	NA	0	20	
DUPLICATE									
Laboratory ID:	09-125-03								
	ORIG	DUP							
Total Solids	27.9	27.2	NA	NA	NA	NA	3	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: John Lenth

CHAIN OF CUSTODY

09-125

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No.

Requested Analyses

Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates	total solids													
----------------------	--------	------	----------------------------------	------------	--------------	--	--	--	--	--	--	--	--	--	--	--	--	--

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates	total solids							
1	SIDL-3M-2017	9-13-17	10:15	Sediment	1		X	X			X							
2	SIDL-3R-2017	↓	10:15	Sediment	1	X			X	X	X							
3	MONT-1M-2017	↓	11:30	Sediment	1		X	X			X							
4	MONT-1R-2017	↓	11:30	Sediment	1	X			X	X	X							
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													

Relinquished by M. Mautner Date 9-13-17 Received by [Signature] Date 9/13/17
 Firm Herrera Time 12:45 Firm OSE Time 1245
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 9/13/2017 / SIDL-3, MONT-1

By G. Catarra
 Date 11/13/2017 Page 1 of 1
 Checked: initials JL
 date 11/17/2017

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	8	≤14	≤0.1% 0.1 %	NA	NA	99	±20	NC	≤20	NS	≤35	OK	NONE.
Copper	OK / EPA 6020	NA	NA	22	≤180	≤1.0 MG/KG 1.0 MG/KG	101,101	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6020	NA	NA	22	≤180	≤2.5 mg/kg 2.5 MG/KG	92,91	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
PAHs	OK / EPA 8270D/SIM	6	≤14	3	≤40	≤4 ug/kg 6.0 -340 UG/KG	NR	NA / 21- 120	51-83	25- 141	BS/BSD 0-6	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	6	≤14	<1	≤40	≤0.02-0.10 MG/KG 0.030-0.34 MG/KG	NR	NA / 21- 120	51-83	25- 141	BS/BSD 0-6	≤400	NS	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
 NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 10, 2017

John Lenth
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1709-245

Dear John:

Enclosed are the analytical results and associated quality control data for samples submitted on September 20, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy, handwritten oval.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 10, 2017
Samples Submitted: September 20, 2017
Laboratory Reference: 1709-245
Project: 14-05806-000

Case Narrative

Samples were collected on September 20, 2017 and received by the laboratory on September 20, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Total Metals EPA 6010C Analysis

The liquid portion of the sample was decanted and only the solid portion was analyzed.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.



Date of Report: October 10, 2017
 Samples Submitted: September 20, 2017
 Laboratory Reference: 1709-245
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-5R-2017					
Laboratory ID:	09-245-01					
Total Organic Carbon	8.2	0.39	EPA 9060	9-27-17	9-27-17	
Client ID:	MONT-4R-2017					
Laboratory ID:	09-245-03					
Total Organic Carbon	1.1	0.072	EPA 9060	9-27-17	9-27-17	
Client ID:	MONT-3R-2017					
Laboratory ID:	09-245-05					
Total Organic Carbon	8.3	0.48	EPA 9060	9-27-17	9-27-17	



Date of Report: October 10, 2017
 Samples Submitted: September 20, 2017
 Laboratory Reference: 1709-245
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0927S1					
Total Organic Carbon	ND	0.042	EPA 9060	9-27-17	9-27-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-245-01							
	ORIG	DUP						
Total Organic Carbon	8.20	9.44	NA	NA	NA	NA	14	29

SPIKE BLANK								
Laboratory ID:	SB0927S1							
	SB	SB		SB				
Total Organic Carbon	42.6	42.1	NA	101	86-130	NA	NA	



Date of Report: October 10, 2017
 Samples Submitted: September 20, 2017
 Laboratory Reference: 1709-245
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C**

Matrix: Sediment
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 09-245-02 Client ID: MONT-5M-2017						
Copper	24	8.0	6010C	10-5-17	10-5-17	
Zinc	120	20	6010C	10-5-17	10-5-17	
Lab ID: 09-245-04 Client ID: MONT-4M-2017						
Copper	40	6.6	6010C	10-5-17	10-5-17	
Zinc	550	17	6010C	10-5-17	10-5-17	
Lab ID: 09-245-06 Client ID: MONT-3M-2017						
Copper	53	7.2	6010C	10-5-17	10-5-17	
Zinc	670	18	6010C	10-5-17	10-5-17	



Date of Report: October 10, 2017
Samples Submitted: September 20, 2017
Laboratory Reference: 1709-245
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 10-5-17
Date Analyzed: 10-5-17

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB1005SM2

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 10, 2017
Samples Submitted: September 20, 2017
Laboratory Reference: 1709-245
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL**

Date Extracted: 10-5-17
Date Analyzed: 10-5-17

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: 09-125-03

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	9.70	9.40	3	1.0	
Zinc	76.5	74.3	3	2.5	



Date of Report: October 10, 2017
 Samples Submitted: September 20, 2017
 Laboratory Reference: 1709-245
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 10-5-17

Date Analyzed: 10-5-17

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-125-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	60.2	101	60.0	101	0	
Zinc	100	169	92	168	91	1	



