Eastern Washington
Stormwater Effectiveness Studies

Technical Evaluation Report (TER)

Street Sweeping and Catch Basin Cleaning Comparison

Study Classification: Operational BMPs

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QAPP and TER Publication Information

The project Quality Assurance Project Plan (QAPP) and the Technical Evaluation Report (TER) will be stored and accessible to the public at the following weblink: https://www.ci.ellensburg.wa.us/. For questions regarding the Proposal, please contact Jon Morrow by email morrowj@ci.ellensburg.wa.us or phone 509.925.6819.

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Document History

The study documents were developed following the Eastern Washington (EWA) Detailed Study Design Proposal and Quality Assurance Project Plan Template for Operational Best Management Practices (BMPs). A copy of the template is located on the Washington Stormwater Center's website at the following web link: https://www.wastormwatercenter.org/ew-effectiveness-studies/

The Detailed Study Design Proposal (Proposal) was submitted to Ecology by Jon Morrow on June 28, 2017. Ecology approved the Proposal via email to Jon Morrow on November 8th, 2017. Appendix A of the Quality Assurance Project Plan (QAPP) contains a copy of the approval letter along with Ecology's comments on the Proposal. Appendix B of the QAPP contains a summary of responses to Ecology's comments including how the comments were incorporated into QAPP.

The draft QAPP was reviewed by members of the Technical Advisory Group (TAG) in January 2018. Appendix C of the QAPP contains a summary of the TAG's comments along with a summary of response to these comments including how the comments were addressed in the QAPP. The final QAPP was submitted to Ecology prior to the May 8, 2018 deadline for their review and comment. Appendix D of the QAPP contains a copy of Ecology's approval letter of the QAPP and a summary of Ecology's comments along with responses to the comments including how the comments were incorporated into the final QAPP document. The revised version of the QAPP was submitted on August 1, 2018.

In June 2020, the QAPP was revised as noted in the Appendix J. Summary of Revisions Table. Generally, the revisions included updating the project schedule and the Technical Advisory Group. The revisions were approved by Ecology in June 2020.

The study started in October 2018 and the last data was collected in April 2020. The draft Technical Evaluation Report (TER) was presented and submitted to the TAG in July 2020 for review and comment. The TAG comments were discussed at an August 2020 TAG meeting. Appendix Q of the TER contains a summary of the TAG's comments along with a summary of response to these comments including how the comments were addressed in this document. The final TER was submitted to Ecology in December 2020.

Distribution List

The distribution list includes each party who will receive a copy of the TER.

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1.0 Table of Contents

2.0 Executive Summary

Street sweeping and catch basin cleaning are operational best management practices (BMPs) that are known to reduce the transport of sediment to receiving water bodies. In the EWA National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System Phase II Permit (MS4 Permit), catch basin cleaning is a required operations and maintenance (O&M) practice. The permit-required frequency of catch basin inspections (and potential cleanings) increased on December 31, 2018. Meeting these requirements creates a logistical and financial challenge for some EWA permittees due primarily to winter climate conditions which can prohibit catch basin cleaning for four months of the year. More frequent street sweeping may provide a solution to meeting the new permit requirements. Specifically, studies have shown that street sweeping can reduce the amount of sediment transported to catch basins during rainfall events. In theory, this could reduce the accumulation rate of sediment in catch basins and subsequently the frequency of which catch basins need to be cleaned.

The goals for this study were to 1) investigate whether the frequency of street sweeping significantly influenced sediment accumulation in catch basins (and transport from catch basins) during the dry season in a semiarid location, 2) recommend a combination of street sweeping and catch basin cleaning procedures for achieving permit requirements for catch basin cleaning, and 3) use the study results to justify a condition in the next permit for O&M procedures that allows street sweeping practices to offset the frequency of catch basin cleanings. These goals were achieved by conducting a two-year study in the City of Ellensburg. The study area is a 1,065-feet long section of SR 97 which includes four catch basins located on each side of the road that each discharge runoff to a swale. During year one (2018), one side of the road (test site) was swept and the catch basins were cleaned every other month starting in April and ending in October. On the other side of the road (control site), the catch basins were cleaned at the same time as the test site however the street was swept in April and October. During year two (2019), the test site and control site switched to the other side of the road and the catch basin cleaning and street sweeping only occurred once in October on the control side. Throughout the study, the City of Ellensburg followed their typical practices for street sweeping and catch basin cleaning and used the same equipment they typically use: a 2016 Elgin Crosswind J Regenerative Air Sweeper and a 2012 VacCon V311/1000 Combination Vactor Truck. Data collected during the study included: precipitation, temperature, and wind speed; street, catch basin, and catch basin washout sediment (wet) weight, moisture content, organic content, and particle size distribution (PSD); and catch basin sediment depth.

The significance of street sweeping frequency compared sediment accumulation in catch basins (and transport from catch basins) was evaluated by comparing the sediment accumulation rates during year one and two. Specifically, sediment accumulation rates from each sample event were calculated at each location (street, catch basins, and catch basin socks) and normalized (days since the last street sweep, basin area, lineal miles swept, etc). A statistical analysis was run to determine if there was a significance difference between data sets at the control site compared to the test site assuming a confidence interval of 95% (α=0.05). A two-sample t-test was used for normally distributed data and the Wilcoxon rank sum test was used for non-normally distributed data.

While there was generally a decreasing trend in the sediment accumulation rates in catch basins and catch basin socks (washout) as the frequency of street sweeping increased, the differences between the test side and control side were statistically insignificant ($p=0.95$ and $p=0.96$ respectively). These results suggest that frequency of street sweeping performed within this study does not significantly reduce the rate of sediment accumulation in catch basins (and transported from catch basins). However, that does not mean that more frequent street sweeping does not have a significant effect on catch basin sediment accumulation rates. It just means the results from this study did not prove a significant difference. One reason for these results is extreme variability in site conditions (i.e., wind, sediment loading, rainfall patterns, etc.) can influence the results especially for studies with small sample sizes like this one. For future work, a longer study over multiple years and with considerably more data may mitigate the influence of extreme variability on the results and increase the likelihood of demonstrating a significant difference.

In semi-arid regions that have distinct wet and dry seasons, more frequent street sweeping during the dry season should reduce sediment transport to catch basins during the wet season. This is because rainfall events are less frequent and may not produce enough runoff energy to transfer a significant amount of sediment to catch basins. As such more frequent sweeping throughout the drier season can reduce the sediment accumulation on roads, which should reduce the sediment that could be transferred catch basins during the wet season.

A recommended schedule for catch basin cleaning based on the frequency of street sweeping was developed using the data collected from this study. A linear least squares regression analysis indicated a strong linear correlation ($R^2=0.9354$) between street sweeping frequency and the time it would take for the catch basin sump to fill (60% full). These recommendations are specific to the site where the study was conducted. A literature review was conducted to identify site specific conditions that may influence the transferability of recommendations from this study to a different site. A synthesis of the literature is provided along with considerations for applying the results to other sites.

3.0 Introduction

3.1 Introduction to the Operational BMP

This study focused on evaluating the effectiveness of street sweeping and catch basin cleaning practices. These operational best management practices (BMPs) are generally described as preventative actions that prevent or reduce pollutant runoff (EPA & ASCE, 2002). Catch basins are located adjacent and flush with the curb line. Catch basins are configured with a grate inlet, which allows runoff from the roadway to enter the catch basin. Pipes (storm drains) connected to the catch basin(s) convey runoff to downstream BMPs such as swales or receiving water bodies. Catch basins typically have a low area (sump) below the invert of the pipes that can retain sediment (conveyed with roadway runoff to the catch basin), reducing the quantity of solids that are conveyed through the storm drain network into receiving waters (EPA, 1999). A vactor truck is periodically used to remove sediment from catch basins by vacuuming the solids out of the catch basin for disposal. In comparison, street sweeping removes sediment accumulation on roads, using a vacuum assisted sweeper truck. Street sweeping is known to reduce the quantity of sediments conveyed to catch basins during rainfall events (Caraco, 2000).

The Eastern Washington Phase II NPDES MS4 Permit (2014-2019) minimum control measure for Municipal Operations and Maintenance *(O&M)* specifies that permittees *"…implement an operation and maintenance program with the goal of preventing or reducing pollutant runoff from municipal operations."* In response to this requirement, the City of Ellensburg Stormwater Department developed an O&M Plan which includes street sweeping 100 miles of road and cleaning approximately 2,500 catch basins (City of Ellensburg, 2017). This typically includes sweeping the streets twice a year, once in the spring and again in the late summer, using a 2016 Elgin Crosswind J Regenerative Air Sweeper. On the other hand, approximately 600 catch basins are cleaned every year using a 2012 VacCon V311/1000 Combination Vactor Truck. In 2016, the combination of these practices collected an estimated 760 tons of solids which were disposed of at the city's decant facility and then transferred to the Wenatchee Waste Management (WM) Landfill (City of Ellensburg, 2017). *Section 4.0 provides more details about the City of Ellensburg's street sweeping and catch basins cleaning practices.*

3.2 Problem Description

The required frequency of catch basin cleaning and inspection is explicitly defined in the O&M section of the NPDES Municipal permit. Street sweeping was not required in the 2014-2019 permit however it was added to the 2019-2024 permit. With respect to catch basins, permittees are required to develop and implement an O&M plan that includes cleaning, regular inspection, and record keeping of the jurisdictions catch basins. In addition, all catch basins and inlets must be inspected once before December 31, 2018 and then every two years thereafter (Ecology, 2014). If the inspection shows it is necessary to clean the catch basin, typically when sediment exceeds 60% of the catch basin depth (Tetra Tech, 2001), the permittee must clean the catch basin. Alternatively, permittees may select other options for meeting this requirement which include (Ecology, 2013):

1. Establishing a specific, less frequent schedule based on documented evidence.
2. Identifying circuits and inspecting 25 percent of the catch basins within each circuit (frequency set by permit either annually or every two years).

3. Cleaning the whole system, including all pipes, ditches, catch basins, and inlets within a circuit once during the five-year permit term, where the circuit drains to a single discharge point.

Note: An outcome of this study is to address item 1, provide documented evidence that will support a less frequent schedule for catch basin cleaning based on the frequency of street sweeping.

Increasing the frequency of catch basin inspections (and potential cleanings), creates a logistical and financial challenge for some eastern Washington (EWA) jurisdictions. Specifically, in locations like the City of Ellensburg that typically experience prolonged durations of snow cover and ice on the roads during the winter months these climate conditions can prohibit catch basin cleaning for 4 months out of the year. Western Washington (WWA) Phase II permittees have the similar catch basin cleaning requirements (see Table 3.1), however, since most WWA jurisdictions experience significantly less snow and ice build-up (if any) on their roads, their catch basin cleaning activities are not impacted to the same degree by climate conditions. For comparison, Figures 3.1 and 3.2 are included to illustrate some of the differences in climate conditions between Ellensburg and Olympia. The subsequent paragraphs in this section provide more details about Ellensburg’s climate conditions and explain why these conditions are important to this study.

Note: An outcome of this study is to demonstrate the need for O&M permit requirements that reflect EWA climate conditions.

Ellensburg is located in Central Washington, a semi-arid region with climate conditions that are characterized by cold winters with snowfall, hot dry summers with high winds (WRCC, no date), and short-duration high intensity rainfall events from late spring through early fall (WSDOT, 2016). During the dry season (April to September) the average monthly precipitation ranges from 0.24-inches (August) to 0.67 inches (May) with maximum daily wind speeds ranging from 20 mph to 25 mph. The average maximum daily temperature ranges from 61 degrees (April) to 86 degrees (August). Rainfall events during the dry season provide on average 3-inches of the 9 mean annual precipitation (MAP) and these short duration, high intensity events are known to deposit 1-inch of rain in less than 30 minutes (based on NOAA historical rainfall records). Conversely, the wet season (October to March), provides the remaining 6-inches of MAP of which an average of 22-inches occurs as snow fall.

Variables such as climatic conditions are known to influence the effectiveness of stormwater management BMPs (Caraco, 2000; Sayre, 2006; Gautam, Acharya, Stone, 2010; Tyagi, Chongtoua, Medina, 2008). For example, in semi-arid areas like Ellensburg, roadway sediment accumulation and stormwater runoff pollutant concentrations from roads tend to be higher than marine areas like Olympia. The reason for this is pollutants and sediments have more time to build up on impervious surfaces due to the longer duration of dry periods between rain events. Recommended strategies for semi-arid areas include more frequent street sweeping during the dry period to reduce the quantity of pollutants and sediments on impervious surfaces thereby reducing the quantity available for transport to catch basins and downstream water bodies (Caraco, 2000). Figure 3.3 shows an example of sediment accumulation on roads and in a catch basin in Ellensburg during the dry season.

Table 3.1 Comparison of WWA and EWA Catch Basin Cleaning 2019 Permit Requirements, Permits Effective August 1, 2019

	WW Phase I Permit	**WW Phase II Permit**	**EWA Phase II Permit**
Catch Basin Cleaning Requirements			
Permit Section	S5.C.10.d.i	S5.C.7.c.iii.	S5.B.6.a.ii.b
Inspection Frequency	Annually, or alternative inspection schedule	Every 2 years, or alternative inspection schedule	Every 2 years, or alternative inspection schedule
Permit Section	S5.C.10.d.i	S5.C.7.c.iii.	
Alternative Inspection & Cleaning Schedules	(a) Inspection schedule may be changed to meet the maintenance standards based on maintenance records of double the length of time of the proposed inspection frequency or written statements to document a specific, less frequent inspection schedule.		(1) Catch basin inspection schedule may be changed to meet the maintenance standard based on maintenance records of double the length of time of the proposed inspection frequency or written statements to document a specific, less frequent inspection schedule.
	(b) Annual inspections may be conducted on a “circuit basis” whereby 25% of catch basins and inlets within each circuit are inspected to identify maintenance needs.	(b) Inspections every two years may be conducted on a “circuit basis” whereby 25% of catch basins and inlets within each circuit are inspected to identify maintenance needs.	(2) Inspections every two years may be conducted on a "circuit basis", whereby 25% of catch basins and inlets within each circuit are inspected to identify maintenance needs.
	(c) The Permittee may clean all pipes, ditches, catch basins, inlets within a circuit (draining to a single point) once during the permit term.		(3) The Permittee may clean all pipes, ditches, catch basins, inlets within a circuit (draining to a single point) once during the permit term.
Permit Section	S5.C.10.a.ii	S5.C.7.a.ii	NA
Timeline for Cleaning Following Inspection	Within 6 months for catch basins, unless encounter denial or delay of access by property owners, denial or delay of necessary permit approvals, unexpected reallocations of maintenance staff to perform emergency work. For each exceedance of the required timeframe, and the Permittee shall document the circumstances and how they were beyond the Permittee’s control.		NA
Street Sweeping Requirements			
Permit Section	S5.C.10.e	S5.C.7.d	S5.B.6.a.i.b
Requirements Involving Street Sweeping	Each Permittee shall implement practices, policies, procedures to reduce stormwater impacts associated with runoff from all lands owned/maintained by Permittee, and road maintenance activities under the functional control of the Permittee. No later than 12/31/22 document the practices, policies, procedures. Street cleaning activities must be addressed.	Implement practices, policies, and procedures to reduce stormwater impacts associated with runoff from all lands owned or maintained by the Permittee, and road maintenance activities under the functional control of the Permittee. No later than 12/31/22, document the practices, policies, and procedures. Street cleaning activities must be addressed.	Permittees shall implement a schedule of municipal O&M activities (Plan). Permittees shall review and, if needed, update the Plan no later than 12/31/22. The Plan shall include appropriate pollution prevention and good housekeeping procedures for roads, highways, parking lots including street cleaning.

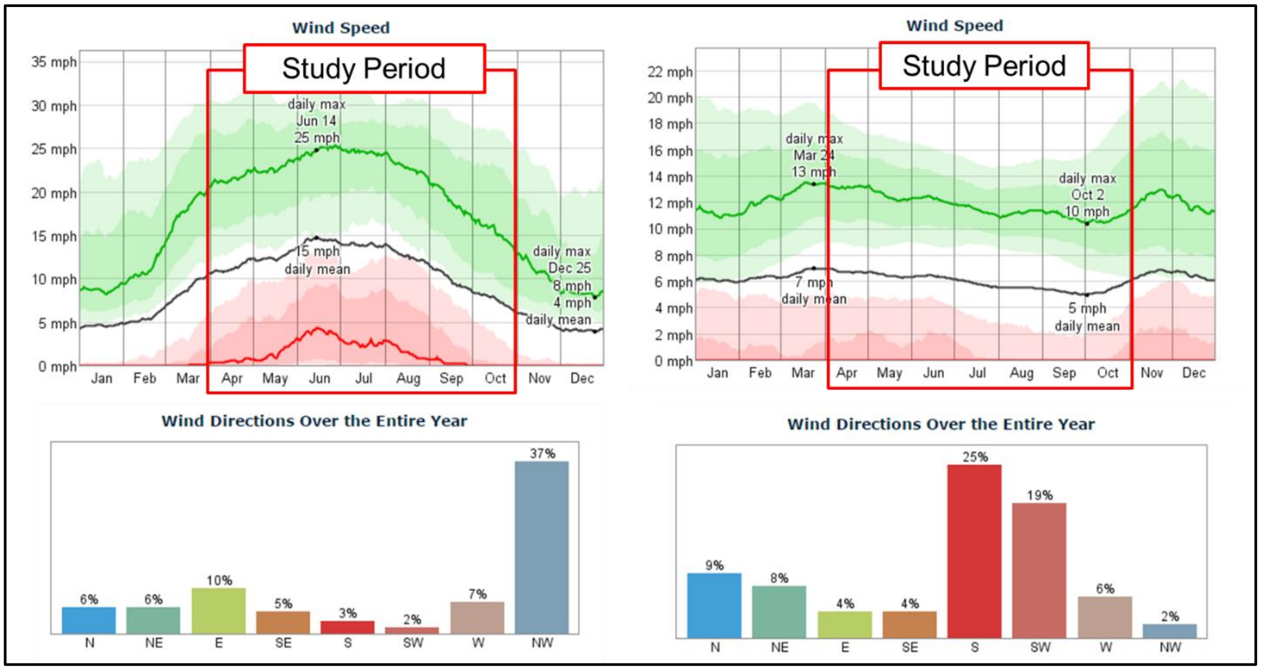

Figure 3.1 Average daily wind speeds in Ellensburg (left) and Olympia (right) (Source: https://weatherspark.com/averages)

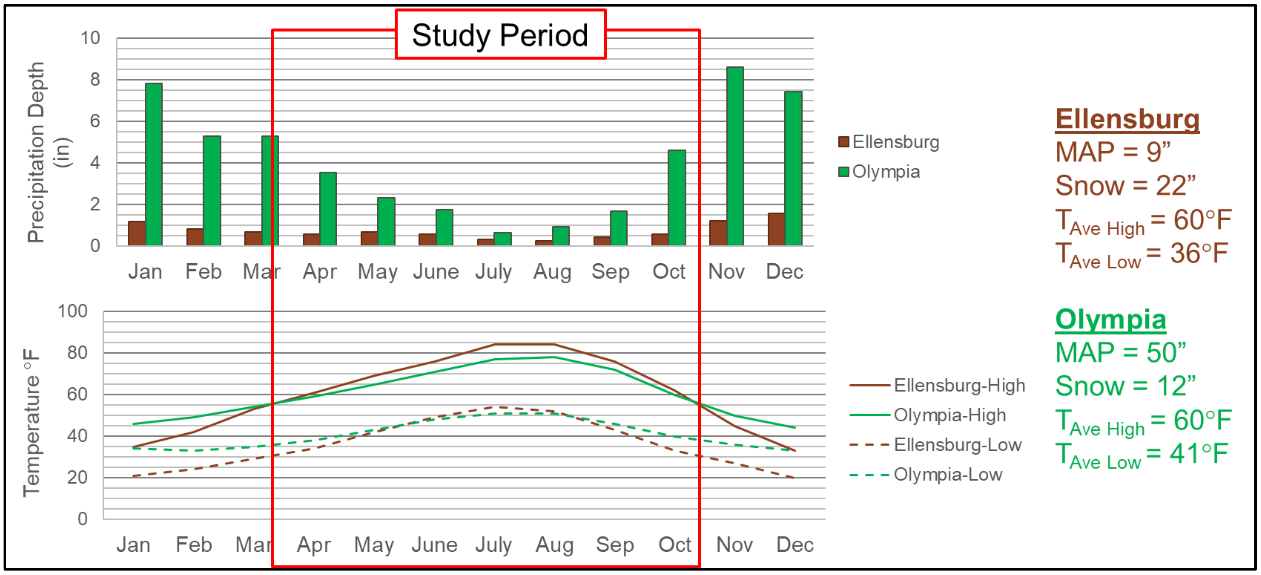

Figure 3.2 Average monthly precipitation depth and temperature in Ellensburg (brown) and Olympia (green) (Source: http://www.usclimatedata.com)

Figure 3.3 Proposed study area: typical roadway and catch basin sediment accumulation

3.3 Study Goals

The goal of this study was to determine whether the frequency of street sweeping significantly reduces the rate of sediment accumulation in catch basins (and transported from catch basins) during the dry season in a semi-arid location. The intent was to use results from this study to recommend a combination of street sweeping and catch basin cleaning procedures for achieving permit requirements for catch basin cleaning. If the study results indicate that the frequency of street sweeping significantly reduces sediment accumulation in catch basins, the results will be used to justify a condition in the next permit for O&M procedures that allows street sweeping practices to offset the frequency of catch basin cleanings.

3.4 Study Description and Objectives

A paired study was conducted on a 1065-foot section of State Route (SR) 97 with the test site located on one side of the road and the control site located on the other side (Figure 3.4). Each site has four catch basins located on the side of the road (eight catch basins total). Runoff from the road enters the catch basins through a herringbone grate inlet and then discharges from the catch basin through a storm drainpipe that outfalls into biofiltration swales (swale) (Figure 3.5). This study occurred over 2 years and data collection primarily occurred over 6 months (April to October) each year. The first year (2018), the test site was swept every other month starting in April while the control site was only swept once in April and October. The following year (2019) the control site and test site were switched to the other side of the road same street sweeping occurred every other month at the test site from April to October and only in October at the control site. All catch basins were cleaned, using a vactor truck, every other month starting in April in 2018 and 2019. Both street sweeping and catch basin cleaning followed the City’s typical practices.

Sediment accumulated on the road, in the catch basins, and transferred from the catch basins was collected and measured. The sediment collected in the vactor truck and street sweeper was transported to the City’s decant facility where it was dewatered and then weighed. Samples of the sediment were collected to determine the moisture content which was used to calculate the dry weight of the sediment collected. Before the catch basins were cleaned the average depth of sediment accumulated in the catch basins was measured at five different locations in each catch basin. Then sediment was collected from each catch basin using the City’s vactor truck. The storm drainpipe outfalls were fitted with a catch basin sock which captured sediment that was transported from the catch basins before discharging to the swales (Figure 3.5). Every other month, the catch basin sock was collected (replaced) and the dry weight of sediment collected in each sock was determined. The particle size distribution (PSD) of sediments collected from each location (roadway, catch basins, and catch basin socks) was determined. Organic content was also determined only for the catch basin sediment. Climate data (precipitation and wind speed) were collected over the duration of the study period. Section 5.0 contains more details regarding data collection.

The study goals were achieved by meeting the following objectives:

1. Characterize the sediment collected (particle size distribution and organic content) of from each sample location (roadway, catch basins, and catch basin socks) at both the test site and control site.
2. Quantify the accumulation rate of sediment on the street, in catch basins, and in catch basin socks, without employing (control site) and while employing (test site) street sweeping.
3. Identify potential weather-related methods of sediment transport to the road, catch basin, and catch basin socks and assess representativeness of the climate conditions during the study (compared to historical records)
4. Determine whether there is a statistically significant difference between the sediment accumulation rate in the catch basins and in the catch basin socks (washout from the catch basin) at the test site compared to the control site.
5. Evaluate whether there is a correlation (using a regression analysis) between catch basin sediment accumulation rates and street sweeping frequency that could be used to develop a schedule for catch basin cleaning and provide recommendations for applying the results.
6. Summarize the study results.

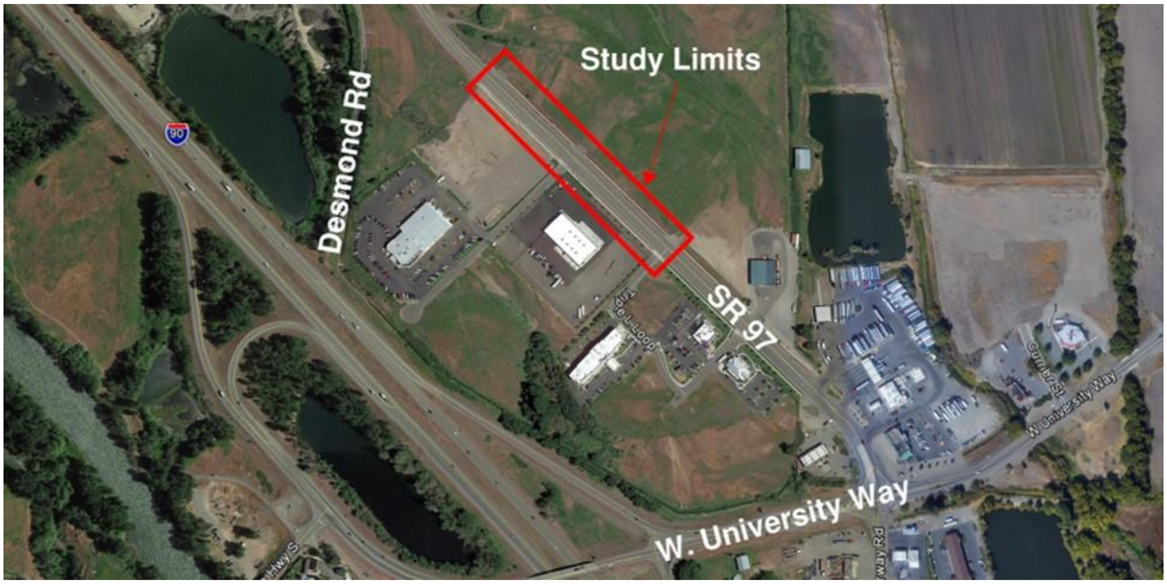

Figure 3.4 Aerial view of the propose study area in the City of Ellensburg

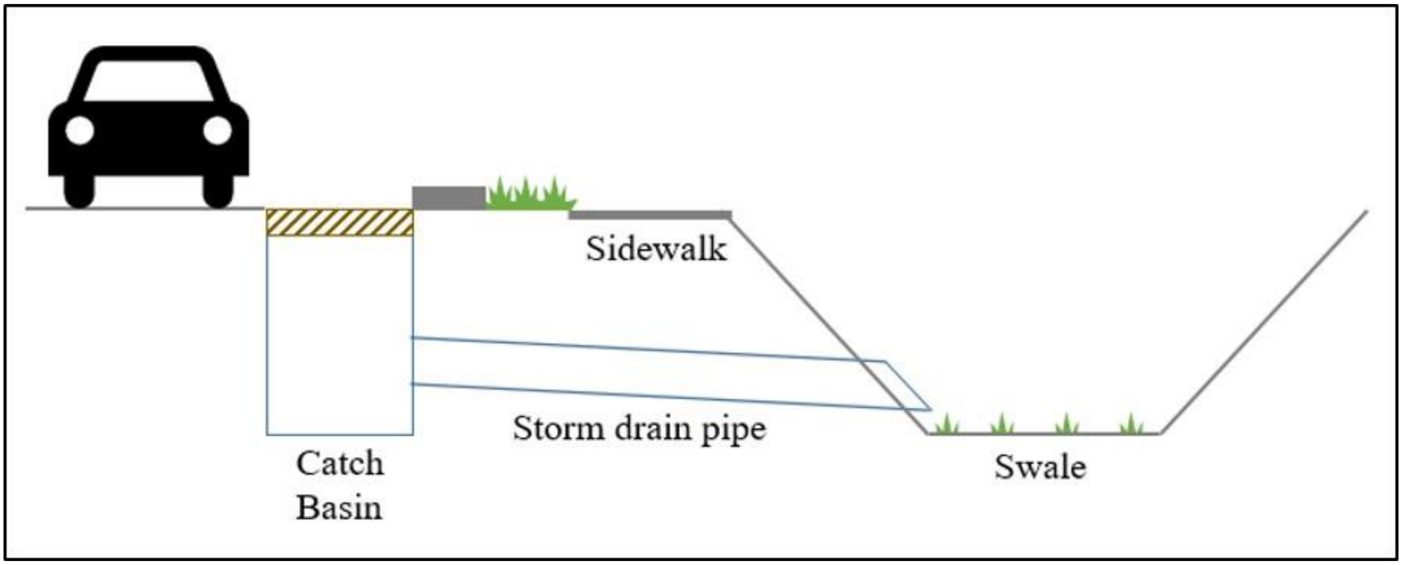

Figure 3.5 Typical Cross Section of Stormwater System in the Study Area

[1] The test-site and control-site will switch to the other sides of the road for year two.

Figure 3.6 Aerial view of the proposed study area showing the locations of the test site and control site
Note: For year one, the test site was the north side of the road, and the control site was the south side of the road. During year two, the south side was the test site and the north side was the control site.

3.5 Study Location

The proposed study area was a 1065-foot section of road on State Route 97 located in Ellensburg, Washington between Desmond Road and West University Way (Figure 3.6). This principal arterial is a major hay hauling route and the land use in the study area is primarily commercial and light industrial. The road has four 12-foot lanes, a 12-foot turning lane, and two 4-foot shoulders (Figure 3.7). The speed limit on the road is 40 mph with an approximate average daily traffic (ADT) of 4000. The study location was selected because the proposed test site and control site provide equivalent areas for comparison including:

- The areas have the same average daily traffic (ADT), roadway topography, land use, and the same number of catch basins which are configured to discharge to swales.
- Typical variables that affect the results are not present at the study location such as leaf litter from tree canopies and parking is not permitted on the road so parked cars will not interfere with street sweeping and catch basin cleaning practices.

The study area was surveyed in July 2017 (Appendix A) and the results of the survey were used to delineate the basin areas summarized in Table 3.2, Figure 3.8, and described herein. The study area starts at station 0+00 and ends at station 10+65 and the longitudinal roadway slopes is 0.33% from the North West to the South East. The roadway crown is in the center of the highway which directs half of the runoff to each side of the road. The area contributing runoff to each catch basin is from PGIS which includes the road and approaches (Figure 3.9) to local. The area adjacent to the approaches (away from the road) is not included in the basin delineation because these areas slope away from the road. The contributing basin areas to the catch basins range from 0.17 to 0.30 acres. Area differences are due to the locations of the inlets and the size of the approaches.

Figure 3.7 Street view of the proposed study area on SR 97

Table 3.2 Area Contributing Runoff to Each Catch Basin

Catch Basin ID	Contributing Drainage Area (AC)
CB-1	0.19
CB-2	0.19
CB-3	0.29
CB-4	0.26
CB-5	0.17
CB-6	0.17
CB-7	0.30
CB-8	0.25

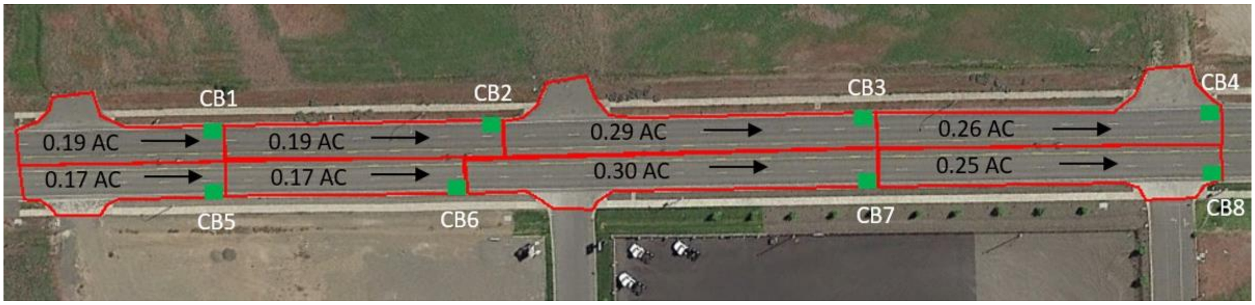

Figure 3.8 Basin delineations

Figure 3.9 Approaches contribute runoff to catch basins

4.0 Operational BMP Description

The city's typical street sweeping and catch basin cleaning practices were documented from interviews with the equipment operators and the city's stormwater manager. A copy of the interview notes is located in Appendix E of the QAPP. This section provides a summary of the typical operating procedures for street sweeping and catch basin cleaning.

4.1 Street Sweeping

Street Sweeping occurs twice per month for principal arterials, once per month for secondary arterials, and once per year for collectors. The streets are swept using a 2016 Elgin Crosswind J Regenerative Air Sweeper. Regenerative air sweepers use rotating brooms and pressurized air on the street side of the pickup head under the vehicle to dislodge material from the street surface. Brooms rotate in opposite directions toward the center of the vehicle to direct material to the pickup head instead of to the outside of the vehicle (i.e. curb and gutter). A vacuum is applied on the opposite side of the pickup head from the pressurized air to pull material into the hopper. The frequencies and practices were modified during the study to sweep the test and control site once every other month and immediately following catch basin cleaning. The detailed modifications to procedures for this study are described in more detail in Section 8.1.3 of the QAPP. Typical street sweeping procedures in Ellensburg are as follows:

- Step 1: At the start of the route to be swept, the sweeper pulls alongside the curb as closely as possible while still allowing the rotating brushes to reach the gutter.
- Step 2: Once the sweeper is aligned with the curb, the manifold at the front of the sweeper releases water to wet the pavement. The water is used to provide dust control, particularly later in the day, when transport of fines by wind is expected to be higher. Once the manifold is started, the brooms begin to rotate and are lowered, and the blower and vacuum near the rear of the sweeper is started.
- Step 3: The sweeper drives along the curb and gutter until the route is completed. Because higher amounts of material are expected to collect in and adjacent to the gutter, a single pass on each side of the street is typical. Once a year and following the winter season, an additional pass along the center median of arterials is performed to capture material in or next to the center median.
- Step 4: After sweeping is complete, the sweeper drives to the City's decant facility for disposal of material collected on the route.

4.2 Catch Basin Cleaning

To date, each catch basin is cleaned approximately once every four years using a 2012 VacCon V311/1000 Combination Vactor Truck. This frequency was modified during the study to clean catch basins at the test and control site every other month. During the months when both street sweeping and catch basin cleaning occur the catch basins were cleaned prior to street sweeping. The modifications to procedures for this study are described in more detail in Section 8.1.2 of the QAPP. Typical catch basin cleaning procedures in Ellensburg are as follows:

- Step 1: The vactor truck drives to the catch basin to be cleaned, and parks alongside the curb so the front of the truck and vactor arm are in line with the inlet.

- Step 2: The catch basin grate is removed, and the arm is lowered to the bottom of the catch basin by use of remote control.
- Step 3: The vacuum is started and a high-pressure water hose attached to the truck is used to wash any material adhered to the walls of the catch basin towards the bottom of the catch basin.
- Step 4: Once the accumulated material and water is removed from the catch basin, the vactor is removed and the grate is replaced on the catch basin.
- Step 5: Material collected during the catch basin cleaning is transported to the City's decant facility for disposal.

4.3 Equipment

The City of Ellensburg Stormwater O&M Plan includes street sweeping 100 lineal miles of road and cleaning approximately 2500 catch basins (City of Ellensburg, 2017). The city owns one street sweeper, an Elgin Crosswind J street sweeper, and two vactor trucks, VacCon Combination Truck. A summary of the equipment specifications is summarized in Table 4.1 with detailed equipment information located in Appendix E of the QAPP.

Table 4.1 Street Sweeper and Vactor Truck Equipment Specifications

2016 Elgin Crosswind J Street Sweeper (2016 Freightliner Chassis)	
Material Storage Capacity	8 CY
Broom Type	Dual Gutter Brooms
Total Sweeping Path	120 in.
Vacuum Pickup Head	2700 sq. in.
Blower Rating	20,000 cfm
Water Storage Capacity	240 gal
Number of Spray Nozzles	16
Pick-Up Efficiency	96.4%
2012 VacCon V311/1000 Combination Truck (2012 International Chassis)	
Material Storage Capacity	11 CY
Diameter of Vacuum Hose	8 in.
Vacuum Pickup Head	200 in. H_2O
Blower Rating	8000 cfm
Water Storage Capacity	1000 gal

5.0 Sampling Procedures

5.1 Types of Data Collected

This section provides an overview of the types of data that was collected. Table 5.1 summarizes the various types of data collected, the location where data was collected, equipment used to collect data, the frequency of data collection, and the total number of samples collected. Table 5.2 provides a timeline for when this data was collected. An overview of the sampling procedures is in the subsequent sections and the detailed sampling procedures are in Section 8.0 of the project QAPP. Appendix B-E contains the raw data measurements for each sample event.

Table 5.1 Summary of Data Collected

Data Type	Data Collection Location	Equipment Used to Collect Data	Frequency	Total Number of Samples
Precipitation, Temperature, and Wind Speed	Weather Station	Weather Station	Daily throughout the study	Continuously
Catch Basin Sediment Depth	All *Test Site* Catch Basins	Survey Rod	Every other month before the catch basins were cleaned	32
	All *Control Site* Catch Basins			32
Catch Basin Sediment Wet Weight and Moisture Content	All *Test Site* Catch Basins	Vactor Truck	Every other month for two 6-month periods; starting on April and ending in October	8 & 21
	All *Control Site* Catch Basins			8 & 21
Roadway Sediment Wet Weight and Moisture Content	Roadway Length at *Test Site*	Street Sweeper	Every other month for two 6-month periods; starting on April and ending in October	8 & 21
	Roadway Length at *Control Site*			3 & 7
Catch Basin Sock Sediment Dry Weight	All *Test Site* Catch Basin Socks	Manual	Every other month for two 6-month periods; starting on April and ending in October	24
	All *Control Site* Catch Basin Socks			25
Roadway, Catch Basin, and Sock Sediment PSD	Each *Test Site & Control Site* sample location (roadway, catch basin, socks)	Manual	Two times per year from April through October (Roadway and Sock), 4 times per year from April through October (Catch Basin)	4, 16, & 6
Roadway, Catch Basin, and Sock Sediment Organic Content	All *Test Site & Control Site* (roadway, catch basin, socks)	Manual	2-3 times per year	9, 22, & 2
Catch Basin Bulk Density	All *Test Site & Control Site*	Manual	1 time	3 & 3

Table 5.2 Data Collection Schedule over the Study Duration

Location	Activity	2018 (North side of SR 97 was test side)									2019 (South side of SR 97 was test side)												2020			
		Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Study Area	Weather Station	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
Test Site	Street Sweep	X^{1}		X^{1,4}		X^{1,6}		X^{1}						X^{1}		X^{1,4}		X^{1}		X^{1,4,6}						
	Catch Basin Cleaning	X^{2,3,4,6}		X^{2,3,4}		X^{2,3,4,6}		X^{2,3,4}						X^{2,3,4,6}		X^{2,3,4}		X^{2,3,4,6}		X^{2,3,4,6,8}						
	Catch Basin Sock Sediment			X^{4,5}		X^{5}		X^{5}						X^{5,7}		X^{4,5}		X^{5}		X^{4,5}						X^{4,5,6}
Control Site	Street Sweep	X^{1}						X^{1}												X^{1,4,6}						
	Catch Basin Cleaning	X^{2,3,4,6}		X^{2,3,4}		X^{2,3,4,6}		X^{2,3,4}						X^{2,3,4,6}		X^{2,3,4}		X^{2,3,4,6}		X^{2,3,4,6,8}						
	Catch Basin Sock Sediment			X^{4,5}		X^{5}		X^{5}						X^{5,7}		X^{4,5}		X^{5}		X^{4,5}						X^{4,5,6}

1. **Street Sediment Weight -** Collected roadway sediment and measured the wet weight from the control site twice (2018) and once (2019) and from the test site four times per year (8 total) for a combined total of 11 wet weights over the duration of the study. After weighing the sediment, triplicate samples of sediment were collected and submitted to the lab to measure the moisture content. The analytical laboratory used at the beginning of the study made an error and created a composite of the first set of samples (one sample from each location instead of triplicates from each location). Following this incident, the samples were sent to a different lab for the duration of the study. As such, a total of 28 samples were collected and analyzed over the duration of study.
2. **Catch Basin Sediment Weight -** Collect sediment from all the catch basins at the control site and then all the catch basins at the test site. The sediment wet weight was measured four times per year for a total of 8 wet weights per year (16 wet weights total over the duration of the study). After weighing, triplicate samples of sediment were collected and submitted to the lab to measure the moisture content. The analytical laboratory used at the beginning of the study created a composite of the first set of samples. Following this incident, the samples were sent to a different lab for the duration of the study. As such, a total of 42 samples were collected and analyzed over the duration of study.
3. **Catch Basin Sediment Depth -** Measured the depth of sediment in each catch basin every other month at the test site (16 catch basins per year for a total of 32 measurements over the duration of the study) and at the control site (16 catch basins per year for a total of 32 measurements over the duration of the study).
4. **Particle Size Distribution (PSD) -** Sediment samples were collected and submitted to the lab to determine the PSD. The samples were collected from the roadway sediment (3 from the test site and 1 from the control site for a total of 4 over the duration of the study), the catch basin sediment (8 from the test site and 8 from the control site for a total of 16 over the duration of the study), and catch basin sock sediment (3 from the test site and 3 from the control site for a total of 6 over the duration of the study).
5. **Catch Basins Sock Sediment Weight -** Collected sediment that washed out from the catch basins (into the socks located in the catch basins) and submitted the socks to the lab to determine the sediment dry weight. This included collecting the socks every other month that are located in the catch basins at the test site (12 socks for year one and 12 socks for year two for a total of 24 socks over the duration of the study) and at the control site (9 socks for year one and 16 socks for year two for a total of 25 socks over the duration of the study). It is important to note that due to the site configuration, there are 4 catch basins on the north side of the road and only 3 catch basins on the south side of the road.
6. **Organic Content -** Samples of sediment from the street sediment and catch basins were submitted to lab to determine the organic content measured as total volatile solids (TVS). Triplicate samples were collected during each sample event except for two events when the lab erroneously combined the triplicate sample into a composite sample before testing the organic content. Samples were collected from the street sediment once per year at the test site (for a total of six samples over the duration of the study) and once from the control site during year two (for a total of three samples over the duration of the study). Samples were collected from the catch basins at the test and control site twice during year one (for a total of four samples from the test site and four from the control site) and three times at the test and control site twice during year two (for a total of seven samples from the test site and seven from the control site). Samples were collected from the catch basin socks once from the test and control site in April 2020 for a total of 2 samples.
7. **Lab Fire -** Catch basin socks that were collected during the April 2019 data collection event were destroyed in a fire. The fire occurred at the analytical lab during the drying process used to obtain the dry weight of the catch basin socks. Following the fire, the lab adjusted their procedures to minimize the possibility of another fire. Because the data was lost, a catch basin sock was installed in October 2019 and collected in April 2020 to approximate how much sediment would have been collected in the catch basin sock in April 2019. *The April 2020 catch basin sock results are substituted for the April 2019 catch basin sock results throughout this report.*
8. **Catch Basin Sediment Bulk Density -** The bulk density of sediment collected in the catch basins from the test site (n=3) and the control site (n=3) was measured at 80% compaction. This information was collected to estimate the weight of sediment when the catch basins are full (~60% depth) as part of the analysis to determine the relationship between catch basin accumulation and street sweeping frequency (Section 7.5).

5.2 Sample Collection Process and Design(s)

This section provides an overview of the process for collecting the various types of data including the equipment that was used to collect samples and where applicable the design of the sample collection system is described. Reference Section 8.0 of the QAPP for the detailed standard operating procedures (SOPs) for collecting samples and measuring field data.

5.2.1 Weather Data

A weather station recorded precipitation, temperature, and wind speed data continuously at 15-minute intervals throughout the duration of the study. The weather station is located at 1306 W. Dolarway Road, which is approximately 1.5 miles from the study area as shown in Figure 5.1. The parcel where the weather station is located is owned by DirectTV, Inc. Personnel at that property operated and maintained the weather station. This weather station stopped operating November 25, 2018 through March 6, 2019 and June 16, 2019 through the end of the study, potentially due to equipment malfunction. An equivalent weather station was located at Central Washington University (CWU) and data from this station was used to replace missing data from November 25, 2018 to March 6, 2019 and from June 17, 2019 to the end of the study. The CWU station is located on the roof of the Hogue Technology Building on campus, approximately 2.5 miles from the study area as shown in Figure 5.1. CWU staff operated and maintained the weather station.

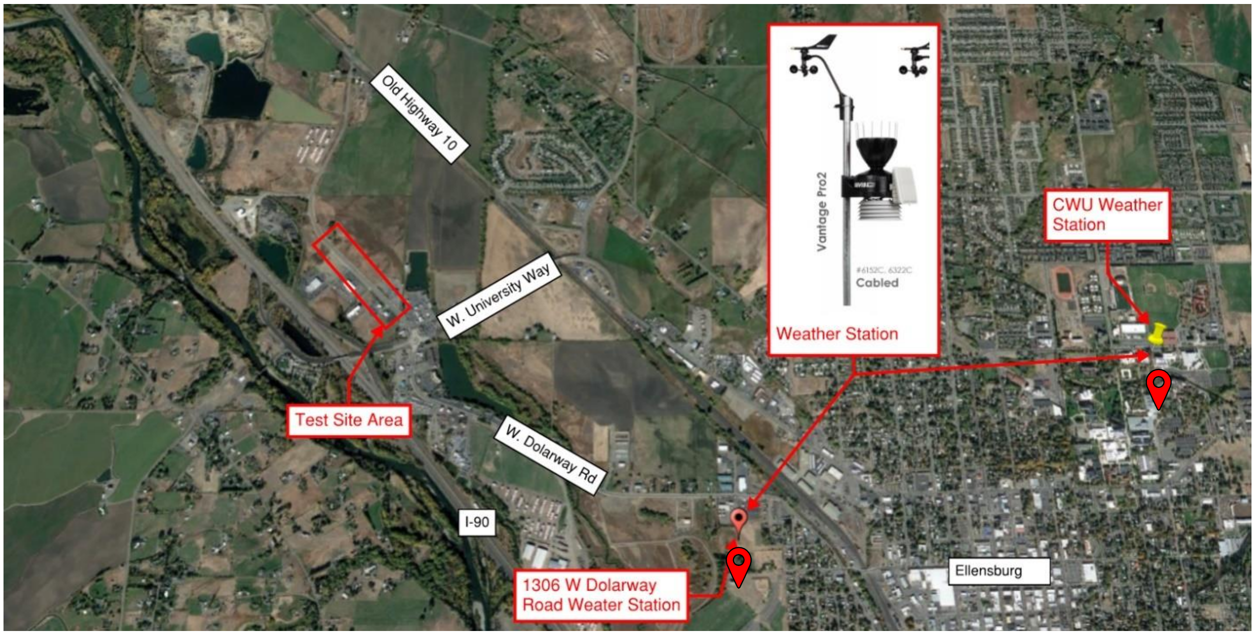

Figure 5.1 Location of Weather Station in Relation to the Study Area

The 1306 W Dolarway Rd and CWU weather stations are Davis Instruments Vantage Pro2 stations, which measure rainfall, wind speed and direction, temperature, and humidity. Precipitation depth is recorded using a tipping bucket. The bucket has a level of accuracy of ±4% or ±0.01-inches, whichever is greater, for rain rates up to 4-inches per hour. Rainfall data is recorded every 20-24 seconds. A storm event is recorded once 0.02-inches has accumulated within the bucket, and the storm event is ended after 24 hours without further accumulation.

Wind speed is measured using a cup anemometer in 1 mile per hour (mph) increments and recorded every 2.5 to 3 seconds. The data is compiled into 10 to 15-minute intervals. The meter has a range of 1 to 200 mph and an accuracy of ±2 mph or ±5%, whichever is greater.

Temperature is measured using a PN junction silicone diode (thermal diode), located beneath a solar radiation shield on the station. The temperature sensor measures temperature between -40°F and 150°F. The temperature sensor is accurate to within ±0.5°F. Temperature is updated every 10 seconds and is compiled into 10- to 15-minute intervals.

Data recorded by the weather stations is uploaded to Weather Underground (wunderground.com), a website which presents forecast and historical weather data. Data for the weather station at 1306 W Dolarway Road can be accessed and downloaded by the public at the webpage for the station (https://www.wunderground.com/personal-weather-station/dashboard?ID=KWAELLEN22). Data for the weather station at CWU can be accessed and downloaded by the public at the webpage for the station (https://www.wunderground.com/dashboard/pws/KWAELLEN13).

5.2.2 Catch Basin Sediment Depth

The depth of sediment in each catch was measured using a fiberglass, telescoping survey rod with hundredths of a foot gradations. This included measuring from the rim of the catch basin to the top of the sediment in five different locations (Figure 5.2) before cleaning catch basins and subtracting these measurements from the depth of the catch basin empty. The average sediment depth in each catch basin was determined by averaging the five measurements. The SOP for measuring the sediment depth is located in Section 8.1.1 of the QAPP.

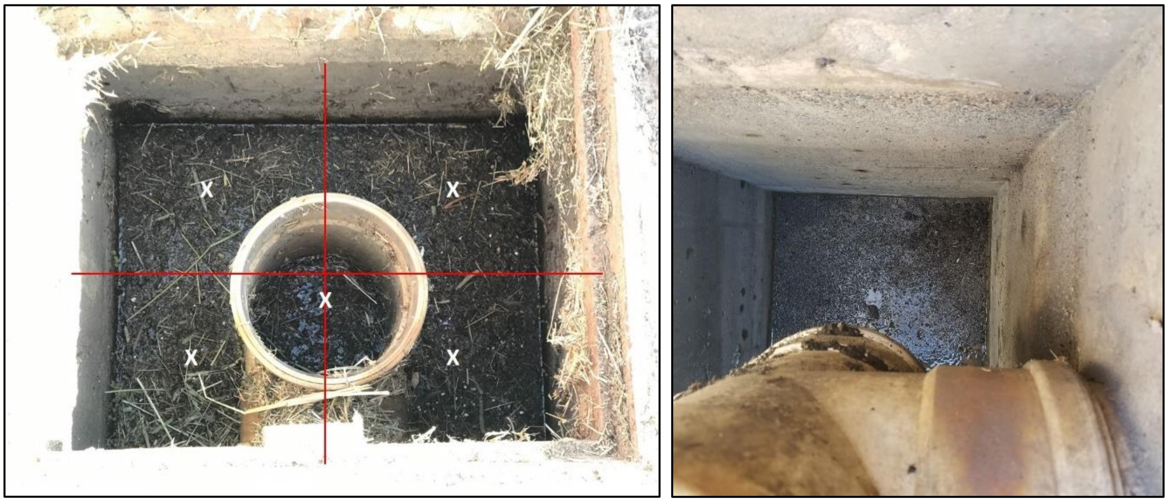

Figure 5.2 Catch basin sediment depth: measure in five locations full (left) and empty (right)

5.2.3 Catch Basin Sediment Wet Weight and Moisture Content

The catch basin sediment was collected from the test site and control site separately in the city's vactor truck (Figure 5.3) following the procedures defined in Section 8.1.2 of the QAPP. The sediment was transported to the city's decant facility. Once the truck arrived at the decant facility, the sediment was transferred to a basin for dewatering (Figure 5.4). The transfer of sediment to the basin took approximately 5-10 minutes to prevent water and sediment from spattering outside of the basin. Any excess which fell outside the basin was shoveled into the basin. The dewatering basin was retrofitted with drains covered with a 1 micron felt filter fabric and attached to ball valves. However, the filter fabric immediately clogged during the first sampling event, inhibiting drainage. The filter fabric was removed, and the dewatering basin and sediment were allowed to sit for 5-7 days to allow small particles to settle to the bottom of the basin. The sediment was dewatered by opening the valves according to the SOPs in Section 8.1.5 of the QAPP.

After excess water was drained, the basin was transported to a scale using a forklift and pallet located under the basin to measure the wet weight. A Coti Global floor scale and Transcell TI-500E SS digital indicator were used to measure the weight. The scale is 4-feet by 4-feet, with a 10,000-pound capacity. The digital indicator is set to display load from the floor scale in 0.1-pound increments. The sensitivity of the scale and digital indicator is 3 millivolts per volt (mV/V). The accuracy of the scale is ±1.06%. Additional information about the scale and digital indicator is in Appendix M of the QAPP and the scale calibration is described in Section 8.1.3 of the QAPP. After the sediment was weighted, three samples were collected and submitted to the lab to determine the moisture content of the sediment collected.

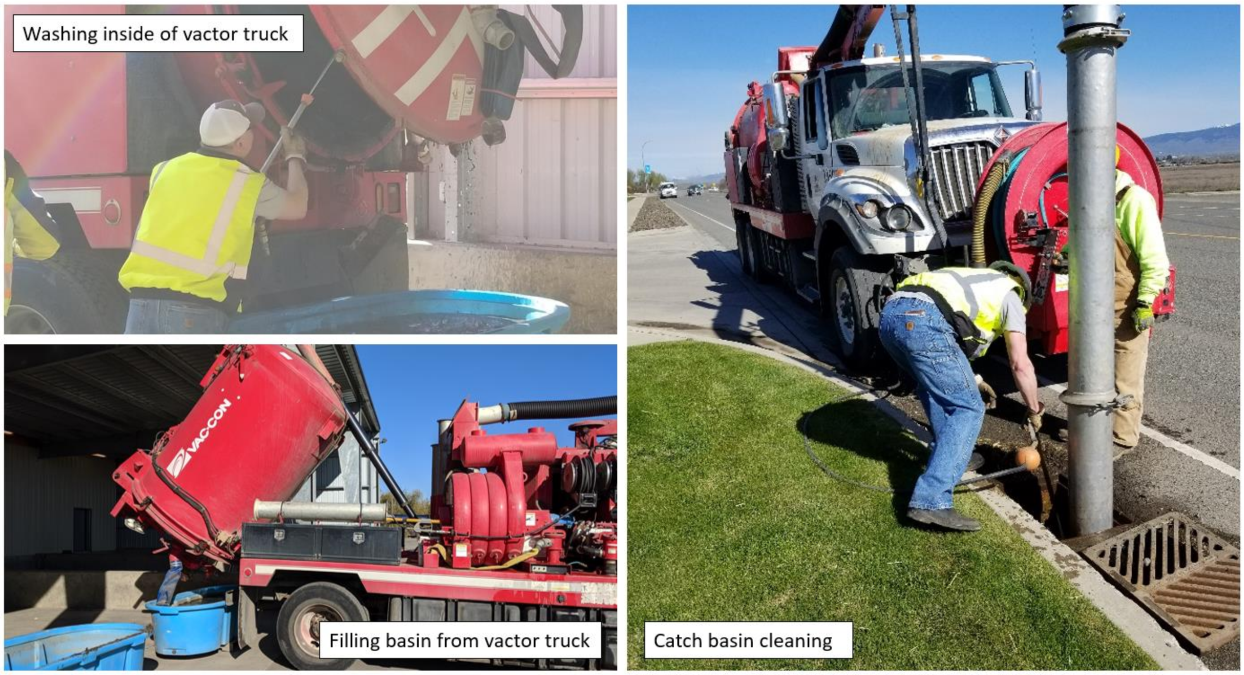

Figure 5.3 Catch Basin Sediment Accumulation Data Collection

Figure 5.4 Dewatering Basin Prior to Settling (Left) and Following Dewatering (Right)

5.5.4 Roadway Sediment Wet Weight and Moisture Content

The roadway sediment was collected from the test site and control site separately in the city's street sweeper following the procedures defined in Section 8.1.3. Sediment from the test site and control site was collected and weighted separately. The sediment was transported to the city's decant facility and transferred to a basin for dewatering (Figure 5.5). Transfer of the sediment to the basin took approximately 5-10 minutes to prevent water and sediment from spattering outside of the basin. Any excess which fell outside the basin was shoveled into the basin. The process for dewatering, weighting the sediment, and collecting moisture content samples is the same as described in Section 5.2.3 of the QAPP.

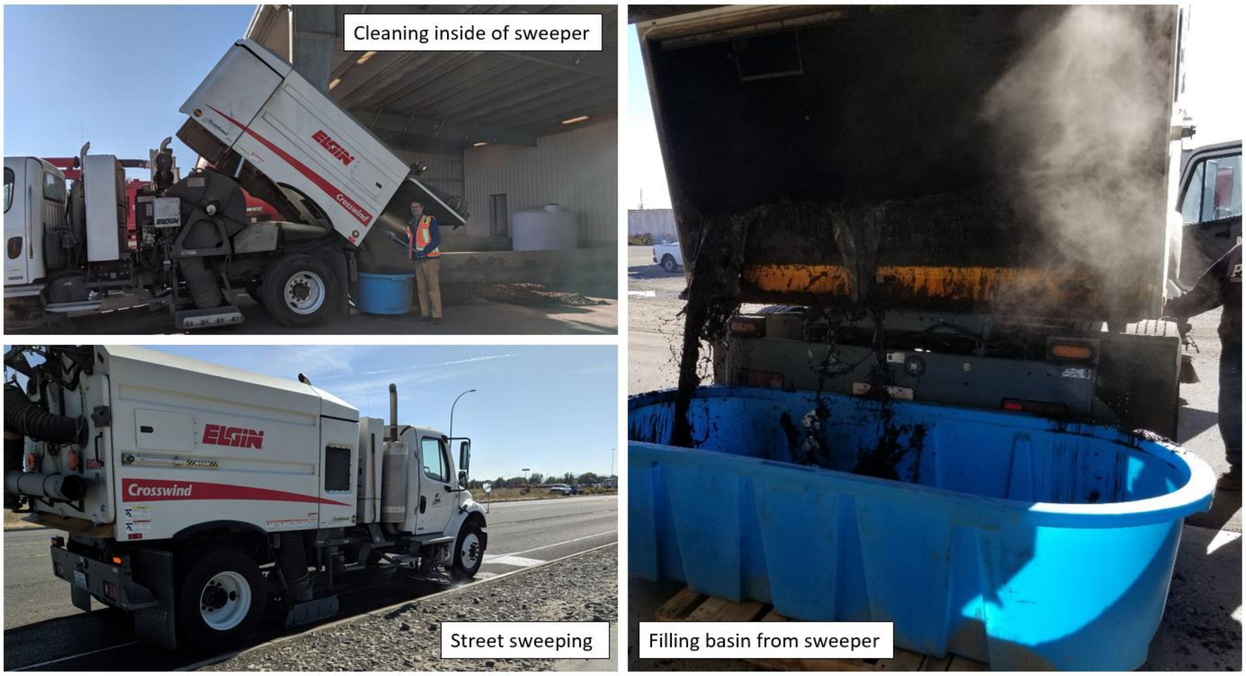

Figure 5.5 Roadway Sediment Accumulation Data Collection

5.5.5 Catch Basin Sock Sediment Dry Weight

Sediment washed out of the catch basins through the storm drainpipe was collected in a sock (a 1-micron filter bag) that was installed in a catch basin on the discharge end of the pipe in the swale. An example of the typical setup is illustrated in Figure 5.6. The QAPP contains detailed installation in Figure 7.8b and a copy of the sock cut-sheet is in Appendix G. The catch basin was retrofitted with 1-inch drain holes on the bottom of the catch basin to allow excess water to drain from the catch basin. Underneath the catch basin, existing soils were replaced with a 2-foot by 2-foot by 2-foot section of 3-inch to 1½-inch gravel infiltration trench. The trench provided additional storage for runoff discharging from the catch basin to reduce the amount of water in the catch basin, subsequently reducing the period that the sock is saturated. Sediment captured in the sock was collected every other month after the respective catch basin is cleaned (Figure 5.7). This included flushing the drainpipe of any residual sediment using the hose on the vactor truck. After excess water drained from the sock, the sock was collected and replaced with a new sock. The old sock was transferred to a sealable plastic container and submitted the lab to determine the sediment dry weight collected in each sock. The standard operating procedures for collecting sediment washout from catch basins is in Section 8.1.4 of the QAPP.

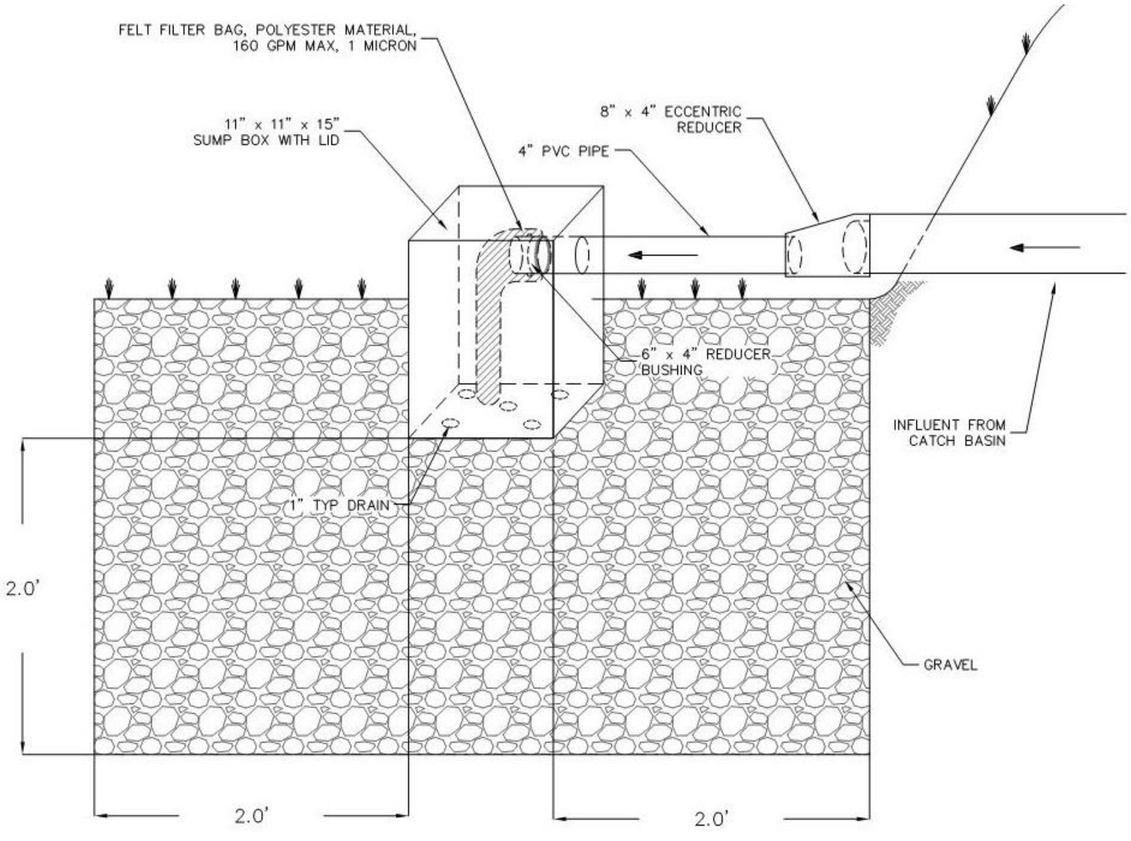

Figure 5.6 Typical Detail for Catch Basin Sock Installation

Figure 5.7 Catch Basin Socks: after 2 months use (left), uninstalled (middle), installed and new (right)

5.5.6 Street, Catch Basin, and Catch Basin Sock Sediment Particle Size Distribution

One to four times each year (see Table 5.2), samples of sediment collected from the roadway, catch basins, and catch basin socks were analyzed for organic content and particle size distribution. After the sediment was weighed, samples were collected and submitted to the lab for analysis. The QAPP includes standard operating procedures for collecting samples in Section 8.1.6 and laboratory testing methods and procedures in Section 9.0.

6.0 Data Quality Assessment

This section describes the assessment performed to review the quality of the data collected during the study. The purpose of the assessment was to determine whether measurement performance criteria (MPC) identified in the project QAPP were met for each of the six data quality indicators (DQIs). DQIs are qualitative and quantitative measures that characterize the aspects of quality data, and the DQIs for the project include bias, precision, representativeness, completeness, comparability, and sensitivity. MPCs are the acceptance criteria for the DQIs which specifies how good the data must be to meet the project objectives. Detailed definitions of each DQI and descriptions for each MPC are included in Section 6.0 of the project QAPP. This section describes the evaluation of each DQI with respect to the MPCs for the data collected during the study. An audit was conducted each year (Appendix M) to verify the study was conducted in conformance with the QAPP.

6.1 Bias

Bias is a systematic error that results in sample values that are consistently distorted in a particular direction from the "true" or known value (EPA, 2006; Erickson, 2013). Bias can result from improper data collection, poorly calibrated analytical or sampling equipment, or limitations and errors in analytical methods and techniques (Ecology, 2011).

DQI #1: Following the manufacturer's recommendations for equipment maintenance can reduce the potential of bias in the quantity of sediment collected.

> **MPC #1:** All equipment maintenance will be performed per the manufacturer recommendations and at the frequency recommended by the manufacturer.
>
> ***Assessment:*** *Routine maintenance and minor repairs were conducted on the vactor truck and sweeper during the study duration. Maintenance was conducted in accordance with manufacturer recommendations as verified from audits (Appendix M) of the maintenance records (Appendix N).*

DQI #2: Consistently following the SOPs for collecting samples and measuring data will minimize errors and reduce the potential of collecting biased data.

> **MPC #2:** The field crew will follow the SOPs defined in the project QAPP.
>
> ***Assessment:*** *Field audits were performed in June 2018 and August 2019 (Appendix M) to assess whether the field crew was following the SOPs. Results from the audits indicate that the field crew followed the SOPs (QAPP Section 5.2).*

DQI #3: The scale used to weigh sediment during the study will be calibrated per manufacturer's recommendations to reduce the potential for bias in the sediment weight data.

> **MPC #3:** The scale calibration will occur prior to the start of data collection for each year.
>
> ***Assessment:*** *The City rented the scale from the vendor during the study. The vendor would deliver in the scale in April to the decant facility and pick the scale up in October. Once*

the scale was delivered, the vendor would calibrate the scale as part of the contract with the City.

6.2 Precision

Precision is a measure of agreement among repeated measurements of the same property taken under identical or substantially similar conditions (EPA, 2006; Erickson, 2013; EPA, 2002). Data is considered precise when the measured values are consistently the same and imprecise when the measured values are consistently different (Erickson, 2013). Random error is a common cause of imprecise data and is always present because of normal variability in the many factors that affect measurement results. For example, variability in sampling or data collection procedures and/or variations of the actual concentrations in the media being sampled (Ecology, 2011).

DQI #1: Developing and consistently following the SOPs for collecting samples and measuring data will reduce the potential of collecting imprecise data.

> **MPC #1:** The field crew will follow the SOPs in the project QAPP.
>
> ***Assessment:*** *Field audits were performed in June 2018 and August 2019 (Appendix M) to assess whether the field crew was following the SOPs. The results of the audits indicate that the field crew consistently followed the SOPs (QAPP Section 5.2).*

DQI #2: Incorrectly reading instruments (e.g., survey rod) when measuring the sediment depth could result in the collection of imprecise data.

> **MPC #2:** When the first catch basin depth is measured, the depth will be measured by two different data collectors with the same instrument. The results of the two data collectors should be consistent, or measurement procedures should be corrected until they are the consistent.
>
> ***Assessment:*** *During the first sample collection event (April 2018), two members of the field staff measured the sediment depth (duplicate measurements) in a catch basin in five different locations. Initially the duplicate measurements were inconsistent. The field staff reviewed the SOPs for measuring sediment depth and repeated the measurements. The second duplicate measurements were within a hundredth of a foot. The survey rod used to measure depth has 100th gradations and is considered accurate to within a 100th of a foot (±0.05 feet) as such the duplicate measurements are considered consistent.*

DQI #3: Duplicate analytical testing will be performed for parameters shown in Table 9.2 to verify the quality of the results.

> **MPC #2:** If the results of the duplicate testing indicate that the relative percent difference (RPD) is ≤20%, the results of the analytical testing will be considered acceptable.
>
> ***Assessment:*** *RPD calculations were performed on the data collected with duplicate and/or triplicate measurements. The following identifies the data and provides a summary of the RPD results. Appendix O contains the detailed results from the RPD analysis.*

- **Street and Catch Basin Sediment Moisture Content and Organic Matter** – Triplicate moisture content and organic matter samples were collected from each sample location (test and control sites for both street sediment and catch basin sediment). Moisture content samples were collected from each sample event and organic matter samples were collected between one to three times per year (reference Table 5.2 footnotes). The RPD for most of these measurements was greater than 20%. Results from the audit along with follow up discussion with the field crew indicate the sample collection SOPs were followed as such it is assumed that improper sample collection was not the reason for these results. Another reason may be related to the sediment characteristics which are known to influence both the moisture and organic matter content measured in samples. The characteristics of sediment on streets and in catch basin is known to be highly variable which may influence the results of these tests (USGS, 2007; Pitt, et. al., 1984; Tang, 2016). In addition, for the study location hay is known to make up a portion of the sediment composition. Considering hay can retain water, samples with a higher fraction of hay will likely have a higher moisture and organic matter content compared to samples with less hay. The RPD analysis was repeated using the three calculated dry weights for each sample event for each sample location to determine how the variance in the moisture content may influence the dry sediment weight. The RPD was less than 20% for all samples. Based on this calculation the RPD is considered acceptable.
- **Catch Basin Sock Sediment Dry Weight** – The RPD was calculated based on the duplicate measurements of the sediment dry weight after the socks were dried. Two of the sock sediment weights exceeded 20% as such they were removed from the analysis to calculate the average dry sediment weight for the data collection event.

6.3 Representativeness

DQI #1: The study operational procedures are consistent with the jurisdiction’s typical operational procedures.

> **MPC #1:** The SOPs were developed to mimic the jurisdiction’s typical operational procedures. Data will be considered acceptable if the equipment operators are consistently following the SOPs in the project QAPP.
>
> ***Assessment:*** *Field audits were performed in June 2018 and August 2019 (Appendix M) to assess whether the field crew was performing data collection in accordance with the SOPs (QAPP Section 5.2). The results of the audits indicate that the field crew was following the SOPs and therefore was mimicking typical operational procedures for the jurisdiction.*

DQI #2: Inclement weather or unusual weather could provide study results that are not representative of typical weather conditions in Ellensburg.

