



Ethan Berkowitz, Mayor

2018 Stormwater Outfall Monitoring Report

APDES Permit No. AKS-052558

MUNICIPALITY OF ANCHORAGE
WATERSHED MANAGEMENT PROGRAM

FINAL REPORT

December 2018

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WATERSHED MANAGEMENT PROGRAM

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List of Acronyms

°C	Degrees Celsius
%	Percent
µg/L	Micrograms/Liter
ADEC	Alaska Department of Environmental Conservation
ADOT&PF	Alaska Department of Transportation and Public Facilities
APDES	Alaska Pollutant Discharge and Elimination System
AWC	Anchorage Waterways Council
AWQS	Alaska Water Quality Standard
AIA	Anchorage International Airport
BETX	Benzene, Ethylbenzene, Toluene, and Xylenes
BMPs	Best Management Practices
BOD ₅	Biological Oxygen Demand (5 Day)
COC	Chain of Custody
CI	Commercial Industrial
Cu	Copper
DO	Dissolved Oxygen
DOY	Day of Year
EPA	U.S. Environmental Protection Agency
FC/100 mL	Fecal Coliform units per 100 Milliliters
gpm	Gallons per Minute
Hr or Hrs	Hour or Hours
HGDB	Hydro-Geographic Database
L	Liter
LCS/LCSD	Laboratory Control Samples and Duplicates
mL	Milliliter
mg/L	Milligrams/Liter
MOA	Municipality of Anchorage
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MS4	Municipal Separate Storm Sewer System
NADP	National Atmospheric Deposition Program
ND	Not Detected
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
Nunaka	Rain Gauge off Boniface Parkway between Debar and East Northern Lights Boulevard
OGS	Oil/Grit Separator
PAHs	Polycyclic Aromatic Hydrocarbons
PANC	NOAA National Weather Service Station at AIA
QA/QC	Quality Assurance/Quality Control
QAP	Monitoring, Evaluation, and Quality Assurance Plan
QC	Quality Control
SMRC	Stormwater Managers Resource Center.
Spencer	Rain Gauge at Elmore and Huffman Roads
SRMs	Standard Reference Material
TAqH	Total Aqueous Hydrocarbons
TAH	Total Aromatic Hydrocarbons
TDS	Total Dissolved Solids
Thomas	Rain Gauge at Lake Otis Parkway and Tudor Road
TMDL	Total Maximum Daily Load
TNTC	Too Numerous to Count
TPAH	Total Polycyclic Aromatic Hydrocarbons

TSS
USGS

Total Suspended Solids
United States Geological Survey

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1.0 Introduction

1.1 Background

The U.S. Environmental Protection Agency (EPA) issued the Municipality of Anchorage (MOA) and the Alaska Department of Transportation and Public Facilities (ADOT&PF) a Municipal Separate Storm Sewer System (MS4) permit under the National Pollutant Discharge Elimination System (NPDES) in 1999. EPA re-issued the permit (Permit No. AKS-052558) in October 2009 (EPA 2009). The 2009 permit included a requirement to conduct stormwater outfall monitoring at ten priority outfalls. The MOA has taken the lead role in implementing the monitoring requirements of the permit. Since permit issuance, EPA has delegated the NPDES stormwater program for Alaska to the Alaska Department of Environmental Conservation (ADEC) who now oversees its implementation and administration under the Alaska Pollutant Discharge Elimination System (APDES). The 2009 permit expired in January 2015 and was reissued in June 2015 with an effective date of August 1, 2015 (ADEC 2015a). The stormwater outfall monitoring requirements in the 2015 permit are, for the most part, identical to those contained in the prior permit, which require continued monitoring at the ten priority stormwater outfalls.