Date of Report: October 10, 2017
 Samples Submitted: September 20, 2017
 Laboratory Reference: 1709-245
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-5R-2017					
Laboratory ID:	09-245-01					
Naphthalene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
2-Methylnaphthalene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
1-Methylnaphthalene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
Dimethylphthalate	ND	0.049	EPA 8270D	10-4-17	10-5-17	
Acenaphthylene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
Acenaphthene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
Diethylphthalate	ND	0.24	EPA 8270D	10-4-17	10-5-17	
Fluorene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
Phenanthrene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
Anthracene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
Di-n-butylphthalate	0.56	0.24	EPA 8270D	10-4-17	10-5-17	
Fluoranthene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
Pyrene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
Butylbenzylphthalate	ND	0.24	EPA 8270D	10-4-17	10-5-17	
Benzo[a]anthracene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
Chrysene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
bis(2-Ethylhexyl)phthalate	ND	0.24	EPA 8270D	10-4-17	10-5-17	
Di-n-octylphthalate	ND	0.24	EPA 8270D	10-4-17	10-5-17	
Benzo[b]fluoranthene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
Benzo(j,k)fluoranthene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
Benzo[a]pyrene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
Indeno[1,2,3-cd]pyrene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
Dibenz[a,h]anthracene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
Benzo[g,h,i]perylene	ND	0.0098	EPA 8270D/SIM	10-4-17	10-5-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>43</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>55</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>50</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>62</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>71</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>68</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: September 20, 2017
 Laboratory Reference: 1709-245
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-4R-2017					
Laboratory ID:	09-245-03					
Naphthalene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
2-Methylnaphthalene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
1-Methylnaphthalene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
Dimethylphthalate	ND	0.029	EPA 8270D	10-4-17	10-5-17	
Acenaphthylene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
Acenaphthene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
Diethylphthalate	ND	0.14	EPA 8270D	10-4-17	10-5-17	
Fluorene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
Phenanthrene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
Anthracene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
Di-n-butylphthalate	0.44	0.14	EPA 8270D	10-4-17	10-5-17	
Fluoranthene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
Pyrene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
Butylbenzylphthalate	ND	0.14	EPA 8270D	10-4-17	10-5-17	
Benzo[a]anthracene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
Chrysene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
bis(2-Ethylhexyl)phthalate	ND	0.14	EPA 8270D	10-4-17	10-5-17	
Di-n-octylphthalate	ND	0.14	EPA 8270D	10-4-17	10-5-17	
Benzo[b]fluoranthene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
Benzo(j,k)fluoranthene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
Benzo[a]pyrene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
Indeno[1,2,3-cd]pyrene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
Dibenz[a,h]anthracene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
Benzo[g,h,i]perylene	ND	0.0057	EPA 8270D/SIM	10-4-17	10-5-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>42</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>56</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>55</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>68</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>72</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>70</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: September 20, 2017
 Laboratory Reference: 1709-245
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-3R-2017					
Laboratory ID:	09-245-05					
Naphthalene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
2-Methylnaphthalene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
1-Methylnaphthalene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
Dimethylphthalate	ND	0.52	EPA 8270D	10-4-17	10-5-17	
Acenaphthylene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
Acenaphthene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
Diethylphthalate	ND	2.6	EPA 8270D	10-4-17	10-5-17	
Fluorene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
Phenanthrene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
Anthracene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
Di-n-butylphthalate	ND	2.6	EPA 8270D	10-4-17	10-5-17	
Fluoranthene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
Pyrene	0.021	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
Butylbenzylphthalate	ND	2.6	EPA 8270D	10-4-17	10-5-17	
Benzo[a]anthracene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
Chrysene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
bis(2-Ethylhexyl)phthalate	ND	2.6	EPA 8270D	10-4-17	10-5-17	
Di-n-octylphthalate	ND	2.6	EPA 8270D	10-4-17	10-5-17	
Benzo[b]fluoranthene	0.022	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
Benzo(j,k)fluoranthene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
Benzo[a]pyrene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
Indeno[1,2,3-cd]pyrene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
Dibenz[a,h]anthracene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
Benzo[g,h,i]perylene	ND	0.021	EPA 8270D/SIM	10-4-17	10-5-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>45</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>59</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>46</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>46</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>55</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>47</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: September 20, 2017
 Laboratory Reference: 1709-245
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB1004S1					
Naphthalene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Dimethylphthalate	ND	0.020	EPA 8270D	10-4-17	10-4-17	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Diethylphthalate	ND	0.10	EPA 8270D	10-4-17	10-4-17	
Fluorene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Anthracene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Di-n-butylphthalate	ND	0.10	EPA 8270D	10-4-17	10-4-17	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Pyrene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Butylbenzylphthalate	ND	0.10	EPA 8270D	10-4-17	10-4-17	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Chrysene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
bis(2-Ethylhexyl)phthalate	ND	0.10	EPA 8270D	10-4-17	10-4-17	
Di-n-octylphthalate	ND	0.10	EPA 8270D	10-4-17	10-4-17	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Benzo(j,k)fluoranthene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>59</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>68</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>68</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>69</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>79</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>77</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: September 20, 2017
 Laboratory Reference: 1709-245
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery	RPD	RPD	Flags
					Recovery	Limits	Limit			
SPIKE BLANKS										
Laboratory ID:	SB1004S1									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	0.502	0.517	0.800	0.800	63	65	37 - 107	3	39	
2-Chlorophenol	0.508	0.521	0.800	0.800	64	65	36 - 107	3	40	
1,4-Dichlorobenzene	0.240	0.243	0.400	0.400	60	61	28 - 108	1	41	
n-Nitroso-di-n-propylamine	0.250	0.253	0.400	0.400	63	63	28 - 113	1	33	
1,2,4-Trichlorobenzene	0.261	0.263	0.400	0.400	65	66	33 - 106	1	38	
4-Chloro-3-methylphenol	0.572	0.587	0.800	0.800	72	73	52 - 106	3	30	
Acenaphthene	0.283	0.290	0.400	0.400	71	73	52 - 90	2	30	
4-Nitrophenol	0.591	0.588	0.800	0.800	74	74	30 - 109	1	32	
2,4-Dinitrotoluene	0.248	0.265	0.400	0.400	62	66	50 - 101	7	32	
Pentachlorophenol	0.680	0.709	0.800	0.800	85	89	21 - 114	4	40	
Pyrene	0.304	0.295	0.400	0.400	76	74	52 - 104	3	30	
<i>Surrogate:</i>										
2-Fluorophenol					59	60	18 - 109			
Phenol-d6					68	68	25 - 111			
Nitrobenzene-d5					65	67	22 - 113			
2-Fluorobiphenyl					70	68	30 - 114			
2,4,6-Tribromophenol					77	74	22 - 116			
Terphenyl-d14					79	75	33 - 114			