> **MPC #2:** The weather during the study will be considered representative if the historical weather data is similar to the data collected at the weather station.
>
> ***Assessment:*** *Weather data was collected for the duration of the study and compared to historical weather data for Ellensburg (Section 7.3). During the study, several intense rainfall events occurred which may have affected results from specific data collection events. However, it is not possible to determine if these single events were unique compared*

to historical records because most available records only include daily and monthly precipitation depths. As such an intense storm that occurred over an hour may not appear high, when compared to daily or monthly historical averages. In addition, short duration high intensity rainfall events are common for the project location (Ecology, 2019). The average precipitation for Ellensburg is 9-inches and during the study the measured precipitation was lower at 7.09-inches and 7.32-inches in 2018 and 2019 respectively. Considering stormwater runoff quantity and flow rates are known to influence sediment transport to catch basins (Tang, 2016), the sediment collected from the catch basins during the study maybe slightly lower compared to an average year.

DQI #3: Developing SOPs and following them consistently will support the representativeness of the collected samples.

MPC #3: Data will be considered acceptable if the field crew is consistently following the SOPs in the project QAPP.

Assessment: *Field audits were performed in June 2018 and August 2019 (Appendix M) to assess whether the field crew was following the SOPs. Results from the audits indicate that the field crew followed the SOPs (QAPP Section 5.2).*

6.4 Completeness

DQI #1: The sample size selected for the study is expected to provide a sufficient amount of data to support conclusions.

MPC #1: The data set is considered complete when the number of valid samples collected is equal to the sample size defined by the DQI.

Assessment: *The number of samples proposed at the beginning of the study were obtained between April 2018 and April 2020. Catch basin material depth, catch basin and street sweeping material dry weights, organic content, and particle size distribution samples were collected as defined in the QAPP during the 6-month data collection periods in 2018 and 2019. The exception was two data collection events when triplicate samples were intended to be collected to measure the moisture content and organic matter and instead the lab combined to three samples before running the test. The catch basin socks collected in April 2019 were lost in a lab fire (see Table 5.2); to replace the lost data catch basin socks were installed in October 2019 and collected in April 2020.*

DQI #2: Procedures are defined for handling missing data, coding of missing data, and reporting of missing data with results.

MPC #2: Procedures for handling missing data and coding missing data are defined in Section 11.0 of the project QAPP. The TER will include consideration for how missing data could limit the comparability of the data set.

Assessment: *The only missing data was from two data collection events when triplicate samples were intended to be collected to measure the moisture content and organic matter and instead the lab combined to three samples before running the test. Considering the* *triplicate samples were combined before testing these samples were considered acceptable an included in the data set.*

6.5 Comparability

DQI #1: Define the process and provide justification for selecting the test site and control site.

MPC #1: The process for selecting the study area is defined in Section 7.2 of the project QAPP. The process focused on having a test site and control site that are equivalent.

Assessment: *Selection of the test and control sites are discussed in the project QAPP. With respect to comparing this site to other sites in Ellensburg or other locations, it will be important to consider specific site conditions that can vary by location. These conditions are detailed in Section 7.5.*

DQI #2: Consistently following SOPs for sample collection and field measurements will improve the comparability of the data within the study.

MPC #2: Data will be considered acceptable if the field crew is consistently following the SOPs in the project QAPP.

Assessment: *Field audits were performed in June 2018 and August 2019 (Appendix M) to assess whether the field crew was following the SOPs. Results from the audits indicate that the field crew followed the SOPs (QAPP Section 5.2).*

DQI #3: Defining and using standard testing methods will improve comparability of analytical data collected.

MPC #3: Data will be considered acceptable if it follows standard test methods. Standard testing methods are defined for the project in Table 9.2 of the project QAPP.

Assessment: *Standard testing methods (and the same methods) were consistently used by the analytical laboratories to test moisture content, particle size distribution, organic content, and the catch basin sock sediment dry weight.*

6.6 Sensitivity

DQI #1: Instruments capable of accurately measuring the variables of interest during the study should be used.

MPC #1: Data will be considered acceptable if instruments used are capable of measuring the different levels expected during the study.

Assessment: *The instruments used in this study (scale, survey rod, weather station, and standard analytical testing methods) are capable of measuring the different levels expected during the study.*

7.0 Results and Discussion

The goal of this study was achieved by completing the objectives outlined in Section 3.4. Each objective is noted in the subsequent section along with a summary of how the objective was achieved, the results, and discussion. The QAPP Table 9.2 defines the Standard Testing Methods for parameters tested at a laboratory and a detailed summary of the data analysis methods is in Section 14.0.

7.1 Sediment Characterization

Objective 1: Characterize the sediment collected (particle size distribution and organic content) from each sample location: on the street, in catch basins, and transferred from the catch basin (washout) at both the test site and control site.

Objective 1 was achieved by testing the particle size distribution (PSD) and organic content of sediment collected from each sample location. Results for PSD testing are first described in this section followed by the results for organic content. Appendix F and G contains the detailed results.

7.1.1 Sediment Particle Size Distribution

The sediment PSD was measured to determine the range of particle size at each sample location. Specifically, the range of particle size collected by the street sweeper, retained in catch basins, and washed out of the catch basins into the socks. Figure 7.1 and Table 7.1 provides a summary of the results from each sample location including the average PSD from the north and south side of the road, the overall average PSD (north and south combined), and the median sediment diameter (d50) of the overall average PSD. A summary of the number of samples collected each year is as follows:

- Street Sediment (SS) – sediment collected by the street sweeper was tested once each year (2018 and 2019) from the north side of the road (n=2) and the south side of the road (n=2).
- Catch Basin (CB) – sediment in the catch basins, collected by the vactor truck, was tested three times during the first year of the study (2018) and four time during the second year (2019). Sediment collected from all the north side catch basins was combined and tested (n=7) and sediment from all the south side catch basins was combined and tested (n=7).
- Catch Basin Socks (CBS) – sediment that washed out of the catch basins and into the socks was tested once the first year (2018), twice the second year (2019), and once in April 2020 (reference Table 5.2 footnote 7). Sediment collected from all the north side catch basin socks was combined and tested (n=4) and sediment from all the south side catch basins was combined and tested (n=4).

As shown in Figure 7.1 the largest sediment was collected from the street (d50=2.0mm) followed by the sediment collected in the catch basins (d50=0.8mm) with the smallest sediment washed from the catch basin into the socks (d50=0.05mm). Based on the d50 measurements, the sediment is classified as very fine gravel to very coarse sand (Street Sediment), coarse sand (catch basins), and silt (catch basins socks). These results are consistent with other studies which suggest that street sweepers are more efficient for picking up the larger size sediment while smaller sediment (d50<0.10mm) can washout of catch basins (Elgin, 2009; Tang, 2016; Rockford et. al., 2009).

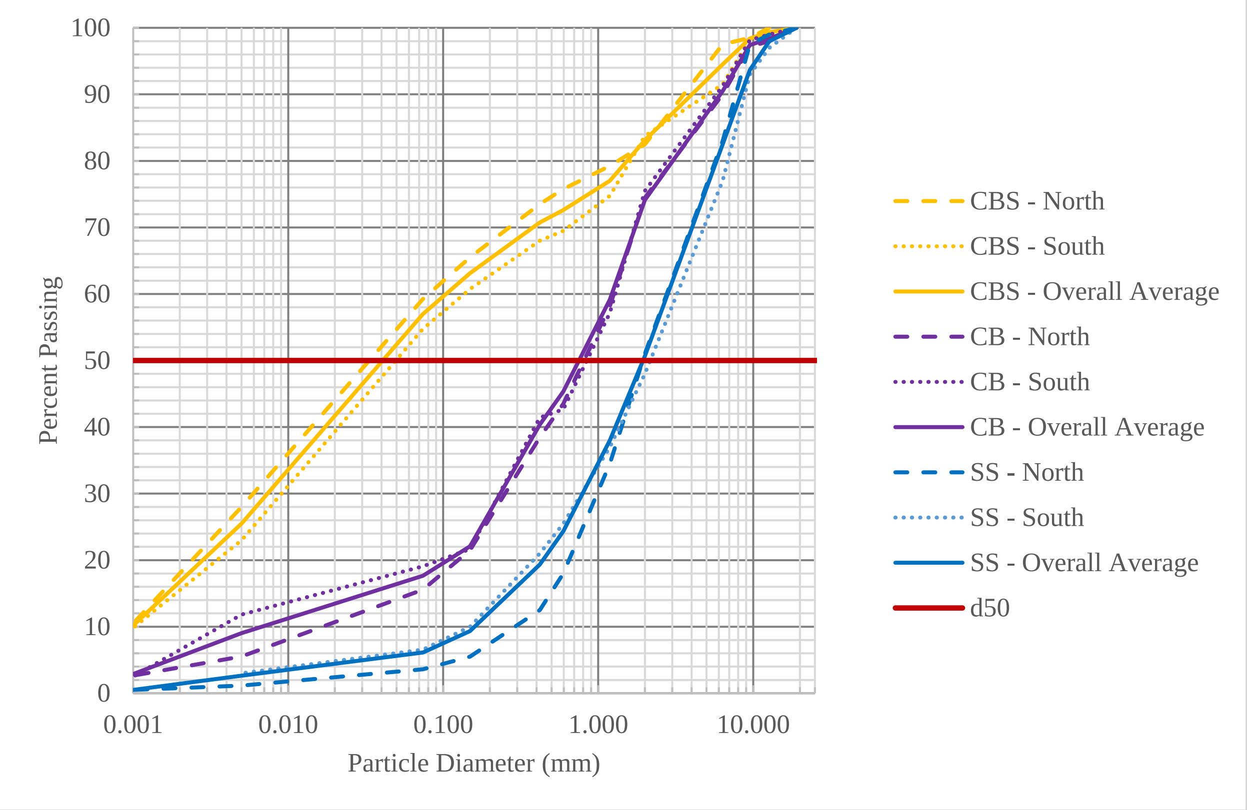

Figure 7.1 Semi Log Graph of Average Sediment PSD

Table 7.1. Summary of Average Sediment PSD by Sieve Size

Sieve Size	**Particle Size (mm)**	**Averages (%)**		
		CB n=14	**SS n=4**	**CBS n=8**
1"	25.400			
3/4"	19.000	100.0	100.0	100.0
1/2"	12.700	98.4	98.0	99.3
3/8"	9.510	97.4	93.7	98.4
1/4"	6.350	90.5	82.5	94.5
#10	2.000	74.1	50.7	83.1
#16	1.190	59.2	38.0	77.0
#30	0.595	45.3	24.3	72.6
#40	0.420	40.4	19.3	70.8
#100	0.149	22.1	9.3	63.1
#200	0.074	17.7	6.1	57.0
0.005mm	0.005	9.0	2.7	25.5
0.001mm	0.001	2.9	0.5	10.2
	d50 (mm)	0.8	2.0	0.05

7.1.2 Sediment Organic Content

The amount of organic content in sediment was measured as total volatile solids (TVS) in the street sediments, catch basins, and catch basin socks. Samples were collected from the street sediment on the north side (n=6) and the south side (n=3), the catch basin sediment collected on the north side (n=11) and the south side (n=11), and from the catch basin socks on the north side (n=1) and the south side (n=1). For each sample event, triplicate samples were tested except for the two sample events when triplicate samples were combined before testing and only one sample was tested (reference Section 6 for more details) and only single samples were collected from the socks due to insufficient sample size to run additional testing.

Results from the TVS testing are summarized in Figure 7.2 and Table 7.2. The organic matter in the catch basins on the south side of the road was 22.0% compared to 18.0% on the north side of the road (combined average of 20.0%). One reason the TVS was slightly higher on the south side of the road is this side is developed with landscaped strips of that are grassed areas adjacent to the road that are frequently mowed by the property owners. It is possible that grass clipping fall onto the road and into the catch basins. The north side of the road has the same landscape strip however this side is undeveloped, and the landscape areas are not maintained. The highest catch basin organic content was measured in October (Table 7.2) which could be due to an increase in hay on the roads as September and October are the primary months for hauling. However, there is insufficient data to draw meaningful conclusions regarding the seasons on the organic content variability.

The TVS of sediment in the catch basins was approximately four times higher than the sediment collected from the street (combined average of 5.2%). This may be due to the hay that builds up on the road and is washed into the catch basins during rainfall events (Figure 3.3). The organic content was highest in the socks (26.0%) however these results are from a small sample size (n=2) and collected from a single sample event (April 2020). Considering the small sample size (n=2) and that the samples were collected from a single sample event (October 2019) it is not possible to draw meaningful conclusions about the catch basin washout organic content.

Organic content results from this study were compared to other studies to assess the comparability of the results to other locations (land use). Few studies were located that reported the organic content of sediment found in streets or catch basins as a function of land use. Two studies that were located were from a Seattle Public Utilities (SPU) study that was similar to this study (SPU, 2009) and a Center for Watershed Protection (CWP) literature review that estimated pollutant removal rates for Street Sweeping and Storm Drain Cleanout Activities (CWP, 2006). Results from these studies and along with this study are summarized in Table 7.3. The street sediment organic content from this study (3.6-6.8%) was about half the content from the SPU industrial sites (9.5%) and three times lower than the residential sites (14%). The CWP study did not report organic content for street sediment. The catch basin sediment organic content from this study (9-31%) was closest to SPU residential sites (17-18%) and within the low end of the industrial sites (28-40%). The CWP catch basins sediment organic content was significantly higher reporting 59% for industrial sites. Compared to the CWP study, the catch basin sediment organic content from this study was within the range for commercial sites (28%) and slightly lower than residential sites (32%). Based on the range of reported data and limited studies reporting TVS or organic content based on land use, it is difficult to assess how the organic content measured during this study compares to other sites based on land uses. In addition, no studies were found that reported the sediment organic content that washes out of catch basins.

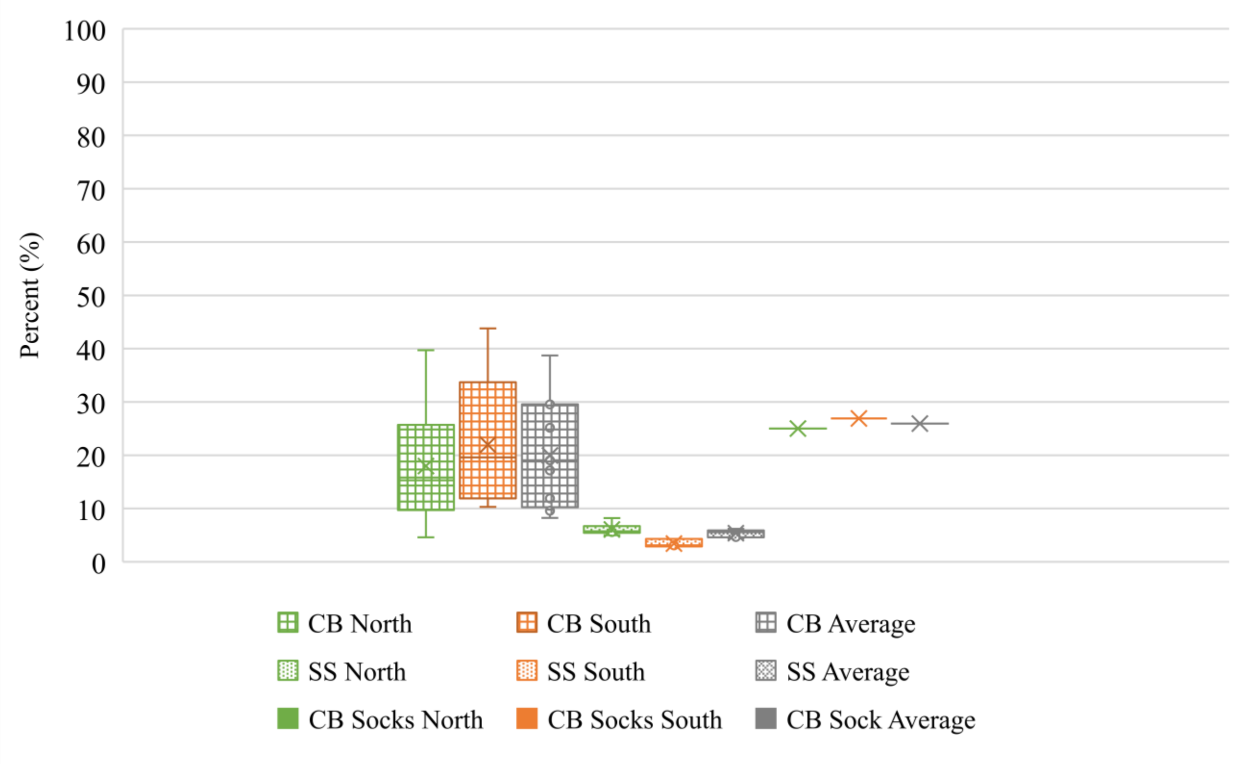

Figure 7.2 Distribution of Organic Content in Catch Basin, Street Sediment, and Catch Basin Socks

Table 7.2 Summary of Sediment Average Percent Organic Matter from Each Sample Event and Location

Sample Date	**CB North n=11**	**CB South n=11**	**SS North n=6**	**SS South n=3**	**CB Socks North n=1**	**CB Socks South n=1**
4/18/2018	15.3	43.8	-	-	-	-
8/18/2018	29.3	24.7	5.9	-	-	-
4/1/2019	34.2	40.0	-	-	-	-
8/1/2019	10.4	37.4	-	-	-	-
10/1/2019	48.9	56.0	6.3	3.4	-	-
4/24/2020	-	-	-	-	25.0	26.9
Average	18.0	22.0	6.1	3.4	25.0	26.9
Overall Average	20.0		5.2		26.0	
Std Deviation	11.0		1.6		1.3	

Table 7.3. Comparison of Sediment Organic Content (%) Based on Land Use

Sediment Collection Location	**City of Ellensburg Study**	**Seattle Public Utilities** (SPU, 2009)		**Center for Watershed Protection** (CWP, 2006)		
Land Use	*Light Industrial*	*Residential*	*Industrial*	*Residential*	*Commercial*	*Industrial*
Street	5.2% (3.6-6.8%)[1]	14%	9.5%	-	-	-
Catch Basin	20% (9-31%)[1]	17-18%	28-40%	32%	28%	59%
Catch Basin Washout	26% (24.7-27.3%)[1]	-	-	-	-	-

1. Includes range from standard deviation reported in Table 7.2

7.2 Sediment Accumulation Rate

Objective 2: Quantify the accumulation rate of sediment on the street, in catch basins, and in catch basin socks, without employing street sweeping (control site) and while employing (test site) street sweeping.

Objective 2 was achieved by calculating the sediment accumulation rate on the street, in the catch basins, and in the catch basin socks. The analysis included calculating the sediment dry weight (lbs) using the sediment wet weight (lbs) and moisture content (%) using Equations 1 and 3 from Section 14 of the QAPP. For each sample event, triplicate samples of dewatered sediment were collected and tested for moisture content (except for the two sample events when triplicate samples were combined before testing and only one sample was tested). The sediment accumulation rate was calculated from the total sediment dry weight collected since the last street sweep divided by the number of days since the last sweep. The accumulation rate was normalized to account for slight differences in the contributing basin areas to each catch basin and areas swept (Table 3.2) as well as differences in the duration between street sweeping (sample collection events) area using Equation 3 or 4 from the QAPP Section 14. The results are reported as grams/curb-mile/day for street sediment and grams/catch basin/day for catch basin and washout sediment. Results from each sample locations are summarized in the subsequent sections and detailed results are in Appendix H, I, and K.

7.2.1 Street Sweeping Sediment

The dry weights were calculated for the test side (n=8) and the control side (n=3). The average moisture content and sediment dry weight are reported for each sample event in Table 7.4 and Figure 7.3 provides a comparison of the dry weight calculated from 2018 and 2019. The first sample event occurred in April 2018, six months after both the test and control sides of the street were swept. The test side was swept four times each year (April, June, July, and August) whereas the control side was swept twice in 2018 (April and October) and once in 2019 (October). On the test side the dry weight was highest in April (six months since last sweep) and then the weight had a downward (decreasing) trend for the remaining sweep events that occurred every other month. On the control side, the dry weight was higher compared to the test side for all three events. For the October 2018 and 2019 events the frequency of street sweeping was longer (six and twelve months) compared to the test side (two months). These results consistent with other research which indicates that more frequency street sweeping reduces the quantity of sediment collected on roads (Rochfort, Q., et al., 2009).

Table 7.5 provides a summary of the average dry sediment weight collected each year from the test side and control side. As noted, the total weight of sediment collected was higher (4,648 lbs) from the control side compared to the test side (3,677 lbs) and higher on the south side (4,775 lbs) compared to the north side (3,550 lbs). This maybe because the wind primarily blows from the north west to the south east and is depositing more sediment on the south side of the road (Figure 3.1). In addition, the south side of the road is developed, and more vehicles use the driveway approaches compared to the undeveloped north side. Vehicles are known to contribute to sediment accumulation on streets from tire wear, pavement abrasion, engine break wear, etc. (Minton, 2011).

Table 7.4 Street Sediment Dry Weight Collected During Each Collection Event

Data Collection Event	Side of Road	Average Moisture Content (%)[1]	Moisture Content Standard Deviation	Sediment Dry Weight (lbs)[2]
April 2018	Test	21.5	NA[3]	1,450
	Control	19.5	NA[3]	2,358
June 2018	Test	5.8	0.6	155
August 2018	Test	15.8	0.5	134
October 2018	Test	19.2	5.6	111
	Control	10.6	4.3	590
April 2019	Test	15.5	1.7	1,226
June 2019	Test	12.6	10.4	170
August 2019	Test	9.9	2.6	146
October 2019	Test	4.1	0.1	284
	Control	19.5	3.4	1,700

1. Average moisture content was calculated using Equation 1 from the QAPP for the study.
2. Sediment dry weight was calculated using Equation 2 from the QAPP for the study.
3. Analytical report included only composite moisture content values for the April 2018 data collection event.

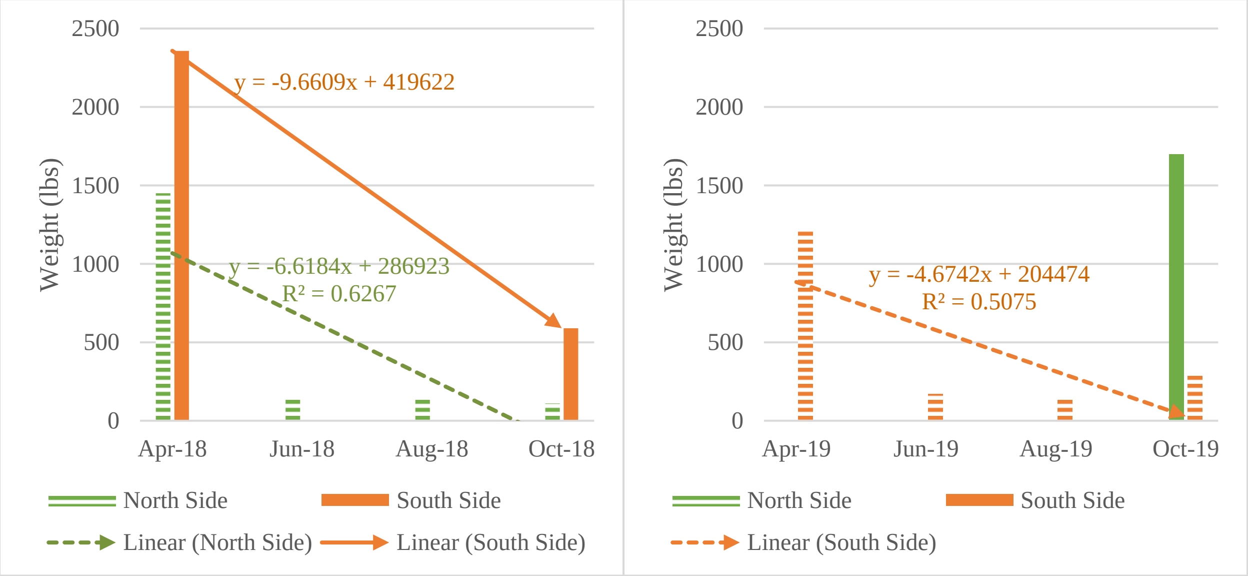

Figure 7.3 Comparison of Street Sediment Dry Weight Collecting during 2018 (left) and 2019 (right)
Note: Hatched bars indicate test side and solid bars indicate control side.

Table 7.5 Summary of Dry Sediment Weight Collected

Side of Road	2018 (lbs)	2019 (lbs)	Total (lbs)
Test	1,850	1,827	3,677
Control	2,948	1,700	4,648
North	1,850	1,700	3,550
South	2,948	1,827	4,775

The normalized accumulation rate was calculated for the same sample events as the dry weight. These results are summarized in Table 7.6 and Figure 7.4 provides a comparison of the accumulation rate from 2018 and 2019. Similar to the dry weights, the accumulation rates from the test side were highest in April, six months after the last sweep, and then the accumulation rate had a downward trend for the remaining sweep events. The control side (south) had a similar trend for 2018 however for 2019 the accumulation rate for the control side (north side) was similar to the test side despite 12 months since the last sweep compared to 2 months on the test side. These results were not as expected since the frequency of street sweeping is known to reduce the accumulation rate of sediment on roads (Rochfort, Q., et al., 2009). However, the average normalized accumulation rate over the entire study (Table 7.7) was lower on the test side (2,289 g/curb-mile/day) where sweeping occurred eight times during the study compared to the control side (4045 g/curb-mile/day) where sweeping occurred three times over the study. which was expected. These average rates are more consistent with the expected results.

Table 7.6 Street Sediment Normalized Accumulation Rate Since Last Sweep

Data Collection Event	Side of Road	Rate of Accumulation (g/d)	Normalized Accumulation Rate (g/lineal mi/d)
April 2018	Test	3,355	4,389
	Control	5,457	7,460
June 2018	Test	1,172	1,534
August 2018	Test	938	1,227
October 2018	Test	811	1,061
	Control	1,431	1,956
April 2019	Test	3,040	4,156
June 2019	Test	1,289	1,762
August 2019	Test	1,016	1,389
October 2019	Test	2,047	2,799
	Control	2,079	2,719

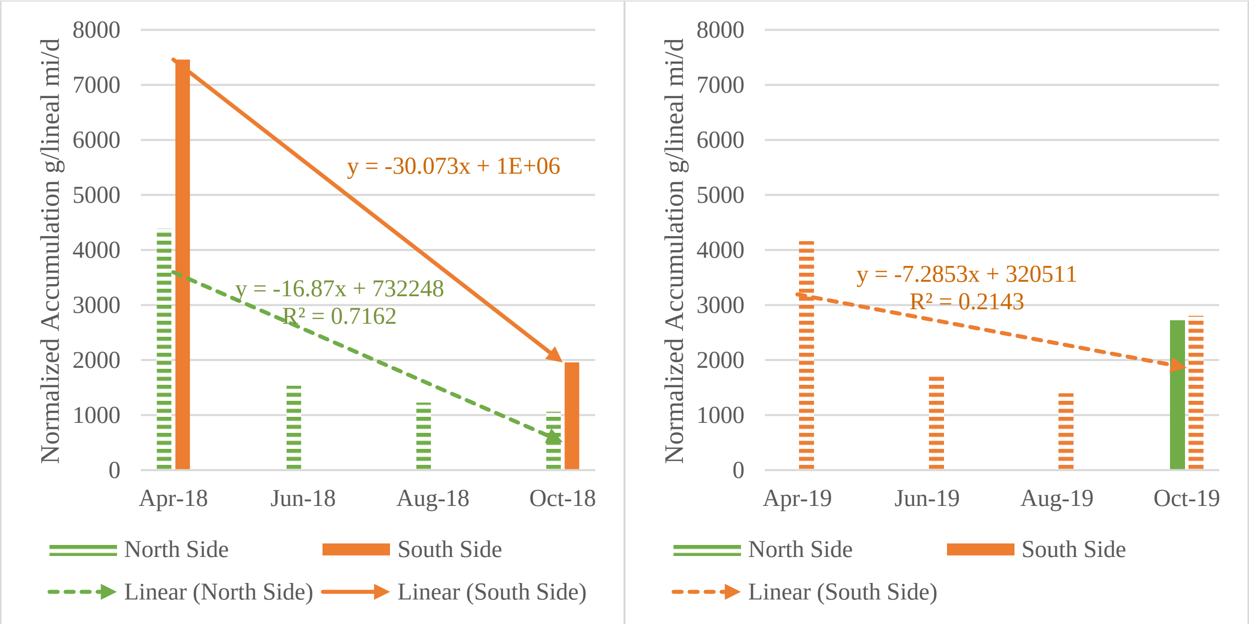

Figure 7.4 Comparison of Normalized Street Sediment Accumulation Rate from 2018 (left) and 2019 (right)
Note: Hatched bars indicate test side and solid bars indicate control side.

Table 7.7 Street Sediment Average Normalized Accumulation Rate Since Last Sweep Over Study Duration

Side of Road	Average Rate of Accumulation (grams/day)	Average Normalized Accumulation (grams/curb-mile/day)
Test	1708.5	2289.5
Control	2988.8	4045.0

7.2.2 Catch Basin Sediment Weight

The dry weight of sediment collected in catch basins was calculated for the test side (n=8) and the control side (n=8) from samples collected in both 2018 and 2019. The average moisture content and sediment dry weight are reported for each sample event in Table 7.7 and Figure 7.5 provides a comparison of the dry weight calculated from 2018 and 2019. The first sample event occurred each year in April approximately six months following the last sweep and then every two months thereafter until October. For both years, the dry weight on the test side and control side was generally highest in April and then the weight had a downward (decreasing) trend for the remaining sweep events. This was expected since the first sample collection event occurred after six months of accumulation and the other events occurred after only two months of accumulation. Table 7.9 summarizes the total sediment weight collected from the test side (466 lbs) which was higher than the control side (370 lbs) as well as the total sediment weight from the north (383 lbs) and the south (453 lbs). These results are similar to the street sediment in that there is more sediment on the south side compared to the north however unlike the street sediment there was more sediment in the catch basins on the test side compared to the control side.

There are several possible reasons for these results. A property owner on the south side (test side) was observed sweeping sediment into the catch basins during March of year two. The City approached the property owner and the owner agreed to stop. During that discussion, the owner indicated he had purchased the business since October 2018 (last sweep) and was not aware of the study. The length of road swept by the property owner plus a portion of their shared driveway was estimated to be approximately 550 feet (Figure 7.6). Another reason is that the there was more sediment on the south side of the road as described in Section 7.2.1.

Table 7.7 Catch Basin Sediment Dry Weight Collected During Each Collection Event

Data Collection Event	Side of Road	Average Moisture Content (%)	Standard Deviation	Sediment Dry Weight (lbs)
April 2018	Test	27.8	NA[3]	151
	Control	22.2	NA[3]	131
June 2018	Test	25.9	4.8	27.0
	Control	36.3	11.6	37.0
August 2018	Test	54.4	8.1	18.3
	Control	48.9	11.7	27.7
October 2018	Test	42.7	4.5	51.0
	Control	57.0	8.3	38.2
April 2019	Test	41.8	5.0	88.1
	Control	37.5	7.2	50.2
June 2019	Test	37.8	2.4	55.9
	Control	2.6	0.7	21.5
August 2019	Test	37.4	5.6	42.9
	Control	10.4	6.1	48.0
October 2019	Test	56.0	6.9	32.1
	Control	48.9	7.2	16.1

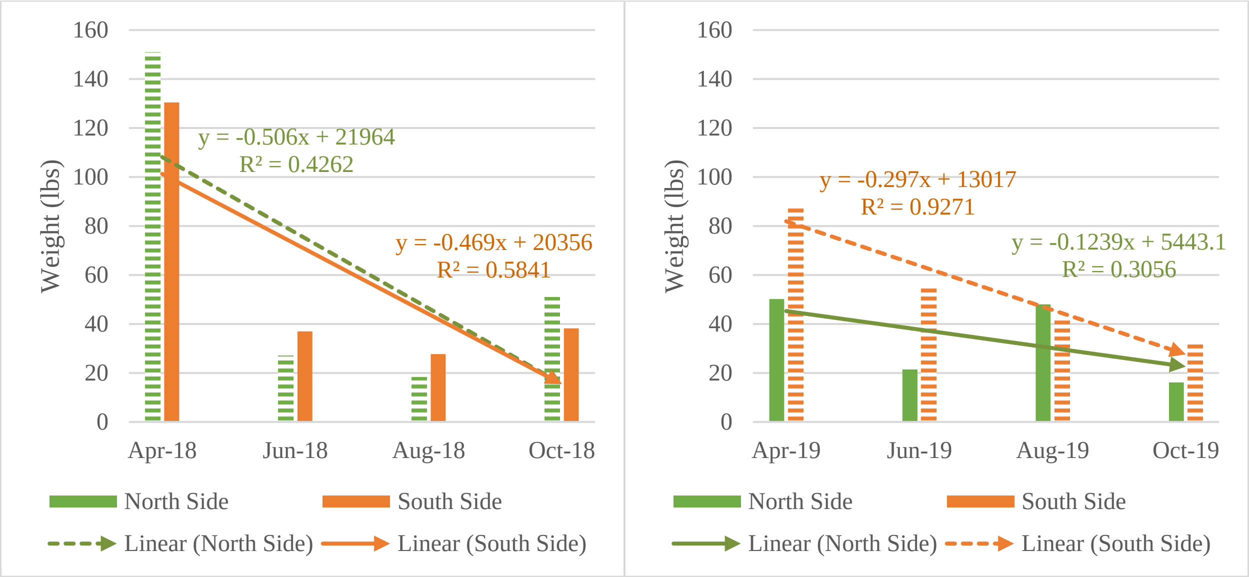

Figure 7.5 Comparison of Catch Basin Sediment Dry Weight Collecting during 2018 (left) and 2019 (right)
Note: Hatched bars indicate test side and solid bars indicate control side.

Figure 7.6 Approximate Location of Street Swept by Property Owner

The normalized accumulation rate was calculated for the same sample events as the dry weight. These results are summarized in Table 7.8 and Figure 7.8 provides a comparison of the accumulation rate from 2018 and 2019. The accumulation rates for both the test side (2018 and 2019) and control side (2018) had a downward trend starting in April and ending in October each year. Whereas the control side during year two (2019) had an increasing trend. For the side of the road where more frequent sweeping is occurring it is anticipated that there would be a decreasing trend in the accumulation rate similar to the test side results. Conversely for the side of the road less frequent sweeping occurring it is anticipated that there would be an increasing trend in the accumulation rate similar to the control side results from 2019. The test side accumulation rate (2018) was highest in April (six months after the last sweep) and October (two months since last sweep). These results were expected for April but not October since theoretically the shorter the duration between street sweeping events the less sediment on the road that could be transferred to the catch basins. During year two (2019) the sediment accumulation rate was higher on the test side (south side) compared to the control side despite the more frequent street sweeping. One reason for these results is that there was more sediment on the south side of the road as described in Section 7.2.1.

Table 7.9 summarized the average normalized accumulation rate over the duration of the study including the average from the test side (north side in 2018 and south side in 2019) and the control side (south side for 2018 and north side for 2019). As noted, the accumulation rate was higher on the test side (16 g/CB/d) compared to the control side (11.7 g/CB/d). These results are the opposite of what was expected since more frequent street sweeping is known to reduce the accumulation rate of sediment on the streets and in theory the sediment that could be transferred to catch basins. SPU conducted a similar study and reported similar results.

Table 7.8 Catch Basin Sediment Accumulation Rate Since Last Collection Event

Data Collection Event	Side of Road	Since last street sweep		Since last CB cleaning	
		Accumulation Rate (g/d)	Normalized Accumulation Rate (g/CB/d)	Accumulation Rate (g/d)	Normalized Accumulation Rate (g/CB/d)
April 2018	Test	349	22.1	349	22.1
	Control	302	15.8	302	15.8
June 2018	Test	204	12.9	204	12.9
	Control	279	14.6	279	14.6
August 2018	Test	128	8.1	128	8.1
	Control	235	12.2	194	10.1
October 2018	Test	373	23.6	373	23.6
	Control	250	13.0	280	14.6
April 2019	Test	218	11.4	218	13.8
	Control	124	7.9	124	6.5
June 2019	Test	422	22.0	422	26.7
	Control	134	8.5	162	8.5
August 2019	Test	300	15.6	300	19.0
	Control	176	11.1	335	17.5
October 2019	Test	231	12.0	231	14.6
	Control	166	10.5	116	6.1

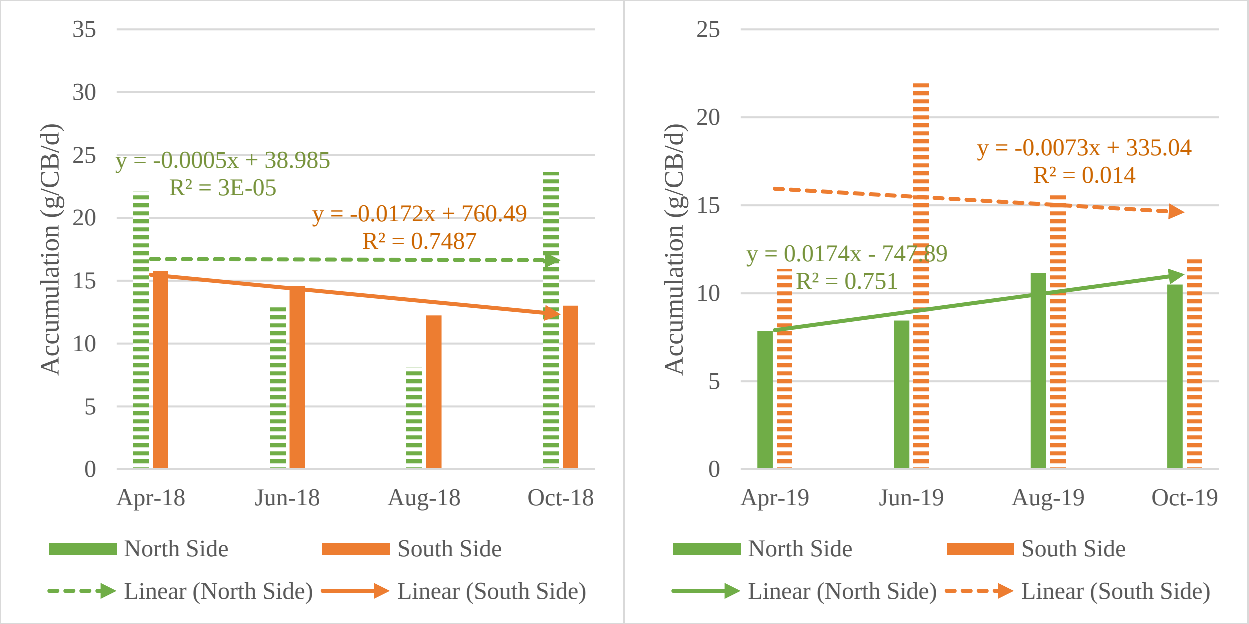

Figure 7.8 Comparison of Catch Basin Normalized Accumulation Rate During 2018 (left) and 2019 (right)
Note: Hatched bars indicate test side and solid bars indicate control side.

Table 7.9 Catch Basin Sediment Average Dry Weight and Normalized Accumulation Rate Over Study

Side of Road	Sediment Weight			Since last sweep	
	Total (lbs)	2018 (lbs)	2019 (lbs)	Average Rate of Accumulation (g/d)	Average Normalized Accumulation g/CB/d
Test	466	247	219	278	16
Control	370	234	136	208	12
North	383	247	136	207	13
South	453	234	219	280	15

7.2.3 Catch Basin Sediment Depth

The average depth of sediment accumulated in catch basins was measured for the test side (n=32) and the control side (n=32) prior to cleaning the catch basins in both 2018 and 2019. The average depth of sediment and standard deviation for each sample event is summarized in Table 7.10 and Figure 7.9 provides a comparison of the depths for 2018 and 2019. The first measurements occurred in April and then every other month thereafter until October each year. For both years, the sediment depth on the test side and control side was highest in April and then the depth had a downward (decreasing) trend for the remaining sample events. This was expected since the first sample collection event occurred after six months of accumulation and the other events occurred after only two months of accumulation. The first test side (south) depth measurement in 2019 was more than double the control side (north) despite both sides being sweep in October 2018. This maybe because of the property owner was sweeping sediment into the catch basins (Section 7.2.2).

Table 7.10 Catch Basin Sediment Depth Recorded During Each Collection Event

Data Collection Event	Side of Road	Average Depth of Sediment (in.)	Standard Deviation
April 2018	Test	3.20	0.06
	Control	3.18	0.11
June 2018	Test	0.94	0.05
	Control	1.11	0.11
August 2018	Test	0.73	0.04
	Control	0.38	0.08
October 2018	Test	0.54	0.03
	Control	0.55	0.06
April 2019	Test	3.30	0.10
	Control	1.41	0.05
June 2019	Test	0.58	0.06
	Control	0.12	0.03
August 2019	Test	0.64	0.07
	Control	0.88	0.05
October 2019	Test	0.55	0.07
	Control	0.23	0.03

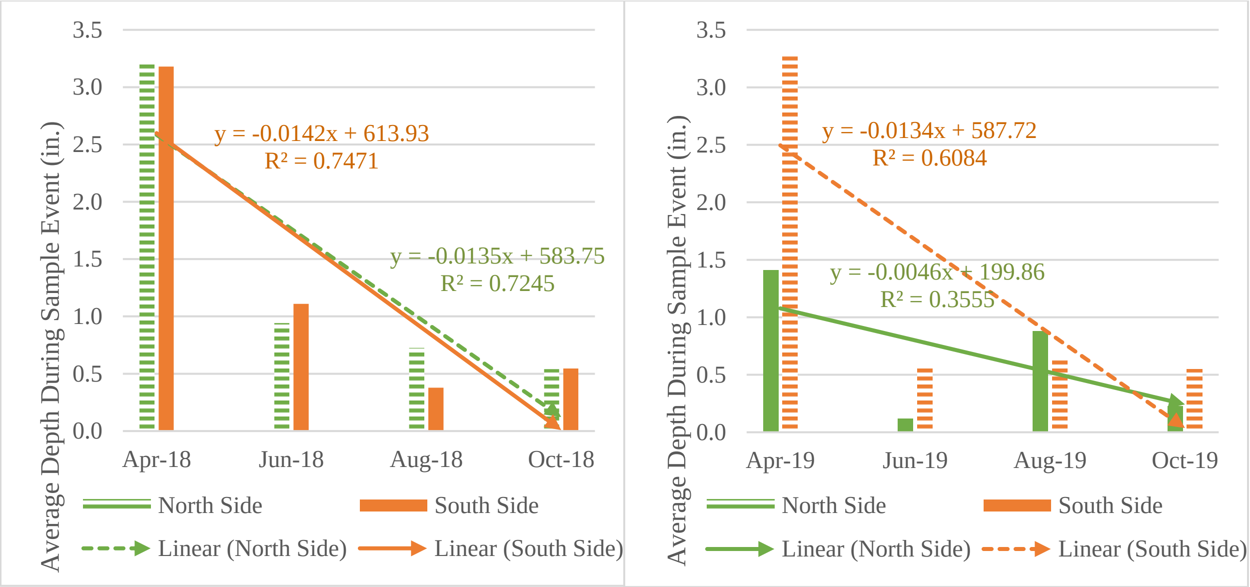

Figure 7.9 Comparison of Catch Basin Sediment Depth During 2018 (left) and 2019 (right)
Note: Hatched bars indicate test side and solid bars indicate control side.

The normalized accumulation rate was calculated for the same sample events as the depth. These results are summarized in Table 7.11 and Figure 7.10 provides a comparison of the accumulation rate from 2018 and 2019. The accumulation rates for the test side and control side (2018 and 2019) had a downward (decreasing) trend starting in April and ending in October each year. For the side of the road where more frequent sweeping is occurring it was expected that there would be a decreasing trend in the accumulation rate similar to the test side results. Conversely for the side of the road less frequent sweeping occurring it is anticipated that there would be an increasing trend in the accumulation rate which is different than the results from this study. Table 7.9 summarized the average normalized accumulation rate over the duration of the study including the average from the test side (north side in 2018 and south side in 2019) and the control side (south side for 2018 and north side for 2019). As noted, the accumulation rate was higher on the test side (0.00028 g/CB/d) compared to the control side (0.00024 g/CB/d). These results are the opposite of what was expected since more frequent street sweeping is known to reduce the accumulation rate of sediment on the streets and in theory the sediment that could be transferred to catch basins. These results are consistent with the catch basin sediment accumulation rates results described in Section 7.2.2.

Table 7.11 Catch Basin Depth Accumulation Rate Since Last Collection Event

Data Collection Event	Side of Road	Since last street sweep	Since last CB cleaning
		Normalized Accumulation Rate (in/CB/d)	Normalized Accumulation (in/CB/d)
April 2018	Test	0.00036	0.00036
	Control	0.00037	0.00037
June 2018	Test	0.00035	0.00035
	Control	0.00043	0.00043
August 2018	Test	0.00025	0.00025
	Control	0.00027	0.00013
October 2018	Test	0.00019	0.00019
	Control	0.00025	0.00021
April 2019	Test	0.00041	0.00041
	Control	0.00017	0.00017
June 2019	Test	0.00023	0.00023
	Control	0.00014	0.00004
August 2019	Test	0.00023	0.00023
	Control	0.00017	0.00030
October 2019	Test	0.00020	0.00020
	Control	0.00016	0.00008

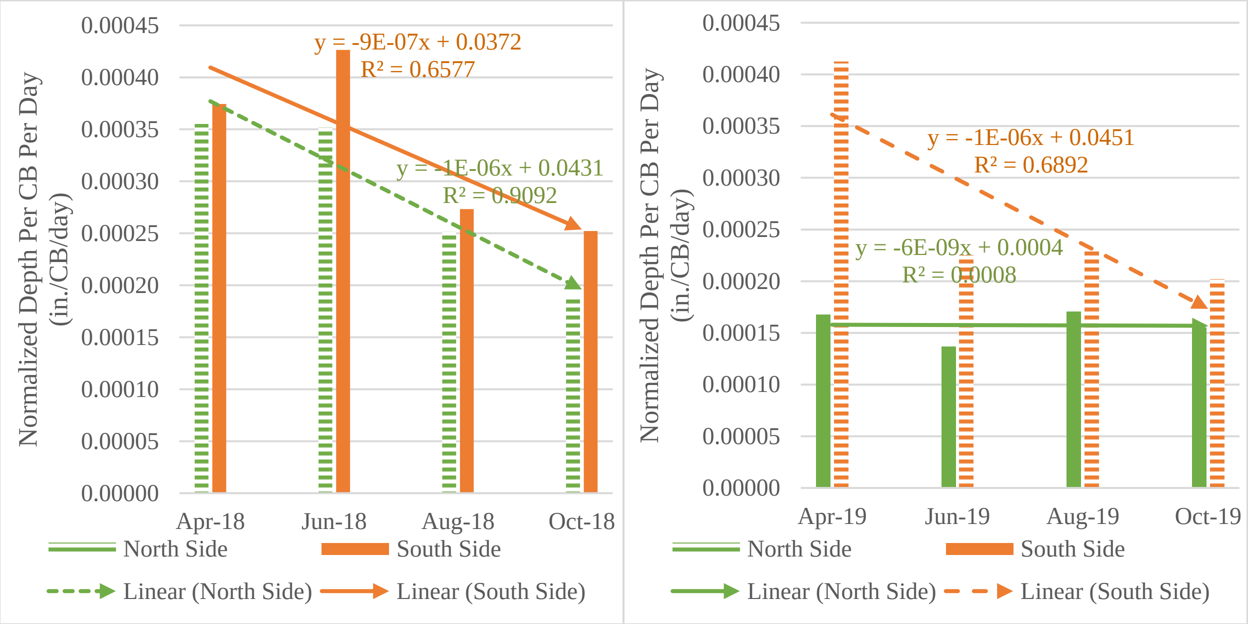

Figure 7.10 Comparison of Normalized Catch Basin Accumulation Depth During 2018 (left) and 2019 (right)

Note: Hatched bars indicate test side and solid bars indicate control side.

Table 7.12 Catch Basin Depth Average Accumulation Rate Over Study Duration

Side of Road	**Average Normalized Accumulation Rate (in/CB/d)**
	Since Last Street Sweep
Test	0.00028
Control	0.00024

7.2.4 Catch Basin Sock Sediment

The dry weight of sediment collected in catch basins socks was calculated for the test side (n=24) and the control side (n=25) from samples collected in both 2018 and 2019. The first sample event occurred in June (2018) and April (2019) and then every other month thereafter until October each year. For each sample event there are seven socks, four on the north and three on the south. There is one less on the south because one of the catch basins does not discharge to swale. The average sediment dry weight and standard deviation are reported for each sample event in Table 7.13 and Figure 7.11 provides a comparison of the dry weight calculated from 2018 and 2019. As noted in the Table 5.2 footnotes, the sock collected in April 2019 were lost in a laboratory fire. Socks were installed in October 2019 and removed in April 2020 that are included in this section as data from April 2019. The April 2020 socks were considered representative of the April 2019 socks since the same street sweeping and catch basin practices were followed as the previous year.

For both years, the dry weight on the test side and control side was generally highest in April and then the weight had a downward (decreasing) trend for the remaining sweep events. This was expected since the first sample collection event occurred after six months of accumulation and the other events occurred after only two months of accumulation. The one exception was from the control side in August 2019 which may be due to a high intensity rainfall event that occurred just before the sample collection event (Section 7.3). Table 7.14 summarizes the total weight collected in the socks from the test side (3696 grams) was lower compared to the control side (4078 grams) as well as the north side (3982 grams) and control side (4078 grams). These results suggest that less sediment was washed out of the catch basins on the side of the street with more frequent street sweeping.

Table 7.13 Catch Basin Sock Sediment Weight Recorded During Each Collection Event

Sample Collection Month	Side of Road	Average Sediment Dry Weight[1] (g)	Standard Deviation
June 2018[1]	Test	159	0.29
	Control	219	0.49
August 2018	Test	16.0	0.01
	Control	19.1	0.02
October 2018	Test	79.8	0.15
	Control	34.3	0.11
April 2019[2]	Test	NA	NA
	Control	NA	NA
June 2019	Test	70.0	0.28
	Control	121	0.40
August 2019	Test	539	0.36
	Control	350	0.76
October 2018	Test	173	0.11
	Control	87.3	0.17

1. Sediment dry weight was provided by the analytical laboratory, following drying of the socks in an oven.

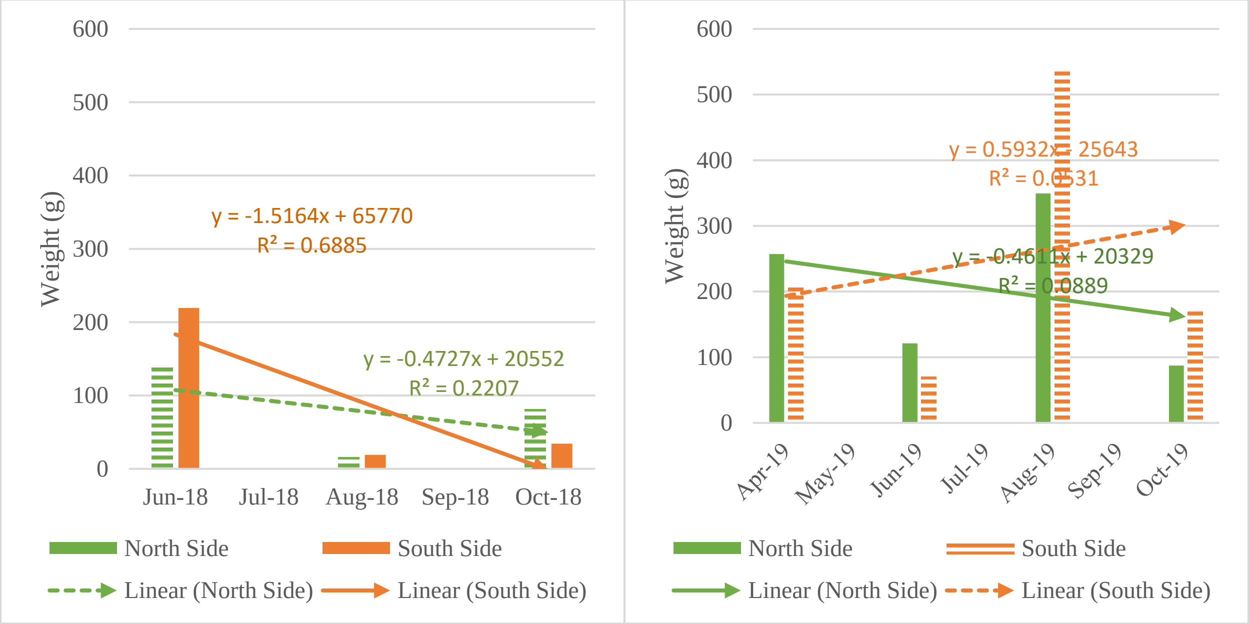

Figure 7.11 Comparison of Catch Basin Sock Sediment Dry Weight Collected in 2018 (left) and 2019 (right)

Note: Hatched bars indicate test side and solid bars indicate control side.

The normalized accumulation rate was calculated for the same sample events as the dry weight. These results are summarized in Table 7.14 and Figure 7.12 provides a comparison of the accumulation rate from 2018 and 2019. The accumulation rates for the test side (2018) and the control side (2018 and 2019) had a downward trend starting in April and ending in October. Whereas the test side during year two (2019) had an increasing trend. If street sweeping can influence sediment washout from catch basins, the side of the road where more frequent sweeping is occurring would have a decreasing trend in the sediment accumulation rate because there is less sediment on the road that could get transferred to and potentially washed out of the catch basins. Conversely for the side of the road with less frequent sweeping occurring there would be an increasing trend in the sediment accumulation rate because there is more sediment on the road that could get transferred to and potentially washed out of the catch basins. Only the results from the 2018 test side are consistent with this theory.

Research conducted by others has reported that washout of sediment from catch basins is more likely to occur once the catch basin sump is 60% full (Tetra Tech, 2001). For this study, the maximum measured sediment depth was 3.2-inches which is lower than the 16-inch at 60% of the sump depth. No research was located that evaluated the influence of street sweeping on sediment washout from catch basins when the depth is lower than 60%. Considering the mixed results from this study, the low sediment depth in the catch basins, and no other studies for comparison, more research is needed to determine if street sweeping can influence the rate of sediment washout from catch basins.

Other factors may influence of the washout of sediment from catch basins. Research conducted by others indicates that the density and particle size distributions most affect the transport of the solids in stormwater. Larger particles in storm water tend to settle out (on the road or in catch basins), whereas smaller particles remain suspended in storm water and can be washed out (Characklis & Wiesner, 1997). Hydraulics can also influence sediment transport for example a high intensity rainfall events has a higher force compared to a rainfall event with the same depth that occurred over a longer duration) for moving larger and more sediment (Minton, 2011). This may explain the highest sediment weight and accumulation rate which was measured in August 2019 following a high intensity event in Ellensburg (Section 7.3).

Table 7.9 summarized the average normalized accumulation rate over the duration of the study including the average from the test side (north side in 2018 and south side in 2019) and the control side (south side for 2018 and north side for 2019). As noted, the accumulation rate was higher on the test side (0.64 g/CB/d) compared to the control side (0.40 g/CB/d). These results are consistent with the catch basin sediment dry weight accumulation rates in catch basins (Section 7.2.2) and the sediment depth accumulation rate (Section 7.2.3) on the test and control side. The higher rate of washout from the test side maybe due to a higher quantity of sediment in the catch basins on the test side.

Table 7.14 Catch Basin Sock Accumulation Rate Since Last Collection Event

Sample Collection Date	Side of Road	Since last sweep		Since last CB clean	
		Rate of Accumulation (g/d)	Normalized Accumulation (g/lineal mi/d)	Rate of Accumulation (g/d)	Normalized Accumulation (g/lineal mi/d)
Jun-18	Test	2.31	0.63	2.31	0.63
	Control	3.66	0.99	3.66	0.99
Aug-18	Test	0.25	0.07	0.25	0.07
	Control	1.92	0.52	0.30	0.08
Oct-18	Test	1.29	0.33	1.31	0.34
	Control	1.46	0.40	0.55	0.15
Apr-19	Test	-	-	-	-
	Control	-	-	-	-
Jun-19	Test	1.17	0.32	1.17	0.32
	Control	0.50	0.14	2.02	0.56
Aug-19	Test	8.42	2.33	8.42	2.33
	Control	1.14	0.29	5.46	1.38
Oct-19	Test	2.75	0.76	2.80	0.77
	Test	0.24	0.06	1.41	0.37
Apr-20	Test	1.18	0.32	1.19	0.33
	Control	1.45	0.39	1.46	0.39
Jun-18	Test	2.31	0.63	2.31	0.63
	Control	3.66	0.99	3.66	0.99

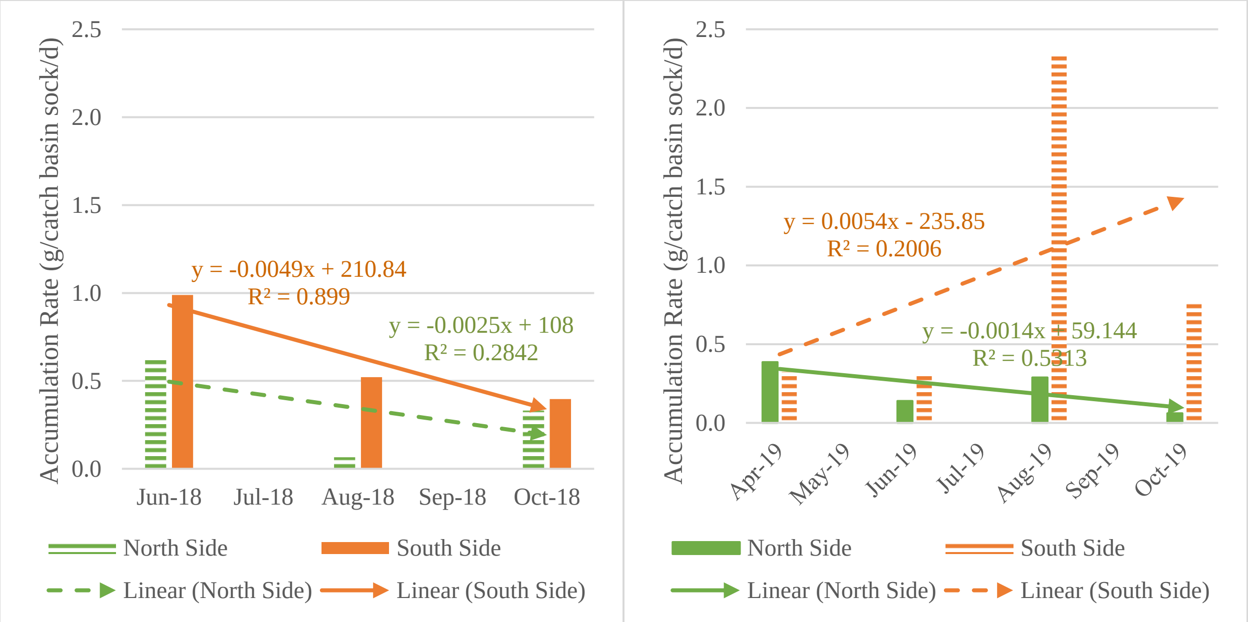

Figure 7.12 Comparison of Catch Basin Sock Normalized Accumulation Rate in 2018 (left) and 2019 (right)
Note: Hatched bars indicate test side and solid bars indicate control side.

Table 7.14 Catch Basin Catch Basin Sock Average Dry Weight and Rate of Accumulation Over Study Duration

Side of Road	Sediment Weight (g)	Since last sweep	
		Average Rate of Accumulation (g/d)	Average Normalized Accumulation (g/CB/d)
Test	3696	2.32	0.64
Control	4078	1.48	0.40
North	3982		
South	4078		

7.3 Weather Data

Objective 3: Identify potential weather-related methods of sediment transport to the road, catch basin, and catch basin socks and assess representativeness of the climate conditions during the study (compared to historical records)

Objective 3 was achieved by collecting and evaluating weather data (precipitation and wind) from a weather station (Section 5.2.1) near the test site. Appendix L contains a copy of the raw weather data. This section provides a summary of the data along with discussion regarding the weather during the study, specifically representativeness (compared to historical weather in Ellensburg) and the potential influence on sediment transport.

7.3.1 Representativeness of Weather During the Study

The historical precipitation depth by month is shown in Figures 7.13-7.15 along with the precipitation depth measured during this study. These precipitation depths include the measured rainfall depths as well as the rainfall equivalent depth of snow fall. The historical precipitation depth for Ellensburg is 9-inches and during this study the measured precipitation depth was slightly lower at 7.09-inches and 7.32-inches. Runoff from precipitation is known to transport sediment to catch basins particularly solids less than 0.25 mm (Fan, 2004; Tang, 2016). Based on the monthly averages during the study, it is anticipated that there was slightly less sediment transported to the catch basins during this study compared to a typical year with historical precipitation depths.

The historical wind speed (average and maximum monthly) in Ellensburg is shown Table 7.15 and Figures 7.13-7.15 along with the measured values during this study. The average wind speed measured (April 2018 to April 2020) was slightly lower compared to historical (4.8 mph compared to 9.0 mph) however the average maximum wind speed was about the same (15.1 compared to 15.5 mph). Wind is known to convey sediment into catch basins (solids less than 5 mm) and even influence sediment washout (smaller solids) from catch basins (Fan, 2004). The lower average wind speed may have reduced the transport of sediment to catch basins.

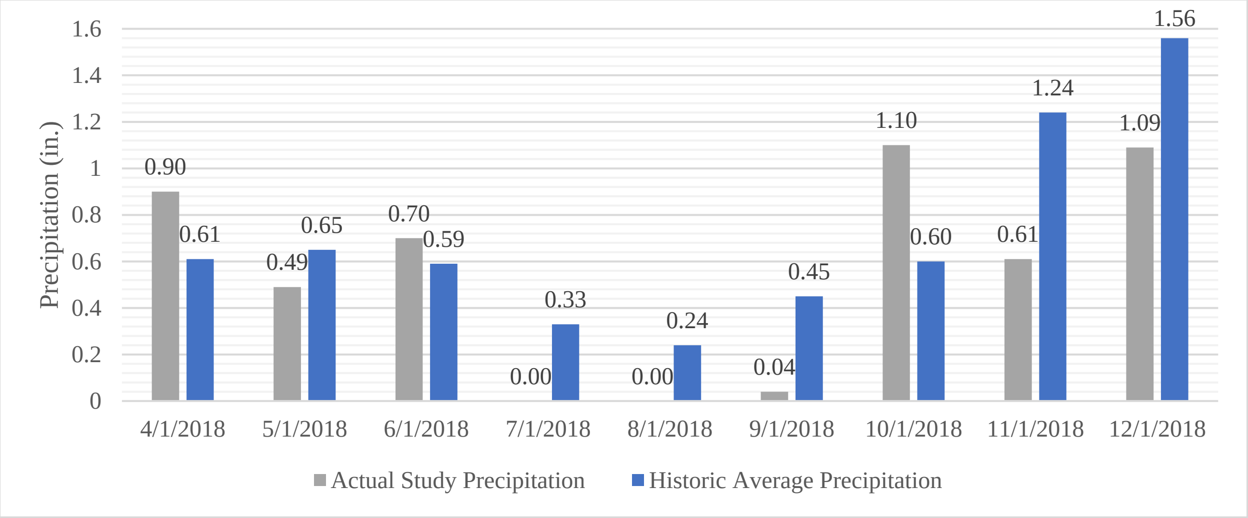

Figure 7.13 2018 Precipitation During Study vs. Historic Average Precipitation

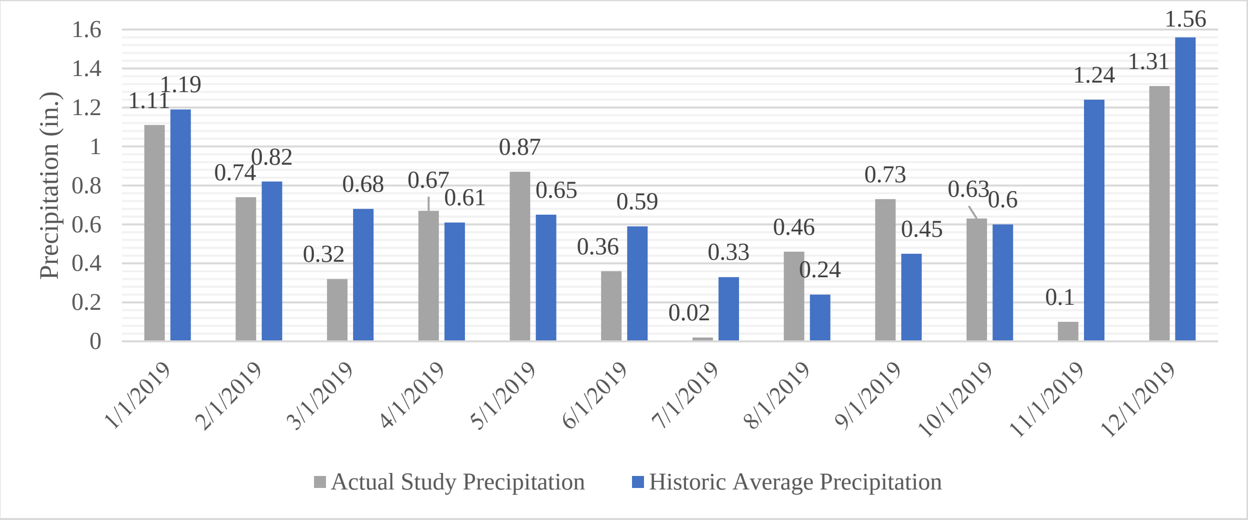

Figure 7.14 2019 Precipitation During Study vs. Historic Average Precipitation

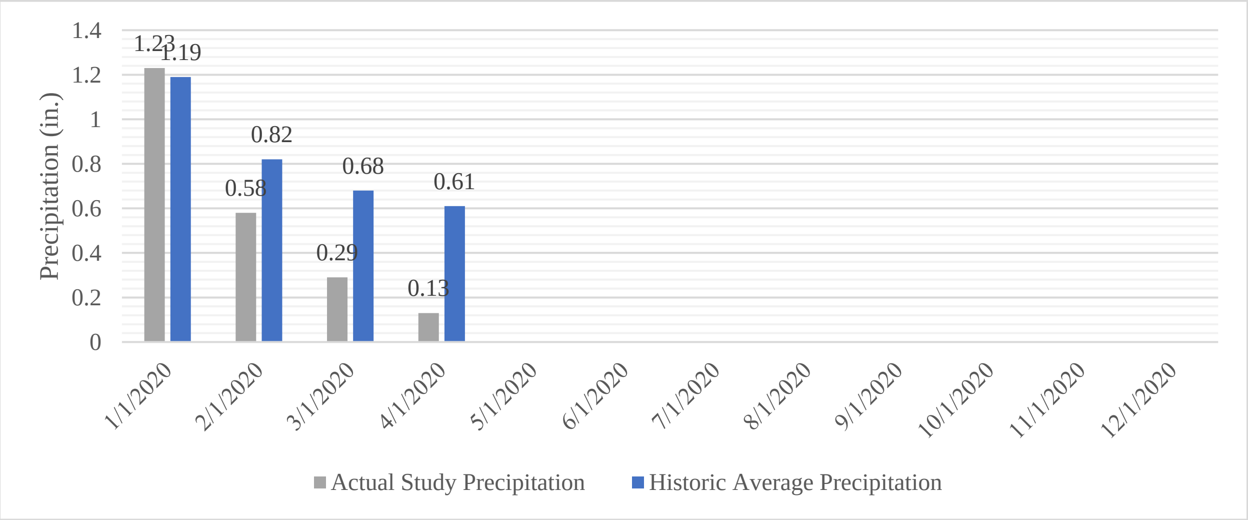

Figure 7.15 2020 Precipitation During Study vs. Historic Average Precipitation

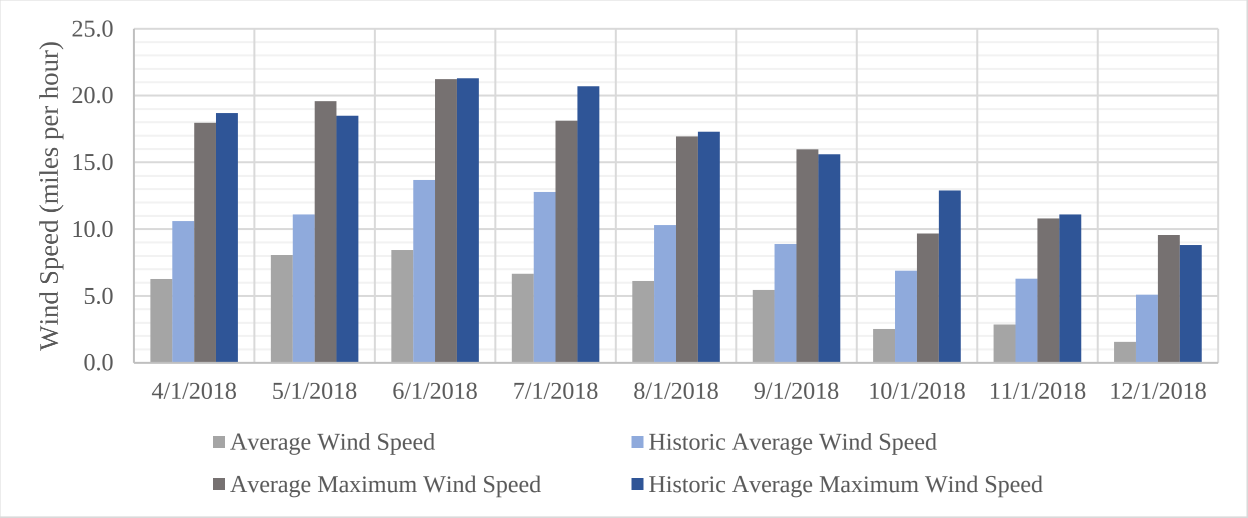

Figure 7.16 2018 Average Monthly Wind vs. Historic Averages

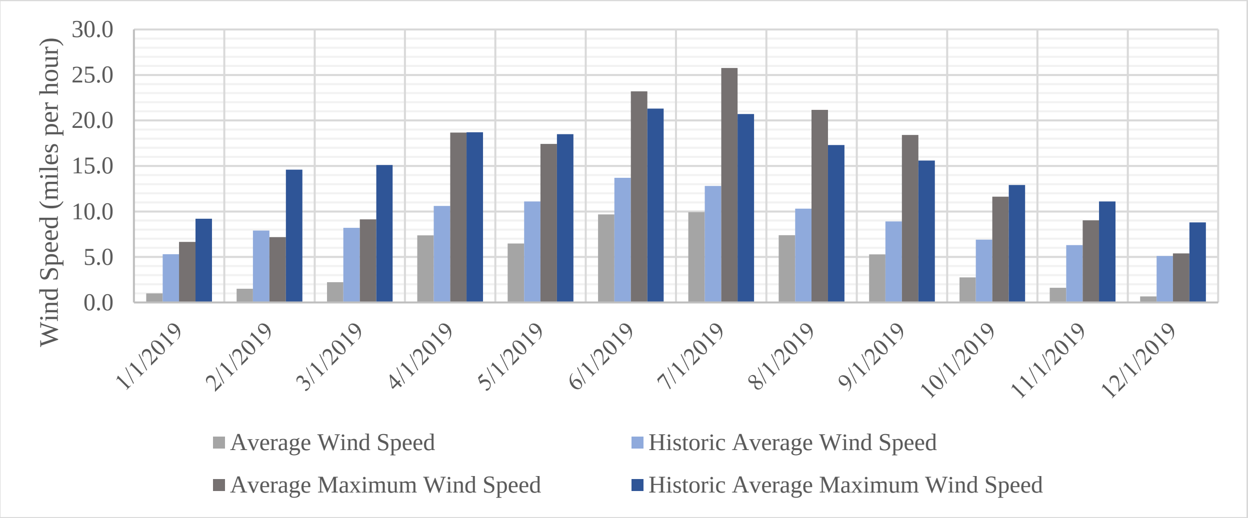

Figure 7.17 2019 Average Monthly Wind vs. Historic Averages

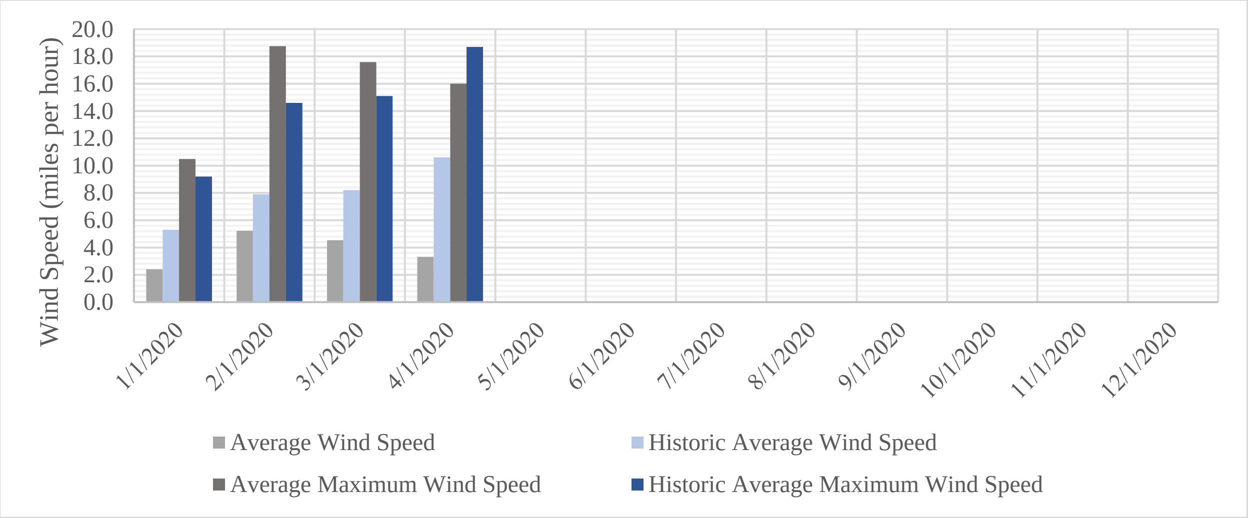

Figure 7.18 2020 Average Monthly Wind vs. Historic Averages

Table 7.15. Comparison of Wind Speed Measured vs. Historical

	Wind Speed (mph)			
	Year 1	**Year 2**	**Overall**	**Historical**
Average	4.4	5.3	4.8	9.0
Maximum	13.6	16.5	15.1	15.5

7.3.2 Potential Influence of Weather on Study Results

The measured precipitation data and maximum wind speed were compared to the data from the sample collection events to assess the potential influence of precipitation and wind on the sediment accumulation rate. Figure 7.19 displays the cumulative precipitation depth since the last catch basin cleaning compared to the sediment depth measured in the catch basins. As shown higher precipitation depth are generally associated with higher sediment depths. These results suggest precipitation events likely influenced the transport of sediment to catch basins. One exception is the August 2018 sample collection event when there was only 0.01-inches of rainfall since the last catch basin cleaning but there was still a measurable depth of sediment in the catch basins. Since wind is known to transfer sediment to catch basins, and the wind speed is highest in Ellensburg during the dry season (Figure 7.20), wind likely contributes to sediment transport to the catch basins. This further support the theory previously mentioned regarding wind being responsible for higher sediment loads on the south side of the road were compared to the north side (wind blows from the north west to the south east). Figure 7.20 displays the average monthly maximum wind speed compared to the sediment depth measured in the catch basins.