The APDES MS4 permit establishes minimum control measures requiring the co-permittees to develop programs and policies and to implement actions designed to prevent and control contaminants entering publicly owned storm sewer systems. The permit also identifies a number of objectives for monitoring, of which the stormwater outfall monitoring is one component. The objective most relevant to stormwater outfall monitoring is to broadly identify fecal coliform and petroleum product loading from stormwater. To accomplish this objective, a variety of land uses must be examined to ensure representative water quality conditions across the MS4 area are included in the monitoring program. This report and the data collected during the monitoring program fulfill the annual outfall monitoring objectives of the APDES permit. The stormwater sampling conducted during 2018 is the fourth year of monitoring that was performed for the reissued permit, but the eighth year of monitoring ten outfalls.

1.2 Stormwater Definition

The EPA has recognized urban stormwater as a major contributor to pollution of the nation's streams, rivers, and lakes. EPA and delegated states are using the NPDES MS4 permit to control pollutants from urban stormwater to the maximum extent practicable. Urban stormwater can contribute to the degradation of the quality of water bodies. Runoff from precipitation and snowmelt events can transport contaminants from impervious surfaces such as driveways, sidewalks, and roads, and semi-pervious surfaces such as lawns, into the local water bodies. Most stormwater runoff flows into a storm sewer system or directly to a water body, often without receiving treatment to remove the pollutants.

In issuing the Anchorage MS4 permit, EPA recognized that a number of water bodies in the greater Anchorage watershed were categorized as impaired under section 303(d) of the Clean Water Act. For 14 impaired water bodies (13 for elevated concentrations of fecal coliform and one for petroleum hydrocarbons), ADEC has developed (and EPA has approved) Total Maximum Daily Load (TMDL) plans to improve water quality to the extent that the waters will meet the current standards. The TMDLs identify stormwater runoff as a contributor of fecal coliform and petroleum

hydrocarbon contamination to the water bodies and establish reduction goals for concentrations of these pollutants in stormwater.

1.3 Goals and Objectives of Monitoring Program

The monitoring elements of the MS4 permit are designed to identify sources of stormwater pollution such as fecal coliform and petroleum hydrocarbons, monitor the effectiveness of best management practices (BMPs), and monitor the status of stormwater outfalls and receiving waters. The goal of the stormwater outfall monitoring component of the permit is to obtain sufficient data to characterize the quality of the stormwater runoff for pollutants identified in the permit. By monitoring the same outfalls over a multi-year period, the results should provide a qualitative characterization that meets the objectives identified in the APDES Permit and Fact Sheet (ADEC 2015a and 2015b).

The stormwater outfall monitoring program measured pollutants and pollutant indicators during precipitation events that generated runoff at ten high priority outfall sites. This monitoring program will allow MOA to meet the ADEC objectives specified in the permit. As specified in the permit, the outfall monitoring should address the following objectives:

- Broadly estimate the annual pollutant loading of fecal coliform and petroleum products discharged to specific watersheds from the MS4s
- Assess the effectiveness and adequacy of existing stormwater controls in reducing fecal coliform bacteria and petroleum products
- Identify and prioritize portions of the MS4 that need additional controls.

2.0 Explanation of Report Organization

This report is divided into the following sections:

- Introduction, background information, and goals and objectives of the program
- Summary information about the field phase of the project including project design, site selection and descriptions, parameters to be measured, field and laboratory procedures, deviations from the monitoring and quality assurance plan, and summary of quality assurance/quality control (QA/QC) results
- Tabular and graphical summaries of the data along with a discussion of results
- Summary and preliminary conclusions
- References
- Appendices that include: field photographs, laboratory data reports, field and laboratory data validation summary, and completed field log forms.