Date of Report: October 10, 2017
 Samples Submitted: September 20, 2017
 Laboratory Reference: 1709-245
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-5R-2017					
Laboratory ID:	09-245-01					
Total Solids	41	0.50	SM 2540G	9-27-17	9-28-17	

Client ID:	MONT-5M-2017					
Laboratory ID:	09-245-02					
Total Solids	13	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	MONT-4R-2017					
Laboratory ID:	09-245-03					
Total Solids	70	0.50	SM 2540G	9-27-17	9-28-17	

Client ID:	MONT-4M-2017					
Laboratory ID:	09-245-04					
Total Solids	15	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	MONT-3R-2017					
Laboratory ID:	09-245-05					
Total Solids	19	0.50	SM 2540G	9-27-17	9-28-17	

Client ID:	MONT-3M-2017					
Laboratory ID:	09-245-06					
Total Solids	14	0.50	SM 2540G	10-5-17	10-6-17	



Date of Report: October 10, 2017
 Samples Submitted: September 20, 2017
 Laboratory Reference: 1709-245
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	09-124-09								
	ORIG	DUP							
Total Solids	62.8	63.8	NA	NA	NA	NA	2	20	
DUPLICATE									
Laboratory ID:	09-125-03								
	ORIG	DUP							
Total Solids	27.9	27.2	NA	NA	NA	NA	3	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants
 Project No.: 14-05806-000
 Project Name: Redmond Paired Watershed Study
 Project Manager: John Lenth

CHAIN OF CUSTODY

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No.

09-245

Requested Analyses

Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates	Total Solids													
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates	Total Solids							
1	MONT-SR-2017	9-20-17	12:00	Sediment	1	X			X	X	X							
2	MONT-SM-2017		12:00	Sediment	1		X	X			X							
3	MONT-4R-2017		1330	Sediment	1	X			X	X	X							
4	MONT-4M-2017		1330	Sediment	1		X	X			X							
5	MONT-3R-2017		1430	Sediment	1	X			X	X	X							
6	MONT-3M-2017		1430	Sediment	1		X	X			X							
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													

Relinquished by Micaela Date 9-20-17 Received by [Signature] Date 9/20/17
 Firm Herrera Time 1500 Firm [Signature] Time 1520
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 9/20/2017 / MONT-5, MONT-4, MONT-3

By G. Catarra
 Date 11/13/2017 Page 1 of 1
 Checked: initials JL
 date 11/17/2017

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	7	≤14	≤0.1% 0.1%	NA	NA	101	±20	14	≤20	NS	≤35	OK	NONE.
Copper	OK / EPA 6020	NA	NA	15	≤180	≤1.0 MG/KG 1.0 MG/KG	101,101	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6020	NA	NA	15	≤180	≤2.5 mg/kg 2.5 MG/KG	92,91	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
PAHs	OK / EPA 8270D/SIM	14	≤14	1	≤40	≤4 ug/kg 5.7 - 21 UG/KG	NR	NA / 21- 120	60 - 89	25- 141	BS/BSD 1-7	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	14	≤14	1	≤40	≤0.02-0.10 MG/KG 0.029 - 2.6 MG/KG	NR	NA / 21- 120	60 - 89	25- 141	BS/BSD 1-7	≤400	NS	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
 NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 10, 2017

John Lenth
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1709-295

Dear John:

Enclosed are the analytical results and associated quality control data for samples submitted on September 22, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 10, 2017
Samples Submitted: September 22, 2017
Laboratory Reference: 1709-295
Project: 14-05806-000

Case Narrative

Samples were collected on September 22, 2017 and received by the laboratory on September 22, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Total Metals EPA 6010C Analysis

The liquid portion of the sample was decanted and only the solid portion was analyzed.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.



Date of Report: October 10, 2017
Samples Submitted: September 22, 2017
Laboratory Reference: 1709-295
Project: 14-05806-000

**TOTAL ORGANIC CARBON
EPA 9060A**

Matrix: Sediment
Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SIDL-1R-2017					
Laboratory ID:	09-295-02					
Total Organic Carbon	2.0	0.15	EPA 9060	9-27-17	9-27-17	
Client ID:	SIDL-2R-2017					
Laboratory ID:	09-295-04					
Total Organic Carbon	0.55	0.14	EPA 9060	9-27-17	9-27-17	



Date of Report: October 10, 2017
 Samples Submitted: September 22, 2017
 Laboratory Reference: 1709-295
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0927S1					
Total Organic Carbon	ND	0.042	EPA 9060	9-27-17	9-27-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-245-01							
	ORIG	DUP						
Total Organic Carbon	8.20	9.44	NA	NA	NA	NA	14	29

SPIKE BLANK								
Laboratory ID:	SB0927S1							
	SB	SB		SB				
Total Organic Carbon	42.6	42.1	NA	101	86-130	NA	NA	