Sediment movement in urban areas to storm sewer systems can occur through wind and stormwater runoff. Reportedly wind can transport solids less 5 mm in size whereas solids in runoff are typically less than 0.25 mm (Fan, 2004). Limited research was located on regarding wind transporting solids to catch basins and into the storm drain system. As such it is not possible to estimate the fraction of sediment transported to catch basins compared to transport via runoff beyond what has been discussed and can be observed in Figures 7.19 and 7.20. Sediment transport through runoff is well documented and a complicated process. Sediment wash off from imperious surfaces is influenced by the rainfall energy, rainfall intensity, runoff volume, and surface characteristics such as topography. For sediment that has collected on roadway surfaces, sediment transport occurs after the runoff energy (velocity of runoff) exceed the critical shear stress of solids (Yang, 2016; Navickis-Brasch, 2011). For high intensity rainfall events, sediment transport is more likely to occur compared to long duration rainfall events with the same precipitation depth because runoff has less energy. This may explain why the sediment depth was higher compared to the cumulative precipitation in August 2019 (Figure 7.20 and 7.22). A few weeks prior to the August 2019 sample collection event, a high intensity rainfall event occurred (0.35 in. in one day). This high intensity rainfall event may also explain why the catch basin sock accumulation rate was highest in August 2019. Figures 7.20 to 7.22 displays the measured monthly precipitation depth along with the daily precipitation depth and the days sample collection occurred.

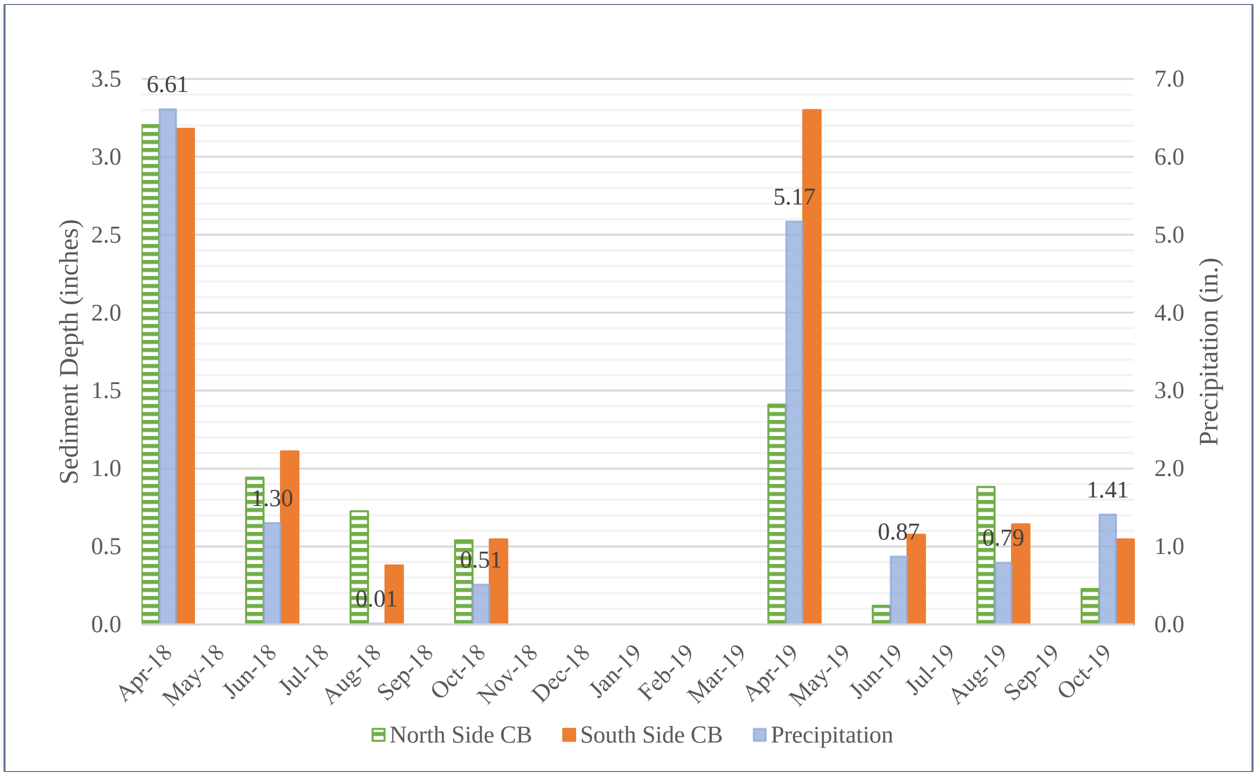

Figure 7.19 Sediment Depth Measured in Catch Basins and Precipitation Since Last Data Collection Event

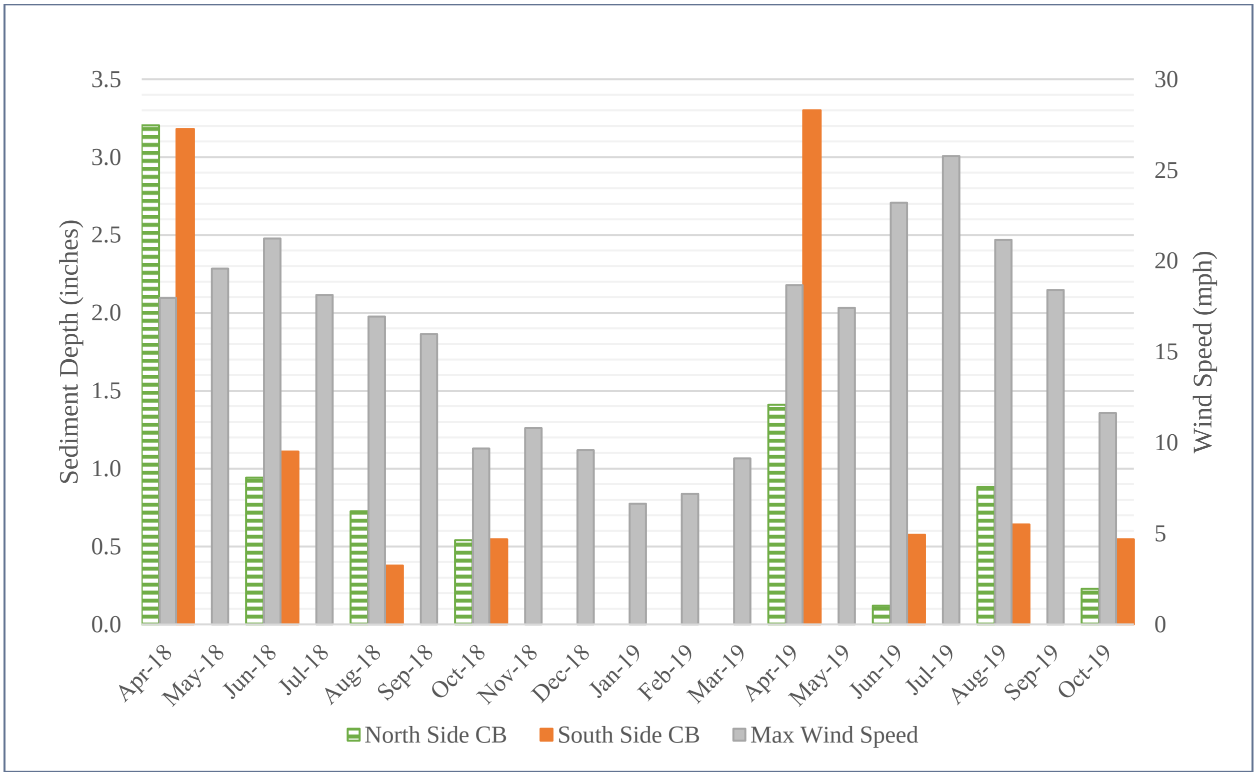

Figure 7.20 Sediment Depth Measured in Catch Basins and Average Monthly Maximum Wind Speed

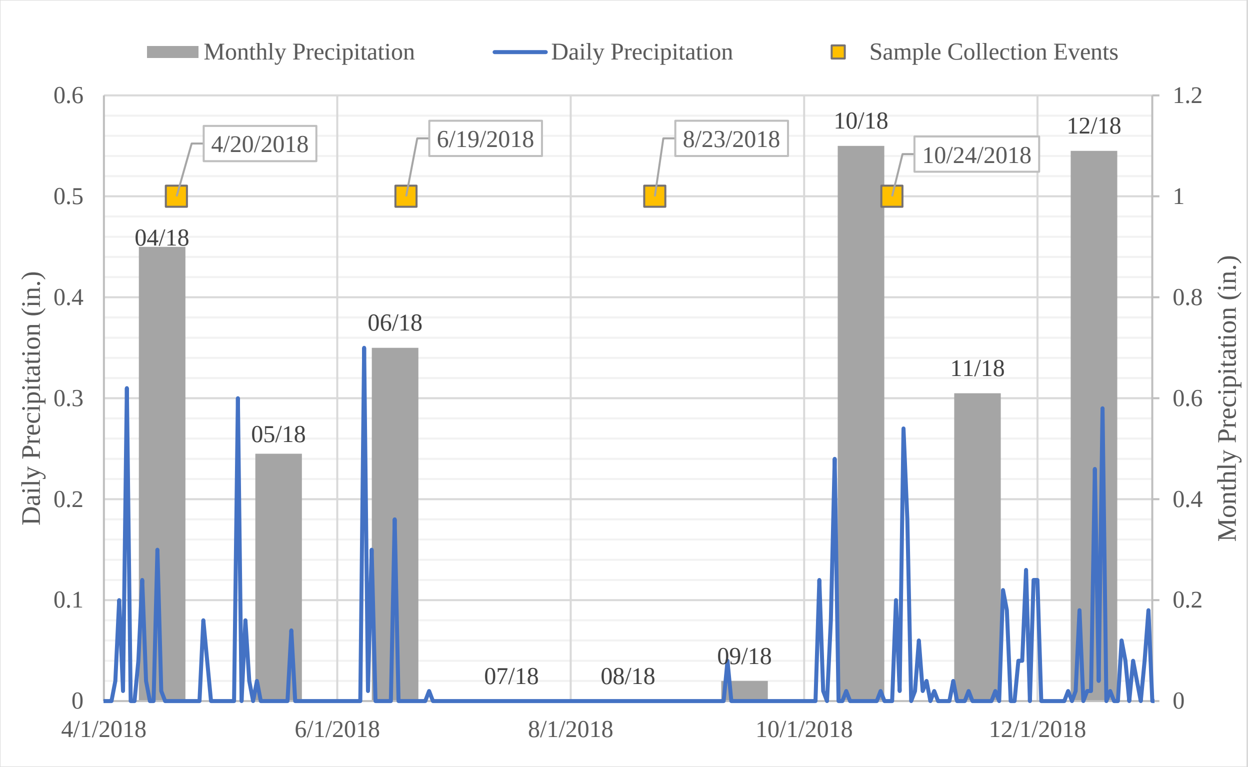

Figure 7.21 2018 Precipitation & Monitoring Events

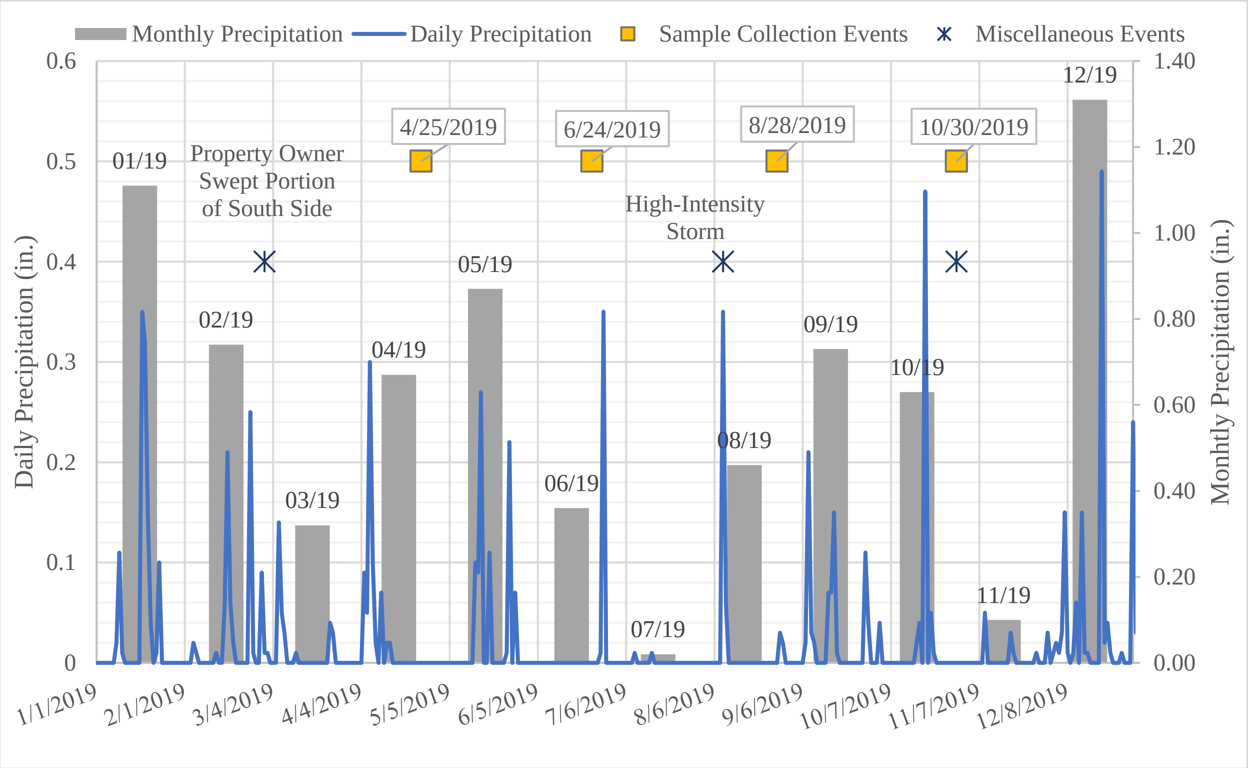

Figure 7.22 2019 Precipitation & Monitoring Events

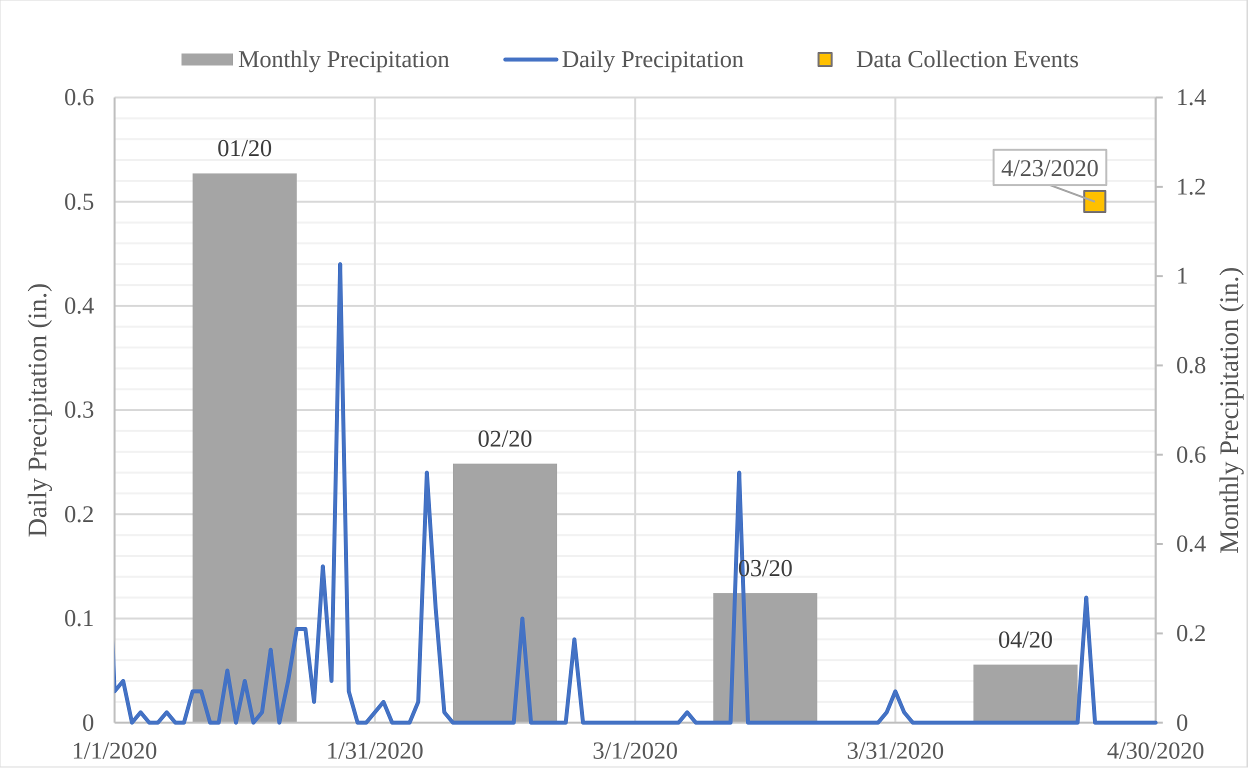

Figure 7.23 2022 Precipitation & Monitoring Events

7.4 Statistical Comparison of Datasets

Objective 4: Determine whether there is a statistically significant difference between the sediment accumulation rate in the catch basins and in the catch basin socks (washout from the catch basin) at the test site compared to the control site

Objective 4 was achieved by conducting a statistical analysis to assess whether there was a significant difference in the sediment accumulation rate between datasets. This included evaluating whether the data was normally distributed using the Ryan-Joiner test (similar to Shapiro-Wilk test) (Helsel & Hirsch, 2002). Normality was assumed if the tests produced a p-value greater than 0.05 (Ecology, 2008). If the data was normally distributed, a two-sample t-test was used to determine if there was a significant difference between the sediment accumulation at the test site and the control site. If the data was non-normally distributed, a Wilcoxon rank sum test (a nonparametric analogue to the paired t-test) was used instead. The specific null hypothesis (Ho) and alternative hypothesis (Ha) that were evaluated is defined below. The statistical comparison will be based on a confidence level of 95% (α=0.05). Appendix P contains the full results from the normality and statistical analysis.

Hypothesis 1:

- H_o: The sediment accumulation rate on the street during year one at the test site is equal to the sediment accumulation rate on the street at the test site during year two
- H_a: The sediment accumulation rate on the street during year one at the test site is not equal to the sediment accumulation rate on the street at the test site during year two

Hypothesis 2:

- Ho: The sediment accumulation rate in the catch basins at the test site is equal to the sediment accumulation in the catch basins at the control site
- Ha: The sediment accumulation rate in the catch basins at the test site is not equal to the sediment accumulation in the catch basins at the control site

Hypothesis 3:

- Ho: The sediment accumulation rate in the catch basin socks at the test site is equal to the sediment accumulation in the catch basins socks at the control site
- Ha: The sediment accumulation rate in the catch basin socks at the test site is not equal to the sediment accumulation in the catch basin socks at the control site

7.4.1 Hypothesis 1: Street Sediment Accumulation Rate

Both a two-sample t-test and the Wilcoxon rank sum test were used to assess the significant difference in the street sediment accumulation rate between on the test side between year one (n=4) and year two (n=4). This is because the results of the normality testing indicate the data collected from year one was non-normally distributed ($p<0.05$) whereas the data collected from year two was normally distributed ($p>0.05$). Results from the t-test and Wilcoxon test indicate that the difference in the street sediment accumulation rate between the two years was statistically insignificant ($p=0.656$ and $p=0.47$ respectively). These results suggest that the distribution of street sediment between the test side during year one (average 2,053 g/lineal-mile/day) was equivalent (statistically insignificant) compared to the test side during year two (average 2527 g/lineal-mile/day).

7.4.2 Hypothesis 2: Catch Basin Sediment Accumulation Rate

A two-sample t-test was used to assess the significant difference in the catch basin sediment accumulation rate between the test and control side. This is because the results of the normality testing indicate the data collected from both sides was normally distributed ($p>0.05$). Results from the t-test indicate that the difference in the catch basin sediment accumulation rate between the test side (average 16.0 grams/catch basin/day) and control side (11.7 grams/catch basin/day) was statistically insignificant ($p=0.095$). These results suggest that the frequency of street sweeping did not influence the accumulation of sediment in the catch basins.

7.4.3 Hypothesis 3: Catch Basin Sock Sediment Accumulation Rate

A two-sample t-test was used to assess the significant difference in the catch basin sock sediment accumulation rate between the test (n=6) and control side (n=7). This is because the results of the normality testing indicate the data collected from the test side was normally distributed ($p>0.05$). Results from the t-test indicate that the difference in the catch basin sock sediment accumulation rate between the test side (average 0.64 grams/sock/day) and control side (average 0.40 grams/sock/day) is statistically insignificant ($p=0.961$). These results suggest that the frequency of street sweeping did not influence sediment accumulation that washed out of the catch basins socks.

Note: the sample size is not the same because one data point was removed after running the Grubb's Test and being identified as an outlier. Reference Appendix P for the outlier results.

8.0 Recommendations and Transferability

Data collected from the study was used to recommend a combination of street sweeping and catch basin cleaning procedures for achieving permit requirements for catch basin cleaning. Section 8.1 provides a summary of the recommendations and the process used to develop the recommendations. Section 8.2 provides an overview and discussion regarding the variables that may influence the transferability of the recommendations to other sites.

8.0 Relationship between Street Sweeping and Catch Basin Cleaning

Objective 5: Evaluate whether there is a correlation (using a regression analysis) between catch basin sediment accumulation rates and street sweeping frequency that could be used to develop a schedule for catch basin cleaning and provide recommendations for applying the results.

Objective 5 was achieved by using data collected from the study to develop a relationship between street sweeping frequency and catch basin cleaning. Results from the analysis are shown in Figure 8.1 and the analysis methods are described in later in this section. The x-axis is the frequency of street sweeping each year that occurs at regular intervals during the dry season. The y-axis is the recommended schedule for cleaning catch basins which is based on the estimated time it would take for sediment to fill 60% of the catch basin sump. A linear least squares regression analysis was used to evaluate the relationship between street sweeping frequency and the time it would take for the catch basin sump to fill (60% full) and the results indicate a strong linear correlation (R^2=0.9354). An example of how Figure 8.1 could be used is if the City decides to sweep four times per year, it is estimated that the catch basins would need to be cleaned every ~7.5 years. These recommendations are specific to the site where the study was conducted. Section 8.2 provides a discussion regarding the transferability of this information to other locations.

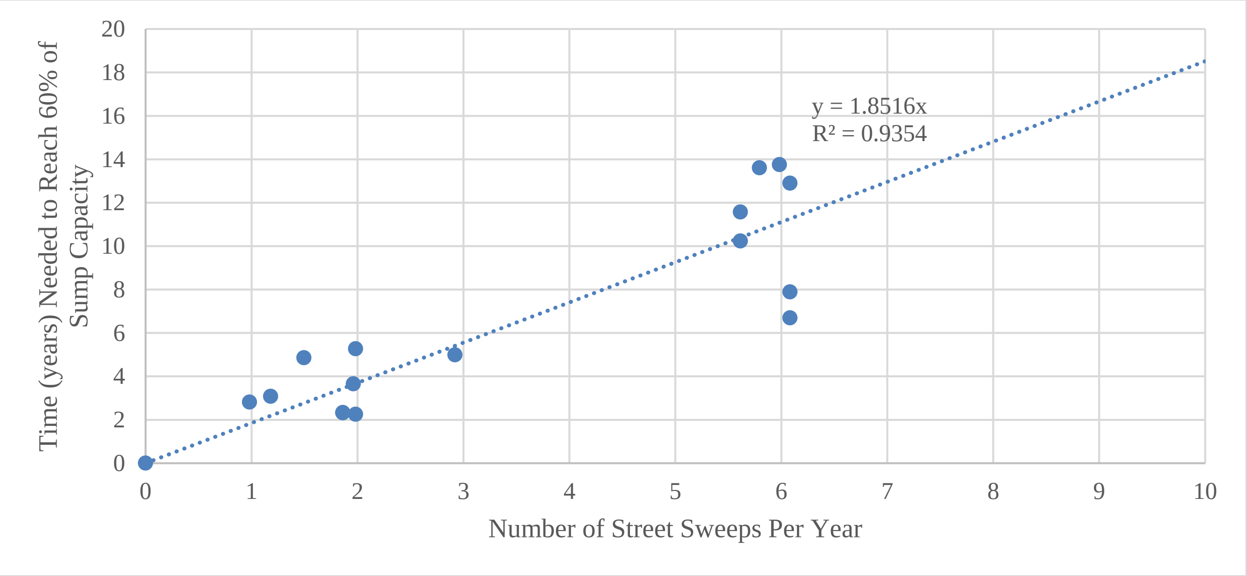

Figure 8.1 Recommend Catch Basin Cleaning Frequency based on Frequency of Street Sweeping

The process of developing the graph is as follows:

- The depth of sediment measured in the catch basins was graphed against the weight of sediment collected during each sample collection event from both the test side and control side. A correlation between the data points was established using a linear least squares regression (trendline equation on Figure 8.1). A few outliers were identified using Grubbs Test and removed.
- The sediment depth vs weight (trendline) equation was used to estimate the dry weight (139 lbs) when the catch basin would be 60% of the sump depth. These results were considered conservative since the density of the sediment will increase as the sediment depth increases due to the weight of the sediment.
- The bulk density of sediment collected from the catch basins (n=6) in October 2019 was measured at 80% compaction (36.83 lb/ft^3). No studies were found that report catch basin sediment density at varying depths, so the compaction was estimated from related studies. Specifically, the average compaction of dry sand that is poured into a container is 85% (Muszynski, 2006). The catch basin sediment from this study has a 20% organic content and bulk density reportedly decreases as the organic content increases (Avnimelech, Y., Ritvo, G., Meijer, L. E., & Kochba, M., 2001). Considering that, compaction was adjusted to 65% to estimate the sediment density in the catch basins (29.9 lb/ft^3) at 60% full.
- The weight of the sediment at 60% sump depth (289 lbs) was calculated from the catch basin sump volume at 60% full (5.5cft) times the assumed density (27.6 lb/ft^3). Considering the weight calculated from the bulk design at 60% compaction is twice the weight using the trendline equation (289 lbs compared to 139 lbs), the trendline equation method appears to be conservative providing a factor of safety of approximately 2.
- For each sample collection event, the average weight of sediment measured in the catch basin was divided by the estimated weight at 60% full using the trendline equation (139 lbs) to estimate how many years it would take to fill the catch basin to 60% the sump depth. The number of years to fill was plotted vs the number of sweeps per year that occurred when that sample was collected (Figure 8.1).

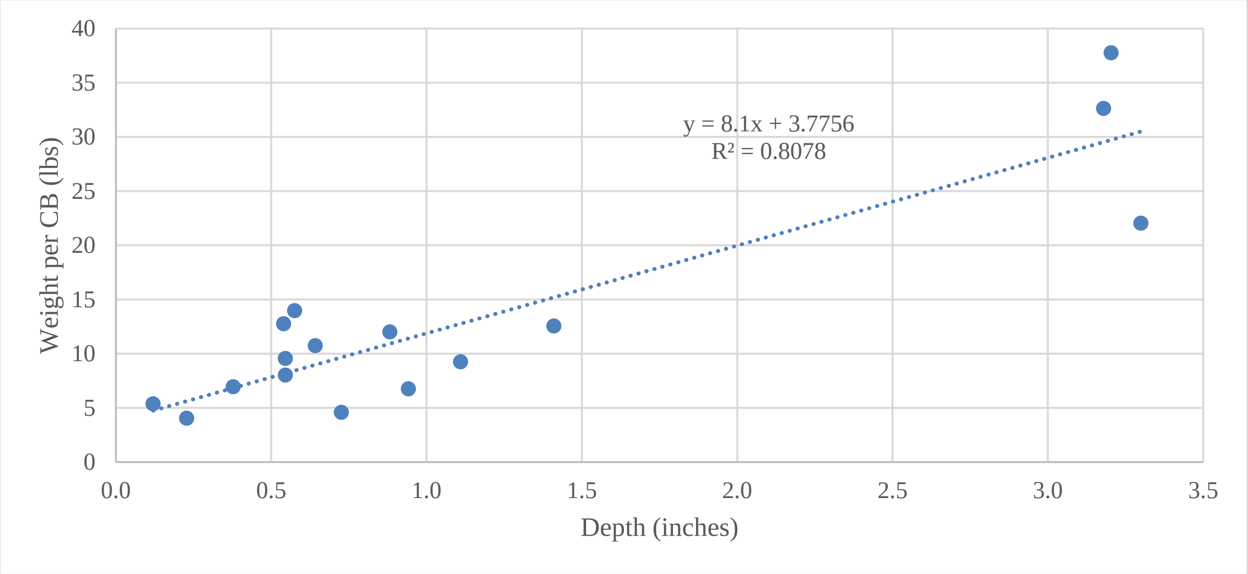

Figure 8.11 Catch Basin Sediment Depth vs. Catch Basin Sediment Weight

8.2 Considerations for Transferability of Recommendations

Figure 8.1 is intended to provide the City of Ellensburg with recommendations for scheduling catch basin cleaning based on the frequency of street sweeping. These recommendations are specific to the site were the study was conducted. A literature review was conducted to identify site specific conditions (variables) that may influence the transferability of these recommendations. If the Figure 8.1 recommendations are considered for a different site, then the cumulative impact of all the conditions described in this section should be evaluated to develop modified recommendations for that specific site.

Sediment accumulation rates in catch basins are influenced by many variables. These variables include land use and traffic volumes; weather (rainfall energy, rainfall intensity, runoff volume, wind); topography; particle size; whether or not street parking is permitted; and the presence of trees; and winter maintenance practices (Tang, 2016; Milesi, 2013; Minton, 2011; Tan, 2006; Caraco et al., 2000). The remainder of the section provides a summary of these variables along with discussion regarding how the presence of these variables may influence the transferability of this studies results to another site:

- **Land Use** – Multiple research studies have reported significantly different sediment accumulation rates based on land use. Industrial areas reportedly have the highest accumulation rates compared to commercial or residential areas (Milesi, 2013; Minton, 2011; Stein, 2006; Maestre & Pitt, 2007). Conflicting results were reported with commercial and residential areas with some studies reporting higher accumulation rates in residential areas (Stein, 2006) whereas other studies reported higher accumulation rates in commercial areas (Maestre & Pitt, 2007). One reason for the differences is more frequent street sweeping may occur in some commercial areas by property owners (compared to residential or industrial areas) that are not reported in the literature (Minton, 2012). Another reason is some studies report results for all residential land use designations combined whereas other studies provide more detailed categories such as low density (one dwelling unit per acre) and high density (sixteen dwellings units per acre). Reportedly low-density residential designations have higher sediment accumulation rates compared to high density residential (Barret, 1996; Stein, 2006) and heavily traveled commercial streets have two to three times higher accumulation rates compared to high density residential (Milesi, 2013). Before distinguishing potential differences in sediment accumulation rates between commercial and residential areas, a more detailed literature search is needed to evaluate the variables that may influence these differences. *Transferability Consideration: The test site for this study is located in a light industrial area and sediment accumulation rates are likely higher compared to commercial or residential areas. As such the frequency of street sweeping and/or catch basin cleaning could be reduced compared to Figure 8.1 recommendations for roads in residential or commercial as it would likely take longer for the catch basins to reach 60% full.*
- **Traffic Volumes –** Conflicting results have been reported with respect to the influence of traffic volumes on sediment accumulation rates. Researchers have reported that sediment accumulation rates increase with traffic volumes for average daily traffic (ADT) counts between 4,500 to 20,000 (Viklander, 1998; zero to 50,000 (Shaheen, 1975), and up to 30,000 (Strecker et al., 1990). Whereas a four-year study conducted by CalTrans at 83 sites with varying ADTs (2,600 to 328,000) found that sediment accumulation rates (n=809) for

non-urban roads (ADT<30,000) were more the twice urban roads (ADT>30,000). In the same study that researcher indicated they reviewed several studies and found that all reported no or weak correlations between ADT and sediment accumulation rates (Kayhanian, 2003). *The reported ADT for this study is 4,000. For sites with ADTs 30,000 or less, there may be an increase in sediment accumulation rates as ADT increases. As such for sites with ADTs higher than 4,000 the frequency of street sweeping and/or catch basin cleaning should be increased compared to Figure 8.1 recommendations to account for additional sediment accumulation.* However, a more detailed review of literature is recommended to better understand the relationship between ADT and sediment accumulation rates. Results from the literature search could be used to expand the Figure 8.1 recommendations to include ADT.

- **Topography** - The test site for this study had a relatively flat topography (3%). Runoff energy tends to increase as the site slope increases, transporting more sediment to catch basins. *For sites with higher slopes (>3%), the frequency of street sweeping and/or catch basin cleaning should be increased compared to Figure 8.1 recommendations to account for additional sediment accumulation. Conversely sites with lower slopes (<3%) may be able to use a decreased frequency.*
- **Wind** - Wind can influence the quantity of sediment transported to catch basins (Section 7.3). The average and maximum historical wind speed at the study site was 9.0 mph and 15.5 mph respectively. *For sites with lower average wind speeds, the Figure 8.1 recommendations may be conservative and the frequency of street sweeping and/or catch basin cleaning could be reduced. A more detailed literature search or research is needed to better understand the relationship between wind speed and the fraction of sediment (by particle size) that is transported to catch basins.*
- **Rainfall Characteristics** – Rainfall intensity and volume can influence the rainfall energy available to transport sediment to catch basins. The mean annual precipitation (MAP) in Ellensburg is 9-inches of which an average of 3-inches occurs during the dry season (Section 7.3.1). In addition, short duration high intensity rainfall events are common during the dry season (Section 3.2). For sites with higher MAP *the frequency of street sweeping and/or catch basin cleaning in Figure 8.1 should be increased to account for potentially higher sediment accumulation rates.*
- **Sediment Particle Size** - The sediment PSD can influence sediment transport via runoff and wind. Before applying these results to other locations, PSD on the streets should be tested and compared to the data in Section 7.1.1. *If the d50 is larger than it was for this study, the recommendations in Figure 8.1 maybe conservative as it will take more energy (from wind or runoff) to transfer sediment. Conversely, if the d50 is smaller the recommendations may need to be adjusted to include more frequent street sweeping and/or catch basin cleaning because it will take less energy to transfer sediment to catch basins.*
- **Sediment Organic Content** - The organic content of sediment in catch basins can influence the sediment bulk density and subsequently the time it will take the catch basin to fill 60% of the sump. Specifically, the higher the organic content, the lower the bulk density of sediment in catch basins. The test site for this study was is a major hay hauling route which may have influenced the catch basin organic content (20%). *If the organic content is higher at a site compared to this study the bulk density will be lower than this study and the recommended frequency of street sweeping and catch basin cleaning may need to be increased (weight to fill catch basin would be less).* There was limited research

located that provided a range of TVS or organic content based on land use, as such it is difficult to assess how the organic content measured during this study compares to similar land uses. In addition, no studies were found that reported the sediment organic content that washes out of catch basins. Future research is recommended to identify a range of organic contents based on land use or test the organic content at specific sites before applying the results from this study.

- **Street Parking** – Street parking can influence the street sweepers effectiveness for reducing sediment accumulation especially in locations that are known to problems with people not moving their vehicle when sweeping is scheduled. The study site did not permit vehicles to park on the street at any time. *If street parking is permitted at a site the there the recommended frequency of street sweeping and catch basin cleaning should be increased.*
- **Trees -** Leaves and pine needles that fall onto streets and are not immediately cleared are known to clog storm drains and also contribute to sediment accumulation rates. This study was conducted on a street without trees. *If the deciduous or evergreen trees are present at a site the recommended frequency of street sweeping and catch basin cleaning should be increased during the season leaf or pine needle fall is expected.*
- **Winter Maintenance Practices** – In cold climate locations, sediment accumulation rates may be higher if winter maintenance practices include applying sand to roads. The test site for this study did not include applying sand. *If the sand is applied at a site the recommended frequency of street sweeping and catch basin cleaning should be increased.*

9.0 Conclusion

Objective 6: Summarize the study results. This objective was achieved by summarizing the results in this section.

The goal of this study was to determine whether the frequency of street sweeping significantly reduces the rate of sediment accumulation in catch basins (and transported from catch basins) during the dry season in a semi-arid location. While there was generally a decreasing trend in the sediment accumulation rate in catch basins and catch basin socks (washout) as the frequency of street sweeping increased, the differences between the test side and control side were statistically insignificant. These results suggest that frequency of street sweeping performed within this study does not significantly reduce the rate of sediment accumulation in catch basins (and transported from catch basins). However, that does not mean that more frequent street sweeping does not have a significant effect on catch basin sediment accumulation rates. It just means the results from this study did not prove a significant difference.

Similar street sweeping and catch basin studies have been conducted and many researchers have reported results similar to this study noting that extreme variability in site conditions can influence the results such as wind, sediment loading, rainfall patterns, etc. (SPU, 2009; USGS, 2007; CWP, 2006; Caraco, 2000). For example, a high intensity rainfall event right before sample collection (reference August 2019 on Figure 7.22) can influence the results for a study with a small sample size like this study. One approach to control some variability might be to design a similar study except that street sweeping would occur right before rainfall events. This could eliminate some of the rainfall variability however it would be challenging because the street sweeping schedule would be based on the weather forecast which is not always accurate. In addition, this type of approach does not reflect world conditions. Another approach for studies with high variability is to collect significantly more data which is needed to detect significant differences from street sweeping (USGS, 2007; CWP, 2006; Kalinosky, et.al; 2014).

More frequent street sweeping during the dry season should be more effective in semi-arid regions that have distinct wet and dry seasons (Caraco, 2000). Low annual rainfall, droughts, high evaporation rates, and high intensity rainfall events are all characteristics of semi-arid locations. Ellensburg’s mean annual precipitation is 9-inches of which 25% is from snow (22-inches) and 67% of the precipitation occurs between October and March. During the dry season (April to October) in a semi-arid location such as Ellensburg, rainfall events are less frequent and may not produce enough runoff energy to transfer a significant amount of sediment to catch basins unless there is a high intensity rainfall event. As such more frequent sweeping throughout the drier season can reduce the sediment accumulation on roads, which will reduce the sediment that could be transferred catch basins during the wet season (Caraco, 2000).

10.0 References

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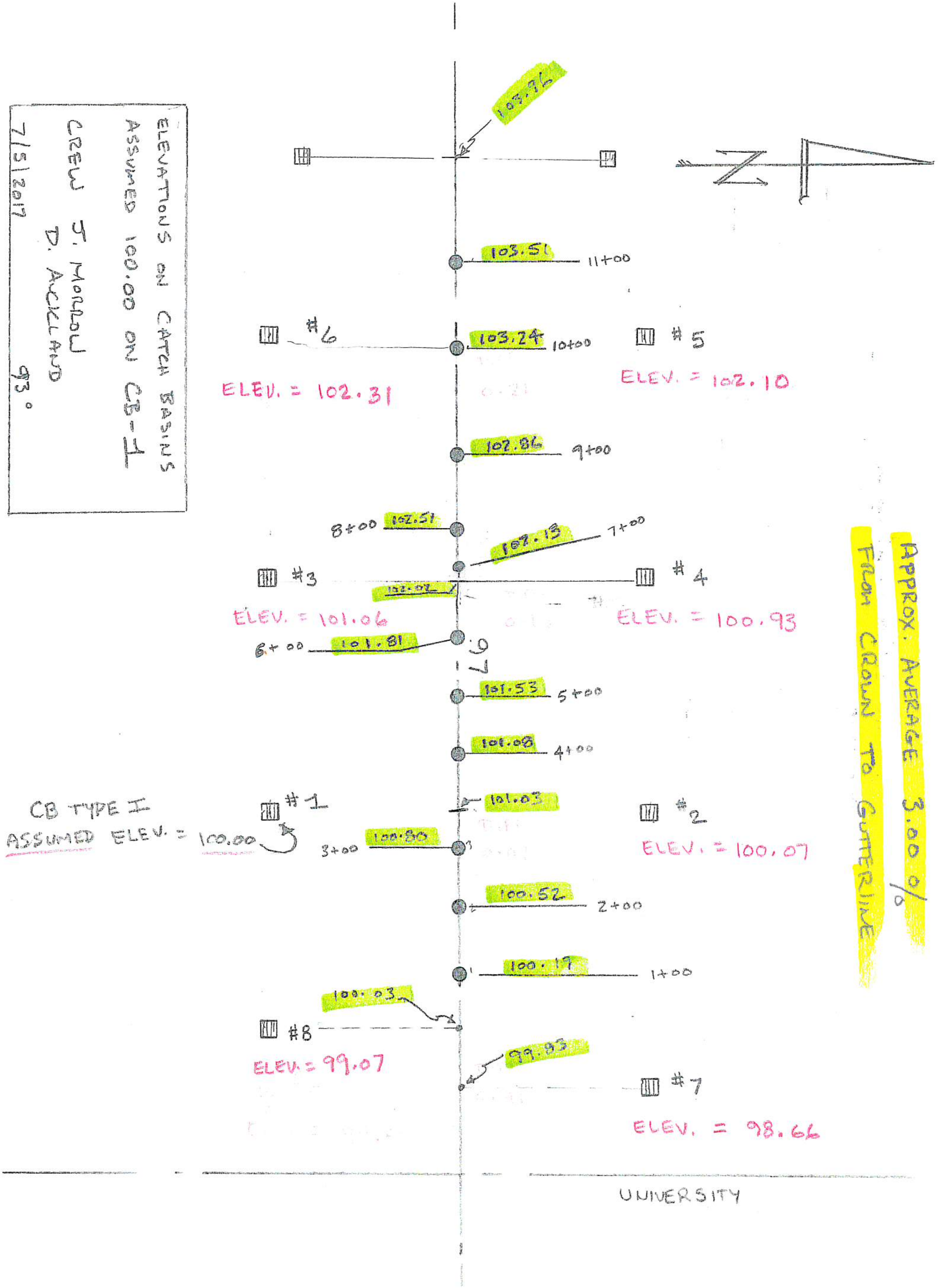
11.0 Appendices

Appendix A Survey Data



ELEVATIONS ON CATCH BASINS
ASSUMED 100.00 ON CB-1
CREW J. MORROW
D. ACKLAND
7/5/2017
93°

APPROX. AVERAGE 3.00 %
FROM CROWN TO GUTTERLINE

Appendix B Raw Lab Data

April 2018 Data Collection Event

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Spokane
11922 East 1st Ave
Spokane, WA 99206
Tel: (509)924-9200

TestAmerica Job ID: 590-8467-1
Client Project/Site: City of Ellensburg Effectiveness Study

For:
HDR Inc
1401 E. Trent Ave
Suite 101
Spokane, Washington 99202

Attn: Aimee Navickis-Brasch

Randee Arrington

Authorized for release by:
5/18/2018 3:52:43 PM

Randee Arrington, Project Manager II
(509)924-9200
randee.arrington@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Case Narrative

Client: HDR Inc
TestAmerica Job ID: 590-8467-1
Project/Site: City of Ellensburg Effectiveness Study

Job ID: 590-8467-1

Laboratory: TestAmerica Spokane

Narrative

Receipt

The samples were received on 5/2/2018 10:55 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.6º C.

Receipt Exceptions

The Chain of Custody was received without any analyses selected. The samples were logged in per the sample IDs and confirmed by the client.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Geotechnical

Method D422: The following samples contained large amounts of grass: Basin 1 (590-8467-1) and Basin 3 (590-8467-3). This method was not designed for these types of samples therefor data may be considered as estimates only. Hydrometer was not able to float freely to give accurate reading. Root balls do not break up with the roto-taper and may hold onto smaller grain sizes.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: HDR Inc
Project/Site: City of Ellensburg Effectiveness Study

TestAmerica Job ID: 590-8467-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
590-8467-1	Basin 1	Solid	05/01/18 10:30	05/02/18 10:55
590-8467-2	Basin 2	Solid	05/01/18 10:30	05/02/18 10:55
590-8467-3	Basin 3	Solid	05/01/18 10:30	05/02/18 10:55
590-8467-4	Basin 4	Solid	05/01/18 10:30	05/02/18 10:55

Definitions/Glossary

Qualifiers

Geotechnical

Qualifier	Qualifier Description
F3	Duplicate RPD exceeds the control limit

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: HDR Inc
TestAmerica Job ID: 590-8467-1
Project/Site: City of Ellensburg Effectiveness Study

Client Sample ID: *050118CBTS-1*

Lab Sample ID: 590-8467-1
Date Collected: 05/01/18 10:30
Date Received: 05/02/18 10:55
Matrix: Solid

CB-TS

Method: D2216-90 - Water (Moisture) Content

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Moisture Content	27.8		0.01		%			05/14/18 14:48	1

Method: D2974 - Moisture, Ash and Organic Matter

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Loss on Ignition	15.3		1.0		%			05/09/18 07:15	1

Method: D422 - Grain Size

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Gravel	7.5				%			05/15/18 09:21	1
Coarse Sand	12.2				%			05/15/18 09:21	1
Medium Sand	36.2				%			05/15/18 09:21	1
Fine Sand	22.9				%			05/15/18 09:21	1
Silt	15.8				%			05/15/18 09:21	1
Clay	5.4				%			05/15/18 09:21	1

Client Sample ID: *050118SSTS-1*

Lab Sample ID: 590-8467-2
Date Collected: 05/01/18 10:30
Date Received: 05/02/18 10:55
Matrix: Solid

SS-TS

Method: D2216-90 - Water (Moisture) Content

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Moisture Content	21.5		0.01		%			05/14/18 14:48	1

Client Sample ID: *050118CBCS-1*

Lab Sample ID: 590-8467-3
Date Collected: 05/01/18 10:30
Date Received: 05/02/18 10:55
Matrix: Solid

CB-CS

Method: D2216-90 - Water (Moisture) Content

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Moisture Content	232.3		0.01		%			05/14/18 14:48	1

Method: D2974 - Moisture, Ash and Organic Matter

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Loss on Ignition	43.8		1.0		%			05/09/18 07:15	1

Method: D422 - Grain Size

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Gravel	7.6				%			05/15/18 09:21	1
Coarse Sand	3.9				%			05/15/18 09:21	1
Medium Sand	17.5				%			05/15/18 09:21	1
Fine Sand	27.3				%			05/15/18 09:21	1
Silt	6.8				%			05/15/18 09:21	1
Clay	36.9				%			05/15/18 09:21	1

Client Sample ID: *050118SSCS-1*

Lab Sample ID: 590-8467-4
Date Collected: 05/01/18 10:30
Date Received: 05/02/18 10:55
Matrix: Solid

SS-CS

Method: D2216-90 - Water (Moisture) Content

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Moisture Content	19.5		0.01		%			05/14/18 14:48	1

Client Sample Results

Method: D422 - Grain Size

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Gravel	**11.1**				%			05/15/18 09:21	1
Coarse Sand	**25.7**				%			05/15/18 09:21	1
Medium Sand	**33.4**				%			05/15/18 09:21	1
Fine Sand	**19.7**				%			05/15/18 09:21	1
Silt	**6.9**				%			05/15/18 09:21	1
Clay	**3.3**				%			05/15/18 09:21	1

QC Sample Results

Client: HDR Inc
TestAmerica Job ID: 590-8467-1
Project/Site: City of Ellensburg Effectiveness Study

Method: D2216-90 - Water (Moisture) Content

Lab Sample ID: 590-8467-1 DU
Matrix: Solid
Analysis Batch: 273791
Client Sample ID: Basin 1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Moisture Content	27.8			16.5	F3	%				51	20

Method: D2974 - Moisture, Ash and Organic Matter

Lab Sample ID: 590-8467-1 DU
Matrix: Solid
Analysis Batch: 515225
Client Sample ID: Basin 1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Loss on Ignition	15.3			10.4	F3	%				38	20

Lab Chronicle

Client: HDR Inc
TestAmerica Job ID: 590-8467-1
Project/Site: City of Ellensburg Effectiveness Study

Client Sample ID: Basin 1

Lab Sample ID: 590-8467-1
Date Collected: 05/01/18 10:30
Matrix: Solid
Date Received: 05/02/18 10:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D2216-90		1			273791	05/14/18 14:48	EMM	TAL SEA
Total/NA	Analysis	D2974		1			515225	05/09/18 07:15	BMC	TAL NSH
Total/NA	Analysis	D422		1			273830	05/15/18 09:21	HJM	TAL SEA

Client Sample ID: Basin 2

Lab Sample ID: 590-8467-2
Date Collected: 05/01/18 10:30
Matrix: Solid
Date Received: 05/02/18 10:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D2216-90		1			273791	05/14/18 14:48	EMM	TAL SEA

Client Sample ID: Basin 3

Lab Sample ID: 590-8467-3
Date Collected: 05/01/18 10:30
Matrix: Solid
Date Received: 05/02/18 10:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D2216-90		1			273791	05/14/18 14:48	EMM	TAL SEA
Total/NA	Analysis	D2974		1			515225	05/09/18 07:15	BMC	TAL NSH
Total/NA	Analysis	D422		1			273830	05/15/18 09:21	HJM	TAL SEA

Client Sample ID: Basin 4

Lab Sample ID: 590-8467-4
Date Collected: 05/01/18 10:30
Matrix: Solid
Date Received: 05/02/18 10:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D2216-90		1			273791	05/14/18 14:48	EMM	TAL SEA
Total/NA	Analysis	D422		1			273830	05/15/18 09:21	HJM	TAL SEA

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177
TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Laboratory: TestAmerica Spokane

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Washington	State Program	10	C569	01-06-19

Laboratory: TestAmerica Nashville

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Washington	State Program	10	C789	07-19-18

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
D2974		Solid	Loss on Ignition

Laboratory: TestAmerica Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Washington	State Program	10	C553	02-17-19

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
D2216-90		Solid	Moisture Content

Method Summary

Client: HDR Inc
Project/Site: City of Ellensburg Effectiveness Study

TestAmerica Job ID: 590-8467-1

Method	Method Description	Protocol	Laboratory
D2216-90	Water (Moisture) Content	ASTM	TAL SEA
D2974	Moisture, Ash and Organic Matter	ASTM	TAL NSH
D422	Grain Size	ASTM	TAL SEA

Protocol References:

ASTM = ASTM International

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177
TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

TestAmerica Spokane
11922 E 1st Avenue

Spokane, WA 99206-5302
phone 509.924.9200 fax 509.924.9290

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☒ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact
City of Ellensburg
501 N. Anderson St.
Ellensburg WA 98926
(509) 962-7236 Phone
(509) 962-7127 FAX
Project Name: Street Sweep/CB clean effectiveness study
Site: SR97, Ellensburg WA
P O #

Project Manager: Jon Morrow
Tel/Fax: (509) 925-8619

Analysis Turnaround Time
☐ CALENDAR DAYS ☒ WORKING DAYS
TAT if different from Below
☐ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact: Gordon Crane
Lab Contact: Chris Williams

Date: ~~4/30/18~~ 5-1-18
Carrier: UPS

COC No:
____ of ____ COCs
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / [✓ N])	Perform MS / MSD (Y / [✓ N])	Sample Specific Notes:
Basin 1 Moisture Content	5-1-18	10:15	G		3			
Basin 2 Moisture Content	5-1-18	10:15	G		3			
Basin 3 Moisture Content	5-1-18	10:15	G		3			
Basin 4 Moisture Content	5-1-18	10:15	G		3			
Basin 1 organic Content	5-1-18	10:30	G		1			
Basin 3 organic Content	5-1-18	10:30	G		1			
Basin 1 PSD	5-1-18	10:30	G		1			
Basin 3 PSD	5-1-18	10:30	G		1			
Basin 4 PSD	5-1-18	10:30	G		1			

590-8467 Chain of Custody

Preservation Used: [✓ 1= Ice,] 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☑ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☒ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: 4.7 c Corr'd: 4.6 c Therm ID No.: IR004

Relinquished by: Jon Morrow	Company: Ellensburg	Date/Time: 5-1-18 10:15	Received by: Sheila Krady	Company: TA Spo	Date/Time: 5/2/18 1035
Relinquished by: Gordon Crane	Company: ''	Date/Time: ''	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.13, dated 9/1/2017

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

COOLER RECEIPT FORM

590-8467 Chain of Custody

Cooler Received/Opened On___05-03-2018_@____09:20_________

Time Samples Removed From Cooler 1501 Time Samples Placed In Storage 1503 (2 Hour Window)

1. Tracking # 5001 (last 4 digits, FedEx) Courier: _FedEx_

IR Gun ID___31470368_________ pH Strip Lot NA Chlorine Strip Lot NA

2. Temperature of rep. sample or temp blank when opened: 4.3 *Degrees Celsius*

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO.. [✓ NA]

4. Were custody seals on outside of cooler? [✓ YES]...NO...NA

If yes, how many and where: 1(front) + 1(rear)

5. Were the seals intact, signed, and dated correctly? [✓ YES]...NO...NA

6. Were custody papers inside cooler? [✓ YES]...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) GH

7. Were custody seals on containers: YES [✓ NO] and Intact YES...NO.. [✓ NA]

Were these signed and dated correctly? YES...NO.. [✓ NA]

8. Packing mat'l used? [✓ Bubblewrap] Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: [✓ Ice] Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? [✓ YES]...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? [✓ YES]...NO...NA

12. Did all container labels and tags agree with custody papers? [✓ YES]...NO...NA

13a. Were VOA vials received? YES.. [✓ NO]...NA

b. Was there any observable headspace present in any VOA vial? YES...NO.. [✓ NA]

● ⬅ Larger than this.

14. Was there a Trip Blank in this cooler? YES.. [✓ NO] .NA If multiple coolers, sequence #________

I certify that I unloaded the cooler and answered questions 7-14 (intial) GH

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO.. [✓ NA]

b. Did the bottle labels indicate that the correct preservatives were used [✓ YES]...NO...NA

16. Was residual chlorine present? YES...NO.. [✓ NA]

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) GH

17. Were custody papers properly filled out (ink, signed, etc)? [✓ YES]...NO...NA

18. Did you sign the custody papers in the appropriate place? [✓ YES]...NO...NA

19. Were correct containers used for the analysis requested? [✓ YES]...NO...NA

20. Was sufficient amount of sample sent in each container? [✓ YES]...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) GH

I certify that I attached a label with the unique LIMS number to each container (intial) GH

21. Were there Non-Conformance issues at login? YES.. [✓ NO] Was a NCM generated? YES... [✓ NO] ..#_______

BIS = Broken in shipment
Cooler Receipt Form doc

LF-1
End of Form

Revised 8/23/17

TestAmerica Spokane
11922 East 1st Ave
Spokane, WA 99206
Phone (509) 924-9200 Fax (509) 924-9290

Chain of Custody Record

Loc: 590
8467

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Arrington, Randee E	COC No: 590-3515.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: randee.arrington@testamericainc.com State of Origin: Washington	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): State Program - Washington	Job #: 590-8467-1
Address: 2960 Foster Creighton Drive, ,	Due Date Requested: 5/14/2018		Preservation Codes:
City: Nashville	TAT Requested (days):		
State, Zip: TN, 37204			
Phone: 615-726-0177(Tel) 615-726-3404(Fax)	PO #:		
Email:	WO #:		
Project Name: City of Ellensburg Effectiveness Study	Project #: 59001497		
Site:	SSOW#:		Other:

Preservation Codes:
A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)

Other:

Analysis Requested

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	D_2974/ (MOD) Ash, Organic Carbon, Organic Matte	Total Number of containers	Special Instructions/Note:
				Preservation Code:					
Basin 1 (590-8467-1)	5/1/18	10:15 Pacific		Solid			X	1	QAPP requires site specific duplicates at <20%
Basin 3 (590-8467-3)	5/1/18	10:15 Pacific		Solid			X	1	QAPP requires site specific duplicates at <20%

Loc: 590
8467

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For ________ Months*

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Special Instructions/QC Requirements:

Empty Kit Relinquished by: Date: Time: Method of Shipment:

Relinquished by:	Date/Time: 5/2/18 1500	Company TASPO	Received by:	Date/Time: 5-3-18/0920	Company TA-NAS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks: 4.3

Ver: 09/20/2016

TestAmerica Spokane
11922 East 1st Ave
Spokane, WA 99206
Phone (509) 924-9200 Fax (509) 924-9290

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)
Sampler:
Lab PM: Arrington, Randee E
Carrier Tracking No(s):
COC No: 590-3514.1
Client Contact: Shipping/Receiving
Phone:
E-Mail: randee.arrington@testamericainc.com
State of Origin: Washington
Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.
Accreditations Required (See note): State Program - Washington
Job #: 590-8467-1
Address: 5755 8th Street East,
Due Date Requested: 5/14/2018
City: Tacoma
TAT Requested (days):
State, Zip: WA, 98424
Phone: 253-922-2310(Tel) 253-922-5047(Fax)
PO #:
Email:
WO #:
Project Name: City of Ellensburg Effectiveness Study
Project #: 59001497
Site:
SSOW#:

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	**Sample Date**	**Sample Time**	**Sample Type (C=comp, G=grab)**	**Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)**	**Field Filtered Sample (Yes or No)**	**Perform MS/MSD (Yes or No)**	**D2216_90/ (MOD) Local Method**	**D422/ D422 Grain Size**	**Total Number of containers**	**Special Instructions/Note:**
			Preservation Code:							
Basin 1 (590-8467-1)	5/1/18	10:15 Pacific		Solid			X	X	2	
Basin 2 (590-8467-2)	5/1/18	10:15 Pacific		Solid			X		1	
Basin 3 (590-8467-3)	5/1/18	10:15 Pacific		Solid			X	X	2	
Basin 4 (590-8467-4)	5/1/18	10:30 Pacific		Solid			X	X	2	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification
Unconfirmed
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For ______ Months*
Deliverable Requested: I, II, III, IV, Other (specify)
Primary Deliverable Rank: 2
Special Instructions/QC Requirements:
Empty Kit Relinquished by:
Date:
Time:
Method of Shipment:

Relinquished by: Sheila Kratz	Date/Time: 5/2/18 1455	Company TA Spo	Received by: Tom Hart	Date/Time: 5/4/18 0930	Company TA-Sea
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks: IR4 10.5/10.3

Login Sample Receipt Checklist

Client: HDR Inc

Job Number: 590-8467-1

Login Number: 8467
List Number: 1
Creator: Kratz, Sheila J

List Source: TestAmerica Spokane

Question	**Answer**	**Comment**
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	True	#214681,214680
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Not listed on COC
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	No analysis requiring residual chlorine check assigned.

Login Sample Receipt Checklist

Client: HDR Inc

Job Number: 590-8467-1

Login Number: 8467
List Number: 3
Creator: Blankinship, Tom X

List Source: TestAmerica Seattle
List Creation: 05/04/18 10:17 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	Refer to Job Narrative for details.
Cooler Temperature is recorded.	True	10.5°C
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Spokane
11922 East 1st Ave
Spokane, WA 99206
Tel: (509)924-9200

TestAmerica Job ID: 590-8467-2
Client Project/Site: City of Ellensburg Effectiveness Study

For:
HDR Inc
1401 E. Trent Ave
Suite 101
Spokane, Washington 99202

Attn: Aimee Navickis-Brasch

Randee Arrington

Authorized for release by:
5/24/2018 9:13:45 AM

Randee Arrington, Project Manager II
(509)924-9200
randee.arrington@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Case Narrative

Client: HDR Inc
Project/Site: City of Ellensburg Effectiveness Study

TestAmerica Job ID: 590-8467-2

Job ID: 590-8467-2

Laboratory: TestAmerica Spokane

Narrative

Receipt
The samples were received on 5/2/2018 10:55 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.6º C.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received
590-8467-3	050118CBCS-1	Solid	05/01/18 10:30	05/02/18 10:55

Definitions/Glossary

Qualifiers

Geotechnical

Qualifier	Qualifier Description
F3	Duplicate RPD exceeds the control limit

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: HDR Inc
Project/Site: City of Ellensburg Effectiveness Study

TestAmerica Job ID: 590-8467-2

Client Sample ID: 050118CBCS-1

Lab Sample ID: 590-8467-3

Date Collected: 05/01/18 10:30

Matrix: Solid

Date Received: 05/02/18 10:55

Method: D2216-90 - Water (Moisture) Content

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Moisture Content	**210.7**		0.01		%			05/23/18 09:38	1

QC Sample Results

Method: D2216-90 - Water (Moisture) Content

Lab Sample ID: 580-77294-B-1 DU
Matrix: Solid
Analysis Batch: 274446

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier			DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Moisture Content	52.1				36.4	F3	%				35	20

Client Sample ID: 050118CBCS-1

Date Collected: 05/01/18 10:30

Date Received: 05/02/18 10:55

Lab Sample ID: 590-8467-3

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D2216-90		1			274446	05/23/18 09:38	EMM	TAL SEA

Laboratory References:

TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: HDR Inc
TestAmerica Job ID: 590-8467-2
Project/Site: City of Ellensburg Effectiveness Study

Laboratory: TestAmerica Spokane

The accreditations/certifications listed below are applicable to this report.

Authority	**Program**	**EPA Region**	**Identification Number**	**Expiration Date**
Washington	State Program	10	C569	01-06-19

Laboratory: TestAmerica Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	**Program**	**EPA Region**	**Identification Number**	**Expiration Date**
Washington	State Program	10	C553	02-17-19

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
D2216-90		Solid	Moisture Content

Method Summary

Client: HDR Inc
Project/Site: City of Ellensburg Effectiveness Study

TestAmerica Job ID: 590-8467-2

Method	Method Description	Protocol	Laboratory
D2216-90	Water (Moisture) Content	ASTM	TAL SEA

Protocol References:

ASTM = ASTM International

Laboratory References:

TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Login Sample Receipt Checklist

Client: HDR Inc

Job Number: 590-8467-2

Login Number: 8467

List Number: 1

Creator: Kratz, Sheila J

List Source: TestAmerica Spokane

Question	**Answer**	**Comment**
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	True	#214681,214680
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Not listed on COC
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	No analysis requiring residual chlorine check assigned.