3.0 Monitoring Program

3.1 Sampling Design

Beginning in the summer of 2011 and annually thereafter, ten priority outfalls were sampled four times each summer when there was sufficient precipitation to generate runoff (typically, 0.1 to 0.25 inches depending upon percent impervious land use within the watershed). For planning purposes, 0.1 inches of rain was the trigger for a potential sampling event. Monitoring of the outfalls included both in situ measurements and discrete grab samples submitted for laboratory analyses. Appendix B (*Stormwater Outfall Monitoring Plan*) of the *Monitoring, Evaluation, and Quality Assurance Plan* (QAP; MOA 2016) stipulates that the following parameters are to be collected at each outfall: flow, dissolved oxygen (DO), pH, temperature, turbidity, 5-day biochemical oxygen demand (BOD₅), fecal coliform, and total suspended solids (TSS). Samples from outfalls located in predominantly commercial, industrial, or paved collector, (arterial streets or parking lots) were also analyzed for total aromatic hydrocarbons (TAH) and polycyclic aromatic hydrocarbons (PAH) to allow calculation of the summed parameter of total aqueous hydrocarbons (TAqH). In addition, the supplemental measurement of specific conductance was obtained with the field parameters. Beginning in 2016, supplemental samples for dissolved copper (Cu) and water hardness were also collected at all ten outfalls.

3.2 Monitoring Site Selection and Descriptions

The stormwater outfall monitoring prescribed in the permit requires the monitoring of specific water quality parameters and flow four times each year at ten separate locations. To meet the permit objectives, the outfalls selected represent a diversity of land uses. The MOA developed a selection process for identifying the ten outfalls as the highest priority locations from a list of 30 medium to high priority outfalls. Criteria identified by the MOA for targeted monitoring within the Anchorage Basin are as follows:

- Include a variety of land uses
- Include storm drains that discharge to water quality impaired (303(d)-listed) streams
- Experience approximately the same annual precipitation
- Be geographically diverse while allowing relatively easy access to all outfalls during a single rainfall event.

To meet these criteria, MOA selected a portion of the MS4 that extends from C Street on the west to Lake Otis Parkway on the east, and from the northern portion of the Chester Creek watershed to the southern edge of the Furrow Creek Watershed. The targeted area included substantially urbanized portions of the watershed tributary to Chester Creek, Furrow Creek, Little Campbell Creek, and Campbell Creek. These four streams are impaired for fecal coliform and have an approved TMDL, and therefore meet one of the permit objectives (ADEC 2004a, 2004b, 2005, and 2006; and Anchorage Waterways Council {AWC} 2014).

Within the target area, the MOA identified priority outfalls that represent homogeneous land use subbasins, heterogeneous land use subbasins, and subbasins with and without oil/grit separator (OGS) devices. This diversity of land uses and structures meets the permit objectives of broadly

quantifying pollutant loads and assessing effectiveness of existing best management practices (BMPs).

Monitoring data from subbasins meeting the four different conditions (homogeneous land use, heterogeneous land use, with OGS and without OGS) serve different functions.

Conditions for the subbasins with a homogeneous land use:

- Data identify specific pollutants originating from a predominant land use that require additional controls. Controls tailored to a specific land use could be utilized in those watersheds.
- Data from basins with homogeneous land uses are appropriate for developing loading estimates for fecal coliform and TAH, as described below.
- Fecal coliform, TAH, and TAqH data are appropriate for comparison with receiving water quality criteria. Since water quality criteria do not apply directly to stormwater, the criteria serve as benchmarks.
- Fecal coliform data are appropriate for comparison with TMDL reduction goals for fecal coliform to determine improvement over time.

Conditions for subbasins with heterogeneous land uses:

- Data are useful when developing loading estimates of fecal coliform and petroleum hydrocarbons.
- Data were also to be used to assess pollutants originating across land uses that may require additional controls, and additional BMP controls that could be applied across the basin.
- Fecal coliform and petroleum hydrocarbon data are appropriate for comparison with receiving water quality criteria.
- Fecal coliform data are appropriate for comparison with TMDL reduction goals for fecal coliform to determine improvement over time.

Conditions for subbasins with or without OGS systems:

- Data are used to assess the effectiveness of the OGS systems and determine whether additional OGS systems could be installed to improve stormwater quality.
- Petroleum hydrocarbon data are appropriate for comparison with receiving water quality criteria.