Date of Report: October 10, 2017
 Samples Submitted: September 22, 2017
 Laboratory Reference: 1709-295
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C**

Matrix: Sediment
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 09-295-01						
Client ID: SIDL-1M-2017						
Copper	28	3.3	6010C	10-5-17	10-5-17	
Zinc	56	8.3	6010C	10-5-17	10-5-17	
Lab ID: 09-295-03						
Client ID: SIDL-2M-2017						
Copper	35	13	6010C	10-5-17	10-5-17	
Zinc	85	32	6010C	10-5-17	10-5-17	



Date of Report: October 10, 2017
Samples Submitted: September 22, 2017
Laboratory Reference: 1709-295
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 10-5-17
Date Analyzed: 10-5-17

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB1005SM2

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 10, 2017
Samples Submitted: September 22, 2017
Laboratory Reference: 1709-295
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL**

Date Extracted: 10-5-17

Date Analyzed: 10-5-17

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-125-03

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	9.70	9.40	3	1.0	
Zinc	76.5	74.3	3	2.5	



Date of Report: October 10, 2017
 Samples Submitted: September 22, 2017
 Laboratory Reference: 1709-295
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 10-5-17

Date Analyzed: 10-5-17

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-125-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	60.2	101	60.0	101	0	
Zinc	100	169	92	168	91	1	



Date of Report: October 10, 2017
 Samples Submitted: September 22, 2017
 Laboratory Reference: 1709-295
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SIDL-1R-2017					
Laboratory ID:	09-295-02					
Naphthalene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
2-Methylnaphthalene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
1-Methylnaphthalene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
Dimethylphthalate	ND	0.042	EPA 8270D	10-4-17	10-5-17	
Acenaphthylene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
Acenaphthene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
Diethylphthalate	ND	0.21	EPA 8270D	10-4-17	10-5-17	
Fluorene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
Phenanthrene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
Anthracene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
Di-n-butylphthalate	0.28	0.21	EPA 8270D	10-4-17	10-5-17	
Fluoranthene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
Pyrene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
Butylbenzylphthalate	ND	0.21	EPA 8270D	10-4-17	10-5-17	
Benzo[a]anthracene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
Chrysene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
bis(2-Ethylhexyl)phthalate	ND	0.21	EPA 8270D	10-4-17	10-5-17	
Di-n-octylphthalate	ND	0.21	EPA 8270D	10-4-17	10-5-17	
Benzo[b]fluoranthene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
Benzo(j,k)fluoranthene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
Benzo[a]pyrene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
Indeno[1,2,3-cd]pyrene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
Dibenz[a,h]anthracene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
Benzo[g,h,i]perylene	ND	0.0084	EPA 8270D/SIM	10-4-17	10-5-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>50</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>60</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>57</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>63</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>70</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>68</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: September 22, 2017
 Laboratory Reference: 1709-295
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SIDL-2R-2017					
Laboratory ID:	09-295-04					
Naphthalene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
2-Methylnaphthalene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
1-Methylnaphthalene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
Dimethylphthalate	ND	0.028	EPA 8270D	10-4-17	10-5-17	
Acenaphthylene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
Acenaphthene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
Diethylphthalate	ND	0.14	EPA 8270D	10-4-17	10-5-17	
Fluorene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
Phenanthrene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
Anthracene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
Di-n-butylphthalate	0.30	0.14	EPA 8270D	10-4-17	10-5-17	
Fluoranthene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
Pyrene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
Butylbenzylphthalate	ND	0.14	EPA 8270D	10-4-17	10-5-17	
Benzo[a]anthracene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
Chrysene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
bis(2-Ethylhexyl)phthalate	ND	0.14	EPA 8270D	10-4-17	10-5-17	
Di-n-octylphthalate	ND	0.14	EPA 8270D	10-4-17	10-5-17	
Benzo[b]fluoranthene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
Benzo(j,k)fluoranthene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
Benzo[a]pyrene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
Indeno[1,2,3-cd]pyrene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
Dibenz[a,h]anthracene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
Benzo[g,h,i]perylene	ND	0.0055	EPA 8270D/SIM	10-4-17	10-5-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>58</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>64</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>63</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>71</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>79</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>81</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: September 22, 2017
 Laboratory Reference: 1709-295
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB1004S1					
Naphthalene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Dimethylphthalate	ND	0.020	EPA 8270D	10-4-17	10-4-17	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Diethylphthalate	ND	0.10	EPA 8270D	10-4-17	10-4-17	
Fluorene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Anthracene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Di-n-butylphthalate	ND	0.10	EPA 8270D	10-4-17	10-4-17	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Pyrene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Butylbenzylphthalate	ND	0.10	EPA 8270D	10-4-17	10-4-17	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Chrysene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
bis(2-Ethylhexyl)phthalate	ND	0.10	EPA 8270D	10-4-17	10-4-17	
Di-n-octylphthalate	ND	0.10	EPA 8270D	10-4-17	10-4-17	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Benzo(j,k)fluoranthene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	10-4-17	10-4-17	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>59</i>	<i>18 - 109</i>				
<i>Phenol-d6</i>	<i>68</i>	<i>25 - 111</i>				
<i>Nitrobenzene-d5</i>	<i>68</i>	<i>22 - 113</i>				
<i>2-Fluorobiphenyl</i>	<i>69</i>	<i>30 - 114</i>				
<i>2,4,6-Tribromophenol</i>	<i>79</i>	<i>22 - 116</i>				
<i>Terphenyl-d14</i>	<i>77</i>	<i>33 - 114</i>				