Login Sample Receipt Checklist

Client: HDR Inc

Job Number: 590-8467-2

Login Number: 8467

List Number: 3

Creator: Blankinship, Tom X

List Source: TestAmerica Seattle

List Creation: 05/04/18 10:17 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	Refer to Job Narrative for details.
Cooler Temperature is recorded.	True	10.5°C
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

June 2018 Data Collection Event

Anatek Labs, Inc.
1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: CITY OF ELLENSBURG
Address: 501 N ANDERSON ST
ELLENSBURG, WA 98926
Attn: JON MORROW

Batch #: 180706055
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 180706055-001 **Sampling Date** 7/3/2018 **Date/Time Received** 7/6/2018 5:14 PM
Client Sample ID 061818SSTS1 **Sampling Time** 3:30 PM **Extraction Date**
Matrix Solid **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	93.7	%	0.1	8/10/2018 11:18:00 AM	TLM	% solids	
%moisture	6.3	Percent		7/12/2018 3:30:00 PM	CME	%moisture	

Sample Number 180706055-002 **Sampling Date** 7/3/2018 **Date/Time Received** 7/6/2018 5:14 PM
Client Sample ID 061818SSTS2 **Sampling Time** 3:30 PM **Extraction Date**
Matrix Solid **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	94.8	%	0.1	8/10/2018 11:18:00 AM	TLM	% solids	
%moisture	5.2	Percent		7/12/2018 3:30:00 PM	CME	%moisture	

Sample Number 180706055-003 **Sampling Date** 7/3/2018 **Date/Time Received** 7/6/2018 5:14 PM
Client Sample ID 061818SSTS3 **Sampling Time** 3:30 PM **Extraction Date**
Matrix Solid **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	94	%	0.1	8/10/2018 11:18:00 AM	TLM	% solids	
%moisture	6	Percent		7/12/2018 3:30:00 PM	CME	%moisture	

Sample Number 180706055-004 **Sampling Date** 7/3/2018 **Date/Time Received** 7/6/2018 5:14 PM
Client Sample ID 061818CBTS1 **Sampling Time** 3:45 PM **Extraction Date**
Matrix Solid **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	72.2	%	0.1	8/10/2018 11:18:00 AM	TLM	% solids	
%moisture	27.8	Percent		7/12/2018 3:30:00 PM	CME	%moisture	

Client:	CITY OF ELLENSBURG	**Batch #:**	180706055
Address:	501 N ANDERSON ST ELLENSBURG, WA 98926	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Attn:	JON MORROW		

Analytical Results Report

Sample Number	180706055-005	**Sampling Date**	7/3/2018	**Date/Time Received**	7/6/2018	5:14 PM
Client Sample ID	061818CBTS2	**Sampling Time**	3:45 PM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	70.5	%	0.1	8/10/2018 11:18:00 AM	TLM	% solids	
%moisture	29.5	Percent		7/12/2018 3:30:00 PM	CME	%moisture	

Sample Number	180706055-006	**Sampling Date**	7/3/2018	**Date/Time Received**	7/6/2018	5:14 PM
Client Sample ID	061818CBTS3	**Sampling Time**	3:45 PM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	79.5	%	0.1	8/10/2018 11:18:00 AM	TLM	% solids	
%moisture	20.5	Percent		7/12/2018 3:30:00 PM	CME	%moisture	

Sample Number	180706055-007	**Sampling Date**	7/3/2018	**Date/Time Received**	7/6/2018	5:14 PM
Client Sample ID	061818CBCS1	**Sampling Time**	3:55 PM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	76.9	%	0.1	8/10/2018 11:18:00 AM	TLM	% solids	
%moisture	23.1	Percent		7/12/2018 3:30:00 PM	CME	%moisture	

Sample Number	180706055-008	**Sampling Date**	7/3/2018	**Date/Time Received**	7/6/2018	5:14 PM
Client Sample ID	061818CBCS2	**Sampling Time**	3:55 PM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	59.1	%	0.1	8/10/2018 11:18:00 AM	TLM	% solids	
%moisture	40.9	Percent		7/12/2018 3:30:00 PM	CME	%moisture	

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: CITY OF ELLENSBURG
Address: 501 N ANDERSON ST
ELLENSBURG, WA 98926
Attn: JON MORROW

Batch #: 180706055
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number	180706055-009	**Sampling Date**	7/3/2018	**Date/Time Received**	7/6/2018	5:14 PM
Client Sample ID	061818CBCS3	**Sampling Time**	3:55 PM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	55	%	0.1	8/10/2018 11:18:00 AM	TLM	% solids	
%moisture	45	Percent		7/12/2018 3:30:00 PM	CME	%moisture	

Authorized Signature Kathleen A. Sattler

Kathleen A. Sattler, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

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The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

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Client:	CITY OF ELLENSBURG	**Batch #:**	180619070
Address:	501 N ANDERSON ST ELLENSBURG, WA 98926	**Project Name:**	STREET SWEEPING VS CATCH BASIN CLEANING
Attn:	JON MORROW		

Analytical Results Report

Sample Number	180619070-001	**Sampling Date**	6/19/2018	**Date/Time Received**	6/19/2018 3:56 PM
Client Sample ID	061918 CBS1 TS	**Sampling Time**	12:15 PM	**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	7.2	Percent	0.1	6/28/2018	KAS	% solids	
%moisture	92.8	Percent		6/28/2018	KAS	%moisture	

Sample Number	180619070-002	**Sampling Date**	6/19/2018	**Date/Time Received**	6/19/2018 3:56 PM
Client Sample ID	061918 CBS2 TS	**Sampling Time**	12:00 PM	**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	17.7	Percent	0.1	6/28/2018	KAS	% solids	
%moisture	82.3	Percent		6/28/2018	KAS	%moisture	

Sample Number	180619070-003	**Sampling Date**	6/19/2018	**Date/Time Received**	6/19/2018 3:56 PM
Client Sample ID	061918 CBS3 TS	**Sampling Time**	12:00 PM	**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	24.1	Percent	0.1	6/28/2018	KAS	% solids	
%moisture	75.9	Percent		6/28/2018	KAS	%moisture	

Client:	CITY OF ELLENSBURG	**Batch #:**	180619070
Address:	501 N ANDERSON ST ELLENSBURG, WA 98926	**Project Name:**	STREET SWEEPING VS CATCH BASIN CLEANING
Attn:	JON MORROW		

Analytical Results Report

Sample Number	180619070-004	**Sampling Date**	6/19/2018	**Date/Time Received**	6/19/2018 3:56 PM
Client Sample ID	061918 CBS4 TS	**Sampling Time**	12:00 PM	**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	17.5	Percent	0.1	6/28/2018	KAS	% solids	
%moisture	82.5	Percent		6/28/2018	KAS	%moisture	

Sample Number	180619070-005	**Sampling Date**	6/19/2018	**Date/Time Received**	6/19/2018 3:56 PM
Client Sample ID	061918 CBS5 CS	**Sampling Time**	12:30 PM	**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	25.2	Percent	0.1	6/28/2018	KAS	% solids	
%moisture	74.8	Percent		6/28/2018	KAS	%moisture	

Sample Number	180619070-006	**Sampling Date**	6/19/2018	**Date/Time Received**	6/19/2018 3:56 PM
Client Sample ID	061918 CBS6 CS	**Sampling Time**	12:45 PM	**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	13.6	Percent	0.1	6/28/2018	KAS	% solids	
%moisture	86.4	Percent		6/28/2018	KAS	%moisture	

Client: CITY OF ELLENSBURG
Address: 501 N ANDERSON ST
ELLENSBURG, WA 98926
Attn: JON MORROW

Batch #: 180619070
Project Name: STREET SWEEPING VS CATCH BASIN CLEANING

Analytical Results Report

Sample Number 180619070-007
Client Sample ID 061918 CBS7 CS
Matrix Solid
Comments

Sampling Date 6/19/2018
Sampling Time 12:50 PM
Sample Location

Date/Time Received 6/19/2018 3:56 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	23.9	Percent	0.1	6/28/2018	KAS	% solids	
%moisture	76.1	Percent		6/28/2018	KAS	%moisture	

Authorized Signature Kathleen A. Sattler
Kathleen A. Sattler, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

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The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

SOILS
LABORATORY SUMMARY

				061918CBSTS	061918CBSCS	
LABORATORY NUMBER				18-0607	18-0608	18-0609
PROJECT SAMPLE NUMBER				061918 TS	061918 CS	061818SSTS
SAMPLED BY				Client	Client	Client
SAMPLE TYPE				Bulk	Bulk	Bulk
DATE RECEIVED				7/26/18	7/26/18	7/26/18
		Units	Test Method	North	South	North
MOISTURE CONTENT		%		1.8	1.5	5.5
SIEVE ANALYSIS			ASTM D422			
	3/4"					100
S	1/2"				100	99
I	3/8"			100	99	95
E	1/4"	%		95	97	88
V	#10			86	78	56
E	#16	P		83	73	40
	#30	A		81	69	22
S	#40	S		80	68	16
I	#100	S		76	61	8
Z	#200	I		73	55	5.3
E	.05mm	N		72	47	5.2
	.01mm	G		46	27	2.9
	.005mm			22	15	2.3
	.001mm			5.0	2.4	1.0

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Login Report

Customer Name: CITY OF ELLENSBURG
501 N ANDERSON ST
ELLENSBURG WA 98926

Order ID: 180619070
Order Date: 6/19/2018

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN CLEANING
Comment:

Sample #: 180619070-001 **Customer Sample #:** 061918 CBS1 TS

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/19/2018
Quantity: 1 **Date Received:** 6/19/2018 3:56:00 PM **Time Collected:** 12:15 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	6/29/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	6/29/2018	***Normal (~10 Days)***

Sample #: 180619070-002 **Customer Sample #:** 061918 CBS2 TS

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/19/2018
Quantity: 1 **Date Received:** 6/19/2018 3:56:00 PM **Time Collected:** 12:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	6/29/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	6/29/2018	***Normal (~10 Days)***

Sample #: 180619070-003 **Customer Sample #:** 061918 CBS3 TS

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/19/2018
Quantity: 1 **Date Received:** 6/19/2018 3:56:00 PM **Time Collected:** 12:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	6/29/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	6/29/2018	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
501 N ANDERSON ST
ELLENSBURG WA 98926

Order ID: 180619070
Order Date: 6/19/2018

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN CLEANING
Comment:

Sample #: 180619070-004 **Customer Sample #:** 061918 CBS4 TS

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/19/2018
Quantity: 1 **Date Received:** 6/19/2018 3:56:00 PM **Time Collected:** 12:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	6/29/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	6/29/2018	***Normal (~10 Days)***

Sample #: 180619070-005 **Customer Sample #:** 061918 CBS5 CS

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/19/2018
Quantity: 1 **Date Received:** 6/19/2018 3:56:00 PM **Time Collected:** 12:30 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	6/29/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	6/29/2018	***Normal (~10 Days)***

Sample #: 180619070-006 **Customer Sample #:** 061918 CBS6 CS

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/19/2018
Quantity: 1 **Date Received:** 6/19/2018 3:56:00 PM **Time Collected:** 12:45 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	6/29/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	6/29/2018	***Normal (~10 Days)***

Sample #: 180619070-007 **Customer Sample #:** 061918 CBS7 CS

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/19/2018
Quantity: 1 **Date Received:** 6/19/2018 3:56:00 PM **Time Collected:** 12:50 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	6/29/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	6/29/2018	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
501 N ANDERSON ST
ELLENSBURG WA 98926

Order ID: 180619070
Order Date: 6/19/2018

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN CLEANING

Comment:

Sample #: 180619070-008 **Customer Sample #:** COMPOSITE 061918 CBS1,2,3,4 TS

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/19/2018
Quantity: 1 **Date Received:** 6/19/2018 3:56:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	6/29/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	6/29/2018	***Normal (~10 Days)***

Sample #: 180619070-009 **Customer Sample #:** COMPOSITE 061918 CBS5,6,7 CS

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/19/2018
Quantity: 1 **Date Received:** 6/19/2018 3:56:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	6/29/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	6/29/2018	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	No
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	27.1/27.2
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	7

80619 070 **CELL** Last Due 6/29/2018
1st SAMP 6/19/2018 1st RCVD 6/19/2018
STREET SWEEPING VS CATCH BASIN CLEANING

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

Company Name: City of Ellensburg
Address: 501 N Anderson St
City: Ellensburg State: WA Zip: 98926
Phone: 509-929-3844
Fax:

Project Manager: Jon Morrow
Project Name & #: Street Sweeping vs. Catch Basin Cleaning
Email Address: morrowj@ci.ellensburg.wa.us
Purchase Order #:
Sampler Name & phone: Gordon Crane 509 962-7236

Turn Around Time & Reporting

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
__Email

Provide Sample Description

List Analyses Requested

Preservative:

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	Dry Weight	Particle Size Distribution
1	061918 CBS1 TS	6/19/18 12:15p	solid	1		X	
2	061918 CBS2 TS	6/19/18 12:00p	solid	1		X	
3	061918 CBS3 TS	6/19/18 12:00p	solid	1		X	
4	061918 CBS4 TS	6/19/18 12:00p	solid	1		X	
5	061918 CBS5 CS	6/19/18 12:30p	solid	1		X	
6	061918 CBS6 CS	6/19/18 12:45p	solid	1		X	
7	061918 CBS7 CS	6/19/18 12:50p	solid	1		X	

composite for PSD -008

composite for PSD -009

Note Special Instructions/Comments

Samples ending in TS + samples ending in CS should be grouped for PSD. Sediment should be left in felt socks to obtain dry weight.

	Printed Name	Signature	Company	Date	Time
Relinquished by	Gordon Crane	Gordon Crane	City of E'Burg	6-19-18	1:00p
Received by	Aimee Navickis-Brasch	A N Brasch	HDR	6/19/18	1:00p
Relinquished by	Aimee Navickis-Brasch	A N Brasch	HDR	6/19/18	4:00p
Received by	K Scott	K Scott	Anatek	6/19/18	1556
Relinquished by					
Received by					

Inspection Checklist

Received Intact? [✓ Y] N
Labels & Chains Agree? [✓ Y] N
Containers Sealed? [✓ Y] N
VOC Head Space? ~~Y N~~

hd/rc/NI/BOX

Temperature (°C): 27.1° / 27.2° IR#1
Preservative:
Date & Time: 6-20-18 1415
Inspected By: MW

August 2018 Data Collection Event

Anatek Labs, Inc.

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Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 180831032
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 180831032-001
Client Sample ID *082318SSTS1*
Matrix Solid
Comments

Sampling Date 8/30/2018
Sampling Time 10:45 AM
Sample Location

Date/Time Received 8/31/2018 1:14 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	16.2	%	0.1	9/5/2018 10:30:00 AM	BAS	% solids	
TVS	5.8	%	0.01	9/5/2018 10:30:00 AM	BAS	SM2540E	
%moisture	16.2	Percent		9/5/2018	BAS	%moisture	

Sample Number 180831032-002
Client Sample ID *082318SSTS2*
Matrix Solid
Comments

Sampling Date 8/30/2018
Sampling Time 10:45 AM
Sample Location

Date/Time Received 8/31/2018 1:14 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	15.3	%	0.1	9/5/2018 10:30:00 AM	BAS	% solids	
TVS	6.2	%	0.01	9/5/2018 10:30:00 AM	BAS	SM2540E	
%moisture	15.3	Percent		9/5/2018	BAS	%moisture	

Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 180831032
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 180831032-003
Client Sample ID *082318SSTS3*
Matrix Solid
Comments

Sampling Date 8/30/2018
Sampling Time 10:45 AM
Sample Location

Date/Time Received 8/31/2018 1:14 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	15.8	%	0.1	9/5/2018 10:30:00 AM	BAS	% solids	
TVS	5.6	%	0.01	9/5/2018 10:30:00 AM	BAS	SM2540E	
%moisture	15.8	Percent		9/5/2018	BAS	%moisture	

Sample Number 180831032-004
Client Sample ID *082318CBTS1*
Matrix Solid
Comments

Sampling Date 8/30/2018
Sampling Time 10:25 AM
Sample Location

Date/Time Received 8/31/2018 1:14 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	56.8	%	0.1	9/5/2018 10:30:00 AM	BAS	% solids	
TVS	30.7	%	0.01	9/5/2018 10:30:00 AM	BAS	SM2540E	
%moisture	56.8	Percent		9/5/2018	BAS	%moisture	

Sample Number 180831032-005
Client Sample ID *082318CBTS2*
Matrix Solid
Comments

Sampling Date 8/30/2018
Sampling Time 10:25 AM
Sample Location

Date/Time Received 8/31/2018 1:14 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	45.4	%	0.1	9/5/2018 10:30:00 AM	BAS	% solids	
TVS	17.4	%	0.01	9/5/2018 10:30:00 AM	BAS	SM2540E	
%moisture	45.4	Percent		9/5/2018	BAS	%moisture	

Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 180831032
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 180831032-006
Client Sample ID 082318CBTS3
Matrix Solid
Comments

Sampling Date 8/30/2018
Sampling Time 10:25 AM
Sample Location

Date/Time Received 8/31/2018 1:14 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	61.0	%	0.1	9/5/2018 10:30:00 AM	BAS	% solids	
TVS	39.7	%	0.01	9/5/2018 10:30:00 AM	BAS	SM2540E	
%moisture	61	Percent		9/5/2018	BAS	%moisture	

Sample Number 180831032-007
Client Sample ID 082318CBCS1
Matrix Solid
Comments

Sampling Date 8/30/2018
Sampling Time 10:30 AM
Sample Location

Date/Time Received 8/31/2018 1:14 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	42.6	%	0.1	9/5/2018 10:30:00 AM	BAS	% solids	
TVS	19.6	%	0.01	9/5/2018 10:30:00 AM	BAS	SM2540E	
%moisture	42.6	Percent		9/5/2018	BAS	%moisture	

Sample Number 180831032-008
Client Sample ID 082318CBCS2
Matrix Solid
Comments

Sampling Date 8/30/2018
Sampling Time 10:30 AM
Sample Location

Date/Time Received 8/31/2018 1:14 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	41.7	%	0.1	9/5/2018 10:30:00 AM	BAS	% solids	
TVS	16.9	%	0.01	9/5/2018 10:30:00 AM	BAS	SM2540E	
%moisture	41.7	Percent		9/5/2018	BAS	%moisture	

Client:	CITY OF ELLENSBURG	**Batch #:**	180831032
Address:	1401 E TRENT AVE, SUITE 101 SPOKANE, WA 99202	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Attn:	JON MORROW		

Analytical Results Report

Sample Number	180831032-009	**Sampling Date**	8/30/2018	**Date/Time Received**	8/31/2018 1:14 PM
Client Sample ID	*082318CBCS3*	**Sampling Time**	10:30 AM	**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	62.4	%	0.1	9/5/2018 10:30:00 AM	BAS	% solids	
TVS	37.7	%	0.01	9/5/2018 10:30:00 AM	BAS	SM2540E	
%moisture	62.4	Percent		9/5/2018	BAS	%moisture	

Authorized Signature Kathleen A. Sattler

Kathleen A. Sattler, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Budinger & Associates

Geotechnical Engineering
Environmental Engineering
Construction Materials Testing
Subsurface Exploration
Special Inspection

Proudly serving the Inland Northwest since 1976

Kathy Sattler
Anatek Labs, Inc
504 E Sprague Ave Ste D
Spokane, WA 99202

September 24, 2018

Project Number L18532

PROJECT: **City of Ellensburg QAPP**

SUBJECT: **Results of Laboratory Testing**
Report #2

At your request, we provided laboratory testing services for the subject project. Services were limited to the performance of testing of laboratory tests, selected at your discretion.

For this period, our involvement was limited to laboratory testing of three two delivered to our laboratory on September 14, 2018. Laboratory tests were conducted in general accordance with methods listed on the attached Laboratory *Summary* sheet.

If you have questions regarding this report, please call.

Respectfully Submitted,
Budinger & Associates, Inc.

Terri Ballard

Terri Ballard
Laboratory Manager

TJB/kh/Addressee –
Kathy Sattler-kathys@anateklabs.com

Attachments:
Soils Laboratory Summary - (1 page)

4-5-6 and 7-8-9 refer to numbers on left-hand side of COC

SOILS
LABORATORY SUMMARY

				061918CBSTS	061918CBSCS	061918SSTS	082318CBTS	082318CBCS
LABORATORY NUMBER				18-0607	18-0608	18-0609	18-0856	18-0857
PROJECT SAMPLE NUMBER				180619070-008	180619070-009	180706055-010	180831032 004-005-006	180831032 007-008-009
SAMPLED BY				Client	Client	Client	Client	Client
SAMPLE TYPE				Bulk	Bulk	Bulk	Bulk	Bulk
DATE RECEIVED				7/26/18	7/26/18	7/26/18	9/14/18	9/14/18
		Units	Test Method	North	South	North	North	South
MOISTURE CONTENT		%		1.8	1.5	5.5	1.2	1.2
SIEVE ANALYSIS			ASTM D422					
	1"						100	
	3/4"					100	100-	
S	1/2"	%			100	99	98	100
I	3/8"			100	99	95	95	99
E	1/4"	P		95	97	88	89	93
V	#10	A		86	78	56	65	67
E	#16	S		83	73	40	56	58
	#30	S		81	69	22	41	46
S	#40	I		80	68	16	35	39
I	#100	N		76	61	8	17	22
Z	#200	G		73	55	5.3	9.8	15
E	.05mm			72	47	5.2	7.7	12
	.01mm			46	27	2.9	2.5	4.6
	.005mm			22	15	2.3	1.3	3.5
	.001mm			5.0	2.4	1.0	1.3	1.7

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

---

Login Report

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 180831032
Order Date: 8/31/2018

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN
Comment: PSD SUBCONTRACTED TO BUDINGER

Sample #: 180831032-001 **Customer Sample #:** *082318SSTS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/30/2018
Quantity: 1 **Date Received:** 8/31/2018 1:14:00 PM **Time Collected:** 10:45 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/13/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	9/13/2018	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	9/13/2018	***Normal (~10 Days)***

Sample #: 180831032-002 **Customer Sample #:** *082318SSTS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/30/2018
Quantity: 1 **Date Received:** 8/31/2018 1:14:00 PM **Time Collected:** 10:45 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/13/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	9/13/2018	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	9/13/2018	***Normal (~10 Days)***

Sample #: 180831032-003 **Customer Sample #:** *082318SSTS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/30/2018
Quantity: 1 **Date Received:** 8/31/2018 1:14:00 PM **Time Collected:** 10:45 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/13/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	9/13/2018	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	9/13/2018	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 180831032
Order Date: 8/31/2018

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment: PSD SUBCONTRACTED TO BUDINGER

Sample #: 180831032-004 **Customer Sample #:** *082318CBTS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/30/2018
Quantity: 1 **Date Received:** 8/31/2018 1:14:00 PM **Time Collected:** 10:25 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/13/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	9/13/2018	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	9/13/2018	***Normal (~10 Days)***

Sample #: 180831032-005 **Customer Sample #:** *082318CBTS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/30/2018
Quantity: 1 **Date Received:** 8/31/2018 1:14:00 PM **Time Collected:** 10:25 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/13/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	9/13/2018	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	9/13/2018	***Normal (~10 Days)***

Sample #: 180831032-006 **Customer Sample #:** *082318CBTS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/30/2018
Quantity: 1 **Date Received:** 8/31/2018 1:14:00 PM **Time Collected:** 10:25 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/13/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	9/13/2018	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	9/13/2018	***Normal (~10 Days)***

Sample #: 180831032-007 **Customer Sample #:** *082318CBCS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/30/2018
Quantity: 1 **Date Received:** 8/31/2018 1:14:00 PM **Time Collected:** 10:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/13/2018	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 180831032
Order Date: 8/31/2018

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN
Comment: PSD SUBCONTRACTED TO BUDINGER

%Moisture	S	%moisture	9/13/2018	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	9/13/2018	***Normal (~10 Days)***

Sample #: 180831032-008 **Customer Sample #:** *082318CBCS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/30/2018
Quantity: 1 **Date Received:** 8/31/2018 1:14:00 PM **Time Collected:** 10:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/13/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	9/13/2018	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	9/13/2018	***Normal (~10 Days)***

Sample #: 180831032-009 **Customer Sample #:** *082318CBCS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/30/2018
Quantity: 1 **Date Received:** 8/31/2018 1:14:00 PM **Time Collected:** 10:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/13/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	9/13/2018	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	9/13/2018	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	9.3/9.4
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	9

Anatek Labs, Inc.

Chain of Custody Record

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504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

80831 032 **CELL** Last Due 9/13/2018
1st SAMP 8/30/2018 1st RCVD 8/31/2018
STREET SWEEPING VS CATCH BASIN

Company Name: City of Ellensburg
Address: 1401 E. Trent Ave, Suite 101
City: Spokane State: WA Zip: 99202
Phone: (509) 343-8515
Fax:

Project Manager: Jon Morrow
Project Name & #: Street Sweeping vs Catch Basin
Email Address: morrowj@ci.ellensburg.wa.us
Purchase Order #:
Sampler Name & phone: Gordon Crane 509 962-7236

Turn Around Time & Reporting

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

✓ Normal
__Next Day*
__2nd Day*
__Other*_______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
× Email

Provide Sample Description

Catch basin and street sediment

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	Preservative: # of Containers	Sample Volume	Moisture Content ASTM D2216	PSD ASTM D422	Organic Content ASTM D2974	TVS						
1	082318SSTS1	8-30-18 10:45AM	solid	1	4oz	×		×							
2	082318SSTS2	"	solid	1	↓	×		×							
3	082318SSTS3	"	solid	1	↓	×		×							
4	082318CBTS1	10:25AM	solid	1	↓	×	×	×							
5	082318CBTS2	"	solid	1	↓	×		×							
6	082318CBTS3	"	solid	1	↓	×		×							
7	082318CBCS1	10:30AM	solid	1	↓	×	×	×							
8	082318CBCS2	"	solid	1	↓	×		×							
9	082318CBCS3	↓ "	solid	1	↓	×		×							

Note Special Instructions/Comments

Please send a copy of the results to Jon at email above and Aimee at aimee.navickis-brasch@hdrinc.com

For ASTM D422 testing, combine all 082218CBTS samples, then combine all 082218CBCS samples and use the following sieve sizes:
>2mm, 0.25-2mm, 0.075-0.25mm, <0,075 mm

SWBS
BUDI - PSD

	Printed Name	Signature	Company	Date	Time
Relinquished by	Gordon Crane	Gordon Crane	City of Ellensburg	8-30-18	1:55
Received by	Wendy OZ	Wendy Oz	Anatek	8-31-18	134
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact? [✓ Y] N
Labels & Chains Agree? [✓ Y] N
Containers Sealed? [✓ Y] N
VOC Head Space? Y N

UPS/c/i

Temperature (°C): 9.3/9.4 IR1
Preservative: —

Date & Time: 8-31-18 1314
Inspected By: Wz

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Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 180828022
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 180828022-001
Client Sample ID *082318CBS1 TS*
Matrix Solid
Comments

Sampling Date 8/23/2018
Sampling Time 11:00 AM
Sample Location

Date/Time Received 8/28/2018 12:46 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	94.1	%	0.1	8/30/2018	CME	% solids	
%moisture	5.9	%		8/30/2018	CME	%moisture	

Sample Number 180828022-002
Client Sample ID *082318CBS2 TS*
Matrix Solid
Comments

Sampling Date 8/23/2018
Sampling Time 11:00 AM
Sample Location

Date/Time Received 8/28/2018 12:46 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	95.1	%	0.1	8/30/2018	CME	% solids	
%moisture	4.9	%		8/30/2018	CME	%moisture	

Sample Number 180828022-003
Client Sample ID *082318CBS3 TS*
Matrix Solid
Comments

Sampling Date 8/23/2018
Sampling Time 11:00 AM
Sample Location

Date/Time Received 8/28/2018 12:46 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	92.5	%	0.1	8/30/2018	CME	% solids	
%moisture	7.5	%		8/30/2018	CME	%moisture	

Sample Number 180828022-004
Client Sample ID *082318CBS4 TS*
Matrix Solid
Comments

Sampling Date 8/23/2018
Sampling Time 11:00 AM
Sample Location

Date/Time Received 8/28/2018 12:46 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	93.0	%	0.1	8/30/2018	CME	% solids	
%moisture	7.0	%		8/30/2018	CME	%moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	CITY OF ELLENSBURG	**Batch #:**	180828022
Address:	1401 E TRENT AVE, SUITE 101 SPOKANE, WA 99202	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Attn:	JON MORROW		

Analytical Results Report

Sample Number	180828022-005	**Sampling Date**	8/23/2018	**Date/Time Received**	8/28/2018	12:46 PM
Client Sample ID	*082318CBS5 CS*	**Sampling Time**	11:00 AM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	93.1	%	0.1	8/30/2018	CME	% solids	
%moisture	6.9	%		8/30/2018	CME	%moisture	

Sample Number	180828022-006	**Sampling Date**	8/23/2018	**Date/Time Received**	8/28/2018	12:46 PM
Client Sample ID	*082318CBS6 CS*	**Sampling Time**	11:00 AM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	88.8	%	0.1	8/30/2018	CME	% solids	
%moisture	11.2	%		8/30/2018	CME	%moisture	

Sample Number	180828022-007	**Sampling Date**	8/23/2018	**Date/Time Received**	8/28/2018	12:46 PM
Client Sample ID	*082318CBS7 CS*	**Sampling Time**	11:00 AM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	94.4	%	0.1	8/30/2018	CME	% solids	
%moisture	1.91	%		8/30/2018	CME	%moisture	

Authorized Signature Kathleen A. Sattler

Kathleen A. Sattler, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Sample Extraction Logbook

%Moisture instructions: Determine the percent moisture for each solid sample by oven drying about 10.0g of sample at 105°C for 2 hours. Allow to cool in a dessicator and re-weigh. Oven dry for an additional 30 minutes and re-weigh. Further drying is necessary if the two weighings differ by more than 1%.

Lab Sample ID	Dish ID	Dish wt (g)	Dish + wet (g)	Dry 1 (g)	Dry 2 (g)	% moisture	Sample Weight (g)	Method	Balance	Date/Time	Initials
082318CBS1 TS	Socks	280	292.50	291.76	291.76	5.9	NA	% Moisture	BAL-2	8-30-18 / 1400	KAS
082318CBS2 TS		284	297.53	296.86	296.88	4.9					
082318CBS3 TS		280	295.11	294.34	293.98	7.5					
082318CBS4 TS		282	296.02	295.35	295.04	7.0					
082318CBS5 CS		280	288.43	287.88	287.85	6.9					
082318CBS6 CS		282	286.72	286.22	286.19	11.2					
082318CBS7 CS		280	295.89	295.27	295.00	5.6					

Comments:

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Login Report

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 180828022
Order Date: 8/28/2018

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN
Comment:

Sample #: 180828022-001 **Customer Sample #:** *082318CBS1 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/23/2018
Quantity: 1 **Date Received:** 8/28/2018 12:46:00 PM **Time Collected:** 11:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/10/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	9/10/2018	***Normal (~10 Days)***

Sample #: 180828022-002 **Customer Sample #:** *082318CBS2 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/23/2018
Quantity: 1 **Date Received:** 8/28/2018 12:46:00 PM **Time Collected:** 11:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/10/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	9/10/2018	***Normal (~10 Days)***

Sample #: 180828022-003 **Customer Sample #:** *082318CBS3 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/23/2018
Quantity: 1 **Date Received:** 8/28/2018 12:46:00 PM **Time Collected:** 11:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/10/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	9/10/2018	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 180828022
Order Date: 8/28/2018

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

Sample #: 180828022-004 **Customer Sample #:** *082318CBS4 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/23/2018
Quantity: 1 **Date Received:** 8/28/2018 12:46:00 PM **Time Collected:** 11:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/10/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	9/10/2018	***Normal (~10 Days)***

Sample #: 180828022-005 **Customer Sample #:** *082318CBS5 CS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/23/2018
Quantity: 1 **Date Received:** 8/28/2018 12:46:00 PM **Time Collected:** 11:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/10/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	9/10/2018	***Normal (~10 Days)***

Sample #: 180828022-006 **Customer Sample #:** *082318CBS6 CS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/23/2018
Quantity: 1 **Date Received:** 8/28/2018 12:46:00 PM **Time Collected:** 11:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/10/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	9/10/2018	***Normal (~10 Days)***

Sample #: 180828022-007 **Customer Sample #:** *082318CBS7 CS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/23/2018
Quantity: 1 **Date Received:** 8/28/2018 12:46:00 PM **Time Collected:** 11:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/10/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	9/10/2018	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG

1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 180828022

Order Date: 8/28/2018

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

SAMPLE CONDITION RECORD

Samples received in a cooler?	No
Samples received intact?	Yes
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	7

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

30828 022 **CELL** Last Due 9/10/2018
1st SAMP 8/23/2018 1st RCVD 8/28/2018
STREET SWEEPING VS CATCH BASIN

Company Name: City of Ellensburg
Address: 1401 E. Trent Ave, Suite 101
City: Spokane State: WA Zip: 99202
Phone: (509) 343-8515
Fax:

Project Manager: Jon Morrow
Project Name & #: Street Sweeping vs Catch Basin
Email Address: morrowj@ci.ellensburg.wa.us
Purchase Order #:
Sampler Name & phone: Gordon Crane 509 962-7236

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

Sediment collected in filter socks

List Analyses Requested

Preservative:

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume Dry Weight	PSD ASTM D422								
1	082318CBS1 TS	8/23/18 11 AM	solid			x								
2	082318CBS2 TS	8/23/18 11 AM	solid			x								
3	082318CBS3 TS	8/23/18 11 AM	solid			x								
4	082318CBS4 TS	8/23/18 11 AM	solid			x								
5	082318CBS5 CS	8/23/18 11 AM	solid			x								
6	082318CBS6 CS	8/23/18 11 AM	solid			x								
7	082318CBS7 CS	8/23/18 11 AM	solid			x								

Note Special Instructions/Comments

Please send a copy of the results to Jon at email above and Aimee at aimee.navickis-brasch@hdrinc.com

SWBS

	Printed Name	Signature	Company	Date	Time
Relinquished by	Gordon Crane	Gordon Crane	City of Ellensburg	8-27-18	09:35
Received by	Wendy Oz	Wendy Oz	Anatek	8/28/18	1246
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact? [✓ Y] N
Labels & Chains Agree? [✓ Y] N
Containers Sealed? [✓ Y] N
VOC Head Space? ~~Y N~~

UPS/nc/ni

Temperature (°C): —
Preservative: —
Date & Time: 8-28-18 1246
Inspected By:

Form COC01.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

October 2018 Data Collection Event

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 181102027
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 181102027-001
Client Sample ID 102418SSTS1
Matrix Solid
Comments
Sampling Date 10/31/2018
Sampling Time
Sample Location
Date/Time Received 11/2/2018 12:50 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	84.2	%	0.1	11/8/2018 1:00:00 PM	HMD	% solids	
%moisture	15.8	%		11/8/2018 1:00:00 PM	HMD	%moisture	

Sample Number 181102027-002
Client Sample ID 102418SSTS2
Matrix Solid
Comments
Sampling Date 10/31/2018
Sampling Time
Sample Location
Date/Time Received 11/2/2018 12:50 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	74.4	%	0.1	11/8/2018 1:00:00 PM	HMD	% solids	
%moisture	25.6	%		11/8/2018 1:00:00 PM	HMD	%moisture	

Sample Number 181102027-003
Client Sample ID 102418SSTS3
Matrix Solid
Comments
Sampling Date 10/31/2018
Sampling Time
Sample Location
Date/Time Received 11/2/2018 12:50 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	83.9	%	0.1	11/8/2018 1:00:00 PM	HMD	% solids	
%moisture	16.1	%		11/8/2018 1:00:00 PM	HMD	%moisture	

Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 181102027
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 181102027-004
Client Sample ID *102418CBTS1*
Matrix Solid
Comments

Sampling Date 10/31/2018
Sampling Time
Sample Location

Date/Time Received 11/2/2018 12:50 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	56.7	%	0.1	11/8/2018 1:00:00 PM	HMD	% solids	
%moisture	43.3	%		11/8/2018 1:00:00 PM	HMD	%moisture	

Sample Number 181102027-005
Client Sample ID *102418CBTS2*
Matrix Solid
Comments

Sampling Date 10/31/2018
Sampling Time
Sample Location

Date/Time Received 11/2/2018 12:50 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	62.1	%	0.1	11/8/2018 1:00:00 PM	HMD	% solids	
%moisture	37.9	%		11/8/2018 1:00:00 PM	HMD	%moisture	

Sample Number 181102027-006
Client Sample ID *102418CBTS3*
Matrix Solid
Comments

Sampling Date 10/31/2018
Sampling Time
Sample Location

Date/Time Received 11/2/2018 12:50 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	53.1	%	0.1	11/8/2018 1:00:00 PM	HMD	% solids	
%moisture	46.9	%		11/8/2018 1:00:00 PM	HMD	%moisture	

Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 181102027
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 181102027-007
Client Sample ID 102418CBCS1
Matrix Solid
Comments

Sampling Date 10/31/2018
Sampling Time
Sample Location

Date/Time Received 11/2/2018 12:50 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	35.6	%	0.1	11/8/2018 1:00:00 PM	HMD	% solids	
%moisture	64.4	%		11/8/2018 1:00:00 PM	HMD	%moisture	

Sample Number 181102027-008
Client Sample ID 102418CBCS2
Matrix Solid
Comments

Sampling Date 10/31/2018
Sampling Time
Sample Location

Date/Time Received 11/2/2018 12:50 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	41.5	%	0.1	11/8/2018 1:00:00 PM	HMD	% solids	
%moisture	58.5	%		11/8/2018 1:00:00 PM	HMD	%moisture	

Sample Number 181102027-009
Client Sample ID 102418CBCS3
Matrix Solid
Comments

Sampling Date 10/31/2018
Sampling Time
Sample Location

Date/Time Received 11/2/2018 12:50 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	51.9	%	0.1	11/8/2018 1:00:00 PM	HMD	% solids	
%moisture	48.1	%		11/8/2018 1:00:00 PM	HMD	%moisture	

Client:	CITY OF ELLENSBURG	**Batch #:**	181102027
Address:	1401 E TRENT AVE, SUITE 101 SPOKANE, WA 99202	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Attn:	JON MORROW		

Analytical Results Report

Sample Number	181102027-010	**Sampling Date**	10/31/2018	**Date/Time Received**	11/2/2018 12:50 PM
Client Sample ID	*102418SSCS1*	**Sampling Time**		**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	32.3	%	0.1	11/8/2018 1:00:00 PM	HMD	% solids	
%moisture	7.7	%		11/8/2018 1:00:00 PM	HMD	%moisture	

Sample Number	181102027-011	**Sampling Date**	10/31/2018	**Date/Time Received**	11/2/2018 12:50 PM
Client Sample ID	*102418SSCS2*	**Sampling Time**		**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	84.5	%	0.1	11/8/2018 1:00:00 PM	HMD	% solids	
%moisture	15.5	%		11/8/2018 1:00:00 PM	HMD	%moisture	

Sample Number	181102027-012	**Sampling Date**	10/31/2018	**Date/Time Received**	11/2/2018 12:50 PM
Client Sample ID	*102418SSCS3*	**Sampling Time**		**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	91.5	%	0.1	11/8/2018 1:00:00 PM	HMD	% solids	
%moisture	8.5	%		11/8/2018 1:00:00 PM	HMD	%moisture	

Client:	CITY OF ELLENSBURG	**Batch #:**	181102027
Address:	1401 E TRENT AVE, SUITE 101 SPOKANE, WA 99202	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Attn:	JON MORROW		

Analytical Results Report

Authorized Signature Kathleen A. Sattler

Kathleen A. Sattler, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

SOILS
LABORATORY SUMMARY

				061918CBSTS	061918CBSCS	061918SSTS	082318CBTS	082318CBCS	102418CBTS	102418CBCS
LABORATORY NUMBER				18-0607	18-0608	18-0609	18-0856	18-0857	18-1134	18-1135
PROJECT SAMPLE NUMBER				180619070-008	180619070-009	180706055-010	180831032	180831032	CBTS	CBSC
							004-005-006	007-008-009		
SAMPLED BY				Client	Client	Client	Client	Client	Client	Client
SAMPLE TYPE				Bulk	Bulk	Bulk	Bulk	Bulk	Bulk	Bulk
DATE RECEIVED				7/26/18	7/26/18	7/26/18	9/14/18	9/14/18	11/27/18	11/27/18
				North	South	North	North	South	North	South
		Units	Test Method							
MOISTURE CONTENT		%		1.8	1.5	5.5	1.2	1.2	62.6	121.7
SIEVE ANALYSIS			ASTM D422							
	1"						100			
	3/4"					100	100-		100	
S	1/2"	%			100	99	98	100	98	100
I	3/8"			100	99	95	95	99	96	98
E	1/4"	P		95	97	88	89	93	91	92
V	#10	A		86	78	56	65	67	73	70
E	#16	S		83	73	40	56	58	59	51
	#30	S		81	69	22	41	46	45	35
S	#40	I		80	68	16	35	39	39	29
I	#100	N		76	61	8	17	22	24	20
Z	#200	G		73	55	5.3	9.8	15	20	17
E	.05mm			72	47	5.2	7.7	12	18	15
	.01mm			46	27	2.9	2.5	4.6	12	9.0
	.005mm			22	15	2.3	1.3	3.5	10	7.8
	.001mm			5.0	2.4	1.0	1.3	1.7	4.0	3.0

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 181102027
Order Date: 11/2/2018

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN
Comment:

Sample #: 181102027-001 **Customer Sample #:** *102418SSTS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2018
Quantity: 1 **Date Received:** 11/2/2018 12:50:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/9/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/9/2018	***Normal (~10 Days)***

Sample #: 181102027-002 **Customer Sample #:** *102418SSTS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2018
Quantity: 1 **Date Received:** 11/2/2018 12:50:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/9/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/9/2018	***Normal (~10 Days)***

Sample #: 181102027-003 **Customer Sample #:** *102418SSTS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2018
Quantity: 1 **Date Received:** 11/2/2018 12:50:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/9/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/9/2018	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 181102027
Order Date: 11/2/2018

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

Sample #: 181102027-004 **Customer Sample #:** *102418CBTS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2018
Quantity: 1 **Date Received:** 11/2/2018 12:50:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/9/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/9/2018	***Normal (~10 Days)***

Sample #: 181102027-005 **Customer Sample #:** *102418CBTS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2018
Quantity: 1 **Date Received:** 11/2/2018 12:50:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/9/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/9/2018	***Normal (~10 Days)***

Sample #: 181102027-006 **Customer Sample #:** *102418CBTS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2018
Quantity: 1 **Date Received:** 11/2/2018 12:50:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/9/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/9/2018	***Normal (~10 Days)***

Sample #: 181102027-007 **Customer Sample #:** *102418CBCS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2018
Quantity: 1 **Date Received:** 11/2/2018 12:50:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/9/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/9/2018	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 181102027
Order Date: 11/2/2018

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN
Comment:

Sample #: 181102027-008 **Customer Sample #:** *102418CBCS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2018
Quantity: 1 **Date Received:** 11/2/2018 12:50:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/9/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/9/2018	***Normal (~10 Days)***

Sample #: 181102027-009 **Customer Sample #:** *102418CBCS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2018
Quantity: 1 **Date Received:** 11/2/2018 12:50:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/9/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/9/2018	***Normal (~10 Days)***

Sample #: 181102027-010 **Customer Sample #:** *102418SSCS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2018
Quantity: 1 **Date Received:** 11/2/2018 12:50:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/9/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/9/2018	***Normal (~10 Days)***

Sample #: 181102027-011 **Customer Sample #:** *102418SSCS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2018
Quantity: 1 **Date Received:** 11/2/2018 12:50:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/9/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/9/2018	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 181102027
Order Date: 11/2/2018

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

Sample #: 181102027-012 **Customer Sample #:** *102418SSCS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2018

Quantity: 1 **Date Received:** 11/2/2018 12:50:00 PM **Time Collected:**

Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/9/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/9/2018	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	2.7/2.8
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	12

81102 027 **CELL** Last Due **11/9/2018**
1st SAMP 10/31/201 1st RCVD 11/2/2018
STREET SWEEPING VS CATCH
BASIN

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

Company Name: City of Ellensburg
Address: 1401 E. Trent Ave, Suite 101
City: Spokane State: WA Zip: 99202
Phone: (509) 343-8515
Fax:

Project Manager: Jon Morrow
Project Name & #: Street Sweeping vs Catch Basin
Email Address: morrowj@ci.ellensburg.wa.us
Purchase Order #:
Sampler Name & phone: Gordon Crane 509 962-7236

Turn Around Time & Reporting

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

☑ Normal
☐ Next Day*
☐ 2nd Day*
☐ Other*

*All rush order requests must be prior approved.

☐ Phone
☐ Mail
☐ Fax
☑ Email

Provide Sample Description

Catch basin and street sediment

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	Moisture Content ASTM D2216	PSD ASTM D422	Organic Content ASTM D2974
1	102418SSTS1	10/31/2018	solid			x		
2	102418SSTS2	10/31/2018	solid			x		
3	102418SSTS3	10/31/2018	solid			x		
4	102418CBTS1	10/31/2018	solid			x	x	
5	102418CBTS2	10/31/2018	solid			x		
6	102418CBTS3	10/31/2018	solid			x		
7	102418CBCS1	10/31/2018	solid			x	x	
8	102418CBCS2	10/31/2018	solid			x		
9	102418CBCS3	10/31/2018	solid			x		
10	102418SSCS1	10/31/2018	solid			x		
11	102418SSCS2	10/31/2018	solid			x		
12	102418SSCS3	10/31/2018	solid			x		

Preservative:

Note Special Instructions/Comments

Please send a copy of the results to Jon at email above and Aimee at aimee.navickis-brasch@hdrinc.com

For ASTM D422 testing, combine all 082218CBTS samples, then combine all 082218CBCS samples and use the following sieve sizes:
>2mm, 0.25-2mm, 0.075-0.25mm, <0.075 mm

	Printed Name	Signature	Company	Date	Time
Relinquished by	Gordon Crane	Gordon Crane	City of Ellensburg	11-1-18	12:00AM
Received by	Wendy Oz	Wendy Oz	Anatek	11-2-18	1250
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact? [✓ Y] N
Labels & Chains Agree? [✓ Y] N
Containers Sealed? [✓ Y] N
VOC Head Space? ~~Y N~~

UPS/c/i

Temperature (°C): 2.7/2.8 IR1
Preservative:
Date & Time: 11-2-18 1440
Inspected By: Woz

Page 1 of 1

Form COC01.00 - Eff 1 Mar 2015

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 181026039
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 181026039-001
Client Sample ID *102418CBS1 TS*
Matrix Solid
Comments

Sampling Date 10/24/2018
Sampling Time 3:00 PM
Sample Location

Date/Time Received 10/26/2018 11:30 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	11.1	%	0.1	11/14/2018 12:00:00 PM	HMD	% solids	
%moisture	88.9	%		11/14/2018 12:00:00 PM	HMD	%moisture	

Sample Number 181026039-002
Client Sample ID *102418CBS2 TS*
Matrix Solid
Comments

Sampling Date 10/24/2018
Sampling Time 3:00 PM
Sample Location

Date/Time Received 10/26/2018 11:30 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	23.5	%	0.1	11/14/2018 12:00:00 PM	HMD	% solids	
%moisture	76.5	%		11/14/2018 12:00:00 PM	HMD	%moisture	

Sample Number 181026039-003
Client Sample ID *102418CBS3 TS*
Matrix Solid
Comments

Sampling Date 10/24/2018
Sampling Time 3:00 PM
Sample Location

Date/Time Received 10/26/2018 11:30 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	18.1	%	0.1	11/14/2018 12:00:00 PM	HMD	% solids	
%moisture	81.9	%		11/14/2018 12:00:00 PM	HMD	%moisture	

Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 181026039
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 181026039-004
Client Sample ID *102418CBS4 TS*
Matrix Solid
Comments

Sampling Date 10/24/2018
Sampling Time 3:00 PM
Sample Location

Date/Time Received 10/26/2018 11:30 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	19.1	%	0.1	11/14/2018 12:00:00 PM	HMD	% solids	
%moisture	80.9	%		11/14/2018 12:00:00 PM	HMD	%moisture	

Sample Number 181026039-005
Client Sample ID *102418CBS5 TS*
Matrix Solid
Comments

Sampling Date 10/24/2018
Sampling Time 3:00 PM
Sample Location

Date/Time Received 10/26/2018 11:30 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	6.1	%	0.1	11/14/2018 12:00:00 PM	HMD	% solids	
%moisture	93.9	%		11/14/2018 12:00:00 PM	HMD	%moisture	

Sample Number 181026039-006
Client Sample ID *102418CBS6 TS*
Matrix Solid
Comments

Sampling Date 10/24/2018
Sampling Time 3:00 PM
Sample Location

Date/Time Received 10/26/2018 11:30 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	4.2	%	0.1	11/14/2018 12:00:00 PM	HMD	% solids	
%moisture	95.8	%		11/14/2018 12:00:00 PM	HMD	%moisture	

Client:	CITY OF ELLENSBURG	**Batch #:**	181026039
Address:	1401 E TRENT AVE, SUITE 101 SPOKANE, WA 99202	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Attn:	JON MORROW		

Analytical Results Report

Sample Number	181026039-007	**Sampling Date**	10/24/2018	**Date/Time Received**	10/26/2018 11:30 AM
Client Sample ID	*102418CBS7 TS*	**Sampling Time**	3:00 PM	**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	7.7	%	0.1	11/14/2018 12:00:00 PM	HMD	% solids	
%moisture	92.3	%		11/14/2018 12:00:00 PM	HMD	%moisture	

Authorized Signature Kathleen A. Sattler

Kathleen A. Sattler, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

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The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Sample Extraction Logbook

%Moisture instructions: Determine the percent moisture for each solid sample by oven drying about 10.0g of sample at 105°C for 2 hours. Allow to cool in a dessicator and re-weigh. Oven dry for an additional 30 minutes and re-weigh. Further drying is necessary if the two weighings differ by more than 1%.

Lab Sample ID	Dish ID	Dish wt (g)	Dish + wet (g)	Dry 1 (g)	Dry 2 (g)	% moisture	Sample Weight (g)	Method	Balance	Date/Time	Initials
102418CBS1 TS -001		280	640	320	310	88.9		%MOIST		11-14-18 1200	HmD
102418CBS2 TS -002		284	820	310	410	76.5					
102418CBS3 TS -003		280	1000	410	360	81.9					
102418CBS4 TS -004		282	951	410	360	80.9					
102418CBS5 TS -005		280	770	280	310	939					
102418CBS6 TS -006		282	951	310	310	95.8					
102418CBS7 TS -007		280	1320	320	360	92.3					

Comments:

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 181026039
Order Date: 10/26/2018

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN
Comment:

Sample #: 181026039-001 **Customer Sample #:** *102418CBS1 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/24/2018
Quantity: 1 **Date Received:** 10/26/2018 11:30:00 AM **Time Collected:** 3:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/2/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/2/2018	***Normal (~10 Days)***

Sample #: 181026039-002 **Customer Sample #:** *102418CBS2 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/24/2018
Quantity: 1 **Date Received:** 10/26/2018 11:30:00 AM **Time Collected:** 3:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/2/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/2/2018	***Normal (~10 Days)***

Sample #: 181026039-003 **Customer Sample #:** *102418CBS3 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/24/2018
Quantity: 1 **Date Received:** 10/26/2018 11:30:00 AM **Time Collected:** 3:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/2/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/2/2018	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 181026039
Order Date: 10/26/2018

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

Sample #: 181026039-004 **Customer Sample #:** *102418CBS4 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/24/2018
Quantity: 1 **Date Received:** 10/26/2018 11:30:00 AM **Time Collected:** 3:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/2/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/2/2018	***Normal (~10 Days)***

Sample #: 181026039-005 **Customer Sample #:** *102418CBS5 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/24/2018
Quantity: 1 **Date Received:** 10/26/2018 11:30:00 AM **Time Collected:** 3:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/2/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/2/2018	***Normal (~10 Days)***

Sample #: 181026039-006 **Customer Sample #:** *102418CBS6 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/24/2018
Quantity: 1 **Date Received:** 10/26/2018 11:30:00 AM **Time Collected:** 3:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/2/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/2/2018	***Normal (~10 Days)***

Sample #: 181026039-007 **Customer Sample #:** *102418CBS7 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/24/2018
Quantity: 1 **Date Received:** 10/26/2018 11:30:00 AM **Time Collected:** 3:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/2/2018	***Normal (~10 Days)***
%Moisture	S	%moisture	11/2/2018	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 181026039

Order Date: 10/26/2018

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

SAMPLE CONDITION RECORD

Samples received in a cooler?	No
Samples received intact?	Yes
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	7

31026 039 **CELL** Last Due 11/2/2018
1st SAMP 10/24/201 1st RCVD 10/26/2018
STREET SWEEPING VS CATCH BASIN

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

Company Name: City of Ellensburg
Address: 1401 E. Trent Ave, Suite 101
City: Spokane State: WA Zip: 99202
Phone: (509) 343-8515
Fax:

Project Manager: Jon Morrow
Project Name & #: Street Sweeping vs Catch Basin
Email Address: morrowj@ci.ellensburg.wa.us
Purchase Order #:
Sampler Name & phone: Gordon Crane

Turn Around Time & Reporting

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

Sediment collected in filter socks

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	Preservative: # of Containers	Sample Volume	PSD ASTM D422									
	102418CBS1 TS	10/24/2018 3PM	solid			✗									
	102418CBS2 TS	10/24/2018 3PM	solid			✗									
	102418CBS3 TS	10/24/2018 3PM	solid			✗									
	102418CBS4 TS	10/24/2018 3PM	solid			✗									
	102418CBS5 CS	10/24/2018 3PM	solid			✗									
	102418CBS6 CS	10/24/2018 3PM	solid			✗									
	102418CBS7 CS	10/24/2018 3PM	solid			✗									

Note Special Instructions/Comments

Please send a copy of the results to Jon at email above and Aimee at aimee.navickis-brasch@hdrinc.com

	Printed Name	Signature	Company	Date	Time
Relinquished by					
Received by	Kathy Sattler	Kathy Sattler	Anatek labs	10-26-18	1130
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact? [✓ Y] N
Labels & Chains Agree? [✓ Y] N
Containers Sealed? [✓ Y] N
~~VOC Head Space? Y N~~
NC | UPS | Box
Temperature (°C): —
Preservative: —
Date & Time: 10-26-18 | 1130
Inspected By: KAS

Form COC01.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

31026 039 **CELL** Last Due 11/2/2018
1st SAMP 10/24/201 1st RCVD 10/26/2018
STREET SWEEPING VS CATCH BASIN

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

Company Name: City of Ellensburg
Address: 1401 E. Trent Ave, Suite 101
City: Spokane State: WA Zip: 99202
Phone: (509) 343-8515
Fax:

Project Manager: Jon Morrow
Project Name & #: Street Sweeping vs Catch Basin
Email Address: morrowj@ci.ellensburg.wa.us
Purchase Order #:
Sampler Name & phone: Gordon Crane

Turn Around Time & Reporting

Please refer to our normal turn around times at: http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
2nd Day*
__Other*______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

Sediment collected in filter socks

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	Preservative # of Containers	Sample Volume	Dry Weight	PSD ASTM 0422
	102418CBS1 TS	10/24/2018 3PM	solid			x	
	102418CBS2 TS	10/24/2018 3PM	solid			x	
	102418CBS3 TS	10/24/2018 3PM	solid			x	
	102418CBS4 TS	10/24/2018 3PM	solid			x	
	102418CBS5 CS	10/24/2018 3PM	solid			x	
	102418CBS6 CS	10/24/2018 3PM	solid			x	
	102418CBS7 CS	10/24/2018 3PM	solid			x	

Note Special Instructions/Comments

Please send a copy of the results to Jon at email above and Aimee at aimee.navickis-brasch@hdrinc.com

Inspection Checklist

Received Intact? [✓ Y] N
Labels & Chains Agree? [✓ Y] N
Containers Sealed? [✓ Y] N
~~VOC Head Space? Y N~~

NC | UPS | Box

Temperature (°C): —
Preservative: —
Date & Time: 10-26-18 | 1130
Inspected By: KAS

	Printed Name	Signature	Company	Date	Time
Relinquished by	Gordon Crane	Gordon Crane	City of E'burg	10-25-18	4:00
Received by	Kathy Sattler	Kathy Sattler	Anatek Labs	10-26-18	1130
Relinquished by					
Received by					
Relinquished by					
Received by					

Form COC01.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

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Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 181129037
Project Name: SWEEPINGS PILE TEST

Analytical Results Report

Sample Number 181129037-001
Client Sample ID SWEEP PILE #1
Matrix Soil
Comments

Sampling Date 11/27/2018
Sampling Time 2:50 AM
Sample Location

Date/Time Received 11/29/201112:49 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Arsenic	5.29	mg/Kg	0.823	11/29/2018 5:38:00 PM	BAG	EPA 6020A	
Barium	152	mg/Kg	0.823	11/29/2018 5:38:00 PM	BAG	EPA 6020A	
Cadmium	0.918	mg/Kg	0.823	11/29/2018 5:38:00 PM	BAG	EPA 6020A	
Chromium	51.5	mg/Kg	0.823	11/29/2018 5:38:00 PM	BAG	EPA 6020A	
Lead	94.9	mg/Kg	0.823	11/29/2018 5:38:00 PM	BAG	EPA 6020A	
Mercury-ICPMS	0.125	mg/Kg	0.0823	11/29/2018 5:38:00 PM	BAG	EPA 6020A	
Selenium	3.02	mg/Kg	0.823	11/29/2018 5:38:00 PM	BAG	EPA 6020A	
Silver	ND	mg/Kg	0.823	11/29/2018 5:38:00 PM	BAG	EPA 6020A	
Diesel	ND	mg/kg	250	11/30/2018 9:44:00 AM	LMD	NWTPHDX	
Lube Oil	2360	mg/kg	1000	11/30/2018 9:44:00 AM	LMD	NWTPHDX	
%moisture	39.1	Percent		11/29/2018 1:15:00 PM	BAG	%moisture	

Surrogate Data

Sample Number 181129037-001

Surrogate Standard	Method	Percent Recovery	Control Limits
hexacosane	NWTPHDX	112.4	50-150

Authorized Signature Kathleen A. Sattler
Kathleen A. Sattler, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

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The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

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Login Report

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 181129037

Order Date: 11/29/2018

Contact Name: JON MORROW

Project Name: SWEEPINGS PILE TEST

Comment:

Sample #: 181129037-001 **Customer Sample #:** SWEEP PILE #1

Recv'd: ☑ **Matrix:** Soil **Collector:** GORDON CRANE **Date Collected:** 11/27/2018

Quantity: 1 **Date Received:** 11/29/2018 12:49:00 PM **Time Collected:** 2:50 AM

Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	11/30/2018	***1 Day***
TPHDX-NW	S	NWTPHDX	11/30/2018	***1 Day***
Arsenic	S	EPA 6020A	11/30/2018	***1 Day***
Barium	S	EPA 6020A	11/30/2018	***1 Day***
Cadmium	S	EPA 6020A	11/30/2018	***1 Day***
Chromium	S	EPA 6020A	11/30/2018	***1 Day***
Lead	S	EPA 6020A	11/30/2018	***1 Day***
Mercury-ICPMS	S	EPA 6020A	11/30/2018	***1 Day***
Selenium	S	EPA 6020A	11/30/2018	***1 Day***
Silver	S	EPA 6020A	11/30/2018	***1 Day***
TOTAL 8	S	N/A	11/30/2018	***1 Day***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 181129037

Order Date: 11/29/2018

Contact Name: JON MORROW

Project Name: SWEEPINGS PILE TEST

Comment:

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	4.6
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	1

Anatek Labs, Inc.

Chain of Custody Record

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504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

81129 037 **CELL** Last Due 11/30/2018
1st SAMP 11/27/201 1st RCVD 11/29/2018
SWEEPINGS PILE TEST

Company Name: City of Ellensburg
Address: 501 N Anderson St.
City: Ellensburg State: WA Zip: 99892
Phone: (509) 929-3844
Fax:

Project Manager: Jon Morrow
Project Name & #: sweepings pile test
Email Address: morrowj@ci.ellensburg.wa.us
Purchase Order #:
Sampler Name & phone: Gordon Crane 509 962-7236

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
[✓ __Next Day*]
__2nd Day*
__Other*______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

Catch basin and street sediment

List Analyses Requested

Preservative:

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TPH	metals								
	sweep pile #1	11-27-18 2:50 AM	solid	1		x	x								

Note Special Instructions/Comments

Please send a copy of the results to Jon at email above and Aimee at aimee.navickis-brasch@hdrinc.com

RUSH

sample for TPH and metals, per email from Jon Morrow

just Dx for the TPH

	Printed Name	Signature	Company	Date	Time
Relinquished by	Gordon Crane	Gordon Crane	City of E'burg	11-28-18	10:20
Received by	Wendy Oz	Wendy Oz	Anatek	11-29-18	1249
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact? [✓ Y] N
Labels & Chains Agree? [✓ Y] N
Containers Sealed? [✓ Y] N
VOC Head Space? ~~Y N~~

UPS/c/i

Temperature (°C): 4.6 dig 04
Preservative:
Date & Time: 11-29-18 1249
Inspected By: WOz

Form COC01.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

April 2019 Data Collection Event

Anatek Labs, Inc.

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Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 190508045
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 190508045-001
Client Sample ID *042519SSTS1*
Matrix Solid
Comments

Sampling Date 5/2/2019
Sampling Time 9:20 AM
Sample Location

Date/Time Received 5/8/2019 1:15 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	86.2	%	0.1	5/9/2019	NDE	% solids	
%moisture	13.8	Percent		5/9/2019	NDE	%moisture	

Sample Number 190508045-002
Client Sample ID *042519SSTS2*
Matrix Solid
Comments

Sampling Date 5/2/2019
Sampling Time 9:20 AM
Sample Location

Date/Time Received 5/8/2019 1:15 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	84.3	%	0.1	5/9/2019	NDE	% solids	
%moisture	15.7	Percent		5/9/2019	NDE	%moisture	

Sample Number 190508045-003
Client Sample ID *042519SSTS3*
Matrix Solid
Comments

Sampling Date 5/2/2019
Sampling Time 9:20 AM
Sample Location

Date/Time Received 5/8/2019 1:15 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	82.9	%	0.1	5/9/2019	NDE	% solids	
%moisture	17.1	Percent		5/9/2019	NDE	%moisture	

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 190508045
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 190508045-004
Client Sample ID *042519CBTS1*
Matrix Solid
Comments

Sampling Date 5/2/2019
Sampling Time 9:15 AM
Sample Location

Date/Time Received 5/8/2019 1:15 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	54.4	%	0.1	5/9/2019	NDE	% solids	
%moisture	45.6	Percent		5/9/2019	NDE	%moisture	

Sample Number 190508045-005
Client Sample ID *042519CBTS2*
Matrix Solid
Comments

Sampling Date 5/2/2019
Sampling Time 9:15 AM
Sample Location

Date/Time Received 5/8/2019 1:15 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	56.3	%	0.1	5/9/2019	NDE	% solids	
%moisture	43.7	Percent		5/9/2019	NDE	%moisture	

Sample Number 190508045-006
Client Sample ID *042519CBTS3*
Matrix Solid
Comments

Sampling Date 5/2/2019
Sampling Time 9:15 AM
Sample Location

Date/Time Received 5/8/2019 1:15 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	63.8	%	0.1	5/9/2019	NDE	% solids	
%moisture	36.2	Percent		5/9/2019	NDE	%moisture	

Client:	CITY OF ELLENSBURG	**Batch #:**	190508045
Address:	1401 E TRENT AVE, SUITE 101 SPOKANE, WA 99202	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Attn:	JON MORROW		

Analytical Results Report

Sample Number	190508045-007	**Sampling Date**	5/2/2019	**Date/Time Received**	5/8/2019	1:15 PM
Client Sample ID	COMPOSITE: CBTS1, 2, 3	**Sampling Time**		**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TVS	10.3	%	0.01	5/10/2019 12:00:00 PM	NDE	SM2540E	
%moisture	40	Percent		5/9/2019	NDE	%moisture	

Sample Number	190508045-008	**Sampling Date**	5/2/2019	**Date/Time Received**	5/8/2019	1:15 PM
Client Sample ID	*042519CBCS1*	**Sampling Time**	9:15 AM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	57.5	%	0.1	5/9/2019	NDE	% solids	
%moisture	42.5	Percent		5/9/2019	NDE	%moisture	

Sample Number	190508045-009	**Sampling Date**	5/2/2019	**Date/Time Received**	5/8/2019	1:15 PM
Client Sample ID	*042519CBCS2*	**Sampling Time**	9:15 AM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	70.7	%	0.1	5/9/2019	NDE	% solids	
%moisture	29.3	Percent		5/9/2019	NDE	%moisture	

Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 190508045
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 190508045-010
Client Sample ID *042519CBCS3*
Matrix Solid
Comments

Sampling Date 5/2/2019
Sampling Time 9:15 AM
Sample Location

Date/Time Received 5/8/2019 1:15 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	59.2	%	0.1	5/9/2019	NDE	% solids	
%moisture	40.8	Percent		5/9/2019	NDE	%moisture	

Sample Number 190508045-011
Client Sample ID COMPOSITE: CBCS1, 2, 3
Matrix Solid
Comments

Sampling Date 5/2/2019
Sampling Time
Sample Location

Date/Time Received 5/8/2019 1:15 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TVS	13.5	%	0.01	5/10/2019 12:00:00 PM	NDE	SM2540E	
%moisture	34.2	Percent		5/9/2019	NDE	%moisture	

Client:	CITY OF ELLENSBURG	**Batch #:**	190508045
Address:	1401 E TRENT AVE, SUITE 101 SPOKANE, WA 99202	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Attn:	JON MORROW		

Analytical Results Report

Authorized Signature Kathleen A. Sattler

Kathleen A. Sattler, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

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The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Budinger
& Associates

Geotechnical Engineering
Environmental Engineering
Construction Materials Testing
Subsurface Exploration
Special Inspection

Proudly serving the Inland Northwest since 1976

Kathy Sattler
Anatek Labs, Inc
504 E Sprague Ave Ste D
Spokane, WA 99202

May 30, 2019

Project Number L19089

PROJECT: **Anatek 2019 Materials**

SUBJECT: **Results of Laboratory Testing**
Report #2

At your request, we provided laboratory testing services for the subject project. Services were limited to the performance of testing of laboratory tests, selected at your discretion.

For this period, our involvement was limited to laboratory testing of two sample delivered to our laboratory on May 16, 2019. Laboratory tests were conducted in general accordance with methods listed on the attached *Laboratory Summary* sheet.

If you have questions regarding this report, please call.

Respectfully Submitted,
Budinger & Associates, Inc.

Terri Ballard

Terri Ballard
Laboratory Manager

TJB/kah/Addressee –
Kathy Sattler - kathys@anateklabs.com

Attachments:
Soils Laboratory Summary - (1 page)

SOILS
LABORATORY SUMMAR

			042519CBCS	042519CBTS
LABORATORY NUMBER			19-0289	19-0290
SAMPLED BY			Client	Client
SAMPLE TYPE			Bulk	Bulk
DATE RECEIVED			5/16/19	5/16/19
FIELD SAMPLE ID			CBCS1	CBTS1
			CBCS2	CBTS2
			CBCS3	CBTS3
			North	South
	Units	Test Method		
SIEVE ANALYSIS		ASTM D6913		
S	1"	%		
I	3/4"		100	100
E	1/2"	P	98	95
V	3/8"	A	96	92
E	#4	S	90	82
	#10	S	78	67
S	#16	I	65	54
I	#30	N	44	36
Z	#40	G	35	28
E	#100		11	11
	#200		4.9	5.4

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Login Report

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190508045
Order Date: 5/8/2019

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

Sample #: 190508045-001 **Customer Sample #:** *042519SSTS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 5/2/2019
Quantity: 1 **Date Received:** 5/8/2019 1:15:00 PM **Time Collected:** 9:20 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	5/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	5/20/2019	***Normal (~10 Days)***

Sample #: 190508045-002 **Customer Sample #:** *042519SSTS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 5/2/2019
Quantity: 1 **Date Received:** 5/8/2019 1:15:00 PM **Time Collected:** 9:20 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	5/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	5/20/2019	***Normal (~10 Days)***

Sample #: 190508045-003 **Customer Sample #:** *042519SSTS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 5/2/2019
Quantity: 1 **Date Received:** 5/8/2019 1:15:00 PM **Time Collected:** 9:20 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	5/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	5/20/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190508045
Order Date: 5/8/2019

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

Sample #: 190508045-004 **Customer Sample #:** *042519CBTS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 5/2/2019
Quantity: 1 **Date Received:** 5/8/2019 1:15:00 PM **Time Collected:** 9:15 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	5/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	5/20/2019	***Normal (~10 Days)***

Sample #: 190508045-005 **Customer Sample #:** *042519CBTS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 5/2/2019
Quantity: 1 **Date Received:** 5/8/2019 1:15:00 PM **Time Collected:** 9:15 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	5/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	5/20/2019	***Normal (~10 Days)***

Sample #: 190508045-006 **Customer Sample #:** *042519CBTS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 5/2/2019
Quantity: 1 **Date Received:** 5/8/2019 1:15:00 PM **Time Collected:** 9:15 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	5/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	5/20/2019	***Normal (~10 Days)***

Sample #: 190508045-007 **Customer Sample #:** COMPOSITE: CBTS1, 2, 3

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 5/2/2019
Quantity: 1 **Date Received:** 5/8/2019 1:15:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	5/20/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	5/20/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190508045
Order Date: 5/8/2019

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

Sample #: 190508045-008 **Customer Sample #:** *042519CBCS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 5/2/2019
Quantity: 1 **Date Received:** 5/8/2019 1:15:00 PM **Time Collected:** 9:15 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	5/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	5/20/2019	***Normal (~10 Days)***

Sample #: 190508045-009 **Customer Sample #:** *042519CBCS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 5/2/2019
Quantity: 1 **Date Received:** 5/8/2019 1:15:00 PM **Time Collected:** 9:15 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	5/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	5/20/2019	***Normal (~10 Days)***

Sample #: 190508045-010 **Customer Sample #:** *042519CBCS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 5/2/2019
Quantity: 1 **Date Received:** 5/8/2019 1:15:00 PM **Time Collected:** 9:15 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	5/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	5/20/2019	***Normal (~10 Days)***

Sample #: 190508045-011 **Customer Sample #:** COMPOSITE: CBCS1, 2, 3

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 5/2/2019
Quantity: 1 **Date Received:** 5/8/2019 1:15:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	5/20/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	5/20/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG

1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190508045

Order Date: 5/8/2019

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	9.0
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	9

90508 045 **CELL** Last Due 5/20/2019
st SAMP 5/2/2019 1st RCVD 5/8/2019
TREET SWEEPING VS CATCH
ASIN

Anatek Labs, Inc.

Chain of Custody Record

○ 1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246 ○
○ 504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433 ○

Company Name: City of Ellensburg/Osborn Consulting
Address: PO Box 48026
City: Spokane State: WA Zip: 99208
Phone: (509) 995-0557
Fax:

Project Manager: Jon Morrow
Project Name & #: Street Sweeping vs Catch Basin
Email Address: morrowj@ci.ellensburg.wa.us
Purchase Order #:
Sampler Name & phone: Gordon Crane 509 962-7236

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
__Email

Provide Sample Description

Catch basin and street sediment

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	Moisture Content ASTMD2216	PSD ASTM D422	Organic Content ASTM D2974
			Preservative:					
	042519SSTS1	5-2-19 9:20	solid			✘		
	042519SSTS2	9:20	solid			✘		
	042519SSTS3	9:20	solid			✘		
	042519CBTS1	9:15	solid			✘	✘	✘
	042519CBTS2		solid			✘		
	042519CBTS3		solid			✘		
	042519CBCS1		solid			✘	✘	✘
	042519CBCS2		solid			✘		
	042519CBCS3		solid			✘		

Note Special Instructions/Comments

Please send a copy of the results to Jon at email above and Aimee at aimeen@osbornconsulting.com

SWBS

For ASTM D422 testing, combine all 042519CBTS samples, then combine all 042519CBCS samples and use the following sieve sizes:
>2mm, 0.25-2mm, 0.075-0.25mm, <0,075 mm
For ASTM D2974 testing, combine all CBTS samples, then combine all CBCS samples.

	Printed Name	Signature	Company	Date	Time
Relinquished by	Gordon Crane	Gordon Crane	City of Ebg	5-2-19	10:15
Received by	Wendy Oz	Wendy Oz	Anatek	5-8-19	1315
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact? [✓ Y] N
Labels & Chains Agree? [✓ Y] N
Containers Sealed? [✓ Y] N
VOC Head Space? Y N
UPS/c/i

Temperature (°C): 9.0 dig04
Preservative: —

Date & Time: 5-8-19 1415
Inspected By: WOz

June 2019 Data Collection Event

Anatek Labs, Inc.