MOA used its hydro-geographic database (HGDB) and other municipal geographic data to select subbasins with the aforementioned characteristics. Application of this selection process resulted in the initial identification of ten priority outfalls. Following the pre-sampling field reconnaissance, it was determined that one of the selected outfalls (Node ID 299-20) exhibited severe corrosion within the outfall pipe and was not suitable for sampling. An alternate outfall within the Little Campbell Creek Watershed, having the same land use and BMP characteristics (Station ID SWM02, Node ID 847-1), became the tenth sampling site. Station SWM02 was sampled from 2011 thru 2016, but was subsequently replaced by Station SWM12 in 2017 since it was found that the original site was not truly representative of the land use category as a result of influence of stream flow from Little Campbell Creek (Table 1). The other outfall replaced in 2017 was SWM01,

which was discontinued due to inconsistent flow and the small size of the drainage area. The replacement outfall, SWM11, is located within the Furrow Creek drainage area, has a larger drainage area, and represents the residential land use category.

To facilitate sample labeling and simplify outfall identification in the field per the *Monitoring, Evaluation and Quality Assurance Plan* (MOA 2016), the outfall stations were sequentially numbered from south to north along the sampling corridor (SWM01 thru SWM10) with SWM11 and SWM12 being added to the original numbering scheme. Table 1 provides the characteristics of each outfall including physical location, geographic location, outfall dimensions, acreage of subbasin, and percent impervious surface of the subbasin. An overview map (Figure 1) shows the ten current monitoring outfall locations along with the subbasins for each watershed. Figures 2-8 are larger scale maps that clearly show land use types for each of the outfalls and subbasins.

SWM03 and SWM04 are located near Sylvan Drive and drain a residential area east of Campbell Creek. Though these outfalls are close together, their drainage areas are vastly different. SWM05 is located at the end of East 56th Avenue and drains a commercial and industrial area south of International Airport Road and east of C Street. SWM06 is located at the end of Maplewood Street and drains a residential area north of Northern Lights Boulevard. SWM07 and SWM08 are located at the Seward Highway where Chester Creek passes beneath the highway. They drain a commercial industrial area to the north and mixed land use area to the south, respectively. SWM09 is located near the Anchorage Football Stadium and drains the area around Ben Boeke and Sullivan Arenas. SWM10 is located at the end of Eagle Street and drains a commercial and residential area south of Chester Creek. SWM11 is located at Johns Road and Botanical Circle and drains a large residential area that flows into Furrow Creek. SWM12 drains the commercial and industrial area near the Old Seward Highway and represents the inflow to the Lynwood retention basin.

Table 1. Top Ten Priority and Replacement Outfalls.

Station ID	Subbasin ID	Outfall Node ID	Watershed	Contributing Land Use*	OGS Present	Priority Rank	Latitude	Longitude	Outfall Diameter (inch)	Drainage Acreage	Percent Impervious
Identified Priority Outfalls											
SWM03	1224a	1224-1	Campbell	R	Yes	3	61° 09.548'	-149° 52.443'	36	92.78	70.05
SWM04	1224b	1224-2	Campbell	R	Yes	6	61° 09.545'	-149° 52.451'	18	20.10	31.78
SWM05	805	207-1	Campbell	CI	Yes	1	61° 10.202'	-149° 52.326'	24	58.34	75.41
SWM06	219	314-22	Chester	R	Yes	2	61° 11.996'	-149° 50.750'	26	33.81	37.26
SWM07	507	484-1	Chester	CI	No	8	61° 12.100'	-149° 52.114'	24	50.17	87.68
SWM08	549	86-1	Chester	M	No	6	61° 12.095'	-149° 52.114'	42	354.62	68.94
SWM09	132	499-1	Chester	CI	Yes	4	61° 12.176'	-149° 52.554'	24	40.04	53.65
SWM10	554	525-2	Chester	M	No	5	61° 12.161'	-149° 52.486'	24	47.51	74.62
Medium Priority Replacement Outfalls											
SWM11	1103	348-3	Furrow Cr.	R	No	-	61° 06.448'	-149° 52.734'	36	86.32	38.58
SWM12	1449	1454-1	Campbell	CI	No	-	61° 09.758'	-149° 52.525'	24	111.68	59.51