Date of Report: October 10, 2017
 Samples Submitted: September 22, 2017
 Laboratory Reference: 1709-295
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery	RPD	RPD	Flags
					Recovery	Limits	Limit			
SPIKE BLANKS										
Laboratory ID:	SB1004S1									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	0.502	0.517	0.800	0.800	63	65	37 - 107	3	39	
2-Chlorophenol	0.508	0.521	0.800	0.800	64	65	36 - 107	3	40	
1,4-Dichlorobenzene	0.240	0.243	0.400	0.400	60	61	28 - 108	1	41	
n-Nitroso-di-n-propylamine	0.250	0.253	0.400	0.400	63	63	28 - 113	1	33	
1,2,4-Trichlorobenzene	0.261	0.263	0.400	0.400	65	66	33 - 106	1	38	
4-Chloro-3-methylphenol	0.572	0.587	0.800	0.800	72	73	52 - 106	3	30	
Acenaphthene	0.283	0.290	0.400	0.400	71	73	52 - 90	2	30	
4-Nitrophenol	0.591	0.588	0.800	0.800	74	74	30 - 109	1	32	
2,4-Dinitrotoluene	0.248	0.265	0.400	0.400	62	66	50 - 101	7	32	
Pentachlorophenol	0.680	0.709	0.800	0.800	85	89	21 - 114	4	40	
Pyrene	0.304	0.295	0.400	0.400	76	74	52 - 104	3	30	
<i>Surrogate:</i>										
2-Fluorophenol					59	60	18 - 109			
Phenol-d6					68	68	25 - 111			
Nitrobenzene-d5					65	67	22 - 113			
2-Fluorobiphenyl					70	68	30 - 114			
2,4,6-Tribromophenol					77	74	22 - 116			
Terphenyl-d14					79	75	33 - 114			



Date of Report: October 10, 2017
 Samples Submitted: September 22, 2017
 Laboratory Reference: 1709-295
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SIDL-1M-2017					
Laboratory ID:	09-295-01					
Total Solids	30	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	SIDL-1R-2017					
Laboratory ID:	09-295-02					
Total Solids	48	0.50	SM 2540G	9-27-17	9-28-17	

Client ID:	SIDL-2M-2017					
Laboratory ID:	09-295-03					
Total Solids	7.7	0.50	SM 2540G	10-5-17	10-6-17	

Client ID:	SIDL-2R-2017					
Laboratory ID:	09-295-04					
Total Solids	72	0.50	SM 2540G	9-27-17	9-28-17	



Date of Report: October 10, 2017
 Samples Submitted: September 22, 2017
 Laboratory Reference: 1709-295
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	09-124-09								
	ORIG	DUP							
Total Solids	62.8	63.8	NA	NA	NA	NA	2	20	
DUPLICATE									
Laboratory ID:	09-125-03								
	ORIG	DUP							
Total Solids	27.9	27.2	NA	NA	NA	NA	3	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants

Project No.: 14-05806-000

Project Name: Redmond Paired Watershed Study

Project Manager: John Lenth

CHAIN OF CUSTODY

Turnaround Requested:

- _____ 1 Day
- _____ 2 Day
- _____ 3 Day
- Standard

Laboratory No. **09-295**

Requested Analyses

Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates	<i>total solids</i>													
----------------------	--------	------	----------------------------------	------------	---------------------	--	--	--	--	--	--	--	--	--	--	--	--	--

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates	<i>total solids</i>							
1	SIDL-1M-2017	9-22-17	1430	Sediment	1		X	X			X							
2	SIDL-1R-2017	↓	1430	Sediment	1	X			X	X	X							
3	SIDL-2M-2017		1520	Sediment	1		X	X			X							
4	SIDL-2R-2017		1520	Sediment	1	X			X	X	X							
					Sediment	1												
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													
				Sediment	1													

Relinquished by Miriam Date 9-22-17 Received by [Signature] Date 9/22/17

Firm Herrera Time 1045 Firm OSE Time 1645

Relinquished by _____ Date _____ Received by _____ Date _____
Firm _____ Time _____ Firm _____ Time _____

Comments:



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 9/22/2017 / SIDL-1 and SIDL-2

By G. Catarra
 Date 11/13/2017 Page 1 of 1
 Checked: initials JL
 date 11/17/2017

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	5	≤14	≤0.1% 0.1%	NA	NA	101	±20	14	≤20	NS	≤35	OK	NONE.
Copper	OK / EPA 6020	NA	NA	13	≤180	≤1.0 MG/KG 1.0 MG/KG	101,101	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6020	NA	NA	13	≤180	≤2.5 mg/kg 2.5 MG/KG	92,91	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
PAHs	OK / EPA 8270D/SIM	12	≤14	1	≤40	≤4 ug/kg 5.5 - 8.4 UG/KG	NR	NA / 21- 120	60 - 89	25- 141	BS/BSD 1-7	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	12	≤14	1	≤40	≤0.02-0.10 MG/KG 0.028 - 0.21 MG/KG	NR	NA / 21- 120	60 - 89	25- 141	BS/BSD 1-7	≤400	NS	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
 NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.

APPENDIX P

Data Validation Memorandum for Sediment Quality Monitoring

Herrera Environmental Consultants, Inc.

Memorandum

To Project File 14-05806-000
From Gina Catarra, Herrera Environmental Consultants
Date December 19, 2017
Subject Data Quality Assurance Review of the Redmond Paired Watershed Stormwater Retrofit Effectiveness Sediment Quality Monitoring Data

This memorandum presents a review of data quality for 18 sediment samples collected for the Redmond Paired Watershed Stormwater Retrofit Effectiveness Study between August 28 and September 22, 2017. OnSite Environmental, Inc., of Redmond, Washington analyzed the samples for:

- Total organic carbon (TOC) by EPA method 9060A
- Total copper and zinc by EPA method 6020
- Polycyclic aromatic hydrocarbons (PAHs) by EPA method 8270D/SIM
- Phthalates by EPA method 8270D.