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Client:	CITY OF ELLENSBURG	**Batch #:**	190703036
Address:	1401 E TRENT AVE, SUITE 101 SPOKANE, WA 99202	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Attn:	JON MORROW		

Analytical Results Report

Sample Number	190703036-001	**Sampling Date**	7/2/2019	**Date/Time Received**	7/3/2019	1:10 PM
Client Sample ID	*062419SSTS1*	**Sampling Time**	10:30 AM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	94.1	%	0.1	7/8/2019 11:00:00 AM	KNP	% solids	
%moisture	5.9	%	0.1	7/8/2019 11:00:00 AM	KNP	%moisture	

Sample Number	190703036-002	**Sampling Date**	7/2/2019	**Date/Time Received**	7/3/2019	1:10 PM
Client Sample ID	*062419SSTS2*	**Sampling Time**	10:30 AM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	75.4	%	0.1	7/8/2019 11:00:00 AM	KNP	% solids	
%moisture	24.6	%	0.1	7/8/2019 11:00:00 AM	KNP	%moisture	

Sample Number	190703036-003	**Sampling Date**	7/2/2019	**Date/Time Received**	7/3/2019	1:10 PM
Client Sample ID	*062419SSTS3*	**Sampling Time**	10:30 AM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	92.6	%	0.1	7/8/2019 11:00:00 AM	KNP	% solids	
%moisture	7.4	%	0.1	7/8/2019 11:00:00 AM	KNP	%moisture	

Sample Number	190703036-005	**Sampling Date**	7/2/2019	**Date/Time Received**	7/3/2019	1:10 PM
Client Sample ID	*062419CBTS1*	**Sampling Time**	10:40 AM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	65.0	%	0.1	7/8/2019 11:00:00 AM	KNP	% solids	
%moisture	35	%	0.1	7/8/2019 11:00:00 AM	KNP	%moisture	

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Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 190703036
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 190703036-006
Client Sample ID *062419CBTS2*
Matrix Solid
Comments

Sampling Date 7/2/2019
Sampling Time 10:40 AM
Sample Location

Date/Time Received 7/3/2019 1:10 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	60.5	%	0.1	7/8/2019 11:00:00 AM	KNP	% solids	
%moisture	39.5	%	0.1	7/8/2019 11:00:00 AM	KNP	%moisture	

Sample Number 190703036-007
Client Sample ID *062419CBTS3*
Matrix Solid
Comments

Sampling Date 7/2/2019
Sampling Time 10:40 AM
Sample Location

Date/Time Received 7/3/2019 1:10 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	61.1	%	0.1	7/8/2019 11:00:00 AM	KNP	% solids	
%moisture	38.9	%	0.1	7/8/2019 11:00:00 AM	KNP	%moisture	

Sample Number 190703036-008
Client Sample ID *062419CBCS1*
Matrix Solid
Comments

Sampling Date 7/2/2019
Sampling Time 10:35 AM
Sample Location

Date/Time Received 7/3/2019 1:10 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	98.1	%	0.1	7/8/2019 11:00:00 AM	KNP	% solids	
%moisture	1.9	%	0.1	7/8/2019 11:00:00 AM	KNP	%moisture	

Sample Number 190703036-009
Client Sample ID *062419CBCS2*
Matrix Solid
Comments

Sampling Date 7/2/2019
Sampling Time 10:35 AM
Sample Location

Date/Time Received 7/3/2019 1:10 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	97.5	%	0.1	7/8/2019 11:00:00 AM	KNP	% solids	
%moisture	2.5	%	0.1	7/8/2019 11:00:00 AM	KNP	%moisture	

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Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 190703036
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 190703036-010
Client Sample ID *062419CBCS3*
Matrix Solid
Comments

Sampling Date 7/2/2019
Sampling Time 10:35 AM
Sample Location

Date/Time Received 7/3/2019 1:10 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	96.7	%	0.1	7/8/2019 11:00:00 AM	KNP	% solids	
%moisture	3.3	%	0.1	7/8/2019 11:00:00 AM	KNP	%moisture	

Authorized Signature Kathleen A. Sattler

Kathleen A. Sattler, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

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The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

SOILS
LABORATORY S

			062419CBS CS	062419CBS TS	062419SSTS
LABORATORY NUMBER			19-0553	19-0554	19-0555
SAMPLED BY			Client	Client	Client
SAMPLE TYPE			Bulk	Bulk	Bulk
DATE RECEIVED			7/23/19	7/23/19	7/23/19
FIELD SAMPLE ID			CB control	CB TEST	SSTS
CLIENT SAMPLE DATE			6/24/19	6/24/19	7/2/19
			North	South	South
	Units	Test Method			
SIEVE ANALYSIS		ASTM D6913			
S	1"	%			
I	3/4"			100	100
E	1/2"	P	100	98	97
V	3/8"	A	97	96	86
E	#4	S	94	95	71
	#10	S	82	88	43
S	#16	I	74	60	30
I	#30	N	68	50	19
Z	#40	G	63	47	15
E	#100		46	36	8
	#200		30	27	4.5

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---

Login Report

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190703036
Order Date: 7/3/2019

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

Sample #: 190703036-001 **Customer Sample #:** *062419SSTS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 7/2/2019
Quantity: 1 **Date Received:** 7/3/2019 1:10:00 PM **Time Collected:** 10:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/15/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/15/2019	***Normal (~10 Days)***

Sample #: 190703036-002 **Customer Sample #:** *062419SSTS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 7/2/2019
Quantity: 1 **Date Received:** 7/3/2019 1:10:00 PM **Time Collected:** 10:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/15/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/15/2019	***Normal (~10 Days)***

Sample #: 190703036-003 **Customer Sample #:** *062419SSTS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 7/2/2019
Quantity: 1 **Date Received:** 7/3/2019 1:10:00 PM **Time Collected:** 10:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/15/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/15/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190703036
Order Date: 7/3/2019

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN
Comment:

Sample #: 190703036-004 **Customer Sample #:** COMPOSITE: SSTS1,2,3

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 7/2/2019
Quantity: 1 **Date Received:** 7/3/2019 1:10:00 PM **Time Collected:** 10:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
HOLD	S	hold	7/15/2019	***Normal (~10 Days)***

Sample #: 190703036-005 **Customer Sample #:** *062419CBTS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 7/2/2019
Quantity: 1 **Date Received:** 7/3/2019 1:10:00 PM **Time Collected:** 10:40 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/15/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/15/2019	***Normal (~10 Days)***

Sample #: 190703036-006 **Customer Sample #:** *062419CBTS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 7/2/2019
Quantity: 1 **Date Received:** 7/3/2019 1:10:00 PM **Time Collected:** 10:40 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/15/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/15/2019	***Normal (~10 Days)***

Sample #: 190703036-007 **Customer Sample #:** *062419CBTS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 7/2/2019
Quantity: 1 **Date Received:** 7/3/2019 1:10:00 PM **Time Collected:** 10:40 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/15/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/15/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190703036
Order Date: 7/3/2019

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

Sample #: 190703036-008 **Customer Sample #:** *062419CBCS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 7/2/2019
Quantity: 1 **Date Received:** 7/3/2019 1:10:00 PM **Time Collected:** 10:35 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/15/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/15/2019	***Normal (~10 Days)***

Sample #: 190703036-009 **Customer Sample #:** *062419CBCS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 7/2/2019
Quantity: 1 **Date Received:** 7/3/2019 1:10:00 PM **Time Collected:** 10:35 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/15/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/15/2019	***Normal (~10 Days)***

Sample #: 190703036-010 **Customer Sample #:** *062419CBCS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 7/2/2019
Quantity: 1 **Date Received:** 7/3/2019 1:10:00 PM **Time Collected:** 10:35 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/15/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/15/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190703036

Order Date: 7/3/2019

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	10.0
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	9

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

90703 036 **CELL** Last Due 7/15/2019
1st SAMP 7/2/2019 1st RCVD 7/3/2019
STREET SWEEPING VS CATCH BASIN

Company Name: City of Ellensburg
Address: 501 N Anderson St.
City: Ellensburg State: WA Zip: 98926
Phone: (509) 929-3844
Fax:

Project Manager: Jon Morrow
Project Name & #: Street Sweeping vs Catch Basin
Email Address: morrowj@ci.ellensburg.wa.us
Purchase Order #:
Sampler Name & phone: Gordon Crane 509 962-7236

http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
__Email

Provide Sample Description

Catch basin and street sediment
Collection event 06-24-2019

List Analyses Requested

Preservative:

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	Moisture Content ASTMD2216	PSD ASTM D422								
	062419SSTS1	7-2-19 10:30	solid			✗	✗								
	062419SSTS2	7-2-19 10:30	solid			✗									
	062419SSTS3	7-2-19 10:30	solid			✗									
	062419CBTS1	7-2-19 10:40	solid			✗									
	062419CBTS2	7-2-19 10:40	solid			✗									
	062419CBTS3	7-2-19 10:40	solid			✗									
	062419CBCS1	7-2-19 10:35	solid			✗									
	062419CBCS2	7-2-19 10:35	solid			✗									
	062419CBCS3	7-2-19 10:35	solid			✗									

Note Special Instructions/Comments

Please send a copy of the results to Aimee at aimeen@osbornconsulting.com & Jon at email above

For ASTM D422 testing, combine all SSTS samples,
and use the following sieve sizes:
>2mm, 0.25-2mm, 0.075-0.25mm, <0.075mm

SWBS

*rec'd broken

Inspection Checklist

Received Intact? ~~[✓ Y]~~ [✓ N] *
Labels & Chains Agree? [✓ Y] N
Containers Sealed? [✓ Y] N
VOC Head Space? ~~Y N~~

UPS/c/i

Temperature (°C): 10.0 dig04
Preservative: –

Date & Time: 7-3-19 1510
Inspected By: WOz

	Printed Name	Signature	Company	Date	Time
Relinquished by	Gordon Crane	Gordon Crane	City of Ebrg	7-2-19	2:30
Received by	Wendy OZ	Wendy Oz	Anatek	7-3-19	1310
Relinquished by					
Received by					
Relinquished by					
Received by					

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	CITY OF ELLENSBURG	**Batch #:**	190701015
Address:	1401 E TRENT AVE, SUITE 101 SPOKANE, WA 99202	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Attn:	JON MORROW		

Analytical Results Report

Sample Number	190701015-001	**Sampling Date**	6/24/2019	**Date/Time Received**	6/26/2019	11:20 AM
Client Sample ID	*062419CBS1 CS*	**Sampling Time**	2:00 PM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	93.5	%	0.1	7/15/2019	ARY	% solids	
%moisture	6.5	%	0.1	7/15/2019	ARY	%moisture	

Sample Number	190701015-002	**Sampling Date**	6/24/2019	**Date/Time Received**	6/26/2019	11:20 AM
Client Sample ID	*062419CBS2 CS*	**Sampling Time**	2:00 PM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	53.5	%	0.1	7/15/2019	ARY	% solids	
%moisture	46.5	%	0.1	7/15/2019	ARY	%moisture	

Sample Number	190701015-003	**Sampling Date**	6/24/2019	**Date/Time Received**	6/26/2019	11:20 AM
Client Sample ID	*062419CBS3 CS*	**Sampling Time**	2:00 PM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	3.4	%	0.1	7/15/2019	ARY	% solids	
%moisture	96.6	%	0.1	7/15/2019	ARY	%moisture	

Sample Number	190701015-004	**Sampling Date**	6/24/2019	**Date/Time Received**	6/26/2019	11:20 AM
Client Sample ID	*062419CBS4 CS*	**Sampling Time**	2:00 PM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	28.8	%	0.1	7/15/2019	ARY	% solids	
%moisture	71.2	%	0.1	7/15/2019	ARY	%moisture	

Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 190701015
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 190701015-006
Client Sample ID *062419CBS5 TS*
Matrix Solid
Comments

Sampling Date 6/24/2019
Sampling Time 2:00 PM
Sample Location

Date/Time Received 6/26/2019 11:20 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	61.6	%	0.1	7/15/2019	ARY	% solids	
%moisture	38.4	%	0.1	7/15/2019	ARY	%moisture	

Sample Number 190701015-007
Client Sample ID *062419CBS6 TS*
Matrix Solid
Comments

Sampling Date 6/24/2019
Sampling Time 2:00 PM
Sample Location

Date/Time Received 6/26/2019 11:20 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	7.8	%	0.1	7/15/2019	ARY	% solids	
%moisture	92.2	%	0.1	7/15/2091	ARY	%moisture	

Sample Number 190701015-008
Client Sample ID *062419CBS7 TS*
Matrix Solid
Comments

Sampling Date 6/24/2019
Sampling Time 2:00 PM
Sample Location

Date/Time Received 6/26/2019 11:20 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	24.2	%	0.1	7/15/2019	ARY	% solids	
%moisture	75.8	%	0.1	7/15/2019	ARY	%moisture	

Authorized Signature Kathleen A. Sattler

Kathleen A. Sattler, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

SOILS

LABORATORY S

			062419CBS CS	062419CBS TS	062419SSTS
LABORATORY NUMBER			19-0553	19-0554	19-0555
SAMPLED BY			Client	Client	Client
SAMPLE TYPE			Bulk	Bulk	Bulk
DATE RECEIVED			7/23/19	7/23/19	7/23/19
FIELD SAMPLE ID			CB control	CB TEST	SSTS
CLIENT SAMPLE DATE			6/24/19	6/24/19	7/2/19
			North	South	South
	Units	Test Method			
SIEVE ANALYSIS		ASTM D6913			
S	1"	%			
I	3/4"			100	100
E	1/2"	P	100	98	97
V	3/8"	A	97	96	86
E	#4	S	94	95	71
	#10	S	82	88	43
S	#16	I	74	60	30
I	#30	N	68	50	19
Z	#40	G	63	47	15
E	#100		46	36	8
	#200		30	27	4.5

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Login Report

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190701015
Order Date: 7/1/2019

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

Sample #: 190701015-001 **Customer Sample #:** *062419CBS1 CS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/24/2019
Quantity: 1 **Date Received:** 6/26/2019 11:20:00 AM **Time Collected:** 2:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/10/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/10/2019	***Normal (~10 Days)***

Sample #: 190701015-002 **Customer Sample #:** *062419CBS2 CS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/24/2019
Quantity: 1 **Date Received:** 6/26/2019 11:20:00 AM **Time Collected:** 2:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/10/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/10/2019	***Normal (~10 Days)***

Sample #: 190701015-003 **Customer Sample #:** *062419CBS3 CS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/24/2019
Quantity: 1 **Date Received:** 6/26/2019 11:20:00 AM **Time Collected:** 2:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/10/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/10/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190701015
Order Date: 7/1/2019

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN
Comment:

Sample #: 190701015-004 **Customer Sample #:** *062419CBS4 CS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/24/2019
Quantity: 1 **Date Received:** 6/26/2019 11:20:00 AM **Time Collected:** 2:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/10/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/10/2019	***Normal (~10 Days)***

Sample #: 190701015-005 **Customer Sample #:** COMPOSITE: CB#1,2,3,4 CONTROL

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/24/2019
Quantity: 1 **Date Received:** 6/26/2019 11:20:00 AM **Time Collected:** 2:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
HOLD	S	hold	6/24/2019	***Normal (~10 Days)***

Sample #: 190701015-006 **Customer Sample #:** *062419CBS5 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/24/2019
Quantity: 1 **Date Received:** 6/26/2019 11:20:00 AM **Time Collected:** 2:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/10/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/10/2019	***Normal (~10 Days)***

Sample #: 190701015-007 **Customer Sample #:** *062419CBS6 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/24/2019
Quantity: 1 **Date Received:** 6/26/2019 11:20:00 AM **Time Collected:** 2:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/10/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/10/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190701015
Order Date: 7/1/2019

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

Sample #: 190701015-008 **Customer Sample #:** *062419CBS7 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/24/2019
Quantity: 1 **Date Received:** 6/26/2019 11:20:00 AM **Time Collected:** 2:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	7/10/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	7/10/2019	***Normal (~10 Days)***

Sample #: 190701015-009 **Customer Sample #:** COMPOSITE: CB#5,6,7 TEST

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 6/24/2019
Quantity: 1 **Date Received:** 6/26/2019 11:20:00 AM **Time Collected:** 2:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
HOLD	S	hold	6/24/2019	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	No
Samples received intact?	Yes
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	7

Sample Extraction Logbook

%Moisture instructions: Determine the percent moisture for each solid sample by oven drying about 10.0g of sample at 105°C for 2 hours. Allow to cool in a dessicator and re-weigh. Oven dry for an additional 30 minutes and re-weigh. Further drying is necessary if the two weighings differ by more than 1%.

Lab Sample ID	Dish ID	Dish wt (g)	Dish + wet (g)	Dry 1 (g)	Dry 2 (g)	% moisture	Sample Weight (g)	Method	Balance	Date/Time	Initials
19070l015-001	1	~~268~~4	303.1g	301.8	301.8	6.5	%S = 93.5	%S	Bal 02	7-15-19	ARY
-002	2	~~272~~ 270g	0.7Kg	0.5Kg	0.5Kg	46.5	53.5	|	WW	|	|
-003	3	268	386.2g	381.9	381.9	3.4	96.6	|	Bal 02	|	|
-004	4	274	429.6g	384.6	384.6	28.8	71.2	|	|	7-17-19	ARY
-006	5	272	384.3	340.96	340.96	38.4	61.6	|	|	|	|
-007	6	274	439.6	287.0	287.0	92.2	7.8	|	|	|	|
-008	7	272	0.8Kg	0.4Kg	0.4Kg	75.8	24.2	|	WW	|	|

ARY

Comments: ______________________________

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Chain of Custody Record

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504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

90701 015 **CELL** Last Due 7/10/2019
1st SAMP 6/24/2019 1st RCVD 6/26/2019
STREET SWEEPING VS CATCH BASIN

Company Name: City of Ellensburg
Address: 501 N Anderson St.
City: Ellensburg State: WA Zip: 98926
Phone: (509) 929-3844
Fax:

Project Manager: Jon Morrow
Project Name & #: Street Sweeping vs Catch Basin
Email Address: morrowj@ci.ellensburg.wa.us
Purchase Order #:
Sampler Name & phone: Gordon Crane 509 962-7236

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
__Email

Provide Sample Description

Sediment collected in filter socks

List Analyses Requested

Preservative:

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	Dry Weight	PSD ASTM D422
	062419CBS1 CS	6/24/19 2:00 PM	solid			✗	✗
	062419CBS2 CS	6/24/19 2:00 PM	solid			✗	
	062419CBS3 CS	6/24/19 2:00 PM	solid			✗	
	062419CBS4 CS	6/24/19 2:00 PM	solid			✗	
	062419CBS5 TS	6/24/19 2:00 PM	solid			✗	✗
	062419CBS6 TS	6/24/19 2:00 PM	solid			✗	
	062419CBS7 TS	6/24/19 2:00 PM	solid			✗	

Note Special Instructions/Comments

Please send a copy of the results to Aimee Navickis-Brasch (aimeen@osbornconsulting.com) & Jon at email above

For ASTM D422 testing, combine all CB# control samples, then combine all CB# test samples and use the following sieve sizes: >2mm, 0.25-2mm, 0.075-0.25mm, <0.075mm

SWBS

	Printed Name	Signature	Company	Date	Time
Relinquished by	Gordon Crane	Gordon Crane		6-25-19	4:00 PM
Received by	Wendy OZ	Wendy Oz	Anatek	6-26-19	1120
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact? [✓ Y] N
Labels & Chains Agree? [✓ Y] N
Containers Sealed? [✓ Y] N
VOC Head Space? ~~Y N~~

VPS/nc/ni

Temperature (°C): —
Preservative: —

Date & Time: 6-26-19 1120
Inspected By: WO

August 2019 Data Collection Event

Anatek Labs, Inc.

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Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 190911065
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 190911065-001
Client Sample ID *082819SSTS1*
Matrix Solid
Comments

Sampling Date 9/9/2019
Sampling Time 12:00 PM
Sample Location

Date/Time Received 9/11/2019 1:40 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	90.0	%	0.1	9/13/2019 9:40:00 AM	NDE	% solids	
%moisture	10	%		9/13/2019	NDE	%moisture	

Sample Number 190911065-002
Client Sample ID *082819SSTS2*
Matrix Solid
Comments

Sampling Date 9/9/2019
Sampling Time 12:00 PM
Sample Location

Date/Time Received 9/11/2019 1:40 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	87.6	%	0.1	9/13/2019 9:40:00 AM	NDE	% solids	
%moisture	12.4	%		9/13/2019	NDE	%moisture	

Sample Number 190911065-003
Client Sample ID *082819SSTS3*
Matrix Solid
Comments

Sampling Date 9/9/2019
Sampling Time 12:00 PM
Sample Location

Date/Time Received 9/11/2019 1:40 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	92.8	%	0.1	9/13/2019 9:40:00 AM	NDE	% solids	
%moisture	7.2	%		9/13/2019	NDE	%moisture	

Sample Number 190911065-004
Client Sample ID *082819CBTS1*
Matrix Solid
Comments

Sampling Date 9/9/2019
Sampling Time 12:05 PM
Sample Location

Date/Time Received 9/11/2019 1:40 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	56.5	%	0.1	9/13/2019 9:40:00 AM	NDE	% solids	
TVS	13.4	%	0.01	9/13/2019 9:40:00 AM	NDE	SM2540E	
%moisture	43.5	%		9/13/2019	NDE	%moisture	

Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 190911065
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 190911065-005
Client Sample ID *082819CBTS2*
Matrix Solid
Comments
Sampling Date 9/9/2019
Sampling Time 12:05 PM
Sample Location
Date/Time Received 9/11/2019 1:40 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	67.4	%	0.1	9/13/2019 9:40:00 AM	NDE	% solids	
TVS	10.8	%	0.01	9/13/2019 9:40:00 AM	NDE	SM2540E	
%moisture	32.6	%		9/13/2019	NDE	%moisture	

Sample Number 190911065-006
Client Sample ID *082819CBTS3*
Matrix Solid
Comments
Sampling Date 9/9/2019
Sampling Time 12:05 PM
Sample Location
Date/Time Received 9/11/2019 1:40 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	63.9	%	0.1	9/13/2019 9:40:00 AM	NDE	% solids	
TVS	11.9	%	0.01	9/13/2019 9:40:00 AM	NDE	SM2540E	
%moisture	36.1	%		9/13/2019	NDE	%moisture	

Sample Number 190911065-008
Client Sample ID *082819CBCS1*
Matrix Solid
Comments
Sampling Date 9/9/2019
Sampling Time 12:10 PM
Sample Location
Date/Time Received 9/11/2019 1:40 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	92.1	%	0.1	9/13/2019 9:40:00 AM	NDE	% solids	
TVS	5.80	%	0.01	9/13/2019 9:40:00 AM	NDE	SM2540E	
%moisture	7.9	%		9/13/2019	NDE	%moisture	

Sample Number 190911065-009
Client Sample ID *082819CBCS2*
Matrix Solid
Comments
Sampling Date 9/9/2019
Sampling Time 12:10 PM
Sample Location
Date/Time Received 9/11/2019 1:40 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	82.7	%	0.1	10/1/2019	NDE	% solids	
TVS	9.70	%	0.01	9/13/2019 9:40:00 AM	NDE	SM2540E	
%moisture	17.3	%		9/13/2019	NDE	%moisture	

Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 190911065
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 190911065-010
Client Sample ID *082819CBCS3*
Matrix Solid
Comments

Sampling Date 9/9/2019
Sampling Time 12:10 PM
Sample Location

Date/Time Received 9/11/2019 1:40 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	94.0	%	0.1	9/13/2019 9:40:00 AM	NDE	% solids	
TVS	4.60	%	0.01	9/13/2019 9:40:00 AM	NDE	SM2540E	
%moisture	6	%		9/13/2019	NDE	%moisture	

Authorized Signature Kathleen A. Sattler
Kathleen A. Sattler, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

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The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Budinger
& Associates

Geotechnical Engineering
Environmental Engineering
Construction Materials Testing
Subsurface Exploration
Special Inspection

Proudly serving the Inland Northwest since 1976

Kathy Sattler
Anatek Labs, Inc
504 E Sprague Ave Ste D
Spokane, WA 99202

September 26, 2019

Project Number L19089

PROJECT: **Anatek 2019 Materials**

SUBJECT: **Results of Laboratory Testing**
Report #4

At your request, we provided laboratory testing services for the subject project. Services were limited to the performance of testing of laboratory tests, selected at your discretion.

For this period, our involvement was limited to laboratory testing of two samples delivered to our laboratory on September 18, 2019. Laboratory tests were conducted in general accordance with methods listed on the attached *Laboratory Summary* sheet.

If you have questions regarding this report, please call.

Respectfully Submitted,
Budinger & Associates, Inc.

Terri Ballard

Terri Ballard
Laboratory Manager

TJB/kah/Addressee –
Kathy Sattler - kathys@anateklabs.com

Attachments:
Soils Laboratory Summary - (1 page)

SOILS
LABORATORY SUMMARY

LABORATORY NUMBER				19-0770	19-0771
SAMPLED BY				Client	Client
SAMPLE TYPE				Bulk	Bulk
DATE RECEIVED				9/18/19	9/18/19
FIELD SAMPLE ID				190911065-007	190911065-011
				CBTS1	CBCS1
				CBTS2	CBCS2
				CBTS3	CBCS3
		Units	Test Method		
SIEVE ANALYSIS			ASTM D422		
S	1"	%			
I	3/4"				
E	1/2"	P			
V	3/8"	A		100	100
E	1/4"	S		91	95
	#10	S		75	72
S	#16	I		65	53
I	#30	N		53	35
Z	#40	G		44	27
E	#100			25	14
	#200			19	10
	0.05mm			12	9.1
	0.01mm			9.3	7.3
	0.005mm			7.9	5.8
	0.001mm			4.5	2.9

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190911065

Order Date: 9/11/2019

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

Sample #: 190911065-001 **Customer Sample #:** *082819SSTS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 9/9/2019

Quantity: 1 **Date Received:** 9/11/2019 1:40:00 PM **Time Collected:** 12:00 PM

Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/23/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/23/2019	***Normal (~10 Days)***

Sample #: 190911065-002 **Customer Sample #:** *082819SSTS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 9/9/2019

Quantity: 1 **Date Received:** 9/11/2019 1:40:00 PM **Time Collected:** 12:00 PM

Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/23/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/23/2019	***Normal (~10 Days)***

Sample #: 190911065-003 **Customer Sample #:** *082819SSTS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 9/9/2019

Quantity: 1 **Date Received:** 9/11/2019 1:40:00 PM **Time Collected:** 12:00 PM

Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/23/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/23/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190911065
Order Date: 9/11/2019

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

Sample #: 190911065-004 **Customer Sample #:** *082819CBTS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 9/9/2019
Quantity: 1 **Date Received:** 9/11/2019 1:40:00 PM **Time Collected:** 12:05 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/23/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/23/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	9/23/2019	***Normal (~10 Days)***

Sample #: 190911065-005 **Customer Sample #:** *082819CBTS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 9/9/2019
Quantity: 1 **Date Received:** 9/11/2019 1:40:00 PM **Time Collected:** 12:05 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/23/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/23/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	9/23/2019	***Normal (~10 Days)***

Sample #: 190911065-006 **Customer Sample #:** *082819CBTS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 9/9/2019
Quantity: 1 **Date Received:** 9/11/2019 1:40:00 PM **Time Collected:** 12:05 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/23/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/23/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	9/23/2019	***Normal (~10 Days)***

Sample #: 190911065-007 **Customer Sample #:** COMPOSITE: CBTS1,2,3

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 9/9/2019
Quantity: 1 **Date Received:** 9/11/2019 1:40:00 PM **Time Collected:** 12:05 PM
Comment:

Test	Lab	Method	Due Date	Priority
HOLD	S	hold	9/23/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190911065
Order Date: 9/11/2019

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN
Comment:

Sample #: 190911065-008 **Customer Sample #:** *082819CBCS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 9/9/2019
Quantity: 1 **Date Received:** 9/11/2019 1:40:00 PM **Time Collected:** 12:10 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/23/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/23/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	9/23/2019	***Normal (~10 Days)***

Sample #: 190911065-009 **Customer Sample #:** *082819CBCS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 9/9/2019
Quantity: 1 **Date Received:** 9/11/2019 1:40:00 PM **Time Collected:** 12:10 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/23/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/23/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	9/23/2019	***Normal (~10 Days)***

Sample #: 190911065-010 **Customer Sample #:** *082819CBCS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 9/9/2019
Quantity: 1 **Date Received:** 9/11/2019 1:40:00 PM **Time Collected:** 12:10 PM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/23/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/23/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	9/23/2019	***Normal (~10 Days)***

Sample #: 190911065-011 **Customer Sample #:** COMPOSITE: CBCS1,2,3

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 9/9/2019
Quantity: 1 **Date Received:** 9/11/2019 1:40:00 PM **Time Collected:** 12:10 PM
Comment:

Test	Lab	Method	Due Date	Priority
HOLD	S	hold	9/23/2019	***Normal (~10 Days)***

Customer Name:	CITY OF ELLENSBURG	**Order ID:**	190911065
	1401 E TRENT AVE, SUITE 101	**Order Date:**	9/11/2019
	SPOKANE WA 99202		
Contact Name:	JON MORROW	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Comment:			

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	3.3
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	9

90911 065 **CELL** Last Due 9/23/2019
1st SAMP 9/9/2019 1st RCVD 9/11/2019
STREET SWEEPING VS CATCH BASIN

Anatek Labs, Inc.

Chain of Custody Record

○ 1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246 ○
○ 504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433 ○

Company Name: City of Ellensburg	Project Manager: Jon Morrow
Address: 501 N Anderson St.	Project Name & #: Street Sweeping vs Catch Basin
City: Ellensburg State: WA Zip: 98926	Email Address: morrowj@ci.ellensburg.wa.us
Phone: (509) 929-3844	Purchase Order #:
Fax:	Sampler Name & phone: Gordon Crane 509 962-7236

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
__Email

Provide Sample Description

Catch basin and street sediment
Collection event 08-27-2019

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	Moisture Content ASTMD2216	PSD ASTM D422	Organic Content ASTM D2974							
	Preservative:														
	Sweep test 082819SSTS1	9/9/19 12:00	solid	1	4 oz.	✗									
	082819SSTS2	9/9/19 "	solid	1	4 oz.	✗									
	082819SSTS3	9/9/19 "	solid	1	4 oz.	✗									
	CB Test 082819CBTS1	9/9/19 12:05	solid	1	4 oz.	✗	✗	✗							
	082819CBTS2	9/9/19 "	solid	1	4 oz.	✗	✗	✗							
	082819CBTS3	9/9/19 "	solid	1	4 oz.	✗	✗	✗							
	CB Control 082819CBCS1	9/9/19 12:10	solid	1	4 oz.	✗	✗	✗							
	082819CBCS2	9/9/19 "	solid	1	4 oz.	✗	✗	✗							
	082819CBCS3	9/9/19 "	solid	1	4 oz.	✗	✗	✗							

Note Special Instructions/Comments

Please send a copy of the results to Aimee at aimeen@osbornconsulting.com & Jon at email above

For ASTM D422 testing, combine all CB control samples, then combine all CB test samples and use the following sieve sizes: 1", 3/4", 1/2", 3/8", 1/4", #10, #16, #30, #40, #100, #200, 0.05mm, 0.01mm, 0.005mm, 0.001mm

SWBS

	Printed Name	Signature	Company	Date	Time
Relinquished by	Gordon Crane	Gordon Crane	City of Ebg	9-10-19	1:20
Received by	Wendy OZ	Wendy Oz	anatek	9-11-19	1340
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact? [✓ Y] N
Labels & Chains Agree? [✓ Y] N
Containers Sealed? [✓ Y] N
VOC Head Space? ~~Y N~~
UPS/c/i
Temperature (°C): 3.3 dig 04
Preservative:
Date & Time: 9-11-19 1400
Inspected By: Wo

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 190830023
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 190830023-001
Client Sample ID *082819CBS1 CS*
Matrix Solid
Comments

Sampling Date 8/29/2019
Sampling Time 8:30 AM
Sample Location

Date/Time Received 8/30/2019 10:45 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	84	%	0.1	10/1/2019	ARY	% solids	
%moisture	16	%	0.1	9/19/2019	ARY	%moisture	

Sample Number 190830023-002
Client Sample ID *082819CBS2 CS*
Matrix Solid
Comments

Sampling Date 8/29/2019
Sampling Time 8:30 AM
Sample Location

Date/Time Received 8/30/2019 10:45 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	44.9	%	0.1	10/1/2019	ARY	% solids	
%moisture	55.1	%	0.1	9/19/2019	ARY	%moisture	

Sample Number 190830023-003
Client Sample ID *082819CBS3 CS*
Matrix Solid
Comments

Sampling Date 8/29/2019
Sampling Time 8:30 AM
Sample Location

Date/Time Received 8/30/2019 10:45 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	29.6	%	0.1	10/1/2019	ARY	% solids	
%moisture	70.4	%	0.1	9/19/2019	ARY	%moisture	

Client:	CITY OF ELLENSBURG	**Batch #:**	190830023
Address:	1401 E TRENT AVE, SUITE 101 SPOKANE, WA 99202	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Attn:	JON MORROW		

Analytical Results Report

Sample Number	190830023-004	**Sampling Date**	8/29/2019	**Date/Time Received**	8/30/2019	10:45 AM
Client Sample ID	*082819CBS4 CS*	**Sampling Time**	8:30 AM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	59.9	%	0.1	10/1/2019	ARY	% solids	
%moisture	40.1	%	0.1	9/19/2091	ARY	%moisture	

Sample Number	190830023-005	**Sampling Date**	8/29/2019	**Date/Time Received**	8/30/2019	10:45 AM
Client Sample ID	*082819CBS5 TS*	**Sampling Time**	8:30 AM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	75.7	%	0.1	10/1/2019	ARY	% solids	
%moisture	24.3	%	0.1	9/19/2019	ARY	%moisture	

Sample Number	190830023-006	**Sampling Date**	8/29/2019	**Date/Time Received**	8/30/2019	10:45 AM
Client Sample ID	*082819CBS6 TS*	**Sampling Time**	8:30 AM	**Extraction Date**		
Matrix	Solid	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	51.2	%	0.1	10/1/2019	ARY	% solids	
%moisture	48.8	%	0.1	9/19/2019	ARY	%moisture	

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: CITY OF ELLENSBURG
Address: 1401 E TRENT AVE, SUITE 101
SPOKANE, WA 99202
Attn: JON MORROW

Batch #: 190830023
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number	190830023-007	**Sampling Date**	8/29/2019	**Date/Time Received**	8/30/2019 10:45 AM
Client Sample ID	*082819CBS7 TS*	**Sampling Time**	8:30 AM	**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	80.6	%	0.1	10/1/2019	ARY	% solids	
%moisture	19.4	%		9/19/2019	ARY	%moisture	

Authorized Signature Kathleen A. Sattler

Kathleen A. Sattler, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

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Login Report

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190830023
Order Date: 8/30/2019

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

Sample #: 190830023-001 **Customer Sample #:** *082819CBS1 CS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/29/2019
Quantity: 1 **Date Received:** 8/30/2019 10:45:00 AM **Time Collected:** 8:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/11/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/11/2019	***Normal (~10 Days)***

Sample #: 190830023-002 **Customer Sample #:** *082819CBS2 CS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/29/2019
Quantity: 1 **Date Received:** 8/30/2019 10:45:00 AM **Time Collected:** 8:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/11/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/11/2019	***Normal (~10 Days)***

Sample #: 190830023-003 **Customer Sample #:** *082819CBS3 CS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/29/2019
Quantity: 1 **Date Received:** 8/30/2019 10:45:00 AM **Time Collected:** 8:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/11/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/11/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190830023
Order Date: 8/30/2019

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

Sample #: 190830023-004 **Customer Sample #:** *082819CBS4 CS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/29/2019
Quantity: 1 **Date Received:** 8/30/2019 10:45:00 AM **Time Collected:** 8:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/11/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/11/2019	***Normal (~10 Days)***

Sample #: 190830023-005 **Customer Sample #:** *082819CBS5 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/29/2019
Quantity: 1 **Date Received:** 8/30/2019 10:45:00 AM **Time Collected:** 8:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/11/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/11/2019	***Normal (~10 Days)***

Sample #: 190830023-006 **Customer Sample #:** *082819CBS6 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/29/2019
Quantity: 1 **Date Received:** 8/30/2019 10:45:00 AM **Time Collected:** 8:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/11/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/11/2019	***Normal (~10 Days)***

Sample #: 190830023-007 **Customer Sample #:** *082819CBS7 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 8/29/2019
Quantity: 1 **Date Received:** 8/30/2019 10:45:00 AM **Time Collected:** 8:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	9/11/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	9/11/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
1401 E TRENT AVE, SUITE 101
SPOKANE WA 99202

Order ID: 190830023
Order Date: 8/30/2019

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment:

SAMPLE CONDITION RECORD

Samples received in a cooler?	No
Samples received intact?	Yes
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	7

Sample Extraction Logbook

%Moisture instructions: Determine the percent moisture for each solid sample by oven drying about 10.0g of sample at 105°C for 2 hours. Allow to cool in a dessicator and re-weigh. Oven dry for an additional 30 minutes and re-weigh. Further drying is necessary if the two weighings differ by more than 1%.

Lab Sample ID	Dish ID	Dish wt (g)	Dish + wet (g)	Dry 1 (g)	Dry 2 (g)	% moisture	Sample Weight (g)	Method	Balance	Date/Time	Initials
190830023-001	1	0.276	0.9	0.8	0.8	16		%m	BWW	9-19-19	ARG
002	2	0.278	0.55	0.4	0.4	55.1					
003	3	0.272	1.55	0.65	0.65	70.4					
4	4	0.276	0.9	0.65	0.65	40.1					
5	5	0.182	0.8	0.65	0.65	24.3					
6	6	0.276	1.3	0.8	0.8	48.8					
7	7	0.176	0.95	0.8	0.8	19.4					

Results are in kg, not g

Comments:

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

90830 023 **CELL** Last Due 9/11/2019
1st SAMP 8/29/2019 1st RCVD 8/30/2019
STREET SWEEPING VS CATCH BASIN

Company Name: City of Ellensburg
Address: 501 N Anderson St.
City: Ellensburg State: WA Zip: 98926
Phone: (509) 929-3844
Fax:

Project Manager: Jon Morrow
Project Name & #: Street Sweeping vs Catch Basin
Email Address: morrowj@ci.ellensburg.wa.us
Purchase Order #:
Sampler Name & phone: Gordon Crane 509 962-7236

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
__Email

Provide Sample Description

Sediment collected in filter socks

List Analyses Requested

Preservative:

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	Dry Weight	PSD ASTM D422
	082819CBS1 CS	08/29/19 8:30 AM	solid			✘	
	082819CBS2 CS	08/29/19 8:30 AM	solid			✘	
	082819CBS3 CS	08/29/19 8:30 AM	solid			✘	
	082819CBS4 CS	08/29/19 8:30 AM	solid			✘	
	082819CBS5 TS	08/29/19 8:30 AM	solid			✘	
	082819CBS6 TS	08/29/19 8:30 AM	solid			✘	
	082819CBS7 TS	08/29/19 8:30 AM	solid			✘	

Note Special Instructions/Comments

Please send a copy of the results to Aimee Navickis-Brasch (aimeen@osbornconsulting.com) & Jon at email above

SWBS

	Printed Name	Signature	Company	Date	Time
Relinquished by	Gordon Crane	Gordon Crane	City of E'burg	8-29-19	11:11
Received by	Wendy Oz	WendyOz	Anatek	8/30/19	1045
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact? [✓ Y] N
Labels & Chains Agree? [✓ Y] N
Containers Sealed? [✓ Y] N
VOC Head Space? ~~Y~~ N

UPS/ac/ni

Temperature (°C): —
Preservative: —
Date & Time: 8-30-19 1045
Inspected By: WOz

October 2019 Data Collection Event

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: CITY OF ELLENSBURG
Address: 501 N ANDERSON ST
ELLENSBURG, WA 99892
Attn: JON MORROW

Batch #: 191108057
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 191108057-001
Client Sample ID *10302019CBTS1*
Matrix Solid
Comments

Sampling Date 11/5/2019
Sampling Time 3:05 PM
Sample Location

Date/Time Received 11/8/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TVS	22.9	%	0.01	11/12/2019 2:00:00 PM	NDE	SM2540E	
%moisture	54.1	%		11/12/2019	NDE	%moisture	

Sample Number 191108057-002
Client Sample ID *10302019CBTS2*
Matrix Solid
Comments

Sampling Date 11/5/2019
Sampling Time 3:05 PM
Sample Location

Date/Time Received 11/8/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TVS	33.7	%	0.01	11/12/2019 2:00:00 PM	NDE	SM2540E	
%moisture	63.6	%		11/12/2019	NDE	%moisture	

Sample Number 191108057-003
Client Sample ID *10302019CBTS3*
Matrix Solid
Comments

Sampling Date 11/5/2019
Sampling Time 3:05 PM
Sample Location

Date/Time Received 11/8/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TVS	20.6	%	0.01	11/12/2019 2:00:00 PM	NDE	SM2540E	
%moisture	50.2	%		11/12/2019	NDE	%moisture	

Client:	CITY OF ELLENSBURG	**Batch #:**	191108057
Address:	501 N ANDERSON ST ELLENSBURG, WA 99892	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Attn:	JON MORROW		

Analytical Results Report

Sample Number	191108057-004	**Sampling Date**	11/5/2019	**Date/Time Received**	11/8/2019 2:17 PM
Client Sample ID	COMPOSITE: CBTS 1,2,3	**Sampling Time**		**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	48.0	%	0.1	11/12/2019 11:00:00 AM	NDE	% solids	
%moisture	52	%		11/12/2019	NDE	%moisture	

Sample Number	191108057-005	**Sampling Date**	11/5/2019	**Date/Time Received**	11/8/2019 2:17 PM
Client Sample ID	*10302019CBCS1*	**Sampling Time**	3:20 PM	**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TVS	15.2	%	0.01	11/12/2019 2:00:00 PM	NDE	SM2540E	
%moisture	42.5	%		11/12/2019	NDE	%moisture	

Sample Number	191108057-006	**Sampling Date**	11/5/2019	**Date/Time Received**	11/8/2019 2:17 PM
Client Sample ID	*10302019CBCS2*	**Sampling Time**	3:20 PM	**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TVS	25.7	%	0.01	11/12/2019 2:00:00 PM	NDE	SM2540E	
%moisture	56.7	%		11/12/2019	NDE	%moisture	

Client: CITY OF ELLENSBURG
Address: 501 N ANDERSON ST
ELLENSBURG, WA 99892
Attn: JON MORROW

Batch #: 191108057
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 191108057-007
Client Sample ID 10302019CBCS3
Matrix Solid
Comments
Sampling Date 11/5/2019
Sampling Time 3:20 PM
Sample Location
Date/Time Received 11/8/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TVS	20.2	%	0.01	11/12/2019 2:00:00 PM	NDE	SM2540E	
%moisture	47.5	%		11/12/2019	NDE	%moisture	

Sample Number 191108057-008
Client Sample ID COMPOSITE: CBCS 1,2,3
Matrix Solid
Comments
Sampling Date 11/5/2019
Sampling Time
Sample Location
Date/Time Received 11/8/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	52.6	%	0.1	11/12/2019 11:00:00 AM	NDE	% solids	
%moisture	47.4	%		11/12/2019	NDE	%moisture	

Sample Number 191108057-009
Client Sample ID 10302019SSTS1
Matrix Solid
Comments
Sampling Date 11/5/2019
Sampling Time 3:25 PM
Sample Location
Date/Time Received 11/8/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TVS	3.10	%	0.01	11/12/2019 2:00:00 PM	NDE	SM2540E	
%moisture	4.1	%		11/12/2019	NDE	%moisture	

Client:	CITY OF ELLENSBURG	**Batch #:**	191108057
Address:	501 N ANDERSON ST ELLENSBURG, WA 99892	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Attn:	JON MORROW		

Analytical Results Report

Sample Number	191108057-010	**Sampling Date**	11/5/2019	**Date/Time Received**	11/8/2019 2:17 PM
Client Sample ID	*10302019SSTS2*	**Sampling Time**	3:25 PM	**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TVS	2.90	%	0.01	11/12/2019 2:00:00 PM	NDE	SM2540E	
%moisture	4	%		11/12/2019	NDE	%moisture	

Sample Number	191108057-011	**Sampling Date**	11/5/2019	**Date/Time Received**	11/8/2019 2:17 PM
Client Sample ID	*10302019SSTS3*	**Sampling Time**	3:25 PM	**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TVS	4.30	%	0.01	11/12/2019 2:00:00 PM	NDE	SM2540E	
%moisture	4.2	%		11/12/2019	NDE	%moisture	

Sample Number	191108057-012	**Sampling Date**	11/5/2019	**Date/Time Received**	11/8/2019 2:17 PM
Client Sample ID	COMPOSITE: SSTS 1,2,3	**Sampling Time**		**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	96.4	%	0.1	11/12/2019 11:00:00 AM	NDE	% solids	
%moisture	3.6	%		11/12/2019	NDE	%moisture	

Client: CITY OF ELLENSBURG
Address: 501 N ANDERSON ST
ELLENSBURG, WA 99892
Attn: JON MORROW

Batch #: 191108057
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 191108057-013
Client Sample ID *10302019SSCS1*
Matrix Solid
Comments

Sampling Date 11/5/2019
Sampling Time 3:35 PM
Sample Location

Date/Time Received 11/8/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TVS	5.70	%	0.01	11/12/2019 2:00:00 PM	NDE	SM2540E	
%moisture	17.6	%		11/12/2019	NDE	%moisture	

Sample Number 191108057-014
Client Sample ID *10302019SSCS2*
Matrix Solid
Comments

Sampling Date 11/5/2019
Sampling Time 3:35 PM
Sample Location

Date/Time Received 11/8/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TVS	8.20	%	0.01	11/12/2019 2:00:00 PM	NDE	SM2540E	
%moisture	23.4	%		11/12/2019	NDE	%moisture	

Sample Number 191108057-015
Client Sample ID *10302019SSCS3*
Matrix Solid
Comments

Sampling Date 11/5/2019
Sampling Time 3:35 PM
Sample Location

Date/Time Received 11/8/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TVS	5.00	%	0.01	11/12/2019 2:00:00 PM	NDE	SM2540E	
%moisture	17.4	%		11/12/2019	NDE	%moisture	

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Client:	CITY OF ELLENSBURG	**Batch #:**	191108057
Address:	501 N ANDERSON ST ELLENSBURG, WA 99892	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Attn:	JON MORROW		

Analytical Results Report

Sample Number	191108057-016	**Sampling Date**	11/5/2019	**Date/Time Received**	11/8/2019 2:17 PM
Client Sample ID	COMPOSITE: SSCS 1,2,3	**Sampling Time**		**Extraction Date**	
Matrix	Solid	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	81.9	%	0.1	11/12/2019 11:00:00 AM	NDE	% solids	
%moisture	18.1	%		11/12/2019	NDE	%moisture	

Authorized Signature Kathleen A. Sattler

Kathleen A. Sattler, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

SOILS
LABORATORY SUMMARY

LABORATORY NUMBER				19-1157	19-1158	19-1159	19-1160	19-1161	19-1162
SAMPLED BY				Client	Client	Client	Client	Client	Client
SAMPLE TYPE				Bulk	Bulk	Bulk	Bulk	Bulk	Bulk
DATE RECEIVED				12/2/19	12/2/19	12/2/19	12/2/19	12/2/19	12/2/19
FIELD SAMPLE ID				1911108057-004	1911108057-008	1911108057-012	1911108057-016	1911108055-008	1911108055-009
		Units	Test Method	103019CBTS	103019CBCS	103019SSTS	103019SSCS	103019CBS CS	103019CBS TS
SIEVE ANALYSIS			ASTM D422						
S	1"	%							
I	3/4"								
E	1/2"	P							
V	3/8"	A		100	100	100	100		100
E	1/4"	S		88	78	85	77	100	86
	#10	S		67	46	65	53	73	73
S	#16	I		59	29	56	44	71	71
I	#30	N		45	14	46	32	69	67
Z	#40	G		22	9	42	25	68	66
E	#100			12	3	27	12	66	61
	#200			8.2	1.9	16	8.6	65	57
	0.05mm			8.0	1.4	9.5	8.1	62	50
	0.01mm			7.8	0.9	7.6	6.0	45	29
	0.005mm			6.6	0.0	5.1	3.0	31	18
	0.001mm			3.3	0.0	2.4	0.0	8.5	8.1

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Login Report

Customer Name: CITY OF ELLENSBURG
501 N ANDERSON ST
ELLENSBURG WA 99892

Order ID: 191108057
Order Date: 11/8/2019

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN
Comment: PSD SUB TO BUDINGER

Sample #: 191108057-001 **Customer Sample #:** *10302019CBTS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:** 3:05 PM
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	11/20/2019	***Normal (~10 Days)***

Sample #: 191108057-002 **Customer Sample #:** *10302019CBTS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:** 3:05 PM
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	11/20/2019	***Normal (~10 Days)***

Sample #: 191108057-003 **Customer Sample #:** *10302019CBTS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:** 3:05 PM
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	11/20/2019	***Normal (~10 Days)***

Sample #: 191108057-004 **Customer Sample #:** COMPOSITE: CBTS 1,2,3

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
501 N ANDERSON ST
ELLENSBURG WA 99892

Order ID: 191108057
Order Date: 11/8/2019

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN
Comment: PSD SUB TO BUDINGER

Sample #: 191108057-005 **Customer Sample #:** *10302019CBCS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:** 3:20 PM
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	11/20/2019	***Normal (~10 Days)***

Sample #: 191108057-006 **Customer Sample #:** *10302019CBCS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:** 3:20 PM
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	11/20/2019	***Normal (~10 Days)***

Sample #: 191108057-007 **Customer Sample #:** *10302019CBCS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:** 3:20 PM
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	11/20/2019	***Normal (~10 Days)***

Sample #: 191108057-008 **Customer Sample #:** COMPOSITE: CBCS 1,2,3

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***

Sample #: 191108057-009 **Customer Sample #:** *10302019SSTS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:** 3:25 PM
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	11/20/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
501 N ANDERSON ST
ELLENSBURG WA 99892

Order ID: 191108057
Order Date: 11/8/2019

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN
Comment: PSD SUB TO BUDINGER

Sample #: 191108057-010 **Customer Sample #:** *10302019SSTS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:** 3:25 PM
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	11/20/2019	***Normal (~10 Days)***

Sample #: 191108057-011 **Customer Sample #:** *10302019SSTS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:** 3:25 PM
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	11/20/2019	***Normal (~10 Days)***

Sample #: 191108057-012 **Customer Sample #:** COMPOSITE: SSTS 1,2,3

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***

Sample #: 191108057-013 **Customer Sample #:** *10302019SSCS1*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:** 3:35 PM
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	11/20/2019	***Normal (~10 Days)***

Sample #: 191108057-014 **Customer Sample #:** *10302019SSCS2*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:** 3:35 PM
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
501 N ANDERSON ST
ELLENSBURG WA 99892

Order ID: 191108057
Order Date: 11/8/2019

Contact Name: JON MORROW

Project Name: STREET SWEEPING VS CATCH BASIN

Comment: PSD SUB TO BUDINGER

SOLIDS - TVS	S	SM2540E	11/20/2019	***Normal (~10 Days)***

Sample #: 191108057-015 **Customer Sample #:** *10302019SSCS3*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:** 3:35 PM
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***
SOLIDS - TVS	S	SM2540E	11/20/2019	***Normal (~10 Days)***

Sample #: 191108057-016 **Customer Sample #:** COMPOSITE: SSCS 1,2,3

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 11/5/2019
Quantity: 1 **Date Received:** 11/8/2019 2:17:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	7.2
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	12

91108 057 **CELL** Last Due 11/20/2019
1st SAMP 11/5/2019 1st RCVD 11/8/2019
STREET SWEEPING VS CATCH BASIN

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

Company Name: City of Ellensburg
Address: PO Box 48026
City: Spokane State: WA Zip: 99208
Phone: (509) 995-0557
Fax:

Project Manager: Jon Morrow
Project Name & #: Street Sweeping vs Catch Basin
Email Address: morrowj@ci.ellensburg.wa.us
Purchase Order #:
Sampler Name & phone: Gordon Crane

Turn Around Time & Reporting

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
__Email

Provide Sample Description

catch basin and street sediment

Small Jars

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	Preservative: # of Containers	Sample Volume	Moisture Content	PSD ASTM D422	Organic Content ASTM D2974
1	10302019CBTS1	11-5-19 3:05	solid	1	4oz	✗	✗	✗
2	Test 10302019CBTS2	"	solid			✗	✗	✗
3	4 CB 10302019CBTS3	"	solid			✗	✗	✗
5	1 10302019CBCS1	3:20	solid			✗	✗	✗
6	Control 1 10302019CBCS2	3 "	solid			✗	✗	✗
7	8 CB 1 10302019CBCS3	"	solid			✗	✗	✗
9	10302019SSTS1	3:25	solid			✗	✗	✗
10	Sweep 10302019SSTS2	"	solid			✗	✗	✗
11	12 Test 10302019SSTS3	"	solid			✗	✗	✗
13	10302019SSCS1	3:36	solid			✗	✗	✗
14	Sweep Control 10302019SSCS2	3:35	solid			✗	✗	✗
15	16 10302019SSCS3	3:35	solid			✗	✗	✗

Note Special Instructions/Comments

Please send a copy of the results to Jon at email above and Aimee at aimeen@osbornconsulting.com

For ASTM D422 testing, combine all CBTS samples, then combine all CBCS samples, then combine all SSTS samples, then combine all SSCS samples and use the following sieve sizes: 1", 3/4", 1/2", 3/8", 1/4", #10, #16, #30, #40, #100, #200, 0.05mm, 0.01mm, 0.005mm, and 0.001mm.

SWBS
BUDI - PSD

	Printed Name	Signature	Company	Date	Time
Relinquished by	Gordon Crane	Gordon Crane	City of E	11-6-19	3:00
Received by	Wendy Oz	Wendy Oz	Anatek	11-7-19	1417
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact? [✓ Y] N
Labels & Chains Agree? [✓ Y] N
Containers Sealed? [✓ Y] N
VOC Head Space? ~~Y~~ N

UPS/c/i

Temperature (°C): 7.2 dig 04
Preservative:

Date & Time: 11-7-19 1417
Inspected By: WO

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: CITY OF ELLENSBURG
Address: 501 N ANDERSON ST
ELLENSBURG, WA 99892
Attn: JON MORROW

Batch #: 191108055
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 191108055-001
Client Sample ID *10302019CBS1 CS*
Matrix Solid
Comments
Sampling Date 10/31/2019
Sampling Time 11:00 AM
Sample Location
Date/Time Received 11/7/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	20.1	%	0.1	11/11/2019	ARY	% solids	
%moisture	79.9	%		11/11/2019	ARY	%moisture	

Sample Number 191108055-002
Client Sample ID *10302019CBS2 CS*
Matrix Solid
Comments
Sampling Date 10/31/2019
Sampling Time 11:00 AM
Sample Location
Date/Time Received 11/7/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	14.6	%	0.1	11/11/2019	ARY	% solids	
%moisture	85.4	%		11/11/2019	ARY	%moisture	

Sample Number 191108055-003
Client Sample ID *10302019CBS3 CS*
Matrix Solid
Comments
Sampling Date 10/31/2019
Sampling Time 11:00 AM
Sample Location
Date/Time Received 11/7/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	14.6	%	0.1	11/11/2019	ARY	% solids	
%moisture	85.4	%		11/11/2019	ARY	%moisture	

Client: CITY OF ELLENSBURG
Address: 501 N ANDERSON ST
ELLENSBURG, WA 99892
Attn: JON MORROW

Batch #: 191108055
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 191108055-004
Client Sample ID *10302019CBS4 CS*
Matrix Solid
Comments

Sampling Date 10/31/2019
Sampling Time 11:00 AM
Sample Location

Date/Time Received 11/7/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	5.2	%	0.1	11/11/2019	ARY	% solids	
%moisture	94.8	%		11/11/2019	ARY	%moisture	

Sample Number 191108055-005
Client Sample ID *10302019CBS5 TS*
Matrix Solid
Comments

Sampling Date 10/31/2019
Sampling Time 11:00 AM
Sample Location

Date/Time Received 11/7/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	29.3	%	0.1	11/11/2019	ARY	% solids	
%moisture	70.7	%		11/11/2019	ARY	%moisture	

Sample Number 191108055-006
Client Sample ID *10302019CBS6 TS*
Matrix Solid
Comments

Sampling Date 10/31/2019
Sampling Time 11:00 AM
Sample Location

Date/Time Received 11/7/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	26.4	%	0.1	11/11/2019	ARY	% solids	
%moisture	73.6	%		11/11/2019	ARY	%moisture	

Client: CITY OF ELLENSBURG
Address: 501 N ANDERSON ST
ELLENSBURG, WA 99892
Attn: JON MORROW

Batch #: 191108055
Project Name: STREET SWEEPING VS CATCH BASIN

Analytical Results Report

Sample Number 191108055-007
Client Sample ID *10302019CBS7 TS*
Matrix Solid
Comments

Sampling Date 10/31/2019
Sampling Time 11:00 AM
Sample Location

Date/Time Received 11/7/2019 2:17 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
% solids	21.9	%	0.1	11/11/2019	ARY	% solids	
%moisture	78.1	%		11/11/2019	ARY	%moisture	

Authorized Signature Kathleen A. Sattler
Kathleen A. Sattler, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Sample Extraction Logbook

%Moisture instructions: Determine the percent moisture for each solid sample by oven drying about 10.0g of sample at 105°C for 2 hours. Allow to cool in a dessicator and re-weigh. Oven dry for an additional 30 minutes and re-weigh. Further drying is necessary if the two weighings differ by more than 1%.

Lab Sample ID	Dish ID	Dish wt (g)	Dish + wet (g)	Dry 1 (g)	Dry 2 (g)	% moisture	~~Sam~~ % Solid	Method	Balance	Date/Time	Initials
10302019CBS1 CS	1	178	800	303	303	79.9	20.1	%m	ww/Bal02	11/11/19 12:00	ARJ
10302019CBS2 CS	2	178	800	269	269	85.4	14.6				
10302019CBS3 CS	3	178	850	276	276	85.4	14.6				
10302019CBS4 CS	4	174	850	209	209	94.8	5.2				
10302019CBS5 TS	5	184	850	379	379	70.7	29.3				
10302019CBS6 TS	6	180	850	357	357	73.6	26.4				
10302019CBS7 TS	7	174	850	322	322	78.1	219				

Comments: ______________________________

SOILS
LABORATORY SUMMARY

LABORATORY NUMBER				19-1157	19-1158	19-1159	19-1160	19-1161	19-1162
SAMPLED BY				Client	Client	Client	Client	Client	Client
SAMPLE TYPE				Bulk	Bulk	Bulk	Bulk	Bulk	Bulk
DATE RECEIVED				12/2/19	12/2/19	12/2/19	12/2/19	12/2/19	12/2/19
FIELD SAMPLE ID				1911108057-004	1911108057-008	1911108057-012	1911108057-016	1911108055-008	1911108055-009
		Units	Test Method	103019CBTS	103019CBCS	103019SSTS	103019SSCS	103019CBS CS	103019CBS TS
SIEVE ANALYSIS			ASTM D422						
S	1"	%							
I	3/4"								
E	1/2"	P							
V	3/8"	A		100	100	100	100		100
E	1/4"	S		88	78	85	77	100	86
	#10	S		67	46	65	53	73	73
S	#16	I		59	29	56	44	71	71
I	#30	N		45	14	46	32	69	67
Z	#40	G		22	9	42	25	68	66
E	#100			12	3	27	12	66	61
	#200			8.2	1.9	16	8.6	65	57
	0.05mm			8.0	1.4	9.5	8.1	62	50
	0.01mm			7.8	0.9	7.6	6.0	45	29
	0.005mm			6.6	0.0	5.1	3.0	31	18
	0.001mm			3.3	0.0	2.4	0.0	8.5	8.1

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: CITY OF ELLENSBURG
501 N ANDERSON ST
ELLENSBURG WA 99892

Order ID: 191108055
Order Date: 11/8/2019

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN
Comment: PSD SUB TO BUDINGER

Sample #: 191108055-001 **Customer Sample #:** *10302019CBS1 CS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2019
Quantity: 1 **Date Received:** 11/7/2019 2:17:00 PM **Time Collected:** 11:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***

Sample #: 191108055-002 **Customer Sample #:** *10302019CBS2 CS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2019
Quantity: 1 **Date Received:** 11/7/2019 2:17:00 PM **Time Collected:** 11:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***

Sample #: 191108055-003 **Customer Sample #:** *10302019CBS3 CS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2019
Quantity: 1 **Date Received:** 11/7/2019 2:17:00 PM **Time Collected:** 11:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***

Sample #: 191108055-004 **Customer Sample #:** *10302019CBS4 CS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2019
Quantity: 1 **Date Received:** 11/7/2019 2:17:00 PM **Time Collected:** 11:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***

Customer Name: CITY OF ELLENSBURG
501 N ANDERSON ST
ELLENSBURG WA 99892

Order ID: 191108055
Order Date: 11/8/2019

Contact Name: JON MORROW
Project Name: STREET SWEEPING VS CATCH BASIN
Comment: PSD SUB TO BUDINGER

Sample #: 191108055-005 **Customer Sample #:** *10302019CBS5 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2019
Quantity: 1 **Date Received:** 11/7/2019 2:17:00 PM **Time Collected:** 11:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***

Sample #: 191108055-006 **Customer Sample #:** *10302019CBS6 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2019
Quantity: 1 **Date Received:** 11/7/2019 2:17:00 PM **Time Collected:** 11:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***

Sample #: 191108055-007 **Customer Sample #:** *10302019CBS7 TS*

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2019
Quantity: 1 **Date Received:** 11/7/2019 2:17:00 PM **Time Collected:** 11:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
% SOLIDS	S	% solids	11/20/2019	***Normal (~10 Days)***
%Moisture	S	%moisture	11/20/2019	***Normal (~10 Days)***

Sample #: 191108055-008 **Customer Sample #:** COMPOSITE: CB# 1,2,3,4 CONTROL

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2019
Quantity: 1 **Date Received:** 11/7/2019 2:17:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
HOLD	S	hold	10/31/2019	***Normal (~10 Days)***

Sample #: 191108055-009 **Customer Sample #:** COMPOSITE: CB# 5,6,7 TEST

Recv'd: ☑ **Matrix:** Solid **Collector:** GORDON CRANE **Date Collected:** 10/31/2019
Quantity: 1 **Date Received:** 11/7/2019 2:17:00 PM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
HOLD	S	hold	11/20/2019	***Normal (~10 Days)***

Customer Name:	CITY OF ELLENSBURG	**Order ID:**	191108055
	501 N ANDERSON ST	**Order Date:**	11/8/2019
	ELLENSBURG WA 99892		
Contact Name:	JON MORROW	**Project Name:**	STREET SWEEPING VS CATCH BASIN
Comment:	PSD SUB TO BUDINGER		

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	7.2
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	7

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

'91108 055 **CELL** Last Due 11/20/2019
1st SAMP 10/31/201 1st RCVD 11/7/2019
STREET SWEEPING VS CATCH BASIN

Company Name: City of Ellensburg
Address: 501 N Anderson St.
City: Ellensburg State: WA Zip: 98926
Phone: (509) 929-3844
Fax:

Project Manager: Jon Morrow
Project Name & #: Street Sweeping vs Catch Basin
Email Address: morrowj@ci.ellensburg.wa.us
Purchase Order #:
Sampler Name & phone: Gordon Crane 509 962-7236

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
__Email

Provide Sample Description

Sediment collected in filter socks

Socks

List Analyses Requested

Preservative:

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	Dry Weight	PSD ASTM D422								
1	10302019CBS1 CS	10/31/19 11:00 AM	solid			✘	✘								
2	10302019CBS2 CS	10/31/19 11:00 AM	solid			✘									
3	10302019CBS3 CS	10/31/19 11:00 AM	solid			✘									
4	10302019CBS4 CS	10/31/19 11:00 AM	solid			✘									
5	10302019CBS5 TS	10/31/19 11:00 AM	solid			✘	✘								
6	10302019CBS6 TS	10/31/19 11:00 AM	solid			✘									
7	10302019CBS7 TS	10/31/19 11:00 AM	solid			✘									

Note Special Instructions/Comments

Please send a copy of the results to Aimee Navickis-Brasch (aimeen@osbornconsulting.com) & Jon at email above

SWBS

	Printed Name	Signature	Company	Date	Time
Relinquished by	Gordon Crane	Gordon Crane	City of E	11-6-19	3:00
Received by	Wendy Oz	Wendy Oz	Anatek	11-7-19	1417
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact? [✓ Y] N
Labels & Chains Agree? [✓ Y] N
Containers Sealed? [✓ Y] N
VOC Head Space? ~~Y N~~

UPS/c/i

Temperature (°C): 7.2 dig 04
Preservative: –

Date & Time: 11-7-19 1417
Inspected By: Wg

soiltest
farm consultants, inc.
2925 Driggs Dr., Moses Lake, Wa 98837 - www.soiltestlab.com
Office: (509)765-1622 - Fax:(509)765-0314 - (800)764-1622

Catch Basin Bulk Density

CITY OF ELLENSBURG
Attn: Jon Morrow
PO Box 48026
Spokane, WA 99208

RECEIVED	11/8/2019
REPORTED	11/14/2019
REPORT #:	S19-23074
Invoice Amt	$ 270.00

		---------------- g/cm^3 -------------------	
Sample ID	**Lab ID**	**Wet Basis BD @ 80% Comp.**	**Dry Basis BD @ 80% Comp.**
CBTS1	S19-23074	1.19	0.52
CBTS2	S19-23075	1.16	0.52
CBTS3	S19-23076	0.98	0.46
CBCS1	S19-23077	1.11	0.59
CBCS2	S19-23078	1.11	0.69
CBCS3	S19-23079	1.14	0.76

soiltest
farm consultants, inc.
2925 Driggs Dr., Moses Lake, Wa 98837 - www.soiltestlab.com
Office: (509)765-1622 - Fax:(509)765-0314 - (800)764-1622

Laboratory Chain of Custody

Client: Please fill out:	**Copy of report sent to:**
Company: City of Ellensburg	Company: email to Aimee and City of Ellensburg
Contact: Jon Morrow	Contact: Aimee Navickis-Brasch
Address: PO Box 48026	Address:
City, ST, Zip.: Spokane, WA 99208	City, ST, Zip.:
Telephone: (509) 995-0557	Telephone:
Fax:	Fax:
e mail: morrowj@ci.ellensburg.wa.us	e mail: aimeen@osbornconsulting.com

Date: ____________

Page ________ of ________

Job #/ Name:

Payment Method: Credit Card____ Est. Acct.___

Write sample information in horizontal rows. Write test name(s) or code(s) in verticle boxes at left. Mark an "X" at the intersection(s) where appropriate.

				Analyses Requested					Lab Use Only	
Sample Identification	Date Sampled	No. of Containers	Sample Matrix	Bulk density at 80% max density SMC 50.100.90					**Sample Condition**	**LAB ID**
110619CBTS1		1	soil	X						
110619CBTS2		1	soil	X						
110619CBTS3		1	soil	X						
110619CBCS1		1	soil	X						
110619CBCS2		1	soil	X						
110619CBCS3		1	soil	X						

Releasing	Date/Time	**Receiving**	Date	Time
Releasing signature 1		Receiving Signature 1		
Releasing signature 2		Receiving Signature 2		
Releasing signature 3		Receiving Signature 3		

Submission of samples to Laboratory with a Chain of Custody constitutes a contract for services requested. Provide payment detail with each COC. If no payment information is provided, you will be contacted by the laboratory. We will make every effort to provide an accurate analysis of this sample. For reasonable cause, we will repeat the tests, but because of factors beyond our control, in sampling procedures and inherent sample variability in compost, soils, plants and water our liability is limited to the price of the tests.

April 2020 Data Collection Event

Client:	City of Ellensburg	Work Order:	WAD0658
Address:	501 N. Anderson St.	Project:	Street Sweeping vs Catch Basin
	Ellensburg, WA 98926	Reported:	7/6/2020 17:09
Attn:	Jon Morrow		

Analytical Results Report

Sample Location:	CB#1 control		
Lab/Sample Number:	WAD0658-01	Collect Date:	04/23/20 12:00
Date Received:	04/24/20 12:55	Collected By:	Gordon Crane
Matrix:	Solid		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
% Solids	19.2	%	0.100	5/8/20 15:53	ary	SM 2540 G	
TVS	26.9	%	0.0100	5/12/20 11:45	ARY	SM 2540 E	H1

Analytical Results Report

(Continued)

Sample Location: CB#2 control
Lab/Sample Number: WAD0658-02
Collect Date: 04/23/20 12:00
Date Received: 04/24/20 12:55
Collected By: Gordon Crane
Matrix: Solid

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
% Solids	27.8	%	0.100	5/8/20 15:53	ary	SM 2540 G	

Analytical Results Report

(Continued)

Sample Location: CB#3 control
Lab/Sample Number: WAD0658-03 Collect Date: 04/23/20 12:00
Date Received: 04/24/20 12:55 Collected By: Gordon Crane
Matrix: Solid

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
% Solids	44.0	%	0.100	5/8/20 15:53	ary	SM 2540 G	

Analytical Results Report

(Continued)

Sample Location: CB#4 control
Lab/Sample Number: WAD0658-04 Collect Date: 04/23/20 12:00
Date Received: 04/24/20 12:55 Collected By: Gordon Crane
Matrix: Solid

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
% Solids	16.6	%	0.100	5/8/20 15:53	ary	SM 2540 G	

Analytical Results Report

(Continued)

Sample Location:	CB#5 test		
Lab/Sample Number:	WAD0658-05	Collect Date:	04/23/20 12:00
Date Received:	04/24/20 12:55	Collected By:	Gordon Crane
Matrix:	Solid		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
% Solids	23.4	%	0.100	5/8/20 15:53	ary	SM 2540 G	
TVS	25.0	%	0.0100	5/12/20 11:45	ARY	SM 2540 E	H1

Analytical Results Report

(Continued)

Sample Location: CB#6 test
Lab/Sample Number: WAD0658-06 Collect Date: 04/23/20 12:00
Date Received: 04/24/20 12:55 Collected By: Gordon Crane
Matrix: Solid

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
% Solids	23.5	%	0.100	5/8/20 15:53	ary	SM 2540 G	

Analytical Results Report

(Continued)

Sample Location: CB#7 test
Lab/Sample Number: WAD0658-07   Collect Date: 04/23/20 12:00
Date Received: 04/24/20 12:55   Collected By: Gordon Crane
Matrix: Solid

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
% Solids	20.8	%	0.100	5/8/20 15:53	ary	SM 2540 G	

Authorized Signature, Kathleen A. Sattler

Kathleen Sattler, Laboratory Manager

H1	Sample analysis performed past holding time.
PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte

This report shall not be reproduced except in full, without the written approval of the laboratory
The results reported related only to the samples indicated.