* R = Residential; CI = Commercial and Industrial; M = Mixed

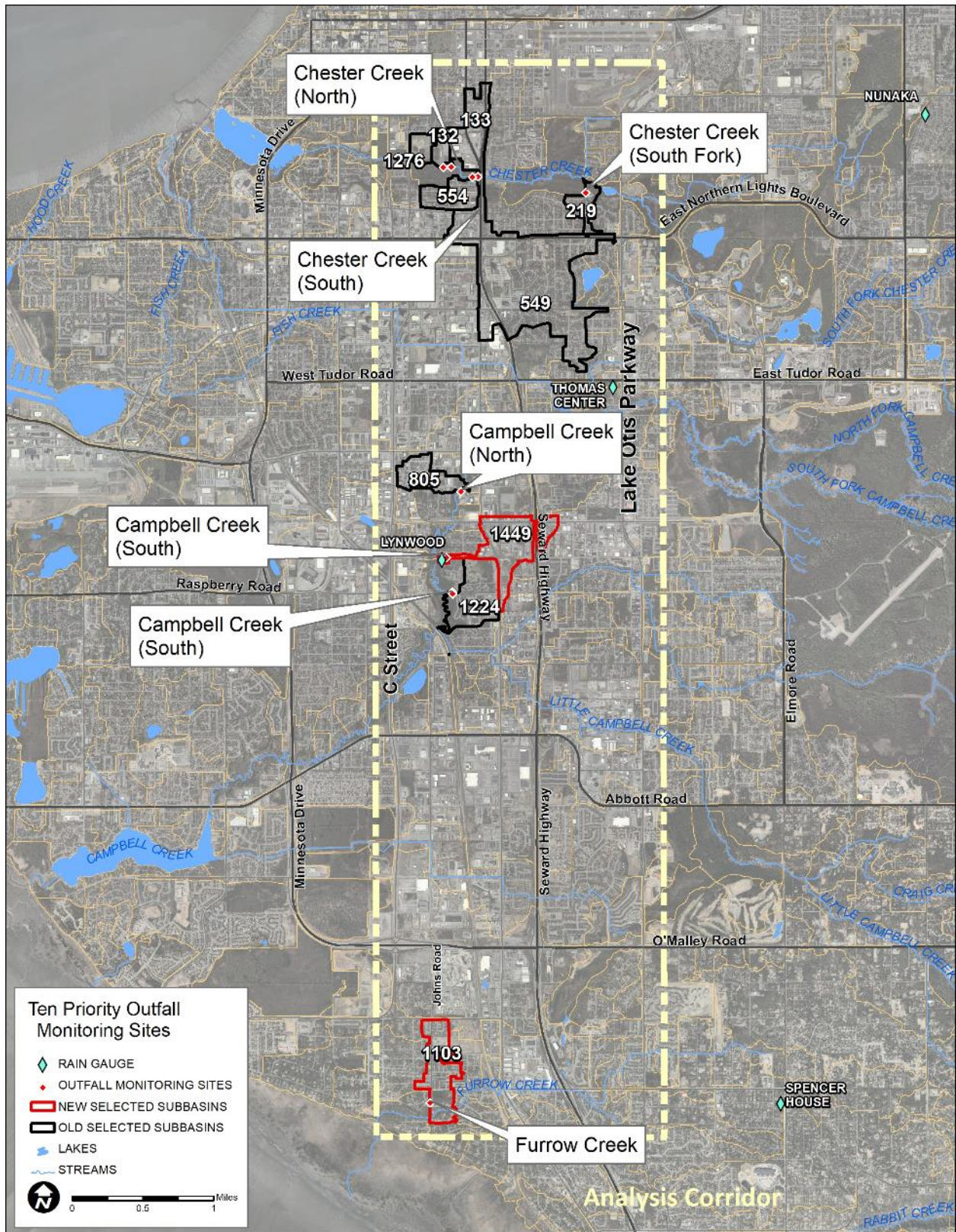


Figure 1. Overview Map of the Ten Final Outfall Monitoring Sites and Subbasins.