Results for the following samples were validated.

Date Collected	Lab SDG	Samples Collected	QC Samples Collected
8/28/2017	1708-332	TOSH-2 and TOSH-3	None
8/30/2017	1708-377	TYLR-1, TYLR-2, and MONT-2	None
9/01/2017	1709-014	TOSH-4, EVAMSS-1, and EVALSS-1	None
9/11/2017	1709-096	CTRY-1, CTRY-2, and TOSH-1	None
9/13/2017	1709-125	SIDL-3 and MONT-1	None
9/20/2017	1709-245	MONT-3, MONT-4, and MONT-5	None
9/22/2017	1709-295	SIDL-1 and SIDL-2	None

The laboratory's performance was reviewed in accordance with quality control (QC) criteria established in the *Redmond Paired Watershed Study Quality Assurance Project Plan (QAPP)* (Herrera 2015), by the laboratory, and in the specified methods.

Quality control data summaries submitted by the laboratories were reviewed; raw data were not submitted by the laboratories. Data Quality Assurance Worksheets were completed for each

laboratory report and are included as an Attachment to this memorandum. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below, followed by definitions of data qualifiers.

Custody, Preservation, Holding Times, and Completeness—Acceptable

The samples were properly preserved and sample custody was maintained from sample collection to receipt at the laboratories. All samples were analyzed within the required method holding times. The laboratory reports were complete and contained results for all samples and tests requested on the chain-of-custody (COC) forms.

Laboratory Reporting Limits—Acceptable

The laboratory reporting limits met those established in the QAPP. No data were qualified based on laboratory reporting limits.

Method Blank Analysis—Acceptable

Method blanks were analyzed at the required frequency. Method blanks did not contain levels of target analytes above the laboratory reporting limits.

Laboratory Control Sample Analysis—Acceptable

Blank spike samples were analyzed with project samples for TOC at the required frequency; blank spike/blank spike duplicate (BS/BSD) samples were analyzed with project samples for PAHs and phthalates at the required frequency. The percent recovery values for all compounds met the criteria established in the QAPP.

Surrogate Analysis—Acceptable

Surrogates were analyzed with project samples, method blanks, and laboratory duplicates for PAHs and phthalates, as required by the analytical methods. The percent recovery values for all surrogate compounds met the criteria established by the laboratory.

Matrix Spike Analysis—Acceptable

Matrix spike/matrix spike duplicate (MS/MSD) samples were analyzed for copper and zinc at the required frequency. The percent recovery values for copper (101 and 101 percent) and zinc (92 and 91 percent) met the control limits (75 to 125 percent) established in the QAPP.

Laboratory Duplicate Analysis—Acceptable

Laboratory duplicates were analyzed for TOC, copper, and zinc; BS/BSD samples were analyzed for PAHs and phthalates. The relative percent difference (RPD) was calculated for each analyte

where both duplicate values were greater than five times the reporting limit (RL). The difference between duplicate values was calculated if the detected compound concentration was less than five times the RL in either the sample or the duplicate. The relative percent difference (RPD) values or difference values met the control limits established by the QAPP

Field Duplicate Analysis—Not Analyzed

Field duplicates were not submitted to the laboratory for analysis due to an oversight. The QAPP specified that two field duplicates would be collected and analyzed for each annual sampling event. Two field duplicate samples will be collected and submitted for analysis for each of the remaining annual sampling events.

Definition of Data Qualifiers

The following data qualifier definitions are taken from the QAPP (Herrera 2015).

- U** Value is below the reporting limit.
- J** Value is an estimate based on analytical results.
- UJ** Value is below the reporting limit and is an estimate based on analytical results.
- R** Value is rejected based on analytical results.

References

Herrera. 2015. Redmond Paired Watershed Study Quality Assurance Project Plan. Herrera Environmental Consultants, Seattle, Washington. December 31.

APPENDIX Q

Laboratory Report for Biological Monitoring

The contents of this appendix are provided in an electronic file only.

APPENDIX R

Quality Assurance Review Documentation for Biological Monitoring

Taxonomy ID QC Percent Similarity

Report Count: 6

7831.1-7

Comparison Date: 11/16/2017 04:04:28

Component: Chironomidae

Collection Date Sample ID

08/16/2017 PTR

TIN	TAXON	NOTE	Original Taxonomist - W. Hoiland				QC Taxonomist - G. Wallace				DIFF.		
			AB	L	P	A	AB	L	P	A			
831	Brillia		17	17	0	0	17	17	0	0	0		
838	Corynoneura		1	0	1	0	1	0	1	0	0		
858	Eukiefferiella claripennis gr.		6	6	0	0	6	6	0	0	0		
859	Eukiefferiella coerulescens gr.		1	1	0	0	0	0	0	0	1		
3663	Eukiefferiella tirolensis		3	3	0	0	3	3	0	0	0		
1054	Micropsectra		15	14	1	0	14	13	1	0	1		
955	Microtendipes rydalensis gr.		1	1	0	0	0	0	0	0	1		
826	Orthocladiinae		0	0	0	0	0	0	0	0	0		
988	Polypedilum		3	3	0	0	3	3	0	0	0		
1029	Tanytarsus		0	0	0	0	1	1	0	0	-1		
			47					45					Difference = 2
											Percent Similarity = 94.94		