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

Anatek Log-In #

WAD0658
Due: 05/08/20

Company Name: City of Ellensburg
Address: 501 N Anderson St.
City: Ellensburg State: WA Zip: 98926
Phone: (509) 929-3844
Fax:

Project Manager: Jon Morrow
Project Name & #: Street Sweeping vs Catch Basin
Email Address: morrowj@ci.ellensburg.wa.us
Purchase Order #:
Sampler Name & phone: Gordon Crane 509 962-7236

Turn Arou

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
__Email

Provide Sample Description

Sediment collected in filter socks

List Analyses Requested

Preservative:

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	Dry Weight	PSD ASTM D422	Organic Content ASTM D2974							
	CB#1 control	04/23/20 12:00 PM	solid			✗	✗	✗							
	CB#2 control	04/23/20 12:00 PM	solid			✗									
	CB#3 control	04/23/20 12:00 PM	solid			✗									
	CB#4 control	04/23/20 12:00 PM	solid			✗									
	CB#5 test	04/23/20 12:00 PM	solid			✗	✗	✗							
	CB#6 test	04/23/20 12:00 PM	solid			✗									
	CB#7 test	04/23/20 12:00 PM	solid			✗									

Note Special Instructions/Comments

Please send a copy of the results to Aimee Navickis-Brasch (aimeen@osbornconsulting.com) & Jon at email above

For ASTM D422 testing, combine all test samples, then combine all control samples and use the following sieve sizes: 1", ¾", ½", 3/8", ¼", #10, #16, #30, #40, #100, #200, 0.05mm, 0.01mm, 0.005mm, and 0.001mm.

SWBS

	Printed Name	Signature	Company	Date	Time
Relinquished by	Gordon Crane	Gordon Crane	City of Ebug	4-23-20	1:05PM
Received by	Wendy OZ	Wendy OZ	Anatek	4-24-20	1255
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact? [✓ Y] N
Labels & Chains Agree? [✓ Y] N
Containers Sealed? [✓ Y] N
VOC Head Space? ~~Y~~ N

UPS/nc/ni

Temperature (°C): —
Preservative: —

Date & Time: 4-24-20 1255
Inspected By:

Budinger
& Associates

Geotechnical Engineering
Environmental Engineering
Construction Materials Testing
Subsurface Exploration
Special Inspection

Proudly serving the Inland Northwest since 1976

Kathy Sattler
Anatek Labs, Inc
504 E Sprague Ave Ste D
Spokane, WA 99202

May 22, 2020

Project Number L20180

PROJECT: **Anatek Materials Testing**

SUBJECT: **Results of Laboratory Testing**
Report #2

At your request, we provided laboratory testing services for the subject project. Services were limited to the performance of testing of laboratory tests, selected at your discretion.

For this period, our involvement was limited to laboratory testing of two samples delivered to our laboratory on May 14, 2020. Laboratory tests were conducted in general accordance with methods listed on the attached *Laboratory Summary* sheet.

If you have questions regarding this report, please call.

Respectfully Submitted,
Budinger & Associates, Inc.

Terri Ballard

Terri Ballard
Laboratory Manager

TJB/kah/Addressee –
Kathy Sattler - kathys@anateklabs.com

Attachments:
Soils Laboratory Summary - (1 page)

SOILS
LABORATORY SUMMARY

LABORATORY NUMBER				20-0334	20-0335
SAMPLED BY				Client	Client
SAMPLE TYPE				Bulk	Bulk
DATE RECEIVED				5/14/20	5/14/20
SAMPLE IDENTIFICATION				WAD0658-8	WAD0658-9
		UNITS	Test Method		
SIEVE ANALYSIS			ASTM D422		
	#4	%		100	100
S	#10			89	96
I	#16	P		89	95
E	#30	A		85	92
V	#40	S		83	91
E	#100	S		74	85
	#200	I		69	80
S	.05mm	N		65	73
I	.01mm	G		44	56
Z	.005mm			31	36
E	.001mm			18	19

Sample Extraction Logbook

% Solid instructions: Determine the percent moisture for each solid sample by oven drying about 10.0g of sample at 105°C for 2 hours. Allow to cool in a dessicator and re-weigh. Oven dry for an additional 30 minutes and re-weigh. Further drying is necessary if the two weighings differ by more than 1%. Subtract %moisture from 100 to get %solid (100 - %moisture = % solid)

Lab Sample ID	Dish ID	Dish wt (g)	Dish + wet (g)	Dry 1 (g)	Dry 2 (g)	% Mois / %Solid	Sample Weight	Method	Balance	Date/Time	Initials
WA00658-01	1	172	1000	331.3	331.3	/ 19.2	—	%S	Bal-03	5-1-20 1500	ARY
-02	2	178	1000	406.37	406.37	/ 27.8	—				
-03	3	178	1250	650	650	/ 44.0	—				
-04	4	182	1200	350.99	350.99	/ 16.6	—				
-05	5	180	1200	419.15	419.15	/ 23.4	—				
-06	6	180	1000	372.73	372.73	/ 23.5	—				
-07	7	182	1100	376.96	376.96	/ 20.8	—				
						/					
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ARY

Comments:

Appendix C Street & Catch Basin Weight Collected Raw Data

April 2018 Data Collection Event

Pg. 1

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

	Location (Circle One):	Street Sweeping		[✓ Catch Basin Cleaning]		
	Date of Data Collection:	4-20-18		Time of Data Collection:	9:30 AM	← Test site
	Data Collectors Name:	Gordon Crane			10:30 AM	← Control site
Test Site	Comments: Test site CB Clean — Tub # 1					
	(4-18-18) Weight of Empty Basin:	WW_1	110.4		pounds	
	Wet Weight of Sediments + Basin:	W_2	303.4		pounds	4-27-18 10:00 AM
	Wet Weight of Sediments: $W=W_2-W_1$	W	193.0		pounds	
	Duration Sediment Dewatered (Before Weighing)	T	7 days, 1/2 hr. (hours) 168.5		time	
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	Organic Content:	Particle Size Distribution:		
	Number of Samples Collected:	Moisture Content:	Organic Content:	Particle Size Distribution:		
	Chain of Custody Form Completed:	Moisture Content:	Organic Content:	Particle Size Distribution:		
Control Site	Comments: Control Site CB Clean — Tub # 3					
	(4-18-18) Weight of Empty Basin:	W_1	102.9		pounds	
	Wet Weight of Sediments + Basin:	W_2	262.3		pounds	4-27-18. 10:10 AM
	Wet Weight of Sediments: $W=W_2-W_1$	W	159.4		pounds	
	Duration Sediment Dewatered (Before Weighing)	T	7 days (hours) 168.0		time	
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	Organic Content:	Particle Size Distribution:		
	Number of Samples Collected:	Moisture Content:	Organic Content:	Particle Size Distribution:		
	Chain of Custody Form Completed:	Moisture Content:	Organic Content:	Particle Size Distribution:		

Pg. 2

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

	Location (Circle One):	[✓ Street Sweeping]		Catch Basin Cleaning	
	Date of Data Collection:	4-20-18	**Time of Data Collection:**	9:30 AM	← Test site
	Data Collectors Name:	Gordon Crane		10:30 AM	← Control site
Test Site	**Comments:** Test site sweep – Tub #2				
	4-18-18 Weight of Empty Basin:	W_1	111.3	pounds	
	Wet Weight of Sediments + Basin:	W_2	1872.7	pounds	4-27-18 10:05 AM
	Wet Weight of Sediments: $W=W_2-W_1$	W	1761.4	pounds	
	Duration Sediment Dewatered (Before Weighing)	T	7days, 1/2hr, hours 168.5	time	
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	Organic Content:	Particle Size Distribution:	
	Number of Samples Collected:	Moisture Content:	Organic Content:	Particle Size Distribution:	
	Chain of Custody Form Completed:	Moisture Content:	Organic Content:	Particle Size Distribution:	
Control Site	**Comments:** Control site sweep – Tub # 4				
	4-18-18 Weight of Empty Basin:	W_1	115.2	pounds	
	Wet Weight of Sediments + Basin:	W_2	2932.9	pounds	4-27-18 10:20 AM
	Wet Weight of Sediments: $W=W_2-W_1$	W	2817.7	pounds	
	Duration Sediment Dewatered (Before Weighing)	T	7days (hours) 168.0	time	
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	Organic Content:	Particle Size Distribution:	
	Number of Samples Collected:	Moisture Content:	Organic Content:	Particle Size Distribution:	
	Chain of Custody Form Completed:	Moisture Content:	Organic Content:	Particle Size Distribution:	

June 2018 Data Collection Event

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

	Location (Circle One):	[✓ Street Sweeping]		Catch Basin Cleaning	
	Date of Data Collection:	6-19-18	Time of Data Collection:	10:30 AM	
	Data Collectors Name:	Gordon Crave			
[✓ Test Site]	Comments: (North side) Sweep Tub #3				
	Weight of Empty Basin:	W_1	110.3		pounds
	Wet Weight of Sediments + Basin:	W_2	274.4		pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	164.1		pounds
	Duration Sediment Dewatered (Before Weighing)	T	14 days, 5 hrs		time
	✓ Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content: ✓	Organic Content:	Particle Size Distribution:	
	✓ Number of Samples Collected:	Mositure Content: 3	Organic Content:	Particle Size Distribution:	
	✓ Chain of Custody Form Completed:	Moisture Content:	Organic Content:	Particle Size Distribution:	
Control Site	Comments:				
	Weight of Empty Basin:	W_1			pounds
	Wet Weight of Sediments + Basin:	W_2			pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W			pounds
	Duration Sediment Dewatered (Before Weighing)	T			time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	Organic Content:	Particle Size Distribution:	
	Number of Samples Collected:	Mositure Content:	Organic Content:	Particle Size Distribution:	
	Chain of Custody Form Completed:	Moisture Content:	Organic Content:	Particle Size Distribution:	

Pg. 1

7-3-18 3:00 PM

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

Pg. 2

	Location (Circle One):	Street Sweeping		[✓ Catch Basin Cleaning]			
	Date of Data Collection:	6-19-18		Time of Data Collection:	10:30 AM		
	Data Collectors Name:	Gordon Crane					
Test Site	Comments: (North Side) Tub # 1						
	Weight of Empty Basin:	W_1	107.8				pounds
	Wet Weight of Sediments + Basin:	W_2	141.8				pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	34.0				pounds
	Duration Sediment Dewatered (Before Weighing)	T	14 days, 5 hours				time
	✓ Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	✓	Organic Content:		Particle Size Distribution:	
	✓ Number of Samples Collected:	Mositure Content:	3	Organic Content:		Particle Size Distribution:	
	✓ Chain of Custody Form Completed:	Moisture Content:		Organic Content:		Particle Size Distribution:	
Control Site	Comments: (South side) Tub # 4 Note: visually, more hay chaff in S. side tub compared to N. Side						
	Weight of Empty Basin:	W_1	100.8				pounds
	Wet Weight of Sediments + Basin:	W_2	151.2				pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	50.4				pounds
	Duration Sediment Dewatered (Before Weighing)	T	14 days, 5 hrs				time
	✓ Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	✓	Organic Content:		Particle Size Distribution:	
	✓ Number of Samples Collected:	Mositure Content:	3	Organic Content:		Particle Size Distribution:	
	✓ Chain of Custody Form Completed:	Moisture Content:		Organic Content:		Particle Size Distribution:	

August 2018 Data Collection Event

August 2018

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

Page 1

Location (Circle One): [✓ Street Sweeping] Catch Basin Cleaning

Date of Data Collection: 8-23-18 Time of Data Collection: 9AM

Data Collectors Name: Gordon Crane

Test Site	Comments: (North side) Sweep Tub # 3						
	Weight of Empty Basin:	W_1	114.5				pounds
	Wet Weight of Sediments + Basin:	W_2	270.1 9 AM 8-30-18)				pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	155.6				pounds
	Duration Sediment Dewatered (Before Weighing)	T	7 days				time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	✓	Organic Content:	✓	Particle Size Distribution:	
	Number of Samples Collected:	Mositure Content:	3	Organic Content:		Particle Size Distribution:	
	Chain of Custody Form Completed:	Moisture Content:		Organic Content:		Particle Size Distribution:	
Control Site	Comments:						
	Weight of Empty Basin:	W_1					pounds
	Wet Weight of Sediments + Basin:	W_2					pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W					pounds
	Duration Sediment Dewatered (Before Weighing)	T					time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:		Organic Content:		Particle Size Distribution:	
	Number of Samples Collected:	Mositure Content:		Organic Content:		Particle Size Distribution:	
	Chain of Custody Form Completed:	Moisture Content:		Organic Content:		Particle Size Distribution:	

Tub # 2	108.3	149.6
Tub # 1	109.1	137.4
Tub # 3	114.5	270.1

August 2018

Page 2

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

	Location (Circle One):	Street Sweeping			[✓ Catch Basin Cleaning]		
	Date of Data Collection:	8-23-18		**Time of Data Collection:**	9 AM		
	Data Collectors Name:	Gordon Crane					
Test Site	**Comments:** (North side) Tub # 1						
	Weight of Empty Basin:	W_1	109.1				pounds
	Wet Weight of Sediments + Basin:	W_2	137.4 4PM 8-29-18				pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	28.3				pounds
	Duration Sediment Dewatered (Before Weighing)	T	6 days 7 hrs				time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	✓	Organic Content:	✓	Particle Size Distribution:	✓
	Number of Samples Collected:	Mositure Content:	3	Organic Content:		Particle Size Distribution:	1
	Chain of Custody Form Completed:	Moisture Content:		Organic Content:		Particle Size Distribution:	
Control Site	**Comments:** (South side) Tub # 2						
	Weight of Empty Basin:	W_1	108.3				pounds
	Wet Weight of Sediments + Basin:	W_2	149.6 4PM 8-29-18				pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	41.3				pounds
	Duration Sediment Dewatered (Before Weighing)	T	6 days 7 hrs				time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	✓	Organic Content:	✓	Particle Size Distribution:	✓
	Number of Samples Collected:	Mositure Content:	3	Organic Content:		Particle Size Distribution:	1
	Chain of Custody Form Completed:	Moisture Content:		Organic Content:		Particle Size Distribution:	

October 2018 Data Collection Event

Page 1

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

Location (Circle One):	[✓ Street Sweeping]	Catch Basin Cleaning	
Date of Data Collection:	10-31-18	**Time of Data Collection:**	11:00 AM
Data Collectors Name:	Gordon Crane		

Test Site	**Comments:** (North Side) Sweep Tub # 4						
	Weight of Empty Basin:	W_1			109.5		pounds
	Wet Weight of Sediments + Basin:	W_2	10-31-18 10:00 AM		241.6		pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W			132.1		pounds
	Duration Sediment Dewatered (Before Weighing)	T	7 days 1 hour				time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:		Organic Content:		Particle Size Distribution:	
	Number of Samples Collected:	Moisture Content:	3	Organic Content:		Particle Size Distribution:	1
	Chain of Custody Form Completed:	Moisture Content:	✓	Organic Content:		Particle Size Distribution:	✓
Control Site	**Comments:** (South side) Sweep Tub# 3 collected 10-30-18, 8:30AM						
	Weight of Empty Basin:	W_1	10-29-18		104.3		pounds
	Wet Weight of Sediments + Basin:	W_2	10-31-18		756.6		pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W			652.3		pounds
	Duration Sediment Dewatered (Before Weighing)	T	1 day, 2.5 hours				time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	3	Organic Content:		Particle Size Distribution:	
	Number of Samples Collected:	Moisture Content:	3	Organic Content:		Particle Size Distribution:	1
	Chain of Custody Form Completed:	Moisture Content:	✓	Organic Content:		Particle Size Distribution:	✓

Sweep/CB collect on 10-24-18

empty 10-23-18

Tub #1 108.1 "

#2 101.9 "

#4 109.5 "

#3 104.3

Note: Last swept in April 2018.

Page 2

Sweep/CB Collect on 10-24-18

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

Location (Circle One):	Street Sweeping	[✓ Catch Basin Cleaning]	
Date of Data Collection:	10-31-18	Time of Data Collection:	11:00 AM
Data Collectors Name:	Gordon Crane		

[✓ Test Site]	Comments: (North side) Tub # 2						
	Weight of Empty Basin:	W_1	101.9	pounds			
	Wet Weight of Sediments + Basin:	W_2	174.7	pounds			
	Wet Weight of Sediments: $W=W_2-W_1$	W	72.8	pounds			
	Duration Sediment Dewatered (Before Weighing)	T	7 days 1 hr	time			
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:		Organic Content:		Particle Size Distribution:	
	Number of Samples Collected:	Mositure Content:	3	Organic Content:		Particle Size Distribution:	/
	Chain of Custody Form Completed:	Moisture Content:	✓	Organic Content:		Particle Size Distribution:	✓
[✓ Control Site]	Comments: (South Side) Tub # 1						
	Weight of Empty Basin:	W_1	108.1	pounds			
	Wet Weight of Sediments + Basin:	W_2	168.1	pounds			
	Wet Weight of Sediments: $W=W_2-W_1$	W	60.0	pounds			
	Duration Sediment Dewatered (Before Weighing)	T	7 days 1 hr.	time			
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:		Organic Content:		Particle Size Distribution:	
	Number of Samples Collected:	Mositure Content:	3	Organic Content:		Particle Size Distribution:	/
	Chain of Custody Form Completed:	Moisture Content:	✓	Organic Content:		Particle Size Distribution:	✓

April 2019 Data Collection Event

2019 Collection

Page 1

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

	Location (Circle One):	[✓ Street Sweeping]		Catch Basin Cleaning	
	Date of Data Collection:	4-25-19	Time of Data Collection:	—	
	Data Collectors Name:	Gordon Crane			
Test Site	Comments: (South Side) Sweep Tub # 3				
Test Site	Weight of Empty Basin:	W_1	111		pounds
Test Site	Wet Weight of Sediments + Basin:	W_2	1528		pounds
Test Site	Wet Weight of Sediments: $W=W_2-W_1$	W	1417		pounds
Test Site	Duration Sediment Dewatered (Before Weighing)	T	5 day 22 hr. 15 min = 144.25 hr.		time
Test Site	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content: ✓	Organic Content: ✓	Particle Size Distribution: ✓	
Test Site	Number of Samples Collected:	Mositure Content:	Organic Content:	Particle Size Distribution:	
Test Site	Chain of Custody Form Completed:	Moisture Content:	Organic Content:	Particle Size Distribution:	
Control Site	Comments:				
Control Site	Weight of Empty Basin:	W_1			pounds
Control Site	Wet Weight of Sediments + Basin:	W_2			pounds
Control Site	Wet Weight of Sediments: $W=W_2-W_1$	W			pounds
Control Site	Duration Sediment Dewatered (Before Weighing)	T			time
Control Site	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	Organic Content:	Particle Size Distribution:	
Control Site	Number of Samples Collected:	Mositure Content:	Organic Content:	Particle Size Distribution:	
Control Site	Chain of Custody Form Completed:	Moisture Content:	Organic Content:	Particle Size Distribution:	

Started decant
11:00 4-26-19

end
9:15 5-2-19

Decreased amount due to
(Note: roadway partly swept by private party)

Page 2

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

	Location (Circle One):	Street Sweeping	[✓ Catch Basin Cleaning]		
	Date of Data Collection:	4-25-19	**Time of Data Collection:**		
	Data Collectors Name:				
Test Site	**Comments:** (South Side) Tub # 2				
	Weight of Empty Basin:	W_1	105		pounds
	Wet Weight of Sediments + Basin:	W_2	230		pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	125		pounds
	Duration Sediment Dewatered (Before Weighing)	T	5 days + 22 hr 15 min = 144.25 hr.		time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content: ✓	Organic Content: ✓	Particle Size Distribution: ✓	
	Number of Samples Collected:	Mositure Content: 3	Organic Content:	Particle Size Distribution:	
	Chain of Custody Form Completed:	Moisture Content:	Organic Content:	Particle Size Distribution:	
Control Site	**Comments:** (North side) Tub # 4				
	Weight of Empty Basin:	W_1	114		pounds
	Wet Weight of Sediments + Basin:	W_2	183		pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	69		pounds
	Duration Sediment Dewatered (Before Weighing)	T	5 day 22 hr 15 min = 144.25 hr.		time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content: ✓	Organic Content: ✓	Particle Size Distribution: ✓	
	Number of Samples Collected:	Mositure Content: 3	Organic Content:	Particle Size Distribution:	
	Chain of Custody Form Completed:	Moisture Content:	Organic Content:	Particle Size Distribution:	

Start decant
11:00 4-26-19

End
9:15 5-2-19

June 2019 Data Collection Event

2019

Page 1

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

	Location (Circle One):	[✓ Street Sweeping]		Catch Basin Cleaning	
	Date of Data Collection:	6-24-19		Time of Data Collection:	—
	Data Collectors Name:	Gordon Crane			
[✓ Test Site]	Comments: (South Side) Sweep Tub #4				
	Weight of Empty Basin:	W_1	100		pounds
	Wet Weight of Sediments + Basin:	W_2	292		pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	192		pounds
	Duration Sediment Dewatered (Before Weighing)	T	6 days 23 hrs (167 hrs)		time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content: ✓	Organic Content:	Particle Size Distribution: ✓	
	Number of Samples Collected:	Moisture Content: 3	Organic Content:	Particle Size Distribution: ✓	
	Chain of Custody Form Completed:	Moisture Content: ✓	Organic Content:	Particle Size Distribution:	
Control Site	Comments:				
	Weight of Empty Basin:	W_1			pounds
	Wet Weight of Sediments + Basin:	W_2			pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W			pounds
	Duration Sediment Dewatered (Before Weighing)	T			time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	Organic Content:	Particle Size Distribution:	
	Number of Samples Collected:	Moisture Content:	Organic Content:	Particle Size Distribution:	
	Chain of Custody Form Completed:	Moisture Content:	Organic Content:	Particle Size Distribution:	

Page 2

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

Location (Circle One):	Street Sweeping	[✓ Catch Basin Cleaning]	
Date of Data Collection:	6-24-19	**Time of Data Collection:**	
Data Collectors Name:	Gordon Crane		

Test Site	**Comments:** (South Side) Tub #3			
	Weight of Empty Basin:	W_1	106	pounds
	Wet Weight of Sediments + Basin:	W_2	183	pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	77	pounds
	Duration Sediment Dewatered (Before Weighing)	T	6 days 23 hr (167 hrs)	time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content: ✓	Organic Content:	Particle Size Distribution:
	Number of Samples Collected:	Mositure Content: 3	Organic Content:	Particle Size Distribution:
	Chain of Custody Form Completed:	Moisture Content: ✓	Organic Content:	Particle Size Distribution:
Control Site	**Comments:** (North side) Tub #2			
	Weight of Empty Basin:	W_1	109	pounds
	Wet Weight of Sediments + Basin:	W_2	131	pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	22	pounds
	Duration Sediment Dewatered (Before Weighing)	T	6 days 23 hr (167 hrs)	time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content: ✓	Organic Content:	Particle Size Distribution:
	Number of Samples Collected:	Mositure Content: 3	Organic Content:	Particle Size Distribution:
	Chain of Custody Form Completed:	Moisture Content: ✓	Organic Content:	Particle Size Distribution:

start decant
6-25-19 @ 11:30 AM
7-2-19 @ 10:30 AM

August 2019 Data Collection Event

August 2019

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

	Location (Circle One):	[✓ Street Sweeping]		Catch Basin Cleaning	
	Date of Data Collection:	8-28-19		**Time of Data Collection:**	10:30
	Data Collectors Name:	Gordon Crane			
[✓ Test Site]	**Comments:** (South Side) Sweep Tub # 4				
	Weight of Empty Basin:	W_1	101		pounds
	Wet Weight of Sediments + Basin:	W_2	261		pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	160		pounds
	Duration Sediment Dewatered (Before Weighing)	T	13 days, 3 1/2 hrs		time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content: ✓		Organic Content:	Particle Size Distribution:
	Number of Samples Collected:	Mositure Content: 3		Organic Content:	Particle Size Distribution:
	Chain of Custody Form Completed:	Moisture Content: ✓		Organic Content:	Particle Size Distribution:
Control Site	**Comments:**				
	Weight of Empty Basin:	W_1			pounds
	Wet Weight of Sediments + Basin:	W_2			pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W			pounds
	Duration Sediment Dewatered (Before Weighing)	T			time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:		Organic Content:	Particle Size Distribution:
	Number of Samples Collected:	Mositure Content:		Organic Content:	Particle Size Distribution:
	Chain of Custody Form Completed:	Moisture Content:		Organic Content:	Particle Size Distribution:

Page 1

Note: Almost no water in this tub. Most dewatering by evaporation!

Weighed tub 9-10-19
2:00 PM

(3 jars)

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

Page 2

Location (Circle One):	Street Sweeping		[✓ Catch Basin Cleaning]		
Date of Data Collection:	8-28-19	**Time of Data Collection:**	10:30		
Data Collectors Name:	Gordon Crane				

[✓ Test Site]	Comments: (South Side) Tub # 3						
	Weight of Empty Basin:	W_1	108				pounds
	Wet Weight of Sediments + Basin:	W_2	167				pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	59				pounds
	Duration Sediment Dewatered (Before Weighing)	T	13 days, 1 hr, 15 min				time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content: ✓		Organic Content: ✓		Particle Size Distribution: ✓	
	Number of Samples Collected:	Mositure Content: 3		Organic Content: 3		Particle Size Distribution: 3	
	Chain of Custody Form Completed:	Moisture Content: ✓		Organic Content: ✓		Particle Size Distribution: ✓	

Weighed tubs 9-10-19
11:45 AM

(3 jars)

[✓ Control Site]	Comments: (North Side) Tub #2						
	Weight of Empty Basin:	W_1	103				pounds
	Wet Weight of Sediments + Basin:	W_2	156				pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	53				pounds
	Duration Sediment Dewatered (Before Weighing)	T	13 days, 1 hr, 15 min				time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content: ✓		Organic Content: ✓		Particle Size Distribution: ✓	
	Number of Samples Collected:	Mositure Content: 3		Organic Content: 3		Particle Size Distribution: 3	
	Chain of Custody Form Completed:	Moisture Content: ✓		Organic Content: ✓		Particle Size Distribution: ✓	

(3 jars)

October 2019 Data Collection Event

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

	Location (Circle One):	[✓ Street Sweeping]			Catch Basin Cleaning		
	Date of Data Collection:	10-30-19		Time of Data Collection:	10:30		
	Data Collectors Name:	Gordon Crane					
[✓ Test Site]	Comments: (South Side) Sweep Tub # 4						
	Weight of Empty Basin:	W_1	102				pounds
	Wet Weight of Sediments + Basin:	W_2	398				pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	296				pounds
	Duration Sediment Dewatered (Before Weighing)	T	8 days, 3 hr				time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	✓	Organic Content:	✓	Particle Size Distribution:	✓
	③ Number of Samples Collected:	Mositure Content:	✓	Organic Content:	✓	Particle Size Distribution:	✓
	Chain of Custody Form Completed:	Moisture Content:	✓	Organic Content:	✓	Particle Size Distribution:	✓
[✓ Control Site]	Comments: (North Side) Sweep Tub # 1						
	Weight of Empty Basin:	W_1	108				pounds
	Wet Weight of Sediments + Basin:	W_2	2139				pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	2031				pounds
	Duration Sediment Dewatered (Before Weighing)	T	8 days 3 hr.				time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	✓	Organic Content:	✓	Particle Size Distribution:	✓
	③ Number of Samples Collected:	Mositure Content:	✓	Organic Content:	✓	Particle Size Distribution:	✓
	Chain of Custody Form Completed:	Moisture Content:	✓	Organic Content:	✓	Particle Size Distribution:	✓

Page 1

weighed tub 11-7-19 1:30 PM

weighed tub 11-7-19 1:30 PM

Sediment Weight Field Data Collection Form: Roadway and Catch Basins

Page 2

Location (Circle One): Street Sweeping [✓ Catch Basin Cleaning]

Date of Data Collection: 10-30-19 Time of Data Collection: 10:30

Data Collectors Name: Gordon Crane

[✓ Test Site]	Comments: (South Side) CB Tub # 3						
	Weight of Empty Basin:	W_1	109				pounds
	Wet Weight of Sediments + Basin:	W_2	159				pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	50				pounds
	Duration Sediment Dewatered (Before Weighing)	T	6 days 5 hrs				time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	✓	Organic Content:	✓	Particle Size Distribution:	✓
	3 Number of Samples Collected:	Mositure Content:	✓	Organic Content:	✓	Particle Size Distribution:	✓
	Chain of Custody Form Completed:	Moisture Content:	✓	Organic Content:	✓	Particle Size Distribution:	✓
[✓ Control Site]	Comments: (North Side) CB Tub # 2						
	Weight of Empty Basin:	W_1	104				pounds
	Wet Weight of Sediments + Basin:	W_2	128				pounds
	Wet Weight of Sediments: $W=W_2-W_1$	W	24				pounds
	Duration Sediment Dewatered (Before Weighing)	T	6 days 5 hrs				time
	Cone & Quartering Technique Followed to Collect Samples for:	Moisture Content:	✓	Organic Content:	✓	Particle Size Distribution:	✓
	3 Number of Samples Collected:	Mositure Content:	✓	Organic Content:	✓	Particle Size Distribution:	✓
	Chain of Custody Form Completed:	Moisture Content:	✓	Organic Content:	✓	Particle Size Distribution:	✓

weighed 11-5-19 3:30 pm

← weighed tubs 11-__-19

weighed 11-5-19 3:30pm

Appendix D Catch Basin Depth Raw Data

April 2018 Data Collection Event

Pg. 1

Catch Basin Sediment Depth Measurements

CB Cleaning Month:	APRIL	Data Collector Name:	Gordon-Jon
Date:	4-19-18	Data Collection Time:	1Pm
Location (Circle One):	4-20-18 Sweep clean	[✓ Test-Site]	Control-Site

Comments:
4-20-18 #4 & #8 Rim to IE all 8CB
4-26-18 Remaining Depth of CB empty

Catch Basin #: 4	Depth Measurement Location in CB:		1	2	3	4	5	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	4.54	4.53	4.54	4.50	4.48	inches
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{invert}	2.19					inches
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	D_{CB-S}	4.45	4.35	4.25	4.42	4.45	inches
Catch Basin #: 3	Depth Measurement Location in CB:		1	2	3	4	5	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	3.86	3.86	3.86	3.92	3.92	inches
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{invert}	1.52					inches
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	D_{CB-S}	3.65	3.62	3.62	3.60	3.60	inches
Catch Basin #: 2	Depth Measurement Location in CB:		1	2	3	4	5	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	4.47 ✓	4.35*	4.46 ✓	4.42*	4.47 ✓	inches
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{invert}	2.08					inches
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	D_{CB-S}	4.15	4.15	4.05	4.25	4.18	inches
Catch Basin #: 1	Depth Measurement Location in CB:		1	2	3	4	5	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	3.93	3.93	3.92	3.93	3.94	inches
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{invert}	1.60					inches
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	D_{CB-S}	3.55	3.55	3.48	3.60	3.52	inches

All Rim to IE →

Catch Basin 4: OK - No Conc.
4.54-2.19 = 2.35

Catch Basin 3: Small blob NW Corner
2.34

Catch Basin 2: Most has same concrete on CB floor
2.39

Catch Basin 1: Small blobs each corner center OK
2.33

Pg. 2

Catch Basin Sediment Depth Measurements

CB Cleaning Month:	APRIL	Data Collector Name:	GORDON-JON
Date:	4-19-18 sed. depth	Data Collection Time:	2pm
Location (Circle One):	4-20-18 Sweep, clean	Test-Site	[✓ Control-Site]

Comments: 4-26-18 Remaining Depth of CB empty Invert #8 & #4, Rim to IE all 8CB

Catch Basin #: 5	Depth Measurement Location in CB:		1	2	3	4	5	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	3.81	3.79	3.80	3.87	3.85	inches
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{Invert}	1.40					inches
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	D_{CB-S}	3.60	3.55	3.48	3.58	3.65	inches

All Rim to IE

Clean, No blob

2.41

Catch Basin #: 6	Depth Measurement Location in CB:		1	2	3	4	5	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	4.26	4.26	4.25	4.30	4.28	inches
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{Invert}	1.88					inches
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	D_{CB-S}	3.95	3.90	390	4.00	3.92	inches

Clean, No blob

2.38

Catch Basin #: 7	Depth Measurement Location in CB:		1	2	3	4	5	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	3.86	3.85	3.85	3.89	3.90	inches
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{Invert}	1.58					inches
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	D_{CB-S}	3.55	3.55	3.50	3.80	3.50	inches

Clean, No Blob

2.28

Catch Basin #: 8	Depth Measurement Location in CB:		1	2	3	4	5	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	4.05*	3.93*	3.93*	4.28*	4.27*	inches
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{Invert}	1.95					inches
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	D_{CB-S}	3.90	3.75	3.65	4.35 4.25	3.95	inches

*Blob of [illegible] @ base

*

June 2018 Data Collection Event

Page 2

CB Cleaning Month:	June 2018	**Data Collector Name:**	Gordon Crane
Date:	June 18 & 19,	**Data Collection Time:**	
Location (Circle One):		**Test-Site**	[✓ **Control-Site**]

Comments:

Catch Basin #: 5	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
6-19-18 **Depth of CB Empty:**	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	3.81	3.79	3.80	3.87	3.85	3.82	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.41						**decimal feet**
6-18-18 **Depth to Top of Sediment in CB:**	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	D_{CB-S}	3.59	3.66	3.74	3.80	3.85	3.73	**decimal feet**
Catch Basin #: 6	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	4.26	4.26	4.25	4.30	4.28	4.27	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.38						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	D_{CB-S}	3.97	4.23	4.18	4.15	4.22	4.15	**decimal feet**
Catch Basin #: 7	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	3.86	3.85	3.85	3.89	3.90	3.87	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.28						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	D_{CB-S}	3.70	3.76	3.79	3.78	3.83	3.77	**decimal feet**
Catch Basin #: 8	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	4.05*	3.93*	3.93*	4.28*	4.27*	4.08*	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.10			(* This CB has blobs of concrete on floor of CB)			**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	D_{CB-S}	3.93	3.88	3.87	4.27	4.18	4.03	**decimal feet**

Page 1

CB Cleaning Month:	June 2018	**Data Collector Name:**	Gordon Crane
Date:	June 18 & 19, 2018	**Data Collection Time:**	
Location (Circle One):		[✓ **Test-Site**]	**Control-Site**

Comments: Sediment measured 6-18-18
Empty CB's " 6-19-18

Catch Basin #: 4	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
6-19-18 **Depth of CB Empty:**	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	4.54	4.53	4.54	4.50	4.50	4.52	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.35 (Barely felt any silt)						**decimal feet**
6-18-18 **Depth to Top of Sediment in CB:**	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	4.46	4.51	4.41	4.49	4.50	4.47	**decimal feet**
Catch Basin #: 3	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	3.86	3.86	3.86	3.92	3.92	3.88	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.34						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	3.85	3.83	3.84	3.79	3.83	3.83	**decimal feet**
Catch Basin #: 2	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	4.47	4.35	4.46	4.42	4.47	4.43	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.39						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	4.32	4.13	4.36	4.32	4.43	4.31	**decimal feet**
Catch Basin #: 1	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	3.93	3.93	3.92	3.93	3.94	3.93	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.33						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	3.81	3.85	3.81	3.88	3.86	3.84	**decimal feet**

August 2018 Data Collection Event

Page 1

CB Cleaning Month:	August 22 2018	**Data Collector Name:**	Gordon Crane
Date:	August 16, 2018	**Data Collection Time:**	
Location (Circle One):		[✓ **Test-Site**]	**Control-Site**

Comments: Sediment measured 8-16-18

Catch Basin #: 4	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	4.54	4.53	4.54	4.50	4.50	4.52	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.35						**decimal feet**
8-16-18 **Depth to Top of Sediment in CB:**	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	4.49	4.48	4.44	4.49	4.52	4.48	**decimal feet**
Catch Basin #: 3	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	3.86	3.86	3.93	3.92	3.92	3.90	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.34						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	3.83	3.83	3.88	3.88	3.88	3.86	**decimal feet**
Catch Basin #: 2	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	4.47	4.35	4.46	4.42	4.47	4.43	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.39						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	4.28	4.31	4.36	4.32	4.40	4.33	**decimal feet**
Catch Basin #: 1	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	3.93	3.93	3.92	3.93	3.94	3.93	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.33						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	3.82	3.82	3.90	3.90	3.88	3.87	**decimal feet**

CB Cleaning Month: August 22 2018

Data Collector Name: Gordon Crane

Date: August 16, 2018

Data Collection Time:

Location (Circle One): Test-Site [✓ Control-Site]

Comments: Note: both CB 7 & 8 are ½ full of water, with hay chaff floating.

Catch Basin #: 5	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	3.81	3.79	3.82	3.84	3.81	3.81	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.41						**decimal feet**
8-16-18 **Depth to Top of Sediment in CB:**	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	3.60	3.72	3.83	3.81	3.79	3.75	**decimal feet**
Catch Basin #: 6	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	4.26	4.25	4.29	4.29	4.28	4.27	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.38						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	4.15	4.22	4.26	4.23	4.26	4.22	**decimal feet**
Catch Basin #: 7	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	3.86	3.86	3.88	3.90	3.86	3.88	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.28		(CB ½ full of water, hay chaff floating				**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	3.83	3.86	3.88	3.90	3.86	3.87	**decimal feet**
Catch Basin #: 8	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	3.95*	3.90*	4.28*	4.14*	4.06*	4.07*	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.10			(this CB has blobs of concrete on floor of CB)			**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	3.95	3.90	4.27	4.12	4.06	4.06	**decimal feet**

October 2018 Data Collection Event

Page 1

CB Cleaning Month:	October	**Data Collector Name:**	Gordon Crane
Date:	10-24-18 Collection	**Data Collection Time:**	
Location (Circle One):		[✓ **Test-Site**]	**Control-Site**

Comments: Measured Sediment depths 10-23-18
" empty " 10-24-18

Catch Basin #: 4	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	4.54	4.53	4.54	4.50	4.53	4.53	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.35						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**$D_{CB\text{-}S}$**	4.50	4.50	4.46	4.48	4.53	4.49	**decimal feet**

Catch Basin #: 3	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	3.86	3.86	3.93	3.92	3.92	3.90	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.34						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**$D_{CB\text{-}S}$**	3.84	3.82	3.89	3.85	3.85	3.85	**decimal feet**

Catch Basin #: 2	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	4.37	4.33	4.35	4.37	4.47 ✓	4.38	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.39			(blob conc.)			**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**$D_{CB\text{-}S}$**	4.30	4.31	4.35	4.37	4.44	4.35	**decimal feet**

Catch Basin #: 1	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	3.93	3.93	3.92	3.93	3.94	3.93	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.33						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**$D_{CB\text{-}S}$**	3.82	3.84	2.90	3.85	3.87	3.86	**decimal feet**

CB Cleaning Month:	October	**Data Collector Name:**	Gordon Crane
Date:	10-24-18 Collection	**Data Collection Time:**	
Location (Circle One):		**Test-Site**	[✓ **Control-Site**]

Comments:

Catch Basin #: 5	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	3.81	3.79	3.82	3.84	3.81	3.81	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.41						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	$D_{CB\text{-}S}$	3.77	3.77	3.82	3.84	3.75	3.79	**decimal feet**
Catch Basin #: 6	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	4.26	4.25	4.29	4.29	4.28	4.27	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.38						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	$D_{CB\text{-}S}$	4.15	4.20	4.20	4.24	4.23	4.20	**decimal feet**
Catch Basin #: 7	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	3.86	3.86	3.88	3.90	3.86	3.87	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.28						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	$D_{CB\text{-}S}$	3.76	3.75	3.84	3.86	3.86	3.81	**decimal feet**
Catch Basin #: 8	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	3.95*	3.90*	4.28*	4.14*	4.06*	4.07*	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.10			(* Note: this CB has blobs of concrete on floor of CB)			**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	$D_{CB\text{-}S}$	3.93	3.88	4.20	4.12	4.05	4.04	**decimal feet**

April 2019 Data Collection Event

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CB Cleaning Month:	April 2019	**Data Collector Name:**	Gordon Crane
Date:	4-25-19 Collection	**Data Collection Time:**	
Location (Circle One):		**Test-Site**	[✓ **Control-Site**]

Comments: Measured sediment depth 4-24-19

Catch Basin #: 4	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	4.54	4.53	4.54	4.53	4.53	4.53	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.35						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	4.32	4.42	4.44	4.42	4.45	4.41	**decimal feet**

Catch Basin #: 3	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	3.86	3.86	3.93	3.92	3.92	3.90	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.34						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	3.75	3.73	3.77	3.80	3.77	3.77	**decimal feet**

Catch Basin #: 2	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	4.37	4.33	4.35	4.37	4.47	4.38	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.39						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	4.27	4.20	4.30	4.28	4.37	4.28	**decimal feet**

Catch Basin #: 1	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	3.93	3.93	3.92	3.93	3.94	3.93	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.23						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	3.79	3.72	3.86	3.85	3.83	3.81	**decimal feet**

CB Cleaning Month:	April 2019	**Data Collector Name:**	Gordon Crane
Date:	4-25-19	**Data Collection Time:**	—
Location (Circle One):		[✓ **Test-Site**]	**Control-Site**

Comments: Measure Sed. 4-24-19

Catch Basin #: 5	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	3.81	3.79	3.82	3.84	3.81	3.81	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.41						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	D_{CB-S}	3.55	3.45	3.68	3.63	3.56	3.57	**decimal feet**
Catch Basin #: 6	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	4.26	4.25	4.29	4.29	4.28	4.27	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.38						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	D_{CB-S}	4.03	4.00	4.11	4.01	3.99	4.03	**decimal feet**
Catch Basin #: 7	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	3.86	3.86	3.88	3.90	3.86	3.87	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.28						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	D_{CB-S}	3.49	3.40	3.68	3.48	3.53	3.52	**decimal feet**
Catch Basin #: 8	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	3.95*	3.90*	4.28*	4.14*	4.06*	4.07*	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.10	(Note: this CB has blobs of concrete on floor of CB)					**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	D_{CB-S}	3.70	3.60	4.07	3.82	3.85	3.81	**decimal feet**

June 2019 Data Collection Event

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CB Cleaning Month:	June 2019	**Data Collector Name:**	Gordon Crane
Date:		**Data Collection Time:**	
Location (Circle One):		**Test-Site**	[✓ **Control-Site**]

Comments: Note: Measured 6-21-99

Catch Basin #: 4	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	4.54	4.53	4.54	4.53	4.53	4.53	decimal feet
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.35						decimal feet
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	$D_{CB\text{-}S}$	4.50	4.51	4.54	4.52	4.53	4.52	decimal feet

Catch Basin #: 3	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	3.86	3.86	3.93	3.92	3.92	3.90	decimal feet
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.34						decimal feet
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	$D_{CB\text{-}S}$	3.86	3.86	3.90	3.90	3.90	3.88	decimal feet

Catch Basin #: 2	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	4.37	4.33	4.35	4.37	4.47	4.38	decimal feet
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.39						decimal feet
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	$D_{CB\text{-}S}$	4.37	4.33	4.35	4.37	4.47	4.39	decimal feet

Catch Basin #: 1	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	3.93	3.93	3.92	3.93	3.94	3.93	decimal feet *
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.23						decimal feet
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	$D_{CB\text{-}S}$	3.93	3.93	3.90	3.91	3.94	3.92	decimal feet

CB Cleaning Month:	June 2019	**Data Collector Name:**	Gordon Crane
Date:		**Data Collection Time:**	
Location (Circle One):		[✓ **Test-Site**]	**Control-Site**
Comments:			

Catch Basin #: 5	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	3.81	3.79	3.82	3.84	3.81	3.81	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.41						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	3.77	3.77	3.81	3.82	3.77	3.79	**decimal feet**

Catch Basin #: 6	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	4.26	4.28	4.29	4.29	4.28	4.27	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.38						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	4.20	4.20	4.18	4.20	4.20	4.20	**decimal feet**

Catch Basin #: 7	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	3.86	3.86	3.88	3.90	3.86	3.87	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.28						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	3.73	3.80	3.83	3.80	3.84	3.80	**decimal feet**

Catch Basin #: 8	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	*3.95	*3.90	*4.28	*4.14	*4.06	*4.07	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	2.10 *(Note: This CB has blobs of Concrete on floor of CB)						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	3.93	3.88	4.26	4.16	4.05	4.06	**decimal feet**

August 2019 Data Collection Event

CB Cleaning Month:	August 2019	**Data Collector Name:**	Gordon Crane
Date:	8-27	**Data Collection Time:**	
Location (Circle One):		**Test-Site**	[✓ **Control-Site**]

Comments: Measured 8-27-19

Catch Basin #: 4	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	4.54	4.53	4.54	4.53	4.53	4.53	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.35						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	$D_{CB\text{-}S}$	4.42	4.39	4.47	4.47	4.46	4.44	**decimal feet**
Catch Basin #: 3	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	3.86	3.86	3.93	3.92	3.92	3.90	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.34						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	$D_{CB\text{-}S}$	3.83	3.80	3.89	3.86	3.85	3.85	**decimal feet**
Catch Basin #: 2	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	4.37	4.33	4.35	4.37	4.47	4.38	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.39						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	$D_{CB\text{-}S}$	4.28	4.19	4.34	4.38	4.36	4.31	**decimal feet**
Catch Basin #: 1	**Depth Measurement Location in CB:**		**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	D_{CB}	3.93	3.93	3.92	3.93	3.94	3.93	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	D_{invert}	2.23						**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	$D_{CB\text{-}S}$	3.80	3.83	3.89	3.86	3.86	3.85	**decimal feet**

Pg. 2

CB Cleaning Month:	August 2019	Data Collector Name:	Gordon Crane
Date:		Data Collection Time:	
Location (Circle One):		[✓ Test-Site]	Control-Site

Comments: South side of Road has lots of hay debris, both on roadway. and in 2 CB (#6 & #7)

Catch Basin #: 5		Depth Measurement Location in CB:	1	2	3	4	5	Avg	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	3.81	3.79	3.85.	3.84	3.81	3.82	decimal feet
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{invert}	2.41						decimal feet
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	D_{CB-S}	3.75	3.78	3.83	3.82	3.77	3.79	decimal feet

Catch Basin #: 6		Depth Measurement Location in CB:	1	2	3	4	5	Avg	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	4.26	4.28	4.29	4.29	4.28	4.28	decimal feet
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{invert}	2.38						decimal feet
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	D_{CB-S}	4.13	4.21	4.26	4.24	4.19	4.21	decimal feet

Catch Basin #: 7		Depth Measurement Location in CB:	1	2	3	4	5	Avg	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	3.86	3.86	3.88	3.90	3.86	3.87	decimal feet
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{invert}	2.28						decimal feet
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	D_{CB-S}	3.76	3.80	3.84	3.84	3.80	3.81	decimal feet

Catch Basin #: 8		Depth Measurement Location in CB:	1	2	3	4	5	Avg	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	*3.95	*3.90	*4.28	*4.14	*4.06	*4.07	decimal feet
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{invert}	2.10	*(Note: This CB has blobs of Concrete on floor of CB)					decimal feet
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	D_{CB-S}	3.89	3.88	4.23	4.10	4.00	4.02	decimal feet

October 2019 Data Collection Event

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CB Cleaning Month:	October 2019	**Data Collector Name:**	Gordon Crane
Date:	10-29-19	**Data Collection Time:**	
Location (Circle One):		**Test-Site**	[✓ **Control-Site**]

Comments: Collection 10-30-19

Catch Basin #: 4		**Depth Measurement Location in CB:**	**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	4.54	4.53	4.54	4.53	4.53	4.53	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**		2.35					**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	4.50	4.52	4.51	4.51	4.52	4.51	**decimal feet**
Catch Basin #: 3		**Depth Measurement Location in CB:**	**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	3.86	3.86	3.93	3.92	3.92	3.90	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**		2.34	.02	.01			**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	3.85	3.85	3.91	3.90	3.91	3.89	**decimal feet**
Catch Basin #: 2		**Depth Measurement Location in CB:**	**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	4.37	4.33	4.35	4.37	4.47	4.38	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**		2.39 .04	.01	.02	.02		**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	4.36	4.29	4.34	4.35	4.45	4.36	**decimal feet**
Catch Basin #: 1		**Depth Measurement Location in CB:**	**1**	**2**	**3**	**4**	**5**	**Avg**	**Units**
Depth of CB Empty:	**Measure from the bottom of CB to CB rim in 5 different locations in the CB**	**D_{CB}**	3.93	3.93	3.92	3.93	3.94	3.93	**decimal feet**
Depth of CB Empty to Pipe Invert:	**Measure from the bottom o CB to bottom of the inside of the pipe**	**D_{invert}**	.02	2.23 .04	.02	.02	.01		**decimal feet**
Depth to Top of Sediment in CB:	**Measure from top of sediment in CB to CB rim in 5 different locations in the CB**	**D_{CB-S}**	3.91	3.89	3.90	3.91	3.93	3.91	**decimal feet**

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CB Cleaning Month:	October 2019	Data Collector Name:	Gordon Crane
Date:	10-29-19	Data Collection Time:	
Location (Circle One):		[✓ Test-Site]	Control-Site

Comments:

Catch Basin #: 5	Depth Measurement Location in CB:		1	2	3	4	5	Avg	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	3.81	3.79	3.82	3.94	3.81	3.81	decimal feet
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{invert}	.10' 2.41	.02	.02	.03	.01		decimal feet
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	$D_{CB\text{-}S}$	3.71	3.77	3.80	3.87	3.80	3.79	decimal feet
Catch Basin #: 6	Depth Measurement Location in CB:		1	2	3	4	5	Avg	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	4.26	4.25	4.29	4.29	4.28	4.27	decimal feet
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{invert}	.10' 2.38	.05	.06	.06	.05		decimal feet
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	$D_{CB\text{-}S}$	4.16	4.20	4.23	4.23	4.23	4.21	decimal feet
Catch Basin #: 7	Depth Measurement Location in CB:		1	2	3	4	5	Avg	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	3.86	3.86	3.88	3.90	3.86	3.87	decimal feet
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{invert}	.02 2.28	.10	.03	.08	.04		decimal feet
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	$D_{CB\text{-}S}$	3.84	3.76	3.85	3.82	3.82	3.82	decimal feet
Catch Basin #: 8	Depth Measurement Location in CB:		1	2	3	4	5	Avg	Units
Depth of CB Empty:	Measure from the bottom of CB to CB rim in 5 different locations in the CB	D_{CB}	*3.95	*3.90	*4.28	*4.14	*4.06	*4.07	decimal feet
Depth of CB Empty to Pipe Invert:	Measure from the bottom o CB to bottom of the inside of the pipe	D_{invert}	.03 2.10	.03 *(Note: This CB has .02 blobs of .06 Concrete .06 on floor of CB)					decimal feet
Depth to Top of Sediment in CB:	Measure from top of sediment in CB to CB rim in 5 different locations in the CB	$D_{CB\text{-}S}$	3.92	3.87	4.22	4.08	4.04	4.03	decimal feet

Appendix E Sump Sock Tare Weights Raw Data

April 2018 Data Collection Event

Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:	April	Data Collector Name:	Gordon Crane
Date:	4-20-18	Data Collection Time:	—
Location (Circle One):	[✓ Test-Site]	Control-Site	

Comments: Socks placed after clean/sweep

Catch Basin #:	4			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:		
New Sock Weighed Pre-Install?	☑	Weight:	280	~~pounds~~ gr.
New Sock Installed and Labeled?	☑	Sock Label:	Test CB #4	

Comments:

Catch Basin #:	3			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:		
New Sock Weighed Pre-Install?	☐	Weight:	282	~~pounds~~ gr.
New Sock Installed and Labeled?	☐	Sock Label:	Test CB #3	

Comments:

Catch Basin #:	2			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:		
New Sock Weighed Pre-Install?	☐	Weight:	278	~~pounds~~ gr.
New Sock Installed and Labeled?	☐	Sock Label:	Test CB #2	

Comments:

Catch Basin #:	1			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:		
New Sock Weighed Pre-Install?	☐	Weight:	276	~~pounds~~ gr.
New Sock Installed and Labeled?	☐	Sock Label:	Test CB #1	

Comments:

Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:	April	Data Collector Name:	Gordon Crane
Date:	4-20-18	Data Collection Time:	—
Location (Circle One):	Test-Site	[✓ Control-Site]	

Comments: Socks placed after clean/sweep

Catch Basin #:	5			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:		
New Sock Weighed Pre-Install?	☐	Weight:	280	~~pounds~~ gr.
New Sock Installed and Labeled?	☐	Sock Label:	Control CB 5	

Comments:

Catch Basin #:	6			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:		
New Sock Weighed Pre-Install?	☐	Weight:	282	~~pounds~~ gr.
New Sock Installed and Labeled?	☐	Sock Label:	Control CB 6	

Comments:

Catch Basin #:	7			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:		
New Sock Weighed Pre-Install?	☐	Weight:	280	~~pounds~~ gr.
New Sock Installed and Labeled?	☐	Sock Label:	Control CB 7	

Comments:

Catch Basin #:	8 (No Sock)			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:		
New Sock Weighed Pre-Install?	☐	Weight:		pounds
New Sock Installed and Labeled?	☐	Sock Label:		

Comments:

June 2018 Data Collection Event

Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:	June	Data Collector Name:	Gordon
Date:	6-19-18	Data Collection Time:	
Location (Circle One):	[✓ Test-Site]		Control-Site

Comments: Dirty socks, placed after 4-20-18 sweep & clean

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Catch Basin #:	4			
Any holes or tears present in used sock?	☐	Describe damage:	None	
Used Sock Removed?	☑	Sock Label:	Test CB #4	
Used Sock Shipping Prep	Used Sock Sealed?	☑	Used Sock Placed in Plastic Bag?	☑
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Test CB #4	
New Sock Weighed Pre-Install?	☑	Weight:	282 Gr.	~~pounds~~ gr
New Sock Installed and Labeled?	☑	Sock Label:	Test CB #4	

Comments:

New Socks 6-19-18

Catch Basin #:	3			
Any holes or tears present in used sock?	☐	Describe damage:	—	
Used Sock Removed?	☑	Sock Label:	Test CB #3	
Used Sock Shipping Prep	Used Sock Sealed?	☑	Used Sock Placed in Plastic Bag?	☑
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Test CB #3	
New Sock Weighed Pre-Install?	☑	Weight:	278 Gr.	~~pounds~~ gr.
New Sock Installed and Labeled?	☑	Sock Label:	Test CB #3	

Comments:

(New Sock)

Catch Basin #:	2			
Any holes or tears present in used sock?	☐	Describe damage:	—	
Used Sock Removed?	☑	Sock Label:	Test CB #2	
Used Sock Shipping Prep	Used Sock Sealed?	☑	Used Sock Placed in Plastic Bag?	☑
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Test CB #2	
New Sock Weighed Pre-Install?	☑	Weight:	290 gr.	~~pounds~~ gr.
New Sock Installed and Labeled?	☑	Sock Label:	Test CB #2	

Comments:

New

Catch Basin #:	1			
Any holes or tears present in used sock?	☐	Describe damage:	—	
Used Sock Removed?	☑	Sock Label:	Test CB #1	
Used Sock Shipping Prep	Used Sock Sealed?	☑	Used Sock Placed in Plastic Bag?	☑
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Test CB #1	
New Sock Weighed Pre-Install?	☑	Weight:	274 gr.	~~pounds~~ gr.
New Sock Installed and Labeled?	☑	Sock Label:	Test CB #1	

Comments:

New

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New Socks

Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:	June	Data Collector Name:	Gordon
Date:	6-19-18	Data Collection Time:	—
Location (Circle One):	Test-Site	[✓ Control-Site]	

Comments: Dirty socks placed after 4-20-18 Sweep & clean

Catch Basin #:	5				
Any holes or tears present in used sock?	☐	Describe damage:	—		
Used Sock Removed?	☑	Sock Label:	Control CB#5		
Used Sock Shipping Prep	Used Sock Sealed?	☑	Used Sock Placed in Plastic Bag?	☑	
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Control CB#5		
New Sock Weighed Pre-Install?	☑	Weight:	270 gr.	~~pounds~~	
New Sock Installed and Labeled?	☑	Sock Label:	Control CB #5		

Comments:

New Socks
6-19-18

Catch Basin #:	6				
Any holes or tears present in used sock?	☐	Describe damage:			
Used Sock Removed?	☑	Sock Label:	Control CB #6		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐	
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Control CB #6		
New Sock Weighed Pre-Install?	☑	Weight:	270 gr	~~pounds~~	
New Sock Installed and Labeled?	☑	Sock Label:	Control CB #6		

Comments:

Catch Basin #:	7				
Any holes or tears present in used sock?	☐	Describe damage:			
Used Sock Removed?	☑	Sock Label:	Control CB #7		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐	
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Control CB #7		
New Sock Weighed Pre-Install?	☑	Weight:	272 gr.	~~pounds~~	
New Sock Installed and Labeled?	☑	Sock Label:	Control CB #7		

Comments:

Catch Basin #:	8 * No Sock this CB *				
Any holes or tears present in used sock?	☐	Describe damage:			
Used Sock Removed?	☐	Sock Label:			
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐	
Used Sock Plastic Bag Labeled?	☐	Bag Label:			
New Sock Weighed Pre-Install?	☐	Weight:		pounds	
New Sock Installed and Labeled?	☐	Sock Label:			

Comments:

August 2018 Data Collection Event

Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:	August 2018	Data Collector Name:	Gordon Crane
Date:	8-23-18	Data Collection Time:	
Location (Circle One):	[✓ Test-Site]		Control-Site

Comments: CB's cleared 8-22-18

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New socks
8-23-18

Catch Basin #:	4			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☑	Sock Label:	Test CB #4	
Used Sock Shipping Prep	Used Sock Sealed?	☑	Used Sock Placed in Plastic Bag?	☑
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Test CB #4	
New Sock Weighed Pre-Install?	☑	Weight:	282 Gr.	~~pounds~~
New Sock Installed and Labeled?	☑	Sock Label:	Test CB #4	

Comments:

Catch Basin #:	3			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☑	Sock Label:	Test CB # 3	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Test CB # 3	
New Sock Weighed Pre-Install?	☑	Weight:	280 Gr.	~~pounds~~
New Sock Installed and Labeled?	☑	Sock Label:	Test CB# 3	

Comments:

Catch Basin #:	2			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☑	Sock Label:	Test CB#2	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Test CB # 2	
New Sock Weighed Pre-Install?	☑	Weight:	284 Gr.	~~pounds~~
New Sock Installed and Labeled?	☑	Sock Label:	TestCB #2	

Comments:

Catch Basin #:	1			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☑	Sock Label:	Test CB #1	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Test CB #1	
New Sock Weighed Pre-Install?	☑	Weight:	280 Gr.	~~pounds~~
New Sock Installed and Labeled?	☑	Sock Label:	Test CB #1	

Comments:

Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:	August 2018	Data Collector Name:	
Date:	8-23-18	Data Collection Time:	
Location (Circle One):	Test-Site	[✓ Control-Site]	

Comments: CB's cleaned 8-22-18

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New Socks
8-23-18

Catch Basin #:	5			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☑	Sock Label:	Control CB#5	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Control CB #5	
New Sock Weighed Pre-Install?	☑	Weight:	280 Gr.	~~pounds~~
New Sock Installed and Labeled?	☑	Sock Label:	Control CB #5	

Comments:

Catch Basin #:	6			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☑	Sock Label:	Control CB #6	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Control CB #6	
New Sock Weighed Pre-Install?	☑	Weight:	282 Gr.	~~pounds~~
New Sock Installed and Labeled?	☑	Sock Label:	Control CB #6	

Comments:

Catch Basin #:	7			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☑	Sock Label:	Control CB #7	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Control CB #7	
New Sock Weighed Pre-Install?	☑	Weight:	280 Gr.	~~pounds~~
New Sock Installed and Labeled?	☑	Sock Label:	Control CB #7	

Comments:

Catch Basin #:	8 * No Sock this CB *			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:		
New Sock Weighed Pre-Install?	☐	Weight:		~~pounds~~
New Sock Installed and Labeled?	☐	Sock Label:		

Comments:

October 2018 Data Collection Event

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Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:	October	Data Collector Name:	Gordon Crane
Date:	10-24-18	Data Collection Time:	
Location (Circle One):	[✓ Test-Site]	Control-Site	
Comments:			

Catch Basin #:	4			
Any holes or tears present in used sock?	☐	Describe damage:	None	
Used Sock Removed?	☑	Sock Label:	Test CB #4	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Test CB#4	
New Sock Weighed Pre-Install?	☑	Weight:	288 Gr	~~pounds~~ Gr
New Sock Installed and Labeled?	☑	Sock Label:	Test CB#4	
Comments:				

Catch Basin #:	3			
Any holes or tears present in used sock?	☐	Describe damage:	None	
Used Sock Removed?	☑	Sock Label:	Test CB # 3	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Test CB# 3	
New Sock Weighed Pre-Install?	☑	Weight:	278 Gr	~~pounds~~
New Sock Installed and Labeled?	☑	Sock Label:	Test CB#3	
Comments:				

Catch Basin #:	2			
Any holes or tears present in used sock?	☐	Describe damage:	None	
Used Sock Removed?	☑	Sock Label:	Test CB #2	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Test CB #2	
New Sock Weighed Pre-Install?	☑	Weight:	284 Gr	~~pounds~~
New Sock Installed and Labeled?	☑	Sock Label:	Test CB #2	
Comments:				

Catch Basin #:	1			
Any holes or tears present in used sock?	☐	Describe damage:	None	
Used Sock Removed?	☑	Sock Label:	Test CB #1	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Test CB#1	
New Sock Weighed Pre-Install?	☑	Weight:	296 Gr.	~~pounds~~
New Sock Installed and Labeled?	☑	Sock Label:	Test CB #1	
Comments:				

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Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:	October	Data Collector Name:	Gordon Crane
Date:	10-24-18	Data Collection Time:	
Location (Circle One):	Test-Site		[✓ Control-Site]

Comments:

Catch Basin #:	5			
Any holes or tears present in used sock?	☐	Describe damage:	None	
Used Sock Removed?	☑	Sock Label:	Control CB #5	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Control CB #5	
New Sock Weighed Pre-Install?	☑	Weight:	278 Gr.	~~pounds~~
New Sock Installed and Labeled?	☑	Sock Label:	Control CB #5	

Comments:

Catch Basin #:	6			
Any holes or tears present in used sock?	☐	Describe damage:	None	
Used Sock Removed?	☑	Sock Label:	Control CB #6	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Control CB #6	
New Sock Weighed Pre-Install?	☑	Weight:	288 Gr	~~pounds~~
New Sock Installed and Labeled?	☑	Sock Label:	Control CB #6	

Comments:

Catch Basin #:	7			
Any holes or tears present in used sock?	☐	Describe damage:	None	
Used Sock Removed?	☑	Sock Label:	Control CB #7	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☑	Bag Label:	Control CB #7	
New Sock Weighed Pre-Install?	☑	Weight:	276 Gr.	~~pounds~~
New Sock Installed and Labeled?	☑	Sock Label:	Control CB #7	

Comments:

Catch Basin #:	8 * No Sock this CB *			
Any holes or tears present in used sock?	☐	Describe damage:	N	
Used Sock Removed?	☐	Sock Label:		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:		
New Sock Weighed Pre-Install?	☐	Weight:		pounds
New Sock Installed and Labeled?	☐	Sock Label:		

Comments:

April 2019 Data Collection Event

Pg. 1

Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:	April 2019	Data Collector Name:	Gordon Crane
Date:	4-25-19	Data Collection Time:	
Location (Circle One):	Test-Site		[✓ Control-Site]

Comments:

All Socks OK, plastic bag labeled!