Taxonomy ID QC Percent Similarity

Report Count: 6

7831.1-7

Comparison Date: 12/04/2017 12:37:49

Component: General

Collection Date **Sample ID**

08/16/2017 PTR

TIN	TAXON	NOTE	Original Taxonomist - B. Sloniker				QC Taxonomist - W. LaVoie				DIFF.		
			AB	L	P	A	AB	L	P	A			
145	Baetis		231	231	0	0	229	229	0	0	2		
144	Baetis tricaudatus		104	104	0	0	104	104	0	0	0		
2436	Crangonyx		1	1	0	0	1	1	0	0	0		
709	Empididae		1	1	0	0	1	1	0	0	0		
757	Limonia		1	1	0	0	1	1	0	0	0		
338	Malenka		15	15	0	0	13	13	0	0	2		
457	Narpus		2	2	0	0	2	2	0	0	0		
67	Nematoda		2	2	0	0	1	1	0	0	1		
4	Oligochaeta		63	63	0	0	65	65	0	0	-2		
724	Simuliidae		2	0	2	0	2	0	2	0	0		
738	Simulium		19	19	0	0	19	19	0	0	0		
511	Trichoptera		2	2	0	0	1	1	0	0	1		
2	Turbellaria		9	9	0	0	9	9	0	0	0		
			452				448				Difference = 4		
													Percent Similarity = 99.14

Taxonomy ID QC Percent Similarity

Report Count: 6

7831.1-13

Comparison Date: 11/16/2017 04:42:35

Component: Chironomidae

Collection Date **Sample ID**

09/13/2017 MONT-1

TIN	TAXON	NOTE	Original Taxonomist - W. Hoiland				QC Taxonomist - G. Wallace				DIFF.
			AB	L	P	A	AB	L	P	A	
831	Brillia		3	3	0	0	2	2	0	0	1
2213	Brundiniella		1	1	0	0	1	1	0	0	0
926	Chironomini		0	0	0	0	1	1	0	0	-1
838	Corynoneura		3	2	1	0	3	2	1	0	0
1054	Micropsectra		63	63	0	0	57	57	0	0	6
955	Microtendipes rydalensis gr.		6	6	0	0	6	6	0	0	0
794	Nilotanypus		0	0	0	0	0	0	0	0	0
826	Orthocladiinae		1	1	0	0	0	0	0	0	1
895	Parametricnemus		9	9	0	0	9	9	0	0	0
973	Phaenopsectra		0	0	0	0	0	0	0	0	0
988	Polypedilum		4	4	0	0	2	2	0	0	2
1029	Tanytarsus		0	0	0	0	1	1	0	0	-1
805	Thienemannimyia gr.		2	2	0	0	1	1	0	0	1
920	Tvetenia bavarica gr.		18	17	1	0	18	17	1	0	0
			110				101				Difference = 9
											Percent Similarity = 95.02

Taxonomy ID QC Percent Similarity

Report Count: 6

7831.1-13

Comparison Date: 12/04/2017 12:28:01

Component: General

Collection Date **Sample ID**

09/13/2017 MONT-1

TIN	TAXON	NOTE	Original Taxonomist - B. Sloniker				QC Taxonomist - W. LaVoie				DIFF.
			AB	L	P	A	AB	L	P	A	
126	Acari		2	2	0	0	2	2	0	0	0
512	Arctopsychinae		8	8	0	0	7	7	0	0	1
145	Baetis		17	17	0	0	17	17	0	0	0
144	Baetis tricaudatus		6	6	0	0	6	6	0	0	0
1032	Ceratopogoninae		1	1	0	0	1	1	0	0	0
202	Cinygma		35	35	0	0	35	35	0	0	0
203	Cinygmula		5	5	0	0	5	5	0	0	0
2436	Crangonyx		10	10	0	0	10	10	0	0	0
751	Dicranota		9	9	0	0	8	8	0	0	1
706	Dixa		3	3	0	0	3	3	0	0	0
709	Empididae		9	9	0	0	10	10	0	0	-1
277	Gomphidae		0	0	0	0	0	0	0	0	0
565	Hydropsyche		14	14	0	0	14	14	0	0	0
542	Hydropsychidae		2	2	0	0	0	0	0	0	2
217	Ironodes		3	3	0	0	3	3	0	0	0
1305	Lara		2	2	0	0	2	2	0	0	0
587	Lepidostoma		1	1	0	0	1	1	0	0	0
237	Leptophlebiidae		29	29	0	0	25	25	0	0	4
338	Malenka		18	18	0	0	15	15	0	0	3
457	Narpus		1	1	0	0	1	1	0	0	0
67	Nematoda		2	2	0	0	2	2	0	0	0

Taxonomy ID QC Percent Similarity

Report Count: 6

7831.1-13

Comparison Date: 12/04/2017 12:28:01

Component: General

(Cont'd.)

Collection Date		Sample ID		Original Taxonomist - B. Sloniker					QC Taxonomist - W. LaVoie					DIFF.
TIN	TAXON	NOTE	AB	L	P	A	AB	L	P	A	NOTE			
09/13/2017	MONT-1													
333	Nemouridae		2	2	0	0	0	0	0	0			2	
4	Oligochaeta		25	25	0	0	27	27	0	0			-2	
465	Optioservus		20	7	0	13	21	8	0	13			-1	
246	Paraleptophlebia		13	13	0	0	13	13	0	0			0	
517	Parapsyche		2	2	0	0	2	2	0	0			0	
759	Pedicia		0	0	0	0	0	0	0	0			0	
380	Perlodidae		1	1	0	0	1	1	0	0			0	
678	Rhyacophila		15	15	0	0	1	1	0	0			14	
662	Rhyacophila betteni gr.		1	1	0	0	1	1	0	0			0	
663	Rhyacophila blarina		0	0	0	0	15	15	0	0			-15	
510	Sialis		0	0	0	0	0	0	0	0			0	
724	Simuliidae		1	0	1	0	1	0	1	0			0	
738	Simulium		49	49	0	0	48	48	0	0			1	
398	Skwala		5	5	0	0	5	5	0	0			0	
101	Sphaeriidae		2	2	0	0	2	2	0	0			0	
321	Sweltsa		7	7	0	0	9	9	0	0			-2	
511	Trichoptera		13	13	0	0	12	12	0	0			1	
2	Turbellaria		1	1	0	0	1	1	0	0			0	
2187	Ulomorpha		0	0	0	0	0	0	0	0			0	
345	Zapada cinctipes		37	37	0	0	36	36	0	0			1	
349	Zapada oregonensis gr.		4	4	0	0	4	4	0	0			0	

Taxonomy ID QC Percent Similarity

Report Count: 6

375

366

Difference =	9
Percent Similarity =	92.95

Taxonomy ID QC Percent Similarity

Report Count: 6

7831.1-24

Comparison Date: 11/17/2017 10:08:38

Component: Chironomidae

Collection Date **Sample ID**

09/01/2017 TOSH-4

TIN	TAXON	NOTE	Original Taxonomist - W. Hoiland				QC Taxonomist - G. Wallace				DIFF.		
			AB	L	P	A	AB	L	P	A			
831	Brillia		3	3	0	0	3	3	0	0	0		
926	Chironomini		2	2	0	0	0	0	0	0	2		
838	Corynoneura		2	2	0	0	2	2	0	0	0		
863	Eukiefferiella		2	2	0	0	0	0	0	0	2		
3663	Eukiefferiella tirolensis		5	5	0	0	7	7	0	0	-2		
870	Limnophyes		1	1	0	0	0	0	0	0	1		
1054	Micropsectra		17	16	1	0	17	16	1	0	0		
955	Microtendipes rydalensis gr.		2	2	0	0	2	2	0	0	0		
988	Polypedilum		5	5	0	0	5	5	0	0	0		
1023	Stempellinella		1	1	0	0	1	1	0	0	0		
1029	Tanytarsus		3	3	0	0	3	3	0	0	0		
920	Tvetenia bavarica gr.		2	2	0	0	2	2	0	0	0		
			45					42					
										Difference =	3		
										Percent Similarity =	88.89		

Taxonomy ID QC Percent Similarity

Report Count: 6

7831.1-24

Comparison Date: 12/04/2017 12:37:12

Component: General

Collection Date		Sample ID		Original Taxonomist - B. Sloniker				QC Taxonomist - W. LaVoie				DIFF.
TIN	TAXON	NOTE	AB	L	P	A	AB	L	P	A	NOTE	
09/01/2017	TOSH-4											
126	Acari		27	27	0	0	25	25	0	0		2
1963	Atrichopogon		1	1	0	0	1	1	0	0		0
145	Baetis		3	3	0	0	2	2	0	0		1
144	Baetis tricaudatus		1	1	0	0	3	3	0	0		-2
3034	Bezzia/Palpomyia		4	4	0	0	4	4	0	0		0
202	Cinygma		5	5	0	0	2	2	0	0		3
2436	Crangonyx		11	11	0	0	11	11	0	0		0
751	Dicranota		1	1	0	0	1	1	0	0		0
706	Dixa		0	0	0	0	1	1	0	0		-1
709	Empididae		1	1	0	0	1	1	0	0		0
536	Glossosoma		10	10	0	0	10	10	0	0		0
201	Heptageniidae		0	0	0	0	0	0	0	0		0
1305	Lara		7	7	0	0	7	7	0	0		0
587	Lepidostoma		9	9	0	0	9	9	0	0		0
338	Malenka		17	17	0	0	17	17	0	0		0
4335	Meringodixa chalonensis		2	2	0	0	2	2	0	0		0
67	Nematoda		1	1	0	0	1	1	0	0		0
333	Nemouridae		1	1	0	0	0	0	0	0		1
4	Oligochaeta		288	288	0	0	279	279	0	0		9
517	Parapsyche		1	1	0	0	1	1	0	0		0
722	Pericoma/Telmatoscopus		1	1	0	0	1	1	0	0		0

Taxonomy ID QC Percent Similarity

Report Count: 6

7831.1-24

Comparison Date: 12/04/2017 12:37:12

Component: General

(Cont'd.)

Collection Date **Sample ID**

09/01/2017 TOSH-4

TIN	TAXON	NOTE	Original Taxonomist - B. Sloniker				QC Taxonomist - W. LaVoie				DIFF.	
			AB	L	P	A	AB	L	P	A		
94	Physella		1	1	0	0	1	1	0	0	0	
3226	Polycelis		5	5	0	0	4	4	0	0	1	
2659	Prostoma		1	1	0	0	1	1	0	0	0	
662	Rhyacophila betteni gr.		2	2	0	0	2	2	0	0	0	
724	Simuliidae		2	0	2	0	2	0	2	0	0	
738	Simulium		137	133	4	0	138	134	4	0	-1	
764	Tipula		4	4	0	0	4	4	0	0	0	
749	Tipulidae		1	1	0	0	0	0	0	0	1	
2	Turbellaria		1	1	0	0	1	1	0	0	0	
345	Zapada cinctipes		4	4	0	0	4	4	0	0	0	
			549				535				Difference = 14	
			Percent Similarity = 98.21									