Catch Basin #:	4			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB #4	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB #4	
New Sock Weighed Pre-Install?	☐	Weight:	274 Gr.	~~pounds~~
New Sock Installed and Labeled?	☐	Sock Label:	Control CB #4	

Comments:

Catch Basin #:	3			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB #3	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB #3	
New Sock Weighed Pre-Install?	☐	Weight:	268 gr.	~~pounds~~
New Sock Installed and Labeled?	☐	Sock Label:	Control CB #3	

Comments:

Catch Basin #:	2			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB #2	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB #2	
New Sock Weighed Pre-Install?	☐	Weight:	270 Gr.	~~pounds~~
New Sock Installed and Labeled?	☐	Sock Label:	Control CB #2	

Comments:

Catch Basin #:	1			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB #1	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB #1	
New Sock Weighed Pre-Install?	☐	Weight:	272 Gr	~~pounds~~
New Sock Installed and Labeled?	☐	Sock Label:	Control CB #1	

Comments:

Page 2

Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:	April 2019	Data Collector Name:	
Date:	4-25-19	Data Collection Time:	
Location (Circle One):	[✓ Test-Site]	Control-Site	

Comments:

All socks OK

Catch Basin #:	5			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Test CB #5	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Test CB #5	
New Sock Weighed Pre-Install?	☐	Weight:	272 Gr	~~pounds~~
New Sock Installed and Labeled?	☐	Sock Label:	Test CB #5	

Comments:

Catch Basin #:	6			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Test CB #6	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Test CB #6	
New Sock Weighed Pre-Install?	☐	Weight:	274 Gr.	~~pounds~~
New Sock Installed and Labeled?	☐	Sock Label:	Test CB #6	

Comments:

Catch Basin #:	7			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Test CB #7	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Test CB #7	
New Sock Weighed Pre-Install?	☐	Weight:	272 Gr.	~~pounds~~
New Sock Installed and Labeled?	☐	Sock Label:	Test CB #7	

Comments:

Catch Basin #:	8	No Sock this CB		
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:		
New Sock Weighed Pre-Install?	☐	Weight:		pounds
New Sock Installed and Labeled?	☐	Sock Label:		

Comments:

June 2019 Data Collection Event

Page 1

Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:	June 2019		Data Collector Name:	Gordon Crane
Date:	6-24-19		Data Collection Time:	
Location (Circle One):	Test-Site		[✓ Control-Site]	
Comments:				
Catch Basin #:	4			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB # 4	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB # 4	
New Sock Weighed Pre-Install?	☐	Weight:	276	~~pounds~~ gr
New Sock Installed and Labeled?	☐	Sock Label:	Control CB # 4	
Comments:				
Catch Basin #:	3			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB # 3	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB # 3	
New Sock Weighed Pre-Install?	☐	Weight:	272	~~pounds~~ gr
New Sock Installed and Labeled?	☐	Sock Label:	Control CB # 3	
Comments:				
Catch Basin #:	2			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB # 2	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB # 2	
New Sock Weighed Pre-Install?	☐	Weight:	278	~~pounds~~ gr
New Sock Installed and Labeled?	☐	Sock Label:	Control CB # 2	
Comments:				
Catch Basin #:	1			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB # 1	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB # 1	
New Sock Weighed Pre-Install?	☐	Weight:	274	~~pounds~~ gr
New Sock Installed and Labeled?	☐	Sock Label:	Control CB # 1	
Comments:				

Page 2

Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:	June 2019	Data Collector Name:	Gordon Crane
Date:	6-24-19	Data Collection Time:	
Location (Circle One):	[✓ Test-Site]	Control-Site	
Comments:			

Catch Basin #:	5			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Test CB #5	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Test CB #5	
New Sock Weighed Pre-Install?	☐	Weight:	182	~~pounds~~ Gr
New Sock Installed and Labeled?	☐	Sock Label:	Test CB #5	
Comments:				

Catch Basin #:	6			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Test CB #6	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Test CB #6	
New Sock Weighed Pre-Install?	☐	Weight:	276	~~pounds~~ Gr
New Sock Installed and Labeled?	☐	Sock Label:	Test CB #6	
Comments:				

Catch Basin #:	7			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Test CB #7	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Test CB #7	
New Sock Weighed Pre-Install?	☐	Weight:	176	~~pounds~~ Gr
New Sock Installed and Labeled?	☐	Sock Label:	Test CB #7	
Comments:	No Sock this CB			

Note: manufacturer switched to lighter weight fabric

Catch Basin #:	8			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:		
New Sock Weighed Pre-Install?	☐	Weight:		~~pounds~~
New Sock Installed and Labeled?	☐	Sock Label:		
Comments:				

August 2019 Data Collection Event

August 2019

Page 1

Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:	August 2019	Data Collector Name:	Gordon Crane
Date:	8-27-19	Data Collection Time:	
Location (Circle One):	Test-Site	[✓ Control-Site]	

Comments:

All socks switched out & sent off 8-29-19

Catch Basin #:	4			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB #4	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB #4	
New Sock Weighed Pre-Install?	☐	Weight:	174	~~pounds~~ gr
New Sock Installed and Labeled?	☐	Sock Label:	Control CB #4	

Comments:

Catch Basin #:	3			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB #3	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB #3	
New Sock Weighed Pre-Install?	☐	Weight:	178	~~pounds~~ gr
New Sock Installed and Labeled?	☐	Sock Label:	Control CB #3	

Comments:

Catch Basin #:	2			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB #2	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB #2	
New Sock Weighed Pre-Install?	☐	Weight:	178	~~pounds~~ gr
New Sock Installed and Labeled?	☐	Sock Label:	Control CB #2	

Comments:

Catch Basin #:	1			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB #1	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB #1	
New Sock Weighed Pre-Install?	☐	Weight:	178	~~pounds~~ gr
New Sock Installed and Labeled?	☐	Sock Label:	Control CB #1	

Comments:

Page 2

Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:		Data Collector Name:	Gordon Crane
Date:		Data Collection Time:	
Location (Circle One):	[✓ Test-Site]	Control-Site	
Comments:			

Catch Basin #:	5			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Test CB # 5	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Test CB # 5	
New Sock Weighed Pre-Install?	☐	Weight:	184	~~pounds~~ Gr
New Sock Installed and Labeled?	☐	Sock Label:	Test CB # 5	
Comments:				

Catch Basin #:	6			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Test CB # 6	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Test CB # 6	
New Sock Weighed Pre-Install?	☐	Weight:	180	~~pounds~~ Gr
New Sock Installed and Labeled?	☐	Sock Label:	Test CB # 6	
Comments:				

Catch Basin #:	7			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Test CB # 7	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Test CB # 7	
New Sock Weighed Pre-Install?	☐	Weight:	174	~~pounds~~ Gr
New Sock Installed and Labeled?	☐	Sock Label:	Test CB # 7	
Comments: No Sock this CB				

Catch Basin #:	8			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:		
New Sock Weighed Pre-Install?	☐	Weight:		~~pounds~~
New Sock Installed and Labeled?	☐	Sock Label:		
Comments:				

October 2019 Data Collection Event

Page 1

Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:	Oct 2019	Data Collector Name:	Gordon Crane
Date:	10-30-19	Data Collection Time:	
Location (Circle One):	Test-Site	[✓ Control-Site]	

Comments:

Catch Basin #:	4			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB #4	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB #4	
New Sock Weighed Pre-Install?	☐	Weight:	182	~~pounds~~ gr
New Sock Installed and Labeled?	☐	Sock Label:	Control CB #4	

Comments:

Catch Basin #:	3			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB #3	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB #3	
New Sock Weighed Pre-Install?	☐	Weight:	178	~~pounds~~ gr
New Sock Installed and Labeled?	☐	Sock Label:	Control CB #3	

Comments:

Catch Basin #:	2			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB #2	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB #2	
New Sock Weighed Pre-Install?	☐	Weight:	178	~~pounds~~ gr
New Sock Installed and Labeled?	☐	Sock Label:	Control CB #2	

Comments:

Catch Basin #:	1			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Control CB #1	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Control CB #1	
New Sock Weighed Pre-Install?	☐	Weight:	172	~~pounds~~ gr
New Sock Installed and Labeled?	☐	Sock Label:	Control CB #1	

Comments:

Page 2

Sump Sock Sediment Collection and Dry Weight Analysis Field Data Collection Form

CB Cleaning Month:	Oct. 2019	Data Collector Name:	Gordon Crane
Date:	10-30-19	Data Collection Time:	
Location (Circle One):	[✓ Test-Site]		Control-Site

Comments:

Catch Basin #:	5			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Test CB #5	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Test CB #5	
New Sock Weighed Pre-Install?	☐	Weight:	180	~~pounds~~ Gr.
New Sock Installed and Labeled?	☐	Sock Label:	Test CB #5	

Comments:

Catch Basin #:	6			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Test CB #6	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Test CB #6	
New Sock Weighed Pre-Install?	☐	Weight:	180	~~pounds~~ Gr
New Sock Installed and Labeled?	☐	Sock Label:	Test CB #6	

Comments:

Catch Basin #:	7			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:	Test CB #7	
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:	Test CB #7	
New Sock Weighed Pre-Install?	☐	Weight:	180	~~pounds~~ Gr
New Sock Installed and Labeled?	☐	Sock Label:	Test CB #7	

Comments:

No Sock this CB

Catch Basin #:	8			
Any holes or tears present in used sock?	☐	Describe damage:		
Used Sock Removed?	☐	Sock Label:		
Used Sock Shipping Prep	Used Sock Sealed?	☐	Used Sock Placed in Plastic Bag?	☐
Used Sock Plastic Bag Labeled?	☐	Bag Label:		
New Sock Weighed Pre-Install?	☐	Weight:		~~pounds~~
New Sock Installed and Labeled?	☐	Sock Label:		

Comments:

Appendix F Sieve Analysis Summary Data

Catch Basin Sieve Results

		North	South	North	South	North	South	South	North	South	North	South	North	South	North	Average		
Sieve Size	Particle Size (mm)	042018CBTS	042018CBCS	082318CBTS	082318CBCS	103118CBTS	103118CBCS	042519CBTS	042519CBCS	062419CBTS	062419CBCS	082819CBTS	082819CBCS	102919CBTS	102919CBCS	CB - Overall Average	CB - North	CB - South
1"	25.400																	
3/4"	19.000			100		100		100	100		100					100.0	100.0	100.0
1/2"	12.700			98	100	98	100	95	98	100	98					98.4	98.0	99.0
3/8"	9.510			95	99	96	98	92	96	97	96	100	100	100	100	97.4	97.2	98.2
1/4"	6.350			89	93	91	92	-	-			91	95	88	85	90.5	90.0	91.3
#10	2.000	80	89	65	67	73	70	67	78	82	88	75	72	67	65	74.1	74.5	75.5
#16	1.190			56	58	59	51	54	65	74	60	65	53	59	56	59.2	58.2	57.2
#30	0.595			41	46	45	35	36	44	68	50	53	35	45	46	45.3	43.5	42.7
#40	0.420	44	71	35	39	39	29	28	35	63	47	44	27	22	42	40.4	38.4	41.4
#100	0.149			17	22	24	20	11	11	46	36	25	14	12	27	22.1	21.5	21.7
#200	0.074	21.2	43.7	9.8	15	20	17	5.4	4.9	30	27	19	10	8.2	16	17.7	15.6	19.1
0.005mm	0.005	5.4	36.9	1.3	3.5	10	7.8					7.9	5.8	6.6	5.1	9.0	5.5	11.8
0.001mm	0.001			1.3	1.7	4.0	3.0					4.5	2.9	3.3	2.4	2.9	2.7	2.5

Street Sweep Sieve Results

Sieve Size	Particle Size (mm)	North	South	South	North	Average		
		061818SSTS	6242019SSTS	101919SSTS	101919SSCS	SS - Overall Average	SS - North	SS - South
1"	25.400	,						
3/4"	19.000	100	100			100.0	100	100.0
1/2"	12.700	99	97			98.0	99	97.0
3/8"	9.510	95	86	100	100	93.7	97.5	93.0
1/4"	6.350	88		77	78	82.5	83	77.0
#10	2.000	56	43	53	46	50.7	51	48.0
#16	1.190	40	30	44	29	38.0	34.5	37.0
#30	0.595	22	19	32	14	24.3	18	25.5
#40	0.420	16	15	27	9	19.3	12.5	21.0
#100	0.149	8	8	12	3	9.3	5.5	10.0
#200	0.074	5.3	4.5	8.6	1.9	6.1	3.6	6.6
0.005mm	0.005	2.3		3	0	2.7	1.15	3.0
0.001mm	0.001	1		0	0	0.5	0.5	

Sump Sock Sieve Results

Sieve Size	Particle Size (mm)	North	South	South	North	South	North	North	South		Average	
		061918(CBS)TS	061918(CBS)CS	062419(CBS)TS	062419(CBS)CS	102919(CBS)TS	102919(CBS)CS	4/23/2020	4/23/2020	CBS - Overall Average	CBS - North	CBS - South
1"	25.400											
3/4"	19.000			100						100.0		100.0
1/2"	12.700		100	98	100					99.3	100.0	99.0
3/8"	9.510	100	99	96	97	100				98.4	98.5	98.3
1/4"	6.350	95	97			86	100			94.5	97.5	91.5
#10	2.000	86	78	88	82	73	73	89	96	83.1	82.5	83.8
#16	1.190	83	73	60	74	71	71	89	95	77.0	79.3	74.8
#30	0.595	81	69	50	68	67	69	85	92	72.6	75.8	69.5
#40	0.420	80	68	47	63	66	68	83	91	70.8	73.5	68.0
#100	0.149	76	61	36	46	61	66	74	85	63.1	65.5	60.8
#200	0.074	73	55	27	30	57	65	69	80	57.0	59.3	54.8
0.005mm	0.005	22	15			18	31	31	36	25.5	28.0	23.0
0.001mm	0.001	5	2.4			8.1	8.5	18	19	10.2	10.5	9.8

Appendix G Organic Content & Moisture Content Summary

	Organic Content													
	CB Test (N)			CB Control (S)			Sweep Test (N)			Sweep Test (S)			CB Socks Control	CB Socks Test
Sample Date	Sample #1	Sample #2	Sample #3	Sample #1	Sample #2	Sample #3	Sample #1	Sample #2	Sample #3	Sample #1	Sample #2	Sample #3	Sample 1	Sample 1
4/20/2018	15.3			43.8										
8/22/2018	30.7	17.4	39.7	19.6	16.9	37.7	5.8	6.2	5.6					
4/25/2019	13.5			10.3										
8/28/2019	5.8	9.7	4.6	13.4	10.8	11.9								
10/29/2019	15.2	25.7	20.2	22.9	33.7	20.6	5.7	8.2	5	3.1	2.9	4.3		
4/24/2020													25	26.9

	Moisture Content											
	CB Test (N)			CB Control (S)			Sweep Test (N)			Sweep Control (N)		
Sample Date	Sample #1	Sample #2	Sample #3	Sample #1	Sample #2	Sample #3	Sample #1	Sample #2	Sample #3	Sample #1	Sample #2	Sample #3
4/20/2018	27.8											
8/23/2018	56.8	45.4	61	42.6	41.7	62.4	16.2	15.3	15.8			
4/25/2019	40			34.2								
8/28/2019	43.5	32.6	36.1	7.9	17.3	6						
10/30/2019	54.1	63.6	50.2	42.5	56.7	47.5	4.1	4	4.2	17.6	23.4	17.4

Appendix H Street Sweeper Sediment Data Summary

Street Sediment Accumulation

Data Collection Date																	
Day	Month	Year	Data Collection Date	Basin #	Tub Contents	Tare Date	Tare Wt of Basin, Pallet (lb)	Dewater Date	Time to dewater (hours)	Dewatered Wt+basin,pallet (lb)	Sediment Wet Weight (lb)	Sediment Moisture Content (%) #1	Sediment Moisture Content (%) #2	Sediment Moisture Content (%) #3	Standard Deviation	Sediment Moisture Content (%)	Sediment Dry Weight (lbs)
6	10	2017	Oct-17								0						
6	10	2017	Oct-17								0						
20	4	2018	Apr-18	2	Sweeper-Test Side	4/18/2018	111.3	4/27/2018 10:05	168.5	1872.7	1761.4					21.5	1,450
20	4	2018	Apr-18	4	Sweeper-Control Side	4/18/2018	115.2	4/27/2018 10:20	168	2932.9	2817.7					19.5	2,358
19	6	2018	Jun-18	3	Sweeper-Test Side	6/19/2018	110.3	7/3/2018 15:00	341	274.4	164.1	6.3	5.2	6	0.6	5.8	155
22	8	2018	Aug-18	3	Sweeper-Test Side	8/23/2018	114.5	8/30/2018 9:00	168	270.1	155.6	16.2	15.3	15.8	0.5	15.8	134
24	10	2018	Oct-18	4	Sweeper - Test Side	10/24/2018	109.5	10/31/2018 10:00	169	241.6	132.1	15.8	25.6	16.1	5.6	19.2	111
24	10	2018	Oct-18	3	Sweeper - Control Side	10/29/2018	104.3	10/31/2018 11:00	26.5	756.6	652.3	7.7	15.5	8.5	4.3	10.6	590
25	4	2019	Apr-19	3	Sweeper-Test Side	4/25/2019	111	5/2/2019 9:15	144.25	1528	1417	13.8	15.7	17.1	1.7	15.5	1,226
24	6	2019	Jun-19	4	Sweeper-Test Side	6/24/2019	100	6/25/2019 11:30	167	292	192	5.9	24.6	7.4	10.4	12.6	170
28	8	2019	Aug-19	4	Sweeper-Test Side	8/28/2019	101	9/10/2019 14:00	315.5	261	160	10	12.4	7.2	2.6	9.9	146
29	10	2019	Oct-19	4	Sweeper-Test Side	10/29/2019	102	11/7/2019 13:30	195	398	296	4.1	4	4.2	0.1	4.1	284
29	10	2019	Oct-19	1	Sweeper - Control Side	10/29/2019	108	11/7/2019 13:30	195	2139	2031	17.6	23.4	17.4	3.4	19.5	1,700

Data Collection Date								Since last sweep		Since last CB clean	
Day	Month	Year	Data Collection Date	Basin #	Tub Contents	Days since last sweep	Days since last CB clean	Rate of Accumulation (g/d)	Normalized Accumulation (g/lineal mi/d)	Rate of Accumulation (g/d)	Normalized Accumulation (g/lineal mi/d)
6	10	2017	Oct-17								
6	10	2017	Oct-17								
20	4	2018	Apr-18	2	Sweeper-Test Side	196	196	3,355	4,389	3,355	4,389
20	4	2018	Apr-18	4	Sweeper-Control Side	196	196	5,457	7,460	5,457	7,460
19	6	2018	Jun-18	3	Sweeper-Test Side	60	60	1,172	1,534	1,172	1,534
22	8	2018	Aug-18	3	Sweeper-Test Side	65	65	938	1,227	938	1,227
24	10	2018	Oct-18	4	Sweeper - Test Side	62	65	811	1,061	774	1,012
24	10	2018	Oct-18	3	Sweeper - Control Side	187	62	1,431	1,956	4,316	5,900
25	4	2019	Apr-19	3	Sweeper-Test Side	183	183	3,040	4,156	3,040	4,156
24	6	2019	Jun-19	4	Sweeper-Test Side	60	60	1,289	1,762	1,289	1,762
28	8	2019	Aug-19	4	Sweeper-Test Side	65	65	1,016	1,389	1,016	1,389
29	10	2019	Oct-19	4	Sweeper-Test Side	63	63	2,047	2,799	2,047	2,799
29	10	2019	Oct-19	1	Sweeper - Control Side	371	63	2,079	2,719	12,240	16,013

Appendix I Catch Basin Sediment Weight Summary

Catch Basin Sediment Accumulation

Data Collection Date																	
Day	Month	Year	Data Collection Date	Basin #	Tub Contents	Tare Date	Tare Wt of Basin, Pallet (lbs)	Dewater Date	Time to dewater (hours)	Dewatered Wt+basin,pallet (lbs)	Sediment Wet Weight (lbs)	Sediment Moisture Content (%) #1	Sediment Moisture Content (%) #2	Sediment Moisture Content (%) #3	Standard Deviation	Sediment Moisture Content (%)	Sediment Dry Weight (lbs)
6	10	2017	Oct-17	1							0						
6	10	2017	Oct-17	3							0						
20	4	2018	Apr-18	1	CB Clean-Test Side	4/20/2018	110.4	4/27/2018 10:00	168.5	303.40	193.00					27.80	151.02
20	4	2018	Apr-18	3	CB Clean-Control Side	4/20/2018	102.9	4/27/2018 10:10	168	262.3	159.4					22.15	130.50
19	6	2018	Jun-18	1	CB Clean-Test Side	6/19/2018	107.8	7/3/2018 15:00	341	141.8	34	27.8	29.5	20.5	4.8	25.9	27.00
19	6	2018	Jun-18	4	CB Clean-Control Side	6/19/2018	100.8	7/3/2018 15:00	341	151.2	50.4	23.1	40.9	45	11.6	36.3	36.97
22	8	2018	Aug-18	1	CB Clean-Test Side	8/23/2018	109.1	8/29/2018 16:00	151	137.4	28.3	56.8	45.4	61	8.1	54.4	18.33
22	8	2018	Aug-18	2	CB Clean-Control Side	8/23/2018	108.3	8/29/2018 16:00	151	149.6	41.3	42.6	41.7	62.4	11.7	48.9	27.74
24	10	2018	Oct-18	2	CB Clean-Test Side	10/24/2018	101.9	10/31/2018 11:00	169	174.7	72.8	43.3	37.9	46.9	4.5	42.7	51.02
24	10	2018	Oct-18	1	CB Clean-Control Side	10/24/2018	108.1	10/31/2018 11:00	169	168.1	60	64.4	58.5	48.1	8.3	57.0	38.22
25	4	2019	Apr-19	2	CB Clean-Test Side	4/25/2019	105	5/2/2019 0:00	144.25	230	125	45.6	43.7	36.2	5.0	41.8	88.13
25	4	2019	Apr-19	4	CB Clean-Control Side	4/25/2019	114	5/2/2019 0:00	144.25	183	69	42.5	29.3	40.8	7.2	37.5	50.17
24	6	2019	Jun-19	3	CB Clean-Test Side	6/24/2019	106	6/25/2019 11:30	167	183	77	35	39.5	38.9	2.4	37.8	55.88
24	6	2019	Jun-19	2	CB Clean-Control Side	6/24/2019	109	6/25/2019 11:30	167	131	22	1.9	2.5	3.3	0.7	2.6	21.45
27	8	2019	Aug-19	3	CB Clean-Test Side	8/28/2019	108	9/10/2019 11:45	313.25	167	59	43.5	32.6	36.1	5.6	37.4	42.94
28	8	2019	Aug-19	2	CB Clean-Control Side	8/28/2019	103	9/10/2019 11:45	313.25	156	53	7.9	17.3	6	6.1	10.4	48.01
29	10	2019	Oct-19	3	CB Clean-Test Side	10/30/2019	109	11/5/2019 15:30	149	159	50	54.1	63.6	50.2	6.9	56.0	32.06
29	10	2019	Oct-19	2	CB Clean-Control Side	10/30/2019	104	11/5/2019 15:30	149	128	24	42.5	56.7	47.5	7.2	48.9	16.12

Data Collection Date								Since last street sweep		Since last CB cleaning	
Day	Month	Year	Data Collection Date	Basin #	Tub Contents	Days since last sweep	Days since last CB clean	Rate of Accumulation (g/d)	Normalized Accumulation (g/CB/d)	Rate of Accumulation (g/d)	Normalized Accumulation (g/CB/d)
6	10	2017	Oct-17	1							
6	10	2017	Oct-17	3							
20	4	2018	Apr-18	1	CB Clean-Test Side	196	196	349	22.1	349	22.1
20	4	2018	Apr-18	3	CB Clean-Control Side	196	196	302	15.8	302	15.8
19	6	2018	Jun-18	1	CB Clean-Test Side	60	60	204	12.9	204	12.9
19	6	2018	Jun-18	4	CB Clean-Control Side	60	60	279	14.6	279	14.6
22	8	2018	Aug-18	1	CB Clean-Test Side	65	65	128	8.1	128	8.1
22	8	2018	Aug-18	2	CB Clean-Control Side	125	65	**235**	12.2	194	10.1
24	10	2018	Oct-18	2	CB Clean-Test Side	62	62	373	23.6	373	23.6
24	10	2018	Oct-18	1	CB Clean-Control Side	187	62	**250**	13.0	280	14.6
25	4	2019	Apr-19	2	CB Clean-Test Side	183	183	218	11.4	218	13.8
25	4	2019	Apr-19	4	CB Clean-Control Side	183	183	124	7.9	124	6.5
24	6	2019	Jun-19	3	CB Clean-Test Side	60	60	422	22.0	422	26.7
24	6	2019	Jun-19	2	CB Clean-Control Side	243	60	**134**	8.5	162	8.5
28	8	2019	Aug-19	3	CB Clean-Test Side	65	65	300	15.6	300	19.0
28	8	2019	Aug-19	2	CB Clean-Control Side	308	65	**176**	11.1	335	17.5
29	10	2019	Oct-19	3	CB Clean-Test Side	63	63	231	12.0	231	14.6
29	10	2019	Oct-19	2	CB Clean-Control Side	371	63	**166**	10.5	116	6.1

Appendix J Catch Basin Depth Summary

									Since last sweep	since last CB cleaning	since last data collection event	
Day	Month	Year	Date	CB #	Side	Average Depth of Sediment (in)	Average Depth of Sediment (ft) - δR	Average Weight of Sediment (lb)	Average Normalized Accumulation Rate (in/CB/d)	Average Normalized Accumulation Rate (in./d)	Normalized Accumulation Rate (in/CB/day)	Normalized Accumulation Rate (in/CB/day) - δR
6	10	2018	Oct-17									
20	4	2018	Apr-18	1	Test	3.20	0.002	151.017	0.0004	0.00036	4.30E-03	5.30E-07
				2	Test							
				3	Test							
				4	Test							
				5	Control	3.18	0.002	130.495	0.0004	0.00037	4.46E-03	5.54E-07
				6	Control							
				7	Control							
				8	Control							
19	6	2018	Jun-18	1	Test	0.94	0.002	26.998	0.0004	0.00035	4.13E-03	1.73E-06
				2	Test							
				3	Test							
				4	Test							
				5	Control	1.11	0.002	36.968	0.0004	0.00043	5.08E-03	1.81E-06
				6	Control							
				7	Control							
				8	Control							
23	8	2018	Aug-18	1	Test	0.73	0.002	18.329	0.0003	0.00025	2.94E-03	1.60E-06
				2	Test							
				3	Test							
				4	Test							
				5	Control	0.38	0.002	27.737	0.0003	0.00013	1.60E-03	1.67E-06
				6	Control							
				7	Control							
				8	Control							
24	10	2018	Oct-18	1	Test	0.54	0.002	51.016	0.0002	0.00019	2.33E-03	1.70E-06
				2	Test							
				3	Test							
				4	Test							
				5	Control	0.55	0.002	38.217	0.0003	0.00021	2.46E-03	1.78E-06
				6	Control							
				7	Control							
				8	Control							
25	4	2019	Apr-19	1	Control	1.41	0.002	50.170	0.0002	0.00017	2.01E-03	5.65E-07
				2	Control							
				3	Control							
				4	Control							
				5	Test	3.30	0.002	88.132	0.0004	0.00041	4.93E-03	5.90E-07
				6	Test							
				7	Test							
				8	Test							
24	6	2019	Jun-19	1	Control	0.12	0.002	21.449	0.0001	0.00004	5.26E-04	1.73E-06
				2	Control							
				3	Control							
				4	Control							
				5	Test	0.58	0.002	55.878	0.0002	0.00023	2.64E-03	1.81E-06
				6	Test							
				7	Test							
				8	Test							
28	8	2019	Aug-19	1	Control	0.88	0.002	48.007	0.0002	0.00030	3.57E-03	1.60E-06
				2	Control							
				3	Control							
				4	Control							
				5	Test	0.64	0.002	42.940	0.0002	0.00023	2.71E-03	1.67E-06
				6	Test							
				7	Test							
				8	Test							
30	10	2019	Oct-19	1	Control	0.23	0.002	16.118	0.0002	0.00008	9.51E-04	1.65E-06
				2	Control							
				3	Control							
				4	Control							
				5	Test	0.55	0.002	32.058	0.0002	0.00020	2.38E-03	1.72E-06
				6	Test							
				7	Test							
				8	Test							

Appendix K Catch Basin Sock Sediment Data Summary

Day	Month	Year	Collection Date	Comments	CB #	Side	Sock Installation Date	Days since last sweep	Days since last CB clean	Sock Tare Weight (g)	Dry Sock + Sediment Weight 1 (g)	Dry Sock + Sediment Weight 2 (g)	%RPD	Sediment Dry Weight (g)	Sediment Accumulation (g/sump sock/day)	Normalized Accumulation (g/sump sock/day)	Sediment Accumulation (g/sump sock/day)	Normalized Accumulation (g/sump sock/day)	Sum of Sediment Accumulated (g)	Average Sediment Dry Weight (g)	Standard Deviation	Average Accumulation (g/sump sock/ day)	Average Normalized Accumulation (g/sump sock/day)	Average Accumulation (g/sump sock/day)	Average Normalized Accumulation (g/sump sock/day)
19	6	2018	Jun-18	Socks placed after clean/sweep	1	Test	4/20/2018	60	60	276	350	350	0%	74	1.233	0.283	1.233	0.28	634	158.5	0.296	2.64	0.71	2.64	0.71
					2	Test				278	450	450	0%	172	2.867	0.869	2.867	0.87							
					3	Test				282	600	400	40%	218	3.633	0.943	3.633	0.94							
					4	Test				280	450	450	0%	170	2.833	0.751	2.833	0.75							
			Jun-18		5	Control	4/20/2018	60	60	280	600	600	0%	320	5.333	**1.37**	5.333	1.37	658.0	219.3	0.399	3.66	0.99	3.66	0.99
					6	Control				282	400	400	0%	118	1.967	**0.57**	1.967	0.57							
					7	Control				280	500	500	0%	220	3.667	**1.02**	3.667	1.02							
					8	Control				NO SOCK	NA	NA		NA	NA	NA	NA	NA		NA	NA		NA		NA
22	8	2018	Aug-18	Socks placed after clean/sweep	1	Test	6/19/2018	64	64	274	291.76	291.76	0%	17.76	0.278	0.06	0.278	0.06	63.985	16.00	0.010	0.25	0.07	0.25	0.07
					2	Test				280	296.86	296.88	0%	16.87	0.264	0.08	0.264	0.08							
					3	Test				278	294.34	293.98	0%	16.16	0.253	0.07	0.253	0.07							
					4	Test				282	295.35	295.04	0%	13.195	0.206	0.05	0.206	0.05							
			Aug-18		5	Control	6/19/2018	124	64	270	287.88	287.85	0%	17.865	**2.725**	**0.70**	0.279	0.07	57.2	19.1	0.016	1.92	0.52	0.30	0.08
					6	Control				270	286.22	286.19	0%	16.205	**1.082**	**0.32**	0.253	0.07							
					7	Control				272	295.27	295	0%	23.135	**1.961**	**0.55**	0.361	0.10							
					8	Control				NO SOCK	NA	NA		NA	NA	NA	NA	NA		NA	NA		NA		NA
24	10	2018	Oct-18	Socks placed after clean/sweep	1	Test	8/23/2018	63	62	280	320	310	3%	35	0.556	0.13	0.565	0.13	319	79.75	0.147	1.27	0.34	1.29	0.35
					2	Test				284	310	410	-28%	76	1.206	0.37	1.226	0.37							
					3	Test				280	410	360	13%	105	1.667	0.43	1.694	0.44							
					4	Test				282	410	360	13%	103	1.635	0.43	1.661	0.44							
			Oct-18		5	Control	8/23/2018	187	62	280	280	310	-10%	15	**1.887**	**0.48**	0.242	0.06	103.0	34.3	0.106	1.46	0.40	0.55	0.15
					6	Control				282	310	310	0%	28	**0.867**	**0.25**	0.452	0.13							
					7	Control				280	320	360	-12%	60	**1.621**	**0.45**	0.968	0.27							
					8	Control				NO SOCK	NA	NA		NA	NA	NA	NA	NA		NA	NA		NA		NA
25	4	2019	Apr-19	All socks OK, plastic bag labeled	1	Control	10/24/2018	183	183	296					0.000	-	0.000	-	0	#DIV/0!	0.000	0.00	0.00	0.00	0.00
					2	Control				284					0.000	-	0.000	-							
					3	Control				278					0.000	-	0.000	-							
					4	Control				288					0.000	-	0.000	-							
			Apr-19		5	Test	10/24/2018	187	183	278					0.000	-	0.000	-	0.0	#DIV/0!	0.000	0.00	0.00	0.00	0.00
					6	Test				288					0.000	-	0.000	-							
					7	Test				276					0.000	-	0.000	-							
					8	Test				NO SOCK	NA	NA		NA	NA	NA	NA	NA		NA	NA		NA		NA
24	6	2019	Jun-19	Manufacturer switched to lighter weight fabric (reflected in CBS #5 and #7	1	Control	4/25/2019	243	60	272	301.8	301.8	0%	29.8	0.123	0.03	0.497	0.11	484.3	121.075	0.436	0.50	0.14	2.02	0.56
					2	Control				270	500	500	0%	230	0.947	0.29	3.833	1.16							
					3	Control				268	381.9	381.9	0%	113.9	0.469	0.12	1.898	0.49							
					4	Control				274	384.6	384.6	0%	110.6	0.455	0.12	1.843	0.49							
			Jun-19		5	Test	4/25/2019	60	60	272	340.96	340.96	0%	68.96	1.149	0.29	1.149	0.29	210.0	70.0	0.267	1.17	0.32	1.17	0.32
					6	Test				274	287	287	0%	13	0.217	0.06	0.217	0.06							
					7	Test				272	400	400	0%	128	2.133	0.60	2.133	0.60							
					8	Test				NO SOCK	NA	NA		NA	NA	NA	NA	NA		NA	NA		NA		NA
27	8	2019	Aug-19	Manufacturer switched to lighter weight fabric (reflected in CBS #5 and #8	1	Control	6/24/2019	307	64	276	800	800	0%	524	1.707	0.39	8.188	1.88	1398	349.5	0.561	1.14	0.29	5.46	1.38
					2	Control				278	400	400	0%	122	0.397	0.12	1.906	0.58							
					3	Control				272	650	650	0%	378	1.231	0.32	5.906	1.53							
					4	Control				276	650	650	0%	374	1.218	0.32	5.844	1.55							
			Aug-19		5	Test	6/24/2019	64	64	182	650	650	0%	468	7.313	1.88	7.313	1.88	1616.0	538.7	0.427	8.42	2.33	8.42	2.33
					6	Test				276	800	800	0%	524	8.188	2.39	8.188	2.39							
					7	Test				176	800	800	0%	624	9.750	2.72	9.750	2.72							
					8	Test				NO SOCK	NA	NA		NA	NA	NA	NA	NA		NA	NA		NA		NA
29	10	2019	Oct-19	Manufacturer switched to lighter weight fabric (reflected in CBS #5 and #9	1	Control	8/28/2019	370	62	178	303	303	0%	125	0.338	0.08	2.016	0.46	349	87.25	0.147	0.24	0.06	1.41	0.37
					2	Control				178	269	269	0%	91	0.246	0.07	1.468	0.45							
					3	Control				178	276	276	0%	98	0.265	0.07	1.581	0.41							
					4	Control				174	209	209	0%	35	0.095	0.03	0.565	0.15							
			Oct-19		5	Test	8/28/2019	63	62	184	379	379	0%	195	3.095	0.79	3.145	0.81	520.0	173.3	0.089	2.75	0.76	2.80	0.77
					6	Test				180	357	357	0%	177	2.810	0.82	2.855	0.83							
					7	Test				174	322	322	0%	148	2.349	0.66	2.387	0.67							
					8	Test				NO SOCK	NA	NA		NA	NA	NA	NA	NA		NA	NA		NA		NA
24	4	2020	Apr-19	Taken in April 2020, used to replace sample lost in lab fire; Manufacturer switched to lighter weight fabric (reflected in CBS #5 and #9	1	Control	10/30/2019	177	176	172	331.3	331.3	0%	159.3	0.900	0.21	0.905	0.21	1028.58	257.145	0.220	1.45	0.39	1.46	0.39
					2	Control				178	406.37	406.37	0%	228.37	1.290	0.39	1.298	0.39							
					3	Control				178	650	650	0%	472	2.667	0.69	2.682	0.70							
					4	Control				182	350.91	350.91	0%	168.91	0.954	0.25	0.960	0.25							
			Apr-20		5	Test	10/30/2019	177	176	180	419.15	419.15	0%	239.15	1.351	0.35	1.359	0.35	626.8	208.9	0.020	1.18	0.32	1.19	0.33
					6	Test				180	372.73	372.73	0%	192.73	1.089	0.32	1.095	0.32							
					7	Test				182	376.96	376.96	0%	194.96	1.101	0.31	1.108	0.31							
					8	Test				NO SOCK	NA	NA		NA	NA	NA	NA	NA		NA	NA		NA		NA

Appendix L Weather Data During Study

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
4/1/2018	49.5	39.5	29.5	26	9	33	**0**
4/2/2018	47.2	36	24.9	25	9	36	**0**
4/3/2018	51.1	39.3	27.5	16	4	19	**0**
4/4/2018	49.7	41.9	34.1	14	3	17	**0.02**
4/5/2018	49.2	44.2	39.1	4	1	7	**0.1**
4/6/2018	52.4	48.6	44.8	13	4	18	**0.01**
4/7/2018	56.3	49.6	42.9	18	7	23	**0.31**
4/8/2018	51.4	43.2	35.1	21	8	26	**0**
4/9/2018	60.5	49	37.5	15	5	19	**0**
4/10/2018	56.9	47.7	38.4	22	5	28	**0.04**
4/11/2018	52.5	43.2	33.9	16	4	22	**0.12**
4/12/2018	51.9	44.8	37.7	22	13	32	**0.02**
4/13/2018	53.7	43.2	32.8	15	4	17	**0**
4/14/2018	57.6	48.7	39.8	10	4	15	**0**
4/15/2018	54.8	47	39.2	9	2	18	**0.15**
4/16/2018	49.7	45	40.3	17	5	23	**0.01**
4/17/2018	48.9	42.7	36.4	26	10	29	**0**
4/18/2018	55.5	44.3	33.2	14	3	18	**0**
4/19/2018	64.7	46.9	29.1	16	5	22	**0**
4/20/2018	**65.8**	**51.4**	**37**	**15**	**5**	**23**	**0**
4/21/2018	53.4	47.1	40.8	26	13	31	**0**
4/22/2018	59.1	45.4	31.7	14	4	16	**0**
4/23/2018	64.9	46.6	28.3	19	4	31	**0**
4/24/2018	69.5	50	30.5	18	5	25	**0**
4/25/2018	77.7	55.8	35.2	11	3	15	**0**
4/26/2018	77.9	55.8	33.6	12	3	18	**0**
4/27/2018	81.4	58.8	36.2	35	8	42	**0.08**
4/28/2018	56.5	51.2	46	24	14	32	**0.04**
4/29/2018	59.6	51.6	43.6	26	13	32	**0**
4/30/2018	60.7	52.2	43.6	20	11	27	**0**
5/1/2018	64.5	55.8	47.1	26	11	29	**0**
5/2/2018	75.5	58	40.5	21	7	28	**0**
5/3/2018	79.2	62.6	46.1	15	4	20	**0**
5/4/2018	74.2	64.1	53.9	20	10	27	**0**
5/5/2018	71.4	61.6	51.7	14	5	21	**0**
5/6/2018	74.9	62.3	49.7	13	3	16	**0.3**
5/7/2018	77.6	67	56.4	16	5	19	**0**
5/8/2018	78.1	63.2	48.3	23	5	30	**0.08**
5/9/2018	64.3	57.5	50.6	26	11	32	**0.02**
5/10/2018	60.2	53.8	47.3	23	12	34	**0**

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
5/11/2018	66.7	57.3	48	31	14	32	**0.02**
5/12/2018	81.3	65.1	48.8	15	6	22	**0**
5/13/2018	84.7	66.9	49.1	11	3	14	**0**
5/14/2018	86.1	65.6	45	12	3	18	**0**
5/15/2018	88.2	67.1	45.9	11	3	16	**0**
5/16/2018	83.4	71.8	60.1	22	11	27	**0**
5/17/2018	74.9	65	55.1	28	14	32	**0**
5/18/2018	65.1	56	47	9	3	13	**0**
5/19/2018	71.5	60.3	49.1	16	6	23	**0**
5/20/2018	71.9	62.4	52.9	21	9	26	**0.07**
5/21/2018	81.1	66.7	52.2	16	7	23	**0**
5/22/2018	85.5	65.7	45.8	9	3	14	**0**
5/23/2018	85.9	69.1	52.3	18	4	20	**0**
5/24/2018	80.3	69.5	58.7	19	10	26	**0**
5/25/2018	75.1	64.6	54	28	11	32	**0**
5/26/2018	67	59.8	52.7	25	15	39	**0**
5/27/2018	82.2	68.1	54.1	20	9	25	**0**
5/28/2018	72.9	64.8	56.7	30	15	34	**0**
5/29/2018	62.9	56.1	49.3	28	14	32	**0**
5/30/2018	68.6	56.3	44.1	18	6	28	**0**
5/31/2018	61.6	54.9	48.2	23	11	30	**0**
6/1/2018	66.4	56.1	45.7	18	11	28	**0**
6/2/2018	80.3	64.1	47.9	10	3	15	**0**
6/3/2018	77.6	61.9	46.3	24	8	34	**0**
6/4/2018	63.5	55.7	47.9	25	12	28	**0**
6/5/2018	71.4	56.6	41.8	18	5	22	**0**
6/6/2018	79.2	61.7	44.2	11	4	15	**0**
6/7/2018	75.1	63.5	52	22	9	30	**0**
6/8/2018	73.2	61.3	49.4	19	6	23	**0.35**
6/9/2018	62.9	54.9	46.9	22	11	34	**0.01**
6/10/2018	59.4	51.1	42.7	19	10	29	**0.15**
6/11/2018	65.7	53.6	41.5	24	11	30	**0**
6/12/2018	70.9	56.3	41.7	11	4	17	**0**
6/13/2018	68	56.5	45	29	10	34	**0**
6/14/2018	67.9	57.6	47.2	26	11	30	**0**
6/15/2018	74.8	62.2	49.5	24	10	31	**0**
6/16/2018	70.5	61.8	53.1	20	6	25	**0.18**
6/17/2018	80.8	67.8	54.7	14	4	21	**0**
6/18/2018	82.3	69	55.7	13	5	22	**0**
6/19/2018	**84.6**	**70.8**	**56.9**	**16**	**4**	**19**	**0**

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
6/20/2018	87.7	71.1	54.4	13	3	21	**0**
6/21/2018	83.8	71.4	59	26	10	34	**0**
6/22/2018	75.8	67.4	59.1	25	13	32	**0**
6/23/2018	73.8	64.9	56.1	30	13	31	**0**
6/24/2018	87.6	68.6	49.6	17	5	20	**0**
6/25/2018	69.2	61.5	53.9	28	14	40	**0.01**
6/26/2018	72.1	60	47.9	24	8	29	**0**
6/27/2018	76.4	62.7	48.9	24	9	37	**0**
6/28/2018	66.8	61.2	55.5	34	15	40	**0**
6/29/2018	75.3	63.2	51	27	9	32	**0**
6/30/2018	70.4	61.2	52	24	10	33	**0**
7/1/2018	69.2	61.5	53.8	28	13	37	**0**
7/2/2018	64.3	57.2	50	31	13	34	**0**
7/3/2018	77.7	64.3	51	13	5	17	**0**
7/4/2018	78.6	60.8	43.1	18	5	26	**0**
7/5/2018	92.2	71.1	50.1	25	6	30	**0**
7/6/2018	86.7	73.6	60.6	25	8	32	**0**
7/7/2018	76.9	65.8	54.8	20	8	27	**0**
7/8/2018	87.2	68.6	49.9	13	5	18	**0**
7/9/2018	90.6	75.3	60.1	28	9	33	**0**
7/10/2018	73.7	65.7	57.7	29	14	31	**0**
7/11/2018	86.1	70.1	54	16	5	16	**0**
7/12/2018	93.6	75.5	57.4	12	4	17	**0**
7/13/2018	93.9	75.8	57.6	23	7	30	**0**
7/14/2018	89.7	76.3	62.9	15	5	25	**0**
7/15/2018	94.7	73.1	51.4	10	3	17	**0**
7/16/2018	72	63.8	57.1	2	1	4	**0**
7/17/2018	94.9	78.1	61.2	22	7	30	**0**
7/18/2018	87.4	75.5	63.6	22	12	31	**0**
7/19/2018	80.8	70.4	59.9	24	14	35	**0**
7/20/2018	77.9	67.4	56.9	26	13	35	**0**
7/21/2018	77.9	66	54.1	19	10	26	**0**
7/22/2018	87.5	67.2	47	10	3	16	**0**
7/23/2018	92.8	71.8	50.7	14	4	18	**0**
7/24/2018	94	77	60	15	5	23	**0**
7/25/2018	95.2	74.9	54.7	16	4	24	**0**
7/26/2018	95.5	77.5	59.5	15	4	20	**0**
7/27/2018	94.8	77.2	59.7	14	4	20	**0**
7/28/2018	93.2	79.1	65	11	4	17	**0**
7/29/2018	96.7	76.4	56.2	13	3	16	**0**

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
7/30/2018	98.2	76.4	54.6	13	3	18	0
7/31/2018	99.7	81.6	63.6	20	6	29	0
8/1/2018	89.1	76.2	63.3	23	12	31	0
8/2/2018	74.7	67.8	61	29	12	42	0
8/3/2018	73.7	66.1	58.4	26	13	32	0
8/4/2018	84.5	69.9	55.3	13	5	18	0
8/5/2018	87.9	71.2	54.6	9	3	14	0
8/6/2018	93.8	73.4	52.9	10	3	19	0
8/7/2018	96.7	76.4	56.2	10	2	12	0
8/8/2018	99	77.4	55.9	12	3	17	0
8/9/2018	103	81.9	60.8	9	2	13	0
8/10/2018	94.2	78.6	63	27	8	30	0
8/11/2018	75.7	67.8	59.8	28	14	37	0
8/12/2018	79.7	66.7	53.7	12	4	20	0
8/13/2018	84.2	66	47.8	12	2	12	0
8/14/2018	87.3	68	48.7	5	2	10	0
8/15/2018	91.9	70.9	49.9	9	2	10	0
8/16/2018	92.4	76.1	59.8	17	5	25	0
8/17/2018	85.7	75.3	65	22	8	27	0
8/18/2018	88.4	74	59.6	15	4	20	0
8/19/2018	84.5	67.7	50.8	9	2	10	0
8/20/2018	85.7	70.4	55.2	11	3	20	0
8/21/2018	84.5	67.6	50.6	12	3	15	0
8/22/2018	**90.6**	**67.2**	**43.8**	**16**	**4**	**23**	0
8/23/2018	78.8	67.9	57.1	28	11	38	0
8/24/2018	70.7	62.8	54.9	23	12	34	0
8/25/2018	68.5	59.2	49.8	21	8	30	0
8/26/2018	67.3	58.6	49.9	22	8	28	0
8/27/2018	77.1	65.2	53.2	14	6	19	0
8/28/2018	80.6	62.7	44.8	13	3	16	0
8/29/2018	82.7	64.2	45.8	21	6	33	0
8/30/2018	74	67.2	60.4	23	11	31	0
8/31/2018	73.1	61.4	49.7	24	9	29	0
9/1/2018	73.3	64.5	55.7	21	10	32	0
9/2/2018	82.8	67	51.2	22	8	27	0
9/3/2018	77.6	68.4	59.2	19	9	24	0
9/4/2018	78.1	60	42	12	3	15	0
9/5/2018	82.1	61.2	40.4	10	2	14	0
9/6/2018	87.8	64.9	42	9	3	13	0
9/7/2018	88.2	73.4	58.6	34	7	38	0

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
9/8/2018	70.4	63.2	56	23	11	29	0
9/9/2018	78.2	64.8	51.3	18	5	23	0
9/10/2018	67.8	61	54.2	21	10	27	0
9/11/2018	68.4	59.2	50.1	19	8	26	0.04
9/12/2018	67.7	54.4	41.1	12	4	17	0
9/13/2018	66.7	53.6	40.5	17	5	21	0
9/14/2018	69	52.3	35.6	15	4	19	0
9/15/2018	65.7	54.1	42.5	11	4	18	0
9/16/2018	62.2	52.2	42.2	16	5	27	0
9/17/2018	66.9	53.1	39.2	11	3	15	0
9/18/2018	72.7	54.5	36.4	7	2	12	0
9/19/2018	72.8	56.8	40.7	18	5	23	0
9/20/2018	67.9	59	50.1	19	10	25	0
9/21/2018	74.4	58.8	43.1	11	2	14	0
9/22/2018	69.2	59.2	49.3	20	6	30	0
9/23/2018	62.8	55.8	48.8	24	12	39	0
9/24/2018	71.5	57.3	43.1	11	4	16	0
9/25/2018	73.9	54.1	34.2	14	2	14	0
9/26/2018	79	57.1	35.2	7	2	10	0
9/27/2018	79.3	59.7	40	14	3	17	0
9/28/2018	73.3	57.7	42.1	14	4	18	0
9/29/2018	69.7	53.9	38.2	18	6	23	0
9/30/2018	62.3	50.6	38.9	12	5	18	0
10/1/2018	66.5	56	45.5	6	2	13	0
10/2/2018	64.6	53.8	42.9	26	9	44	0
10/3/2018	53.7	42	30.4	13	4	17	0
10/4/2018	62	48.5	35.1	13	3	20	0
10/5/2018	51.1	42	33	6	2	8	0.12
10/6/2018	63.1	52.2	41.3	12	3	16	0.01
10/7/2018	56.5	47.6	38.7	4	1	9	0
10/8/2018	52	50.2	48.3	9	2	11	0.08
10/9/2018	59.7	52.8	45.9	8	2	13	0.24
10/10/2018	59.3	49.9	40.6	8	2	15	0
10/11/2018	62.5	47.7	32.8	4	1	8	0
10/12/2018	68.9	51.5	34.1	22	6	28	0.01
10/13/2018	64.3	49.4	34.5	16	4	19	0
10/14/2018	60.5	45.1	29.7	10	3	12	0
10/15/2018	66.2	47.5	28.9	5	1	7	0
10/16/2018	67.1	48	28.9	4	1	8	0
10/17/2018	67.6	47.9	28.2	8	1	9	0

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
10/18/2018	65.9	47.2	28.4	4	1	6	0
10/19/2018	68.3	49.1	29.9	4	1	7	0
10/20/2018	67.3	49.2	31	3	1	5	0
10/21/2018	67.5	48.5	29.6	4	1	7	0.01
10/22/2018	66.2	47.6	29.1	4	1	5	0
10/23/2018	58.7	44.3	29.9	15	2	23	0
10/24/2018	**61.6**	**50.5**	**39.4**	**10**	**2**	**14**	**0**
10/25/2018	48.4	43.8	39.3	4	1	8	0.1
10/26/2018	59.2	51.8	44.5	16	5	28	0.01
10/27/2018	57.9	44.8	31.7	11	3	19	0.27
10/28/2018	52.3	46.8	41.4	18	4	24	0.18
10/29/2018	53	43.2	33.3	15	5	23	0
10/30/2018	55	43.4	31.8	10	2	15	0.01
10/31/2018	58.3	50.5	42.8	8	2	12	0.06
11/1/2018	**61.8**	**56.5**	**51.3**	**15**	**4**	**23**	0.01
11/2/2018	59.7	53.2	46.7	28	9	35	0.02
11/3/2018	54.1	49.8	45.6	16	7	28	0
11/4/2018	53.6	47.9	42.2	33	12	41	0.01
11/5/2018	54.7	46.4	38.1	18	5	24	0
11/6/2018	53	43.8	34.7	18	6	25	0
11/7/2018	50.8	40.5	30.1	12	5	18	0
11/8/2018	46.9	34	21.1	3	1	7	0
11/9/2018	44.6	32.9	21.3	16	3	23	0.02
11/10/2018	52.2	39.2	26.1	9	2	10	0
11/11/2018	45.9	32.8	19.7	7	2	12	0
11/12/2018	40.4	30.4	20.3	3	1	6	0
11/13/2018	41.1	31.3	21.5	7	1	10	0.01
11/14/2018	38.2	32.2	26.2	6	2	8	0
11/15/2018	57.1	45.4	33.7	12	3	19	0
11/16/2018	52.8	44.5	36.2	14	5	19	0
11/17/2018	47	33.9	20.8	12	3	16	0
11/18/2018	45.7	31.9	18.1	4	1	7	0
11/19/2018	46.2	32.2	18.1	5	1	6	0
11/20/2018	43.8	30.5	17.1	6	1	7	0.01
11/21/2018	36.5	30.6	24.7	10	1	13	0
11/22/2018	41	35.5	30.1	8	2	14	0.11
11/23/2018	38.2	32.9	27.6	18	3	28	0.09
11/24/2018	48.8	40.1	31.4	12	4	18	0
11/25/2018	37	31.5	26	5	0	0	0
11/26/2018	34	30.5	27	3	0	0	0.04

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
11/27/2018	48.8	40.7	32.5	7	1	0	**0.04**
11/28/2018	37	34.7	32.3	4	0	0	**0.13**
11/29/2018	43.3	40	36.8	7	0	0	**0**
11/30/2018	47.5	40.7	33.8	6	1	0	**0.12**
12/1/2018	37.4	35	32.6	4	0	0	**0.12**
12/2/2018	41.1	35.8	30.6	6	0	0	**0**
12/3/2018	38.2	34.1	30	7	1	0	**0**
12/4/2018	33.1	28	22.9	4	1	0	**0**
12/5/2018	36.5	28.5	20.6	8	3	0	**0**
12/6/2018	32.1	26.5	20.9	8	2	0	**0**
12/7/2018	28	24.6	21.3	7	1	0	**0**
12/8/2018	31.4	28.1	24.8	6	1	0	**0**
12/9/2018	33	30.1	27.3	4	0	0	**0.01**
12/10/2018	29.7	26.9	24	2	0	0	**0**
12/11/2018	34.5	29.7	24.9	25	0	0	**0.01**
12/12/2018	43.1	37.4	31.8	17	3	0	**0.09**
12/13/2018	47	38.8	30.6	5	0	0	**0**
12/14/2018	36.2	32.7	29.2	13	2	0	**0.01**
12/15/2018	39.6	35.4	31.3	8	2	0	**0.01**
12/16/2018	35.6	34	32.5	4	0	0	**0.23**
12/17/2018	40.4	36	31.6	6	1	0	**0.02**
12/18/2018	50.7	42.4	34.1	10	2	0	**0.29**
12/19/2018	43.7	37.8	31.8	8	2	0	**0**
12/20/2018	45.5	39.8	34.2	28	4	0	**0.01**
12/21/2018	40.3	33.6	26.9	21	6	0	**0**
12/22/2018	33.7	28	22.4	8	1	0	**0**
12/23/2018	37.9	33.7	29.4	6	0	0	**0.06**
12/24/2018	34.6	32.6	30.6	7	1	0	**0.04**
12/25/2018	31.9	30	28	7	2	0	**0**
12/26/2018	32.6	30.6	28.6	4	0	0	**0.04**
12/27/2018	38.7	30.9	23.1	4	1	0	**0.02**
12/28/2018	29.1	25.2	21.3	2	0	0	**0**
12/29/2018	48.9	38.8	28.8	21	3	0	**0.04**
12/30/2018	42.3	37	31.7	29	8	0	**0.09**
12/31/2018	40.8	31.9	23	8	2	0	**0**
1/1/2019	37	29	21.1	7	1	0	**0**
1/2/2019	34.9	28.2	21.6	4	0	0	**0**
1/3/2019	38.6	33.4	28.3	4	0	0	**0**
1/4/2019	47	38.9	30.8	6	1	0	**0**
1/5/2019	38.6	33.2	27.9	5	0	0	**0**

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
1/6/2019	40.8	34.6	28.4	5	1	0	**0**
1/7/2019	42.1	35.1	28.1	9	2	0	**0**
1/8/2019	32.2	29.5	26.7	6	1	0	**0.02**
1/9/2019	36.2	32.6	29	5	1	0	**0.11**
1/10/2019	34	32.5	31.1	4	1	0	**0.01**
1/11/2019	36.1	32.2	28.4	4	1	0	**0**
1/12/2019	35.9	31.7	27.5	5	1	0	**0**
1/13/2019	33.9	30.5	27	5	1	0	**0**
1/14/2019	28.1	27	26	8	2	0	**0**
1/15/2019	28.7	27	25.2	7	1	0	**0**
1/16/2019	34.3	29.2	24.2	4	0	0	**0**
1/17/2019	36.3	33.5	30.8	4	0	0	**0.35**
1/18/2019	36.4	33.2	30	6	1	0	**0.32**
1/19/2019	35.2	32.1	29	4	1	0	**0.15**
1/20/2019	36	32.2	28.3	3	0	0	**0.04**
1/21/2019	43.2	32.4	21.6	18	3	0	**0**
1/22/2019	37.3	33.1	28.9	4	0	0	**0.01**
1/23/2019	50.1	39.9	29.7	22	4	0	**0.1**
1/24/2019	47.2	36.3	25.5	7	1	0	**0**
1/25/2019	50.8	39.2	27.7	7	1	0	**0**
1/26/2019	47.5	37.3	27.2	5	0	0	**0**
1/27/2019	60.4	43.9	27.4	10	2	0	**0**
1/28/2019	44.5	34.6	24.7	10	1	0	**0**
1/29/2019	42.9	31.6	20.3	7	1	0	**0**
1/30/2019	30.4	25.8	21.1	6	1	0	**0**
1/31/2019	30.8	29.5	28.2	5	1	0	**0**
2/1/2019	33.4	30.9	28.3	5	1	0	**0**
2/2/2019	44.4	36.1	27.8	4	1	0	**0**
2/3/2019	39.8	32	24.3	11	3	0	**0**
2/4/2019	31.9	27.5	23	12	2	0	**0.02**
2/5/2019	23.7	18.7	13.6	8	2	0	**0.01**
2/6/2019	25.4	14.1	2.8	5	0	0	**0**
2/7/2019	22.7	11.6	0.4	4	1	0	**0**
2/8/2019	24.3	17.5	10.8	7	1	0	**0**
2/9/2019	25.7	20	14.4	8	2	0	**0**
2/10/2019	25.6	19.2	12.8	12	3	0	**0**
2/11/2019	18.1	14.2	10.4	9	3	0	**0**
2/12/2019	25.3	21	16.7	4	0	0	**0.01**
2/13/2019	27.7	19.8	11.8	5	0	0	**0**
2/14/2019	30.2	24.2	18.2	7	0	0	**0**

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
2/15/2019	34.3	30	25.6	7	1	0	**0.06**
2/16/2019	37.7	32.1	26.5	6	1	0	**0.21**
2/17/2019	37	31.2	25.5	7	2	0	**0.06**
2/18/2019	35.3	25.4	15.5	8	2	0	**0.02**
2/19/2019	42.2	27.7	13.2	7	2	0	**0**
2/20/2019	34.8	27.5	20.1	4	1	0	**0**
2/21/2019	38	27.5	17.1	8	2	0	**0**
2/22/2019	34.1	25.8	17.5	5	1	0	**0**
2/23/2019	32.1	21.1	10.2	11	2	0	**0**
2/24/2019	33.3	24.1	14.9	6	1	0	**0.25**
2/25/2019	29.9	22.2	14.5	5	1	0	**0.01**
2/26/2019	24.4	21.3	18.3	15	4	0	**0**
2/27/2019	31.7	25.2	18.6	6	2	0	**0**
2/28/2019	24.7	18	11.2	5	1	0	**0.09**
3/1/2019	23	18.2	13.4	6	2	0	**0.01**
3/2/2019	29.6	23.2	16.9	9	2	0	**0.01**
3/3/2019	25.4	17.7	10	13	4	0	**0**
3/4/2019	27	14.6	2.1	6	1	0	**0**
3/5/2019	32.1	22.5	13	6	1	0	**0**
3/6/2019	32	27.7	23.4	3	1	0	**0.14**
3/7/2019	36.6	28.2	19.8	8	2	0	**0.05**
3/8/2019	28.1	20.9	13.6	4	1	0	**0.03**
3/9/2019	32.4	20.2	8.1	5	1	0	**0**
3/10/2019	31.2	19.6	7.9	6	1	0	**0**
3/11/2019	33.1	19.5	6	5	1	0	**0**
3/12/2019	42.7	33.5	24.2	22	5	0	**0.01**
3/13/2019	46.9	39.5	32	11	4	0	**0**
3/14/2019	42.6	32.7	22.8	5	0	0	**0**
3/15/2019	47.5	38.2	29	8	1	0	**0**
3/16/2019	48.1	37.2	26.2	4	1	0	**0**
3/17/2019	57.5	42.9	28.3	6	1	0	**0**
3/18/2019	59.6	42.7	25.8	7	1	0	**0**
3/19/2019	60	43.5	26.9	9	2	0	**0**
3/20/2019	64.5	46.5	28.5	9	1	0	**0**
3/21/2019	67.8	50	32.1	8	2	0	**0**
3/22/2019	64.4	52.4	40.4	14	3	0	**0**
3/23/2019	62.7	52.7	42.7	13	5	0	**0**
3/24/2019	48.3	45.5	42.7	13	5	0	**0.04**
3/25/2019	55	44	37	18	4	0	**0.03**
3/26/2019	57	46	37	12	5	0	**0**

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
3/27/2019	55	42	28	9	2	0	0
3/28/2019	57	47	39	14	3	0	0
3/29/2019	56	46	38	9	2	0	0
3/30/2019	61	46	29	12	3	0	0
3/31/2019	64	47	31	9	2	0	0
4/1/2019	63	49	36	14	4	0	0
4/2/2019	63	52	38	12	4	0	0
4/3/2019	59	51	43	21	7	0	0
4/4/2019	59	51	42	14	5	0	0
4/5/2019	57	49	39	16	6	0	0.09
4/6/2019	55	43	33	10	4	0	0.05
4/7/2019	57	47	38	23	8	1	0.3
4/8/2019	51	46	42	9	3	0	0.1
4/9/2019	54	48	40	34	13	0	0.02
4/10/2019	52	46	40	25	13	0	0
4/11/2019	52	46	39	10	4	0	0.07
4/12/2019	58	49	40	21	7	0	0
4/13/2019	50	46	40	18	8	0	0.02
4/14/2019	48	41	34	16	7	0	0.02
4/15/2019	53	44	31	14	4	0	0
4/16/2019	59	47	36	21	6	0	0
4/17/2019	61	52	46	23	11	3	0
4/18/2019	69	57	47	10	4	1	0
4/19/2019	62	56	51	22	8	0	0
4/20/2019	64	55	48	18	10	1	0
4/21/2019	68	54	41	20	10	1	0
4/22/2019	71	53	41	22	7	0	0
4/23/2019	62	56	49	33	14	0	0
4/24/2019	**68**	**55**	**44**	**24**	**11**	**2**	0
4/25/2019	66	50	29	9	3	0	0
4/26/2019	64	55	46	24	12	0	0
4/27/2019	50	44	40	29	13	0	0
4/28/2019	57	47	34	15	6	0	0
4/29/2019	59	47	31	21	5	0	0
4/30/2019	62	49	34	12	4	0	0
5/1/2019	63	48	29	23	7	0	0
5/2/2019	61	50	43	25	13	2	0
5/3/2019	67	54	45	20	10	1	0
5/4/2019	75	59	44	19	8	0	0
5/5/2019	75	63	52	17	7	2	0

Weather History for Ellensburg, WA [KWAELLEN22]

Date	**Temperature (°)**			**Wd Speed (mph)**			**Precip. Daily (in)**
	High	**Avg**	**Low**	**High**	**Avg**	**Gust**	**Sum**
5/6/2019	78	63	45	15	5	0	**0**
5/7/2019	78	66	50	17	6	1	**0**
5/8/2019	77	64	50	10	4	0	**0**
5/9/2019	76	67	51	20	6	1	**0**
5/10/2019	82	61	39	12	3	0	**0**
5/11/2019	85	63	41	13	3	0	**0**
5/12/2019	77	65	55	21	10	1	**0**
5/13/2019	75	64	53	22	9	1	**0**
5/14/2019	60	56	49	17	6	0	**0.1**
5/15/2019	63	53	40	18	4	0	**0.09**
5/16/2019	62	56	51	9	2	0	**0.27**
5/17/2019	59	54	48	32	16	4	**0**
5/18/2019	67	55	40	16	6	0	**0**
5/19/2019	70	60	53	20	5	0	**0.11**
5/20/2019	63	55	49	17	5	0	**0**
5/21/2019	67	57	48	15	6	1	**0**
5/22/2019	69	59	52	17	5	1	**0**
5/23/2019	79	63	47	17	4	0	**0**
5/24/2019	64	58	51	24	12	1	**0**
5/25/2019	59	54	49	17	7	1	**0.01**
5/26/2019	65	55	48	11	4	0	**0.22**
5/27/2019	78	65	55	19	6	0	**0**
5/28/2019	83	68	59	11	6	1	**0.07**
5/29/2019	81	67	56	21	8	1	**0**
5/30/2019	85	69	57	12	4	1	**0**
5/31/2019	86	71	54	13	4	0	**0**
6/1/2019	86	71	56	16	7	0	0
6/2/2019	86	71	56	20	8	1	0
6/3/2019	72	63	56	28	16	4	0
6/4/2019	75	64	53	25	10	3	0
6/5/2019	72	60	52	22	6	0	0
6/6/2019	60	53	45	22	12	2	0
6/7/2019	60	50	38	22	11	0	0
6/8/2019	67	56	46	22	11	0	0
6/9/2019	76	60	40	10	3	0	0
6/10/2019	81	66	47	26	7	0	0
6/11/2019	85	71	55	12	4	0	0
6/12/2019	90	71	51	7	2	0	0
6/13/2019	87	74	61	26	11	0	0
6/14/2019	76	65	55	26	14	5	0

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
6/15/2019	85	69	56	19	10	1	0
6/16/2019	78	66	61	26	11	3	0
6/17/2019	85	72	62	30	15	5	0
6/18/2019	75	67	60	35	16	5	0
6/19/2019	64	58	50	34	15	2	0
6/20/2019	64	55	48	38	16	3	0
6/21/2019	72	61	52	28	16	4	0
6/22/2019	76	64	52	31	13	0	0
6/23/2019	70	61	55	27	14	4	0
6/24/2019	**73**	**60**	**49**	**30**	**12**	**0**	**0**
6/25/2019	78	62	46	21	7	0	0
6/26/2019	76	60	47	26	6	0	0
6/27/2019	67	56	46	20	5	0	0.01
6/28/2019	72.4	59.1	45.1	20	4.6	0	0.35
6/29/2019	81.5	64.3	46.6	11	3.9	0	0
6/30/2019	82	67.8	52.4	16	3.6	0	0
7/1/2019	86.4	69.4	53.8	18	4.3	0	0
7/2/2019	70.7	63.8	57.6	33	16.4	4	0
7/3/2019	81.8	65.7	55.7	29	12.3	0	0
7/4/2019	82.1	68.2	58.2	30	14.4	3	0
7/5/2019	84.6	68.4	53.2	29	8.4	0	0
7/6/2019	73.6	65	59	38	16.8	6	0
7/7/2019	74.5	64.4	55.9	28	12.4	3	0
7/8/2019	83.8	67.5	56.8	22	7.8	0	0
7/9/2019	81.1	66.5	51.6	14	3.3	0	0.01
7/10/2019	81.2	69.6	61.6	24	5.8	0	0
7/11/2019	80.7	68.8	60.4	30	10.6	0	0
7/12/2019	80.3	69	57.9	20	8.2	0	0
7/13/2019	81.3	70.4	63.6	30	14.1	2	0
7/14/2019	82.2	70.1	57.1	27	11.7	3	0
7/15/2019	77	66.9	60.8	22	9.1	2	0.01
7/16/2019	79.1	67.7	57.3	17	6.4	0	0
7/17/2019	76.6	66.6	61.1	29	10.9	0	0
7/18/2019	68.9	62.1	55.8	39	16.3	0	0
7/19/2019	76.6	62.4	50.5	26	10.9	1	0
7/20/2019	80.9	65.1	46.2	12	4.2	0	0
7/21/2019	86.7	69.5	49	13	2.9	0	0
7/22/2019	94.4	74.4	56.2	25	5.6	0	0
7/23/2019	91.1	72.3	61.9	31	13.2	4	0
7/24/2019	77.5	65.3	55.4	33	14.9	4	0

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
7/25/2019	91.5	71.1	50.8	13	4.1	0	0
7/26/2019	96.9	74.2	55.1	30	6.9	0	0
7/27/2019	74.1	69	63.3	36	17.6	6	0
7/28/2019	88.6	70.9	56.4	19	6.7	0	0
7/29/2019	91	72.2	55	25	6.9	0	0
7/30/2019	84.4	71.7	61.4	31	15.6	8	0
7/31/2019	89	73.4	60	26	8.7	0	0
8/1/2019	88.9	74.2	57.3	15	4.9	0	0
8/2/2019	79.5	70.7	59.2	31	10.3	0	0
8/3/2019	90.2	71.4	52.6	9	2.8	0	0
8/4/2019	88.9	71.7	52	12	2.3	0	0
8/5/2019	96.8	77.2	55.1	13	2.9	0	0
8/6/2019	102.6	80.7	62.9	15	3.5	0	0
8/7/2019	98.1	80.3	63	16	5.1	0	0
8/8/2019	97.2	74.3	62.3	24	7.9	0	0
8/9/2019	85.4	69.9	58.5	23	6.9	0	0.35
8/10/2019	85.2	68.6	61.4	29	8.7	0	0.06
8/11/2019	72.1	65.2	59.4	28	10.7	0	0
8/12/2019	80.1	67.8	56.7	14	5.6	0	0
8/13/2019	87.2	69.2	52.6	20	3.6	0	0
8/14/2019	88.8	74	58.1	30	7.3	0	0
8/15/2019	85.2	73.5	64.8	25	13	5	0
8/16/2019	81	69.5	61.8	30	14.6	5	0
8/17/2019	84.6	67.6	59.1	31	12.3	0	0
8/18/2019	88.8	70.9	58.4	25	9.1	0	0
8/19/2019	87.1	72.1	60.7	25	13.2	3	0
8/20/2019	89.9	72.4	51.7	12	3.3	0	0
8/21/2019	77.2	69.3	62.8	30	10.2	0	0
8/22/2019	79.6	67.7	59.4	22	11.6	0	0
8/23/2019	85.1	66.6	47.9	19	5.1	0	0
8/24/2019	77.9	68.4	62.2	34	14.7	4	0
8/25/2019	75.5	66.1	59	30	12.9	4	0
8/26/2019	85.3	66.9	49.6	16	3.8	0	0
8/27/2019	86.7	68.1	47.8	7	1.6	0	0
8/28/2019	**94.4**	**71.5**	**49.3**	**6**	**1.1**	**0**	**0**
8/29/2019	88.2	68.2	57.3	19	4.7	0	0.03
8/30/2019	89	74.8	66	24	9.3	0	0.02
8/31/2019	91.9	72.1	55.8	22	6	0	0
9/1/2019	85.3	70.5	59.3	23	6.7	0	0
9/2/2019	87.7	70.8	56.9	16	3.8	0	0

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
9/3/2019	86.8	68.2	52.7	30	6.4	0	0
9/4/2019	85.1	70	56.1	14	3.2	0	0
9/5/2019	91.4	67.5	50.9	8	1.2	0	0
9/6/2019	85.9	69.8	60.3	9	2.3	0	0
9/7/2019	83.3	68.8	55.6	30	4.3	0	0.02
9/8/2019	73.3	63.8	57.6	30	13.9	2	0.21
9/9/2019	71.9	61.1	55.6	12	5.2	0	0.03
9/10/2019	71	60	52.2	11	2.8	0	0.02
9/11/2019	78.3	61.4	46.7	16	3.3	0	0
9/12/2019	80.1	64.3	48.2	13	2.9	0	0
9/13/2019	70.3	62.8	57.7	20	11.6	2	0
9/14/2019	70.9	61.9	55.9	23	6.1	0	0
9/15/2019	58.7	55.1	53.1	16	2.3	0	0.07
9/16/2019	69.1	55.7	47.6	12	2.6	0	0.07
9/17/2019	59	51.9	43.6	13	2.9	0	0.15
9/18/2019	65.6	55.8	47.9	12	1.7	0	0.01
9/19/2019	72.2	57.7	46.1	20	5.5	0	0
9/20/2019	71.9	61.7	55.7	32	12.3	2	0
9/21/2019	78	62.2	50.9	18	7.3	0	0
9/22/2019	69.9	57.3	47.9	15	3.7	0	0
9/23/2019	60.4	56.4	52.2	30	11.8	2	0
9/24/2019	67.2	58.2	47.2	25	6.6	0	0
9/25/2019	73.9	61.5	52.2	17	4.2	0	0
9/26/2019	69.7	60.6	53.5	29	8.9	0	0
9/27/2019	60.4	52.4	43.3	30	9.6	0	0
9/28/2019	49.6	42.2	35.1	10	2.2	0	0.11
9/29/2019	43.4	40	36.8	13	2.3	0	0.04
9/30/2019	50.3	41.9	34.8	5	1.1	0	0
10/1/2019	59	43.5	32	13	1.9	0	0
10/2/2019	59.5	45.4	32.4	9	1.6	0	0
10/3/2019	61.9	49.5	39.1	6	1.2	0	0.04
10/4/2019	59.7	48	35.9	15	3.4	0	0
10/5/2019	60.8	52.2	44.2	15	5	0	0
10/6/2019	65.7	48.5	32.3	6	1	0	0
10/7/2019	71.6	50.5	37	11	1.9	0	0
10/8/2019	56.9	46.7	38.7	20	7.2	0	0
10/9/2019	52.6	41.2	32	9	2.4	0	0
10/10/2019	53.5	37.5	23	13	1.5	0	0
10/11/2019	53.9	38.4	24.2	13	1.5	0	0
10/12/2019	52.9	39.4	26	3	0.2	0	0

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
10/13/2019	59.8	45.5	34.7	16	2.7	0	0
10/14/2019	60.5	46.2	31.7	8	1.7	0	0
10/15/2019	52.6	43.3	33.2	4	0.4	0	0
10/16/2019	53	46.5	41.3	6	0.9	0	0.02
10/17/2019	58.7	50	41.2	9	2.4	0	0.04
10/18/2019	56.9	46.2	39.5	14	2.6	0	0
10/19/2019	46.6	42.2	39.4	21	6.3	0	0.47
10/20/2019	47.9	42.2	38.5	12	3.1	0	0
10/21/2019	49.6	45.3	40	4	0.4	0	0.05
10/22/2019	58.5	51	40.6	22	7.9	0	0.01
10/23/2019	60.5	47.5	35.7	9	1.5	0	0
10/24/2019	64.7	46.8	32.8	4	0.5	0	0
10/25/2019	65.9	47.5	37.1	27	6.2	0	0
10/26/2019	52.5	44.4	35.7	14	5.8	0	0
10/27/2019	52.5	38.8	28.8	8	1.7	0	0
10/28/2019	53.9	37.8	27.7	14	3.7	0	0
10/29/2019	36.4	28.8	19.3	12	3.5	0	0
10/30/2019	**43.5**	**27.0**	**15.1**	**3.0**	**0.1**	**0.0**	**0**
11/1/2019	52.7	34.4	20.5	6	0.7	0	0.00
11/2/2019	54.4	36.5	23.3	4	0.4	0	0.00
11/3/2019	55.3	38.5	26.4	4	0.2	0	0.00
11/4/2019	58.3	40.4	28	4	0.4	0	0.00
11/5/2019	60.1	39.5	25.6	5	0.5	0	0.00
11/6/2019	58	39.2	26	14	1.4	0	0.00
11/7/2019	52.5	36.8	24.5	4	0.3	0	0.00
11/8/2019	44.3	33.4	25.2	3	0.3	0	0.00
11/9/2019	53	41.6	29.5	16	1.6	0	0.05
11/10/2019	62.3	50.7	42.8	14	3.1	0	0.00
11/11/2019	53	41.3	32	7	0.9	0	0.00
11/12/2019	55	40.7	30.1	9	1.3	0	0.00
11/13/2019	45	38.5	33.9	9	1.5	0	0.00
11/14/2019	41.7	39.3	36.7	2	0.2	0	0.00
11/15/2019	49	43.7	38.9	9	1.4	0	0.00
11/16/2019	51.3	43.2	33	6	0.7	0	0.00
11/17/2019	62.2	50	39.3	21	4.7	0	0.00
11/18/2019	48.9	41.1	36.4	6	1	0	0.03
11/19/2019	53	42.9	35.8	14	3.1	0	0.01
11/20/2019	53	38.5	27.2	6	0.9	0	0.00
11/21/2019	47	31.6	20.9	5	0.7	0	0.00
11/22/2019	44.9	28.6	18.7	4	0.1	0	0.00

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
11/23/2019	44.9	33	23.5	12	0.9	0	0.00
11/24/2019	49.5	44.6	36.2	27	9.6	0	0.00
11/25/2019	44.7	37.2	31	20	4.6	0	0.00
11/26/2019	34.4	28.9	20.3	12	2.8	0	0.00
11/27/2019	35.6	32.3	29.3	15	3.6	0	0.01
11/28/2019	32.5	27.4	17.5	5	0.8	0	0.00
11/29/2019	33.1	20	10.8	4	0.4	0	0.00
11/30/2019	32.9	19.3	10	4	0.3	0	0.00
12/1/2019	29.7	24.4	16.9	5	0.4	0	0.03
12/2/2019	25.2	23	19.6	4	0.5	0	0
12/3/2019	29.7	25.4	20.6	4	0.2	0	0.01
12/4/2019	34.4	29.9	24.2	5	0.4	0	0.02
12/5/2019	38.9	35.8	32.7	4	0.2	0	0.01
12/6/2019	41.6	38.2	36	5	0.2	0	0.03
12/7/2019	41	37.4	34.8	5	0.6	0	0.15
12/8/2019	38.9	34.6	29.1	5	0.7	0	0.01
12/9/2019	30.7	28.4	25.6	5	0.5	0	0
12/10/2019	31	29.9	28.5	6	0.9	0	0.01
12/11/2019	32.1	30.6	29.2	6	1.1	0	0.06
12/12/2019	31.3	27.6	23.6	5	0.7	0	0
12/13/2019	38.5	31.8	24.9	6	0.6	0	0.15
12/14/2019	30.8	26.7	22.3	3	0.2	0	0.01
12/15/2019	36.9	29.9	23.1	9	1	0	0.01
12/16/2019	32.2	23.9	15.5	4	0.5	0	0
12/17/2019	26.8	25.4	23.9	4	0.6	0	0
12/18/2019	29.1	26.3	24.8	3	0.5	0	0
12/19/2019	31	28.6	26.5	7	0.6	0	0
12/20/2019	38.7	32.9	29.6	2	0.1	0	0.49
12/21/2019	40.9	37	33.3	21	4.1	0	0.02
12/22/2019	39.1	35.6	34.3	5	0.3	0	0.04
12/23/2019	41.5	35.8	32.6	5	0.8	0	0.01
12/24/2019	39.3	31.7	28	3	0.1	0	0
12/25/2019	36.1	31.5	27.7	4	0.4	0	0
12/26/2019	30.3	27.7	23.9	4	0.3	0	0
12/27/2019	34	30.3	27.4	4	0.5	0	0.01
12/28/2019	32.9	30.7	27.7	6	1.4	0	0
12/29/2019	32.7	31.5	30	7	0.9	0	0
12/30/2019	36.3	32.9	30.5	5	0.5	0	0
12/31/2019	38.5	34.3	31.3	6	0.8	0	0.24
1/1/2020	49.1	42	33.2	23	8.3	0	0.03

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
1/2/2020	42.8	37.5	32.8	32	7.6	0	0.04
1/3/2020	33.2	31.2	28.9	5	0.1	0	0
1/4/2020	43.4	37.2	29.9	22	6.8	0	0.01
1/5/2020	42.3	33.6	29.1	14	2.9	0	0
1/6/2020	43.7	37.1	31.7	11	2.7	0	0
1/7/2020	44.9	38	31.8	7	1.3	0	0.01
1/8/2020	40.3	36.5	31.2	20	6.7	0	0
1/9/2020	39	32.6	27.7	16	4	0	0
1/10/2020	31.8	28.9	26	5	0.8	0	0.03
1/11/2020	43.8	34.5	28.1	25	5	0	0.03
1/12/2020	38.4	31.2	26.2	15	3.5	0	0
1/13/2020	29.2	22.8	14.9	22	8.6	0	0
1/14/2020	25.1	16.9	11.2	6	1.6	0	0.05
1/15/2020	20.6	15.2	9.6	12	1.6	0	0
1/16/2020	28.2	21.9	15	5	0.6	0	0.04
1/17/2020	26	17.5	6.6	4	0.6	0	0
1/18/2020	32.6	28.3	22	3	0.1	0	0.01
1/19/2020	38	32.2	27.8	4	0.6	0	0.07
1/20/2020	38.3	31.8	27.9	5	0.4	0	0
1/21/2020	39.7	32.5	27.5	6	0.9	0	0.04
1/22/2020	34	30.9	26.2	4	0.6	0	0.09
1/23/2020	36.4	34.5	33	4	0.2	0	0.09
1/24/2020	39.3	35.5	32	4	0.5	0	0.02
1/25/2020	42.2	34.9	31.4	9	0.7	0	0.15
1/26/2020	50.1	39.5	33.2	7	1	0	0.04
1/27/2020	47.6	36.9	30.9	6	1.7	0	0.44
1/28/2020	43.3	36.2	31.8	6	1.1	0	0.03
1/29/2020	42.4	34.7	31.2	6	0.6	0	0
1/30/2020	43.4	34.1	26.2	5	1.1	0	0
1/31/2020	56.8	42.8	31.1	12	2.4	0	0.01
2/1/2020	55.8	45.7	33	25	10.8	0	0.02
2/2/2020	41.3	33.3	28.2	13	4.5	0	0
2/3/2020	41.9	30.2	21	18	3.5	0	0
2/4/2020	32.6	27.5	21.2	5	0.8	0	0
2/5/2020	49.9	39.5	29.4	28	6.7	0	0.02
2/6/2020	47.1	43.9	41.2	15	5.7	0	0.24
2/7/2020	49.3	43.4	36.1	17	4.4	0	0.11
2/8/2020	46.8	38.4	31.9	24	7.8	0	0.01
2/9/2020	47	37.8	27.1	27	5.2	0	0
2/10/2020	54.3	39.3	31.2	12	2.2	0	0

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
2/11/2020	47.9	39.6	30.3	33	10.2	0	0
2/12/2020	53.2	40.5	29.4	12	2	0	0
2/13/2020	45.8	34.5	25.2	14	3.4	0	0
2/14/2020	45.5	37.4	29.6	22	6.3	0	0
2/15/2020	46.2	38.9	33.1	8	2.4	0	0
2/16/2020	45.4	38.4	32.3	28	10.5	0	0
2/17/2020	42.5	35.4	28.2	23	9.2	0	0.1
2/18/2020	46.6	30.5	20.5	7	1.6	0	0
2/19/2020	44.6	29.9	18	11	2.2	0	0
2/20/2020	47.5	31.3	18.3	9	1.2	0	0
2/21/2020	49.4	32.7	20	6	0.8	0	0
2/22/2020	51.6	38.8	26.5	24	7.1	0	0
2/23/2020	46.6	37.5	31.4	17	4.7	0	0.08
2/24/2020	43.5	37.6	32.8	28	12.3	0	0
2/25/2020	51.3	38.1	26.7	11	1.6	0	0
2/26/2020	52.4	42.4	33.4	35	8.2	0	0
2/27/2020	63.4	46.5	32.9	15	2.8	0	0
2/28/2020	62.3	42.9	29.9	23	4.3	0	0
2/29/2020	46.8	37.1	29	34	9.3	0	0
3/1/2020	47.2	37.5	30	24	12	0	0
3/2/2020	51.7	44	37.1	30	14.6	0	0
3/3/2020	57.7	48.1	42.2	31	11.7	0	0
3/4/2020	51.5	42.8	34.9	29	10.3	0	0
3/5/2020	58.1	41.2	28.1	12	3.3	0	0
3/6/2020	53.6	42.8	32.1	15	4.6	0	0
3/7/2020	50.6	40.3	33.9	16	6.4	0	0.01
3/8/2020	49.5	37.5	25.2	17	5.4	0	0
3/9/2020	54.5	38.4	21.7	16	3	0	0
3/10/2020	54.2	38.7	26.8	24	4.2	0	0
3/11/2020	48.3	43.2	34.9	40	12.2	0	0
3/12/2020	51.6	39.9	28	27	7.5	0	0
3/13/2020	35.9	33.5	30.8	14	1.3	0	0.24
3/14/2020	33.7	30	25.2	19	6.9	0	0
3/15/2020	44	29.9	18.3	11	2.2	0	0
3/16/2020	53.2	36.2	21.3	10	2.2	0	0
3/17/2020	54.9	37.6	21.4	11	2.1	0	0
3/18/2020	60.9	41.8	25.4	8	2	0	0
3/19/2020	59.7	42.4	27.5	12	1	0	0
3/20/2020	64.4	47.5	30.3	16	1.3	0	0
3/21/2020	65	49.2	32.3	19	3.3	0	0

Weather History for Ellensburg, WA [KWAELLEN22]

Date	Temperature (°)			Wd Speed (mph)			Precip. Daily (in)
	High	Avg	Low	High	Avg	Gust	Sum
3/22/2020	61.4	46.6	29.1	3	0.1	0	0
3/23/2020	53.8	44	34.5	1	0	0	0
3/24/2020	46.5	35.4	25	14	0.9	0	0
3/25/2020	52	39.6	33.2	5	0.1	0	0
3/26/2020	47.8	39.2	26.9	23	6.6	0	0
3/27/2020	53.2	44.4	39.1	19	4.9	0	0
3/28/2020	58	45.7	34.9	11	0.8	0	0
3/29/2020	58.2	46.7	38.6	17	1.9	0	0
3/30/2020	50.7	42.5	31.8	20	4.5	0	0.01
3/31/2020	48.5	38.5	31.3	31	3.4	0	0.03
4/1/2020	46.6	38.3	32.2	9	0.3	0	0.01
4/2/2020	49.9	36.2	22.2	0	0	0	0
4/3/2020	46	38.3	31.6	20	1.8	0	0
4/4/2020	48.1	38.3	26.7	17	2.3	0	0
4/5/2020	55	42.4	34.2	14	2.1	0	0
4/6/2020	60.3	41.8	28.2	27	3.1	0	0
4/10/2020	67	59.5	54.1	28	13.4	5	0
4/11/2020	60.1	51.9	43.4	27	9.5	0	0
4/12/2020	54.9	45.4	35	11	0.6	0	0
4/13/2020	64.4	46.5	27.3	4	0.1	0	0
4/14/2020	65.4	55.3	45.3	18	0.2	0	0
4/15/2020	64.4	52.6	40.1	17	0.2	0	0
4/16/2020	63.6	47.3	30.6	0	0	0	0
4/17/2020	73	51.9	29.5	0	0	0	0
4/18/2020	65.4	55.2	47	0	0	0	0
4/19/2020	71.9	55.8	44.9	0	0	0	0
4/20/2020	74.7	55.6	36.9	23	2.5	0	0
4/21/2020	61.2	53	47.9	31	7.2	0	0
4/22/2020	59	49.4	44.5	0	0	0	0.12
4/23/2020	**61**	**51.7**	**44.2**	**20**	**3.7**	**0**	**0**

Appendix M Audit Results

June 2018 Audit

Auditor name: Taylor Hoffman-Ballard
Date: 6/19/2018
Field staff name(s): Bryan, Glen, Gordon
Time: 9am

Standard Operating Procedure (SOP)	**Actions Compliant with SOPs?**	**Comments:**
Measuring Catch Basin Sediment Depth	**Overall SOP audit notes:**	
Prior to cleaning, 5 depth to sediment measurements collected in different spots	✓	Use lath, measure from top of rim so its easier to see value on lath
Depth to sediment measurements recorded	✓	
Following cleaning, 5 depth to CB floor measurements collected in different spots	✓	
Depth to CB floor measurements recorded	✓	
Catch Basin Sediment Collection	**Overall SOP audit notes:**	
Prior to start, vactor truck debris tank is clean	✓	Hoses which collect sediment are flushed too
Material on grate rim washed into catch basin sump	✓	
Material adhered to walls washed into catch basin sump	✓	
All material and water removed from catch basin	✓	
Typical catch basin cleaning procedures followed overall	✓	
Flushed residual sediment in outlet pipe to swale	✓	
Cleaning occurred for all CBs on both sides of street (test and control)	✓	
Material from CBs on each side of street placed into separate basins	✓	
Emptied all sediment from vactor truck into respective basin	✓	Empty all sediment by rinsing out the tank with water; note: any sediment which misses the basin is allowed to dry on concrete decant facility floor, then is scooped/shoveled into respective basin
Vactor truck debris tank cleaned	✓	
Roadway Sediment Collection	**Overall SOP audit notes:**	
Prior to start, sweeper debris tank is clean	✓	
Sweeping occurs as typically done on test side of street only (except in April)	✓	
Full length of study site swept	✓	
Emptied all sediment into respective basin (each side into separate basin in April)	✓	Empty all sediment by rinsing out the tank with water; note: any sediment which misses the basin is allowed to dry on concrete decant facility floor, then is scooped/shoveled into respective basin
Sweeper debris tank cleaned	✓	

Standard Operating Procedure (SOP)	**Actions Compliant with SOPs?**	**Comments:**
Catch Basin Sediment Washout Collection	**Overall SOP audit notes:**	
Sock tare weight obtained prior to installation	✓	Use scale to ±2g accuracy
Sock labeled and label matches respective upstream catch basin	✓	
Observe and note any tears, holes, etc. in sump sock	✓	
Sock sealed and placed in labeled plastic bag	✓	
Clean sock installed immediately following removal of previous sock	✓	
Tare weight of clean sock obtained prior to installation	✓	
COC filled out	✓	
Procedures followed for each sump	✓	
Dewatering and Weighing Sediment Samples	**Overall SOP audit notes:**	
Prior to start, basins are clean	✓	
Inspected filter fabric prior to placing sediment in basins	**change**	Because waited 1 week, filter fabric was not used for the top three rows of valves, as suggested in the alternative for the dewatering SOP.
Tare weight of basins plus pallets obtained prior to placing sediment in basins	✓	
Roadway and CB sediment allowed to settle for minimum of 1 hour	✓	Waited 1 week to allow for settling
Dewater according to SOP (20 minutes wait following each valve row)	**change**	Followed the alternative dewatering SOP (wait 7 days to dewater), and open valves from top to bottom without waiting 20 minutes between valves.
Wet weight of sediment, basin, and pallet obtained for each basin	✓	
Tare weights and wet weights recorded on appropriate form	✓	
Samples taken after weighing of sediment	✓	
Sample Collection and Handling: Moisture Content, Organic Content, and PSD	**Overall SOP audit notes:**	
Bowl and scoop washed with soap and water/cleaned and dried	✓	
Collected samples in 3-6 random locations several inches below surface	✓	
Homogenized sediment collected in bowl	✓	
Filled appropriate sample containers using homogenized sediment samples	✓	
Procedures followed for each basin	✓	
COC filled out	✓	
All basins emptied, cleaned, and dried	✓	

Standard Operating Procedure (SOP)	**Actions Compliant with SOPs?**	**Comments:**
Inspection of Study Area for Damage or Vandalism	**Overall SOP audit notes:**	
Inspections conducted once per week	✓	
Visually inspected inside of catch basin for spills or illicit discharges	✓	
Visually inspected sump for damage or vandalism	✓	
Record any incidents and the date of inspection	✓	No incidents so far
Maintain record of incidents during the study	✓	No incidents so far
Create pdf copies of inspections once per month and email to Project Manager	✓	No incidents so far
Calibration and Maintenance of Equipment: Scale and Weather Station	**Overall SOP audit notes:**	
Obtained records of maintenance and calibration activities from Direct TV, Inc.		Gordon to obtain from Direct TV
Obtained records of maintenance and calibration activities from scale vendor	✓	
Maintenance of Street Sweeper and Vactor Truck	**Overall SOP audit notes:**	
Records of maintenance activities maintained		Gordon to email
PDF copies of records will be emailed to Project Manager		Gordon to email

Ellensburg Street Sweeping, CB Cleaning, and Sampling Event – June 19th, 2018

Sump sock for CB 4 shown above. Sump sock was removed and placed in a bag for dry weight and PSD sampling. Sediment accumulation reflects washout from the catch basin upstream between the April sampling event and June 19th.

The same sump sock is shown next to the sump basin from which it was removed. The inside of the outlet pipe is coated in the same sediment as was in the sock. Care was taken not to lose any of the sediment in the pipe when removing the sock.

The photo above shows the removed sock with “Test CB4 270 gr” written on the sock. 270 grams is the clean/tare weight of the sock prior to when it was installed.

The above two pictures display the new clean sock being installed. The sock is folded and placed in the sump box, and gorilla tape/duct tape is placed around the plastic ring and across the cut in the sock (done intentionally to get the sock onto the pipe). The sock fits tightly onto the pipe.

Photo of a closed sump box at the site and the upstream/area across the street

Picture of sweeper on the test side of the road (north)

Picture of the road after swept

Material left behind after sweeper completed sweeping at site (just beyond crown/end of contributing basin) and lifted vacuum head below truck to drive away

First photo shows the decant facility and basins with sweeper truck on the left and vactor truck on the right. Second photo shows the sweeper operator spraying out the inside of the debris tank to remove any remaining sediment inside the tank.

Photo shows street sweeping solids plus water used to wash out debris tank. Sediment on the decant facility floor (from emptying the sweeper debris tank) is typically allowed to dry and is scooped/shoveled into the basin with the rest of the sediment to minimize losses. Was told this amount is about 1/3 of what was collected from sweeping in April.

Another picture showing what was collected during the street sweeping. Slight sheen (possibly biological from breakdown of hay?) and hay chaff was observed.

Material collected during catch basin cleaning. Appeared to fill the basin to almost the same depth as in April. Smelled horrible. No dead mice observed.

August 2019 Audit

Auditor name: Taylor Hoffman-Ballard		Date: 8/28/2019	
Field staff name(s): Bryan, Glen, Gordon		Time: 9am	
Standard Operating Procedure (SOP)	**Actions Compliant with SOPs?**	**Comments:**	
Measuring Catch Basin Sediment Depth	**Overall SOP audit notes:**		**2018 Previous Audit Responses**
Prior to cleaning, 5 depth to sediment measurements collected in different spots	✓		Use lath, measure from top of rim so its easier to see value on lath
Depth to sediment measurements recorded	✓		
Following cleaning, 5 depth to CB floor measurements collected in different spots	✓		
Depth to CB floor measurements recorded	✓		
Catch Basin Sediment Collection	**Overall SOP audit notes:**		**2018 Previous Audit Responses**
Prior to start, vactor truck debris tank is clean	✓		Hoses which collect sediment are flushed too
Material on grate rim washed into catch basin sump	**NA**	Typically no material on rim - whatever is present is blown into catch basin when Gordon lifts the grate to measure depth the day before catch basin cleaning	
Material adhered to walls washed into catch basin sump	✓		
All material and water removed from catch basin	✓		
Typical catch basin cleaning procedures followed overall	✓		
Flushed residual sediment in outlet pipe to swale	✓		
Cleaning occurred for all CBs on both sides of street (test and control)	✓		
Material from CBs on each side of street placed into separate basins	✓		
Emptied all sediment from vactor truck into respective basin	✓		Empty all sediment by rinsing out the tank with water; note: any sediment which misses the basin is allowed to dry on concrete decant facility floor, then is scooped/shoveled into respective basin
Vactor truck debris tank cleaned	✓		
Roadway Sediment Collection	**Overall SOP audit notes:**		**2018 Previous Audit Responses**
Prior to start, sweeper debris tank is clean	✓		
Sweeping occurs as typically done on test side of street only (except in October)	✓		
Full length of study site swept	✓		
Emptied all sediment into respective basin (each side into separate basin in October)	✓		Empty all sediment by rinsing out the tank with water; note: any sediment which misses the basin is allowed to dry on concrete decant facility floor, then is scooped/shoveled into respective basin
Sweeper debris tank cleaned	**NA**	Will do in October, not applicable this month because only cleaning test side	

Standard Operating Procedure (SOP)	**Actions Compliant with SOPs?**	**Comments:**	
Catch Basin Sediment Washout Collection	**Overall SOP audit notes:**		**2018 Previous Audit Responses**
Sock tare weight obtained prior to installation	✓		Use scale to ±2g accuracy
Sock labeled and label matches respective upstream catch basin	✓		
Observe and note any tears, holes, etc. in sump sock	✓	Have never seen any tears, holes, etc. One time have seen duct tape off of the pipe and sock when the sump was opened, but the sock was still on the pipe.	
Sock sealed and placed in labeled plastic bag	✓		
Clean sock installed immediately following removal of previous sock	✓		
Tare weight of clean sock obtained prior to installation	✓		
COC filled out	✓		
Procedures followed for each sump	✓		
Dewatering and Weighing Sediment Samples	**Overall SOP audit notes:**		**2018 Previous Audit Responses**
Prior to start, basins are clean	✓	The vactor truck is used to vacuum out any residual sediment, and the pressure hose on the vactor truck is used as needed to wash off any sediment	
Inspected filter fabric prior to placing sediment in basins	**NA**	See previous Audit Response, still following change from June 2018	**Change:** Because waited 1 week, filter fabric was not used for the top three rows of valves, as suggested in the alternative for the dewatering SOP.
Tare weight of basins plus pallets obtained prior to placing sediment in basins	✓	Main difference between tare weights is due to differences in construction of pallets, adds up to a few pounds	
Roadway and CB sediment allowed to settle for minimum of 1 hour		**Change:** See previous Audit Response, typically allow 5-7 days to dewater	**Change:** Waited 1 week to allow for settling
Dewater according to SOP (20 minutes wait following each valve row)		**Change:** See previous Audit Response, typically allow 5-7 days to dewater	**Change:** Followed the alternative dewatering SOP (wait 7 days to dewater), and open valves from top to bottom without waiting 20 minutes between valves.
Wet weight of sediment, basin, and pallet obtained for each basin	✓		
Tare weights and wet weights recorded on appropriate form	✓		
Samples taken after weighing of sediment	✓		
Sample Collection and Handling: Moisture Content, Organic Content, and PSD	**Overall SOP audit notes:**		**2018 Previous Audit Responses**
Bowl and scoop washed with soap and water/cleaned and dried		**Change:** Use disposable gloves to scoop material directly into sample jars	
Collected samples in 3-6 random locations several inches below surface	**NA**	**Change:** Since homogenize full basin of material (see note below), not applicable	
Homogenized sediment collected in bowl		**Change:** To homogenize, all material is mixed within the basin using a metal shovel	
Filled appropriate sample containers using homogenized sediment samples	✓		
Procedures followed for each basin	✓		
COC filled out	✓		
All basins emptied, cleaned, and dried	✓		

Standard Operating Procedure (SOP)	**Actions Compliant with SOPs?**	**Comments:**	
Inspection of Study Area for Damage or Vandalism	**Overall SOP audit notes:**		**2018 Previous Audit Responses**
Inspections conducted once per week		**Change:** Driving by every other week - have not seen much foot traffic around site. Looking for obvious signs of damage or vandalism when inspect	
Visually inspected inside of catch basin for spills or illicit discharges		**Change:** Driving by every other week - have not seen much foot traffic around site. Look inside of catch basins during depth measurements day before sample collection day. Have not observed any spills or discharges	
Visually inspected sump for damage or vandalism		**Change:** Driving by every other week - have not seen much foot traffic around site. Looking for obvious signs of damage or vandalism when inspect	
Record any incidents and the date of inspection	✓	No incidents so far	No incidents so far
Maintain record of incidents during the study	✓	No incidents so far	No incidents so far
Create pdf copies of inspections once per month and email to Project Manager	✓	No incidents so far	No incidents so far
Calibration and Maintenance of Equipment: Scale and Weather Station	**Overall SOP audit notes:**		**2018 Previous Audit Responses**
Obtained records of maintenance and calibration activities from Direct TV, Inc.	✓	Gordon to call and request records	Gordon to obtain from Direct TV
Obtained records of maintenance and calibration activities from scale vendor	✓	Gordon to request records	
Maintenance of Street Sweeper and Vactor Truck	**Overall SOP audit notes:**		**2018 Previous Audit Responses**
Records of maintenance activities maintained	✓	Have these in a spreadsheet; need to contact new manager of spreadsheet for a copy	Gordon to email
PDF copies of records will be emailed to Project Manager	✓	Gordon to send copies of records	Gordon to email

Appendix N Equipment Maintenance Records

135 - 2012 International 7600 - Vactor truck	Date of Service Order	Date Task Completed	Hours (vac engine)	Odometer	Complaint/Issue	Mechanic's Tasks	Mechanic Name
135	3/12/2018	3/21/2018			blower motor in cab not working.	Checked blower. Checked circuit breaker. Both OK and working.	
135	8/22/2018	8/22/2018	2700			Service call for transmission range inhibited.	
135	8/28/2018					scanned truck and found a code for low voltage or mis-communication between the transmission and the computer. Could not find the problem at this time.	Bryan
135	8/28/2018					Replaced the radiator and air cooler.	Tyge
135	12/4/2018	12/4/2018	2843		Hydraulic functions work intermittently.		
135	12/27/2018					Found a bad wire in the lower valve loom. By-passed wire and ordered a new loom.	
135	12/27/2018					Ordered a New Set of Bearings For Fan Shaft and Idler Pulley	
135	2/6/2019	2/6/2019	2,875			Side wall assembly, routine servicing	
135	4/30/2019	5/7/2019	3,044	15,825		heater & A/C unit	
135	6/27/2019	7/15/2019	3,044	15,825		routine servicing	
135	6/27/2019	7/8/2019	3,044	18,000		air to air boot replacement	KA
135A	5/11/2018	5/11/2018	2,594		Needs forced re-gen.	Went to treatment plant and found exhaust 100% plugged. Did 3 forced re-gens to get down to 5%.	KA
135A	5/11/2018	5/14/2018	2,601			routine servicing	TT
135A	8/22/2018	8/22/2018				Radiator is leaking.	
135A	1/15/2019	1/18/2019			Vacuum door would not open.	Found a bad relay for the hydraulic valve that opens the door. Replaced with a used relay.	
135A	2/6/2019	2/7/2019	2,889			routine servicing	
135A	3/27/2019	3/29/2019				Power shaft assembly	

Note: 135A, 160A and, 161A are the attached assemblies of the equipment.

160 - 2016 Freightliner M2 - Street Sweeper	Date of Service Order	Date Task Completed	Hours (vac engine)	Odometer	Complaint/Issue	Mechanic's Tasks	Mechanic Name
161	2/9/2018	2/9/2018				Added air line and did pre season check. Prime water pump.	
160	4/19/2018	4/19/2018			Service call. No throttle or fuel gauge.	Went to Manitoba and Pine and switched back to right side controls.	
160	4/19/2018	4/19/2018			Leaking hydraulic oil.	Tightened fitting on bottom of lift cylinder.	
161	6/28/2018	7/2/2018			A/C needs to be recharged	Replaced cabin air filter	
160	7/16/2018	7/16/2018			Check fan for noise.	Steam cleaned fan and housing. OK at this time.	Glen
160	7/18/2018					Check noise in sweeper, found fan bearings going bad.	JM
160	7/18/2018					Fan Bearing	KA
160	7/18/2018	7/18/2018				Washed out fan on blower, installed new mirrors	TT
160	7/18/2018	7/23/2018				Found fan bearings failing also found air blocker air solenoid needed repair. Changed out fan bearings, idler pulley bearings, fan belt and repaired air solenoid for air blocker.	Glen
160	7/23/2018	7/23/2018		8,256		routine servicing	KA
160	8/1/2018	8/1/2018				Found inner fan bearing had too much play. Replaced inner fan brearing. Installed another shim in the idler pulley.	Glen
160	8/22/2018	8/22/2018				routine servicing	Rodney
160	8/23/2018	8/23/2018				Replaced curtain set in head. Weld worn latches on hopper door lock.	Jack
160	10/2/2018	10/2/2018				Serviced and tightened fan belt.	Glen
160	10/11/2018	10/11/2018				Changed brooms.	Glen
160	10/16/2018	10/16/2018				Rocker switch on rear bumper replaced.	Glen
160		10/28/2018				routine servicing	JM
160		12/28/2018		10,696		routine servicing	KA
160	5/14/2019	5/16/2019		11,675		routine servicing	
160	9/26/2019	9/26/2019				routine servicing	
160A	7/23/2018	7/23/2018	1,565			routine servicing	KA
160A	7/27/2018	7/27/2018	1,572		Fan making a clunking sound.		JM
160A	10/1/2018	10/2/2018	1,728			routine servicing	KA
160A		10/28/2018				routine servicing	JM
160A		12/28/2018	1,884			routine servicing	KA
160A	1/11/2019	1/11/2019	1,959			replace broom assembly	
160A	4/18/2019	4/18/2019	1,959			replace sweeping unit	
160A	5/14/2019	5/17/2019	2,022			routine servicing	
160A	6/10/2019	6/10/2019				replace sweeping unit	
160A	7/11/2019	7/15/2019				replace broom assembly	
160A	7/16/2019		2,156			dust supression	
160A		9/26/2019				Replaced wandering hose switch and built dummy plug for next time.	
160A	9/26/2019	9/26/2019				routine servicing	

Note: 135A, 160A and, 161A are the attached assemblies of the equipment.

161 - 2016 Elgin Crosswind - Street Sweeper	Date of Service Order	Date Task Completed	Hours (vac engine)	Odometer	Complaint/Issue	Mechanic's Tasks	Mechanic Name
161	7/18/2018	8/20/2018	1,547	5,280		Pick up hood needs new curtains.	KA
161	7/26/2018					Needs a new back up alarm.	KA
161	8/2/2018					Replaced light with LED. Replaced broken hose to tank	Glen
161	8/16/2018	8/20/2018	1,547	5,280		Hood needs new curtains.	KA
161	8/16/2018	8/20/2018	1,547	5,280		Service due.	KA
161	8/22/2018					Serviced engine.	Rodney
161		10/12/2018				Replaced back up alarm.	Jack
161	11/5/2018	11/5/2018				Service call for broken clevis on hood pick up chain.	JM
161	11/27/2018	11/27/2018				Hood lift cylinder clevis broke.	JM
161	12/3/2018	12/31/2018	1,799	6,457		routine servicing	KA
161	4/18/2019	4/18/2019	1,959	7,254		replace sweeping unit	
161	5/14/2019	5/17/2019	2,043	7,793		routine servicing	
161		9/26/2019		9,288		routine servicing	
161A	8/1/2018	8/2/2018				Right gutter broom light is out, Fill hose to rear tank is leaking.	KA
161A	8/16/2018	8/20/2018				Service due.	KA
161A	12/3/2018	12/31/2018				routine servicing	KA
161A	5/14/2019	5/17/2019	2,043			replace broom assembly	
161A	5/30/2019	6/3/2019	2,049			replace coupling	
161A	7/18/2019	8/1/2019				replace shared power hydraulic motor fitting	
161A		9/26/2019				replace broom assembly	
161A		9/26/2019				routine servicing	
161A	10/29/2019	10/29/2019				routine servicing	

Note: 135A, 160A and, 161A are the attached assemblies of the equipment.

Appendix O Relative Percent Difference Results

Catch Basin Sediment %RPD

Data Collection Date																
Day	Month	Year	Data Collection Date	Tub Contents	Sediment Moisture Content (%) #1	Sediment Moisture Content (%) #2	Sediment Moisture Content (%) #3	Average Moisture Content (%)	Moisture Content %RPD	Sediment Wet Weight	Sediment Dry Weight (lb) #1	Sediment Dry Weight (lb) #2	Sediment Dry Weight (lb) #3	average dry weight (lbs)	Sediment Dry Weight %RPD	std deviation (lbs)
6	10	2017	Oct-17													
6	10	2017	Oct-17													
20	4	2018	Apr-18	CB Clean-Test Side												
20	4	2018	Apr-18	CB Clean-Control Side												
19	6	2018	Jun-18	CB Clean-Test Side	27.8	29.5	20.5	25.93	34.7%	34	26.60	26.25	28.22	27.02	7.3%	1.05
19	6	2018	Jun-18	CB Clean-Control Side	23.1	40.9	45	36.33	60.3%	50	40.94	35.77	34.76	37.16	16.6%	3.32
22	8	2018	Aug-18	CB Clean-Test Side	56.8	45.4	61	54.40	28.7%	28	18.05	19.46	17.58	18.36	10.3%	0.98
22	8	2018	Aug-18	CB Clean-Control Side	42.6	41.7	62.4	48.90	42.3%	41	28.96	29.15	25.43	27.85	13.3%	2.09
24	10	2018	Oct-18	CB Clean-Test Side	43.3	37.9	46.9	42.70	21.1%	73	50.80	52.79	49.56	51.05	6.3%	1.63
24	10	2018	Oct-18	CB Clean-Control Side	64.4	58.5	48.1	57.00	28.6%	60	36.50	37.85	40.51	38.29	10.5%	2.04
25	4	2019	Apr-19	CB Clean-Test Side	45.6	43.7	36.2	41.83	22.5%	125	85.85	86.99	91.78	88.21	6.7%	3.14
25	4	2019	Apr-19	CB Clean-Control Side	42.5	29.3	40.8	37.53	30.6%	69	48.42	53.36	49.01	50.26	9.8%	2.70
24	6	2019	Jun-19	CB Clean-Test Side	35	39.5	38.9	37.80	11.9%	77	57.04	55.20	55.44	55.89	3.3%	1.00
24	6	2019	Jun-19	CB Clean-Control Side	1.9	2.5	3.3	2.57	54.5%	22	21.59	21.46	21.30	21.45	1.4%	0.15
27	8	2019	Aug-19	CB Clean-Test Side	43.5	32.6	36.1	37.40	29.1%	59	41.11	44.49	43.35	42.99	7.9%	1.72
28	8	2019	Aug-19	CB Clean-Control Side	7.9	17.3	6	10.40	108.7%	53	49.12	45.18	50.00	48.10	10.0%	2.56
29	10	2019	Oct-19	CB Clean-Test Side	54.1	63.6	50.2	55.97	23.9%	50	32.45	30.56	33.29	32.10	8.5%	1.40
29	10	2019	Oct-19	CB Clean-Control Side	42.5	56.7	47.5	48.90	18.8%	24	16.84	15.32	16.27	16.14	9.5%	0.77

Street Sweeper Sediment %RPD

Day	Month	Year	Data Collection Date	Tub Contents	Sediment Moisture Content (%) #1	Sediment Moisture Content (%) #2	Sediment Moisture Content (%) #3	Average Moisture Content (%)	Moisture Content %RPD	Sediment Wet Weight	Sediment Dry Weight (lb) #1	Sediment Dry Weight (lb) #2	Sediment Dry Weight (lb) #3	average dry weight (lbs)	Sediment Dry Weight %RPD	std deviation (lbs)
6	10	2017	Oct-17													
6	10	2017	Oct-17													
20	4	2018	Apr-18	Sweeper-Test Side												
20	4	2018	Apr-18	Sweeper-Control Side												
19	6	2018	Jun-18	Sweeper-Test Side	6.3	5.2	6	5.83	18.9%	164	154.37	155.99	154.81	155.06	1.0%	0.83
22	8	2018	Aug-18	Sweeper-Test Side	16.2	15.3	15.8	15.77	5.7%	156	133.91	134.95	134.37	134.41	0.8%	0.52
24	10	2018	Oct-18	Sweeper - Test Side	15.8	25.6	16.1	19.17	51.1%	132	114.08	105.18	113.78	111.01	8.0%	5.06
24	10	2018	Oct-18	Sweeper - Control Side	7.7	15.5	8.5	10.57	73.8%	652	605.66	564.76	601.20	590.54	6.9%	22.44
25	4	2019	Apr-19	Sweeper-Test Side	13.8	15.7	17.1	15.53	9.0%	1417	1245.17	1224.72	1210.08	1226.65	2.9%	17.62
24	6	2019	Jun-19	Sweeper-Test Side	5.9	24.6	7.4	12.63	148.0%	192	181.30	154.09	178.77	171.39	15.9%	15.03
28	8	2019	Aug-19	Sweeper-Test Side	10	12.4	7.2	9.87	52.7%	160	145.45	142.35	149.25	145.69	4.7%	3.46
29	10	2019	Oct-19	Sweeper-Test Side	4.1	4	4.2	4.10	4.9%	296	284.34	284.62	284.07	284.34	0.2%	0.27
29	10	2019	Oct-19	Sweeper - Control Side	17.6	23.4	17.4	19.47	30.8%	2031	1727.04	1645.87	1729.98	1700.96	4.9%	47.74

Sump Sock %RPD

Collection Date	CB #	Side	Sock Tare Weight (g)	Dry Sock + Sediment Weight 1 (g)	Dry Sock + Sediment Weight 2 (g)	%RPD
6/19/2018	1	Test	276	350	350	0%
	2	Test	278	450	450	0%
	3	Test	282	600	400	40%
	4	Test	280	450	450	0%
6/19/2018	5	Control	280	600	600	0%
	6	Control	282	400	400	0%
	7	Control	280	500	500	0%
	8	Control	NO SOCK	NA	NA	NA
8/22/2018	1	Test	274	291.76	291.76	0%
	2	Test	280	296.86	296.88	0%
	3	Test	278	294.34	293.98	0%
	4	Test	282	295.35	295.04	0%
8/22/2018	5	Control	270	287.88	287.85	0%
	6	Control	270	286.22	286.19	0%
	7	Control	272	295.27	295	0%
	8	Control	NO SOCK	NA	NA	NA
10/24/2018	1	Test	280	320	310	3%
	2	Test	284	310	410	28%
	3	Test	280	410	360	13%
	4	Test	282	410	360	13%
10/24/2018	5	Control	280	280	310	10%
	6	Control	282	310	310	0%
	7	Control	280	320	360	12%
	8	Control	NO SOCK	NA	NA	NA
4/25/2019	1	Control	296			
	2	Control	284			
	3	Control	278			
	4	Control	288			
4/25/2019	5	Test	278			
	6	Test	288			
	7	Test	276			
	8	Test	NO SOCK	NA	NA	NA
6/24/2019	1	Control	272	301.8	301.8	0%
	2	Control	270	500	500	0%
	3	Control	268	381.9	381.9	0%
	4	Control	274	384.6	384.6	0%
6/24/2019	5	Test	272	340.96	340.96	0%
	6	Test	274	287	287	0%
	7	Test	272	400	400	0%
	8	Test	NO SOCK	NA	NA	NA
8/27/2019	1	Control	276	800	800	0%
	2	Control	278	400	400	0%
	3	Control	272	650	650	0%
	4	Control	276	650	650	0%
8/27/2019	5	Test	182	650	650	0%
	6	Test	276	800	800	0%
	7	Test	176	800	800	0%
	8	Test	NO SOCK	NA	NA	NA
10/29/2019	1	Control	178	303	303	0%
	2	Control	178	269	269	0%
	3	Control	178	276	276	0%
	4	Control	174	209	209	0%
10/29/2019	5	Test	184	379	379	0%
	6	Test	180	357	357	0%
	7	Test	174	322	322	0%
	8	Test	NO SOCK	NA	NA	NA
4/23/2020	1	Control	172	331.3	331.3	0%
	2	Control	178	406.37	406.37	0%
	3	Control	178	650	650	0%
	4	Control	182	350.91	350.91	0%
4/23/2020	5	Test	180	419.15	419.15	0%
	6	Test	180	372.73	372.73	0%
	7	Test	182	376.96	376.96	0%
	8	Test	NO SOCK	NA	NA	NA

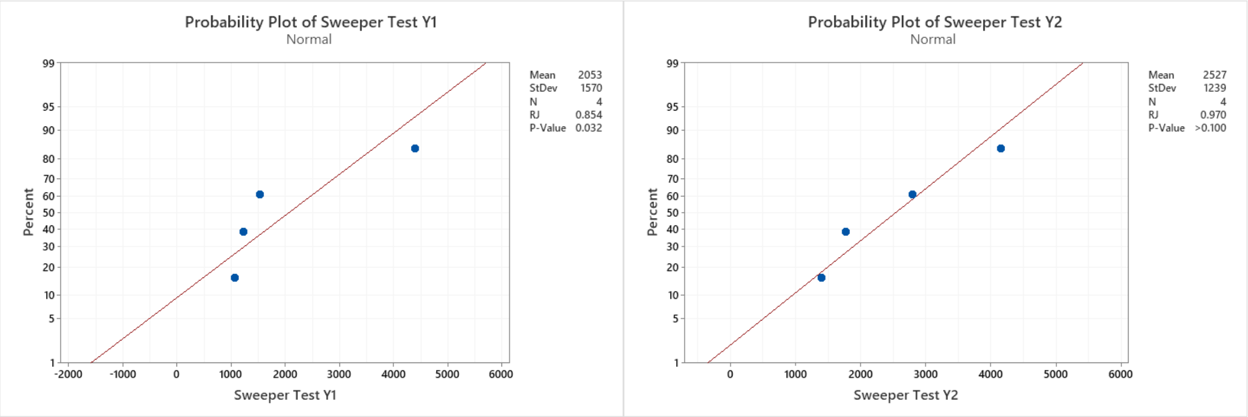
Organic Content %RPD

	Organic Content																							
	CB Test (N)						CB Control (S)						Sweep Test (N)						Sweep Test (S)					
Sample Date	Sample #1	Sample #2	Sample #3	%RPD 1-2	%RPD 2-3	%RPD 1-3	Sample #1	Sample #2	Sample #3	%RPD 1-2	%RPD 2-3	%RPD 1-3	Sample #1	Sample #2	Sample #3	%RPD 1-2	%RPD 2-3	%RPD 1-3	Sample #1	Sample #2	Sample #3	%RPD 1-2	%RPD 2-3	%RPD 1-3
4/20/2018	15.3						43.8																	
8/22/2018	30.7	17.4	39.7	55%	78%	26%	19.6	16.9	37.7	15%	76%	63%	5.8	6.2	5.6	7%	10%	4%						
4/25/2019	13.5						10.3																	
8/28/2019	5.8	9.7	4.6	50%	71%	23%	13.4	10.8	11.9	21%	10%	12%												
10/29/2019	15.2	25.7	20.2	51%	24%	28%	22.9	33.7	20.6	38%	48%	11%	5.7	8.2	5	36%	48%	13%	3.1	2.9	4.3	7%	39%	32%

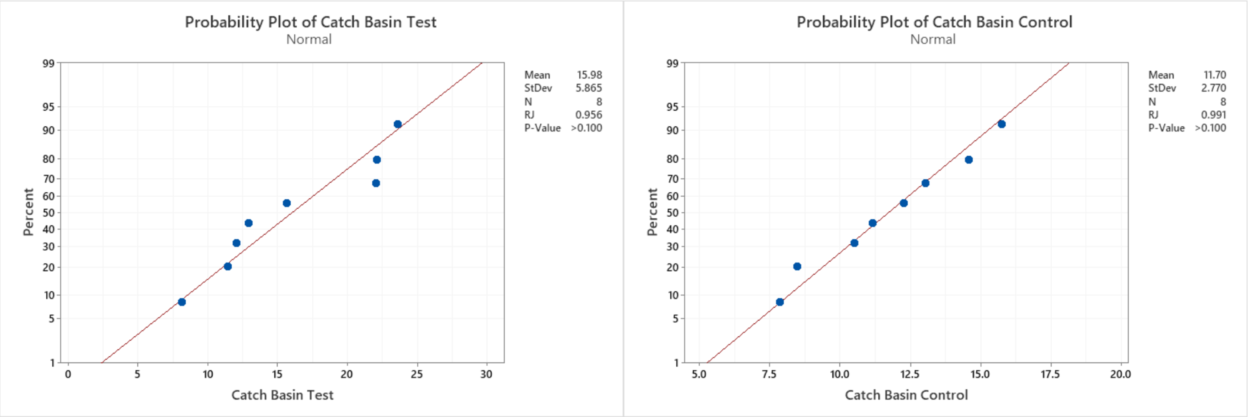
	Moisture Content																							
	CB Test (N)						CB Control (S)						Sweep Test (N)						Sweep Control (N)					
Sample Date	Sample #1	Sample #2	Sample #3	%RPD 1-2	%RPD 2-3	%RPD 1-3	Sample #1	Sample #2	Sample #3	%RPD 1-2	%RPD 2-3	%RPD 1-3	Sample #1	Sample #2	Sample #3	%RPD 1-2	%RPD 2-3	%RPD 1-3	Sample #1	Sample #2	Sample #3	%RPD 1-2	%RPD 2-3	%RPD 1-3
4/20/2018	27.8																							
8/23/2018	56.8	45.4	61	22%	29%	7%	42.6	41.7	62.4	2%	40%	38%	16.2	15.3	15.8	6%	3%	2%						
4/25/2019	40						34.2																	
8/28/2019	43.5	32.6	36.1	29%	10%	19%	7.9	17.3	6	75%	97%	27%												
10/30/2019	54.1	63.6	50.2	16%	24%	7%	42.5	56.7	47.5	29%	18%	11%	4.1	4	4.2	2%	5%	2%	17.6	23.4	17.4	28%	29%	1%

Appendix P Statistical Analysis Results

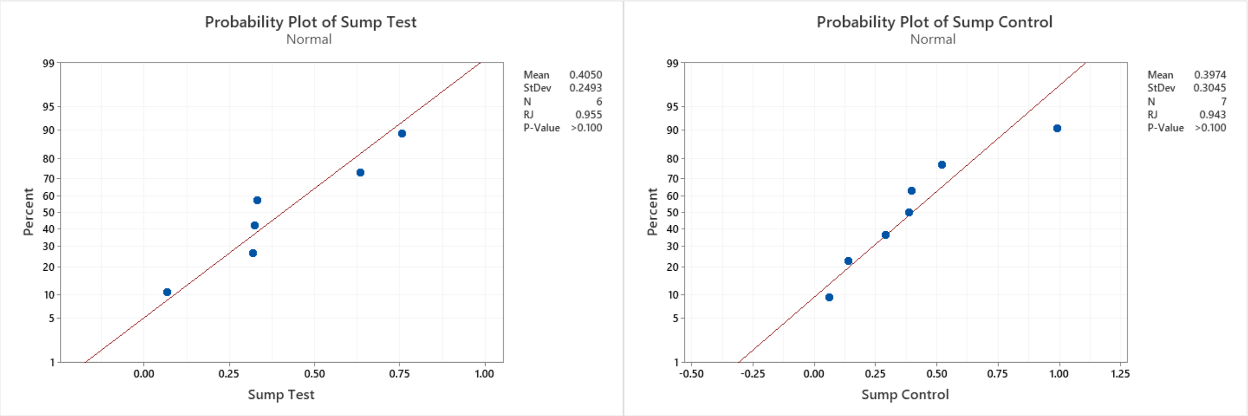
NORMALITY TEST RESULTS



Street Sediment Normality Test Results for Test Side Year 1 (left) and Test Side Year 2 (Right)



Catch Basin Sediment Normality Test Results for Test Side (left) and Control Side (Right)



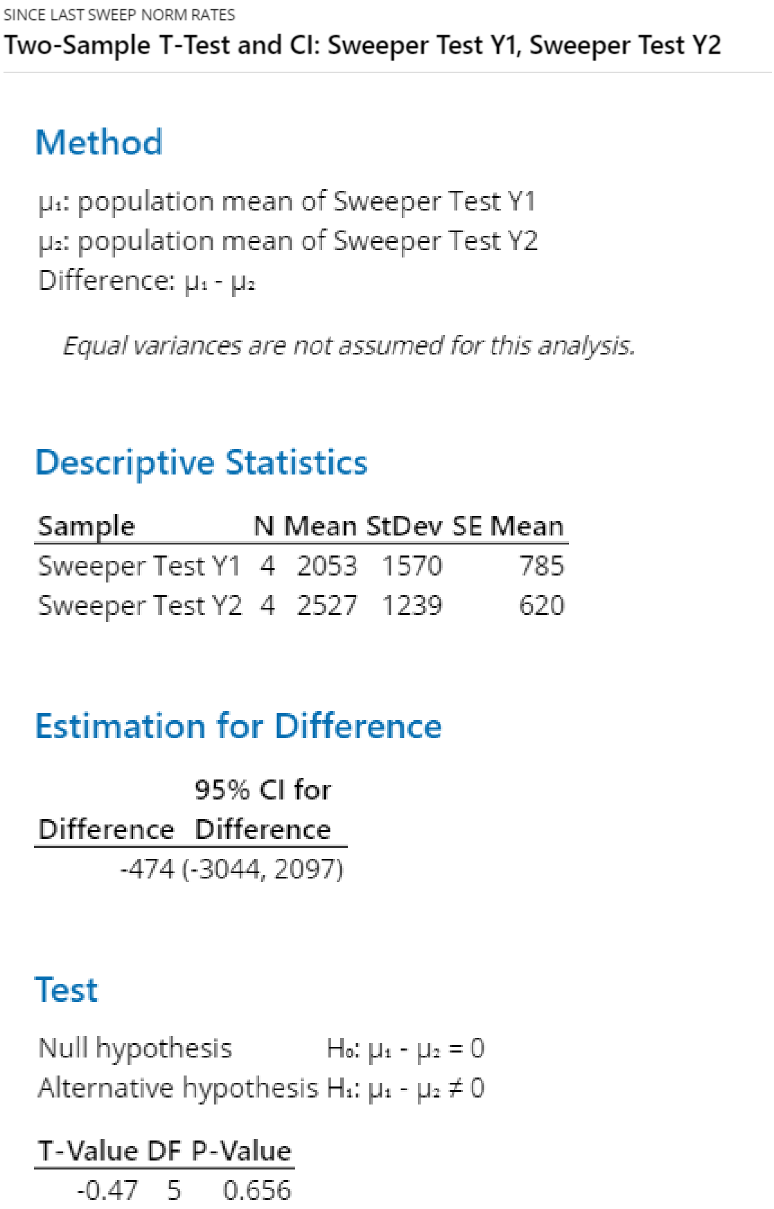
Catch Basin Sock Sediment Normality Test Results for Test Side (left) and Control Side (Right)

STATISTICAL SIGNIFICANCE TEST RESULTS

Hypothesis 1: Street Sediment Accumulation Rate

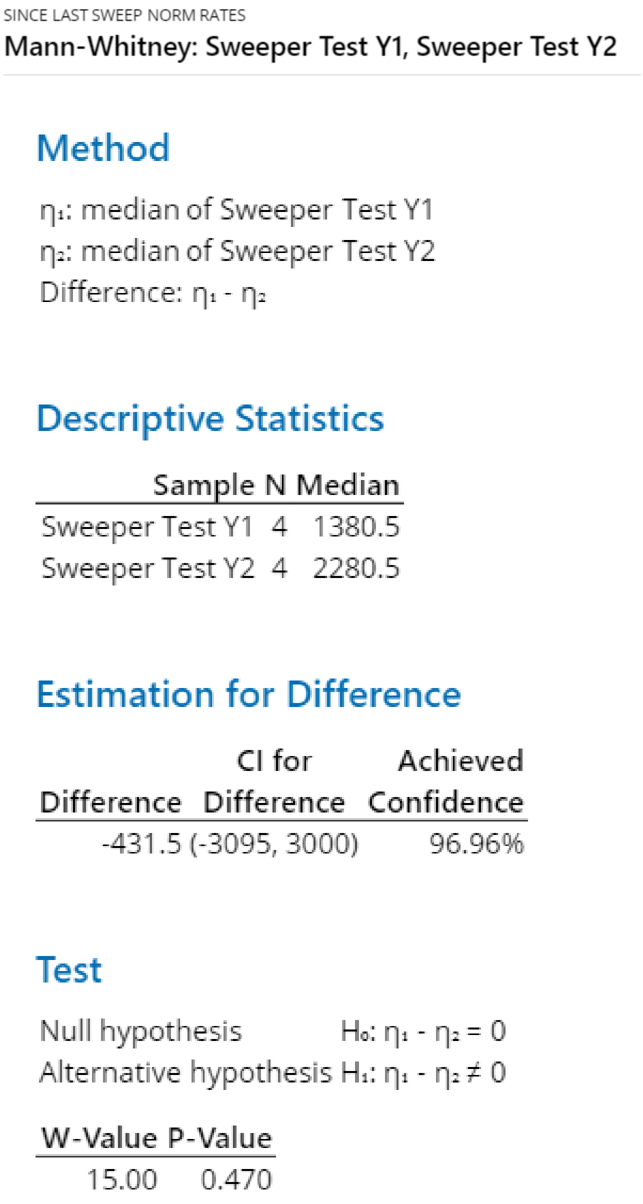
Street Sediment Accumulation Rate Raw Data

Month	Year 1	Year 2
	Sweeper Test (grams/lineal mile/day)	Sweeper Control (grams/lineal mile/day)
April	4389.17	4155.86
June	1533.53	1761.70
August	1227.07	1389.28
October	1060.99	2798.66



```
SINCE LAST SWEEP NORM RATES
Two-Sample T-Test and CI: Sweeper Test Y1, Sweeper Test Y2

Method

μ₁: population mean of Sweeper Test Y1
μ₂: population mean of Sweeper Test Y2
Difference: μ₁ - μ₂

  Equal variances are not assumed for this analysis.


Descriptive Statistics

Sample           N Mean StDev SE Mean
Sweeper Test Y1  4  2053  1570     785
Sweeper Test Y2  4  2527  1239     620


Estimation for Difference

              95% CI for
Difference    Difference
      -474 (-3044, 2097)


Test

Null hypothesis          H₀: μ₁ - μ₂ = 0
Alternative hypothesis H₁: μ₁ - μ₂ ≠ 0

T-Value DF P-Value
  -0.47  5   0.656
```

Appendix P Statistical Comparison of Datasets Results



SINCE LAST SWEEP NORM RATES

Mann-Whitney: Sweeper Test Y1, Sweeper Test Y2

Method

η_1: median of Sweeper Test Y1
η_2: median of Sweeper Test Y2
Difference: $\eta_1 - \eta_2$

Descriptive Statistics

Sample	N	Median
Sweeper Test Y1	4	1380.5
Sweeper Test Y2	4	2280.5

Estimation for Difference

Difference	CI for Difference	Achieved Confidence
-431.5	(-3095, 3000)	96.96%

Test

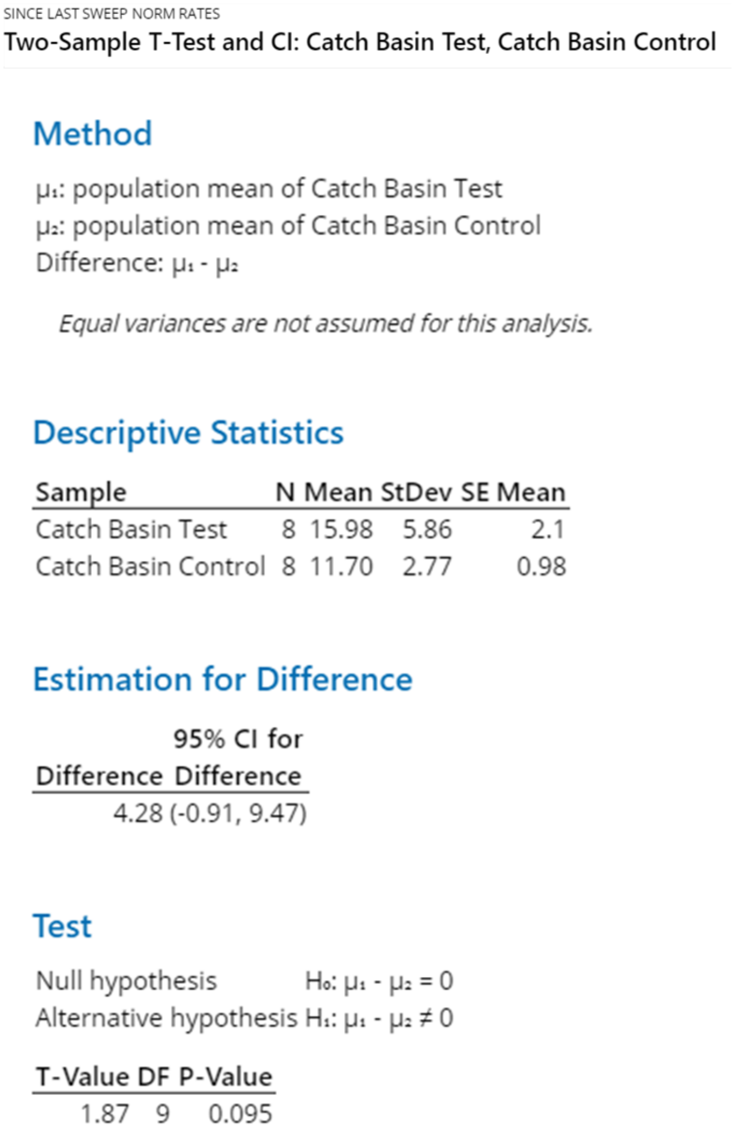
Null hypothesis	H_0: $\eta_1 - \eta_2 = 0$
Alternative hypothesis	H_1: $\eta_1 - \eta_2 \neq 0$

W-Value	P-Value
15.00	0.470

Hypothesis 2: Catch Basin Sediment Accumulation Rate

Catch Basin Sediment Accumulation Rate Raw Data

Year	Month	Catch Basin Test (grams/catch basin/day)	Catch Basin Control (grams/catch basin/day)
2018	April	22.11	15.75
2018	June	12.91	14.58
2018	August	8.09	12.25
2018	October	23.61	13.02
2019	April	11.39	7.87
2019	June	22.03	8.46
2019	August	15.63	11.14
2019	October	12.04	10.50

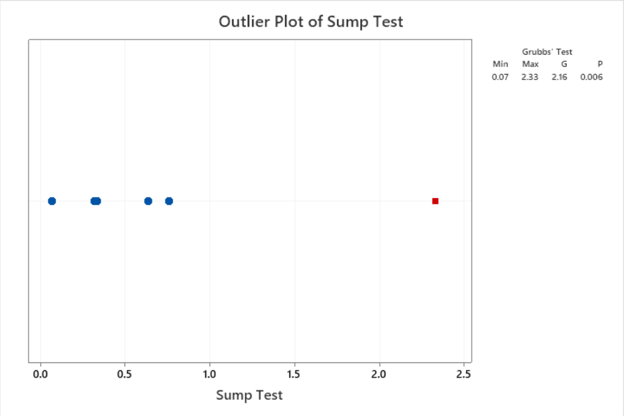


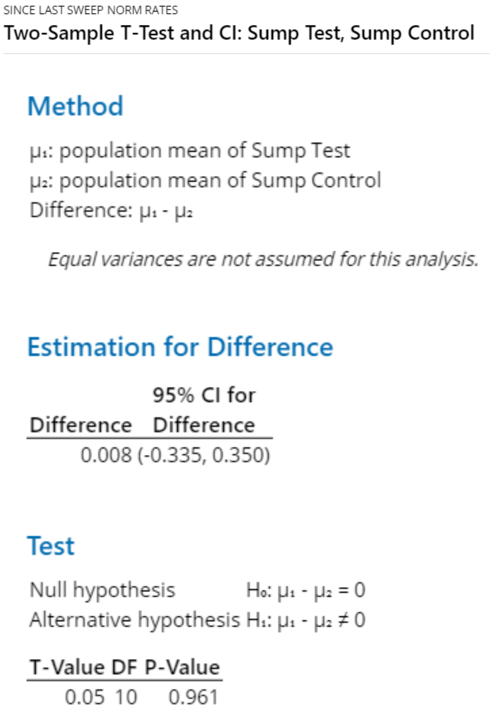
```
SINCE LAST SWEEP NORM RATES
Two-Sample T-Test and CI: Catch Basin Test, Catch Basin Control

Method

μ₁: population mean of Catch Basin Test
μ₂: population mean of Catch Basin Control
Difference: μ₁ - μ₂

  Equal variances are not assumed for this analysis.

Descriptive Statistics

Sample              N Mean  StDev SE Mean
Catch Basin Test    8 15.98  5.86     2.1
Catch Basin Control 8 11.70  2.77    0.98

Estimation for Difference

                95% CI for
Difference  Difference
      4.28 (-0.91, 9.47)

Test

Null hypothesis         H₀: μ₁ - μ₂ = 0
Alternative hypothesis H₁: μ₁ - μ₂ ≠ 0

T-Value DF P-Value
   1.87  9   0.095
```

Hypothesis 2: Catch Basin Sock Sediment Accumulation Rate

Catch Basin Sock Sediment Accumulation Rate Raw Data

Year	Month	Catch Basin Sock Test (grams/sump sock/day)	Catch Basin Sock Control (grams/sump sock/day)
2018	April		
2018	June	0.634	0.989
2018	August	0.066	0.521
2018	October	0.331	0.397
2019	April	0.324	0.386
2019	June	0.318	0.139
2019	August	~~2.329~~	0.289
2019	October	0.757	0.061




SINCE LAST SWEEP NORM RATES

Two-Sample T-Test and CI: Sump Test, Sump Control

Method

μ₁: population mean of Sump Test
μ₂: population mean of Sump Control
Difference: μ₁ - μ₂

Equal variances are not assumed for this analysis.

Estimation for Difference

Difference	95% CI for Difference
0.008	(-0.335, 0.350)

Test

Null hypothesis H_0: $\mu_1 - \mu_2 = 0$
Alternative hypothesis H_1: $\mu_1 - \mu_2 \neq 0$

T-Value	DF	P-Value
0.05	10	0.961

Appendix Q TAG TER Comments & Responses to Comments

TAG TER Coments Responses to Comments

Comment #	Commenter Initials	Section	Page	Comment	Suggested Revision to TER	OCI Response to Comment
1	BCM/WW	2	3	In paragraph 2, second sentence, use of the verb 'was' seems like the wrong tense.	Suggest changing to 'were'.	Updated to 'were'.
2	CP/CSV	2	3	2nd para, 6th sentence. Different description then comment 2	correct grammar and also it appears to repeat. The second description appears correct.	Description of study has been updated in Section 2.0 to be consistent.
3	BCM/WW	3.1	4	In paragraph 1, sentence describing catchbasins with the words catchbasins in parenthsis.	Should the term sump be used in stead of catchbasin?	Wording has been updated to 'sump'.
4	DW/WR	Fig 3.2	7	Reference in Figure title to left and right does not seem to apply to the figure.	Suggest omitting reference altogether or replacing with color code (brown/green)	Replaced with color code.
	KD	3.2		did this option continue in 2019? Try to reference both permits each time - either as having the same requirements or not		Table 3.1 was added that compares the relevant NPDES MS4 requirements between EWA and WWA for the 2019-2024 permit.
5	CP/CSV	3.4	8	1st para, 5th sentence. Different description then comment 1		Description of study has been updated in Section 2.0 to be consistent.
6	CP/CSV	3.4	8	2nd para, 1st sentence. Restate, sentence does not read clearly		Updated text.
7	CP/CSV	3.4	9	1st para, 4th sentence. Organic content was determined only for the catch basin sediment?	clarifly where testing was conducted	Clarified text.
8	DCH	3.4	8	Last paragraph "*transferred from the catch basins was be collected and measured* ."	Delete "be"	Deleted "be".
9	DCH	3.4	9	Bullet 1 "*Characterize the sediment collected from each sample location* " How do you characterize the sediment, weight, PSD, % of total, etc.?		Revised text as follows: *Characterize the sediment collected (particle size distribution and organic content)* .... Also updated in Secton 7.1 for consistency.
10	DCH	4.3	15	"*The city owns one street sweeper, an Elgin Crosswind J street sweeper, and two vactor trucks, VacCon Combination Truck* ." In earlier text you said two sweepers and one vactor truck.	Confirm number of sweepers and vactors	There are two vactor trucks and one sweeper. Earlier text was updated to reflect this.
11	DCH	5.1	17	You might want to note that the test side of the road changed after the first year saying which side was the test side (south or north) in year one and the other side was the test side in year 2.		Added text to the table to clarify.
12	BCM/WW	7.1.2	31	When did the heavy rainstorm event occur? Could this one heavy rain event somehow influenced the organic content in the SS samples by washing them into the CBs? Likewise, could the CB samples have been impacted by having more organic content washed into them?	For discussion by the group and consideration if this event could have affected the sampling data. consider adding more about the heavy event and when it occurred. Add references in this section for when items are further discussed in a subsequent section.	Added text to report.
13	BCM/WW	7.1.2	31	In paragraph 3, fourth sentence, omitted the word 'from'.	Suggest inserting the word from after the first word Results.	Updated text.

Comment #	Commenter Initials	Section	Page	Comment	Suggested Revision to TER	OCI Response to Comment
14	BCM/WW	7.1.2	38	In Paragraph 2, discussion about the accumulation rate of sediment in October being higher than expected, could this be explained by the fact that most hay hauling is done later in the season (Sept. and Oct.)? Hard to make the correlation but maybe worth a mention.	For discussion by the group and consideration if this event could have affected the sampling data. mention that hay hauling season may have influenced accumulation rate.In general add discuss about hay hauling in section 7. "Generally the hay hauling season is month to month".	Discussion about hay hauling was added. However there is insufficient data to draw conclusions about organic content variability as a function of season.
15	BCM/WW	7.1.4	45	In Paragraph 3, first sentence. Wording indicates something ommitted in the sentence.	Author's discretion.	No change was made
16	BCM/WW	7.3.2	50	In Paragraph 1, sentence 5. "except" is used instaed of exception.	Correction	Updated text.
17	BCM/WW	7.3.2	50	Have you considered including Pan Evaporation Rates for Eburg into the discussion? Evaporation rates are high in semi-arid/arid regions. Records indicate that it rained less than it normally does during the test period and the average wind speeds were close to normal? But what about over all evaporation for the period? Would a higher evaporation rate have any influence on the accumulation data?	For discussion by the group and consideration if this event could have affected the sampling data. Include discussion about evaporation rates in semi-arid locations and how this could influence data. Discuss pan evap rates from winter to summer. Add to weather.	The pan evaporation rates were not identified as a variable that would influence sediment accumulation rates and thus not included in the data collection.
18	BCM/WW	7.3.2	52	How were the Sample Collection Event dates chosen? Were these dates affected by rainfall events? If yes, could this have affected the data collection and outcomes?	For discussion by the group and consideration if this event could have affected the sampling data. Explain in the study.	No change was made to this section because there is discussion regarding the influence of rainfall event on the data. Also the data a was normalized based on the number days since the last sample collection event. Section 8 provides an example of how rainfall events can influent the data.
19	BCM/WW	7.3.2	52,53	Figures 7.21 & 7.22 refer to Daily Precipitation. During the winter months, weren't these events snow events due to the time of year? If so, a comment should be added somewhere to clarify that the "precipitation" measured was snowmelt and not rainfall. And what about plowing during the winter months? Was only sand and salt applied or were the roads plowed as well?	For discussion by the group and consideration if this event could have affected the sampling data. Add a discussion about winter practices including that WSDOT provides this. Also clarify that precipitation is both rainfall and rain equavalent of snow fall	The total precipitation includes both rain and snow fall. The following was added to the first paragraph: *These precipitation depths include the measured rainfall depths as well as the rainfall equivalent depth of snow fall.*
20	BCM/WW	7.4	53	In Paragraph 1, sentence 2. "include" should be changed to included.	Correction	Updated to "included"
21	CP/CSV	8	56	last sentence, first paragraph. This statement seems to conflict with the above statement.		Clarification was added to both the first and second paragraph in Section 8

TAG TER Coments Responses to Comments

Comment #	Commenter Initials	Section	Page	Comment	Suggested Revision to TER	OCI Response to Comment
	KD	8		Second paragraph regarding reference to timing street sweeping with rainfall events: how would this be possible? it also would not reflect real-world practices. might it not make more sense to recommend that sweeping could be delayed for a certain amount of time following an intense rainfall event?		Provided text that clarifies that the statement about timing street sweeping with rainfall events was intended to provide an example of how difficult it would be to reduce the variability of real world conditions.
	KD	8.1		clarify that sweeping should occur at regular frequencies.		clarified
22	BCM/WW	8.1	57	In the first sentence, the word "were'" should be changed to where.	Correction	Updated to "where"
23	DCH	8.1	57	You just say "reference" in the bulk density paragraph of your step-by-step process for developing Figure 7.24. Don't you need to list a reference?	Add specific reference or delete reference	reference added. Also the reference was for 85% not 80% compaction as previously listed so the estimated compaction of catch basin sediment was increased to 65% for developing Figure 7.24
24	CP/CSV	8.2	58	2nd para, 2nd sentence. Does this statement say the opposite of what was stated above?		revisions were made to the paragraph to provided clarification.
25	BCM/WW	8.2	58	In the first sentence, the word "a" appears to be left out between with and reccommended. Also, in second sentence, the word "were" should be changed to where.	Correction	Updated text.
26	BCM/WW	8.2	58	In paragraph 2, sentence 1, the word reported should be used instead of report.	Correction	Updated text.
27	BCM/WW	8.2	59	Should there be some mention about the lack of trees at this test site and how the presence of trees in other locations will have a profound effect on the sediment type and accumulation rates?	For discussion by the group and consideration if this event could have affected the sampling data.	Added text to report.
	KD	8.2		Second Paragraph regarding trasferability of recommendations to different sites: as long as there aren't trees dropping leaf litter?		Additional text was added to the section regarding how the presence of treas may impact the transferability of the recommendations to other sites.
28	DCH	9	60	Text incomplete, still need to provide final conclusions.	Complet text	Section 9 is the conclusion and it was left blank until after the TAG comments/disscusion. It has been completed in the final paper.
29	DCH	5.2.1	18	"*November 25, 2018 to March 6, 2019 and from June 17, 2019 to end of study.* " Where did you get weather data from for March 19 to June 19?		Added text to clarify.