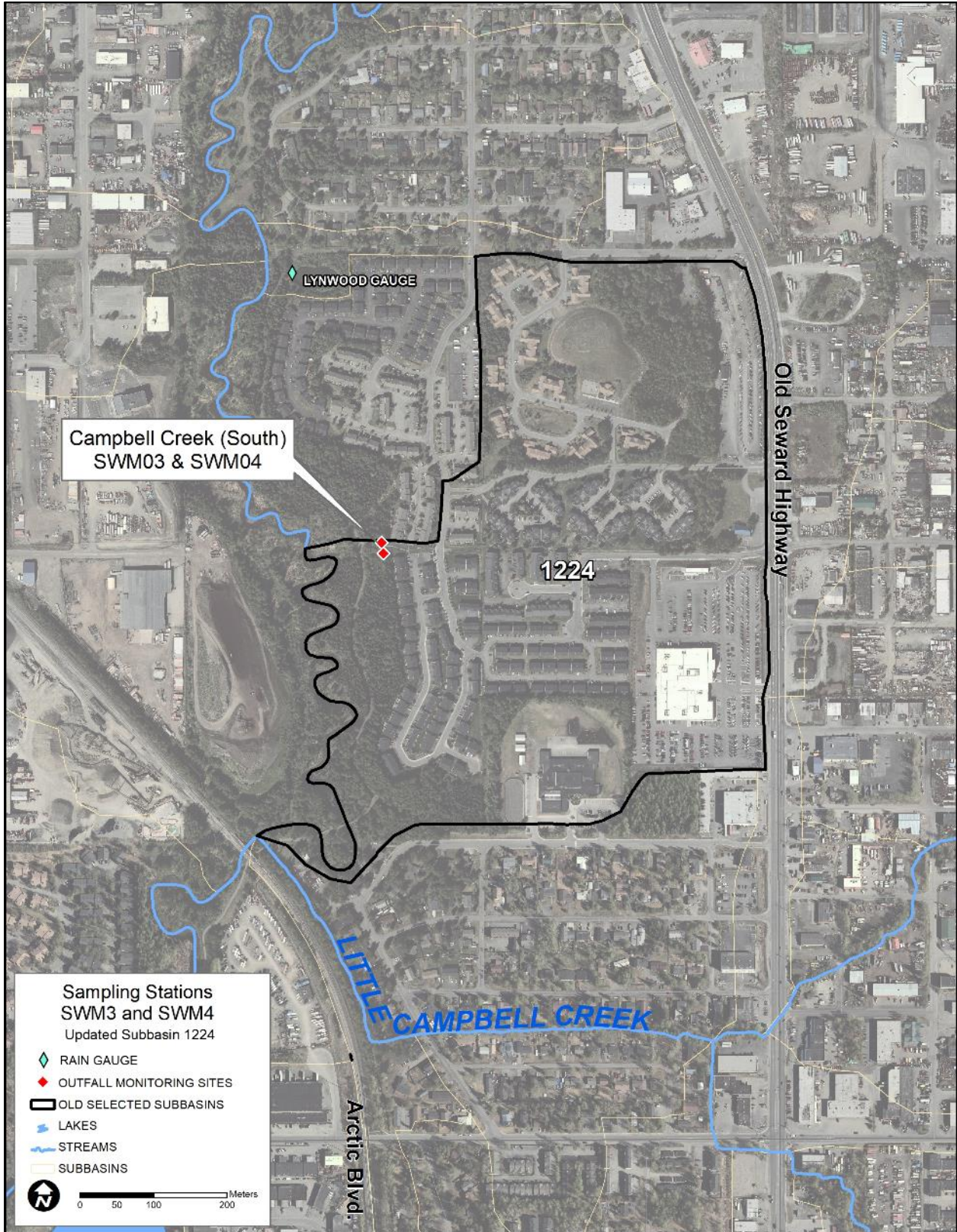


Figure 2. Outfalls SWM03 and SWM04, Fairweather Loop off Sylvan Drive (Campbell Creek).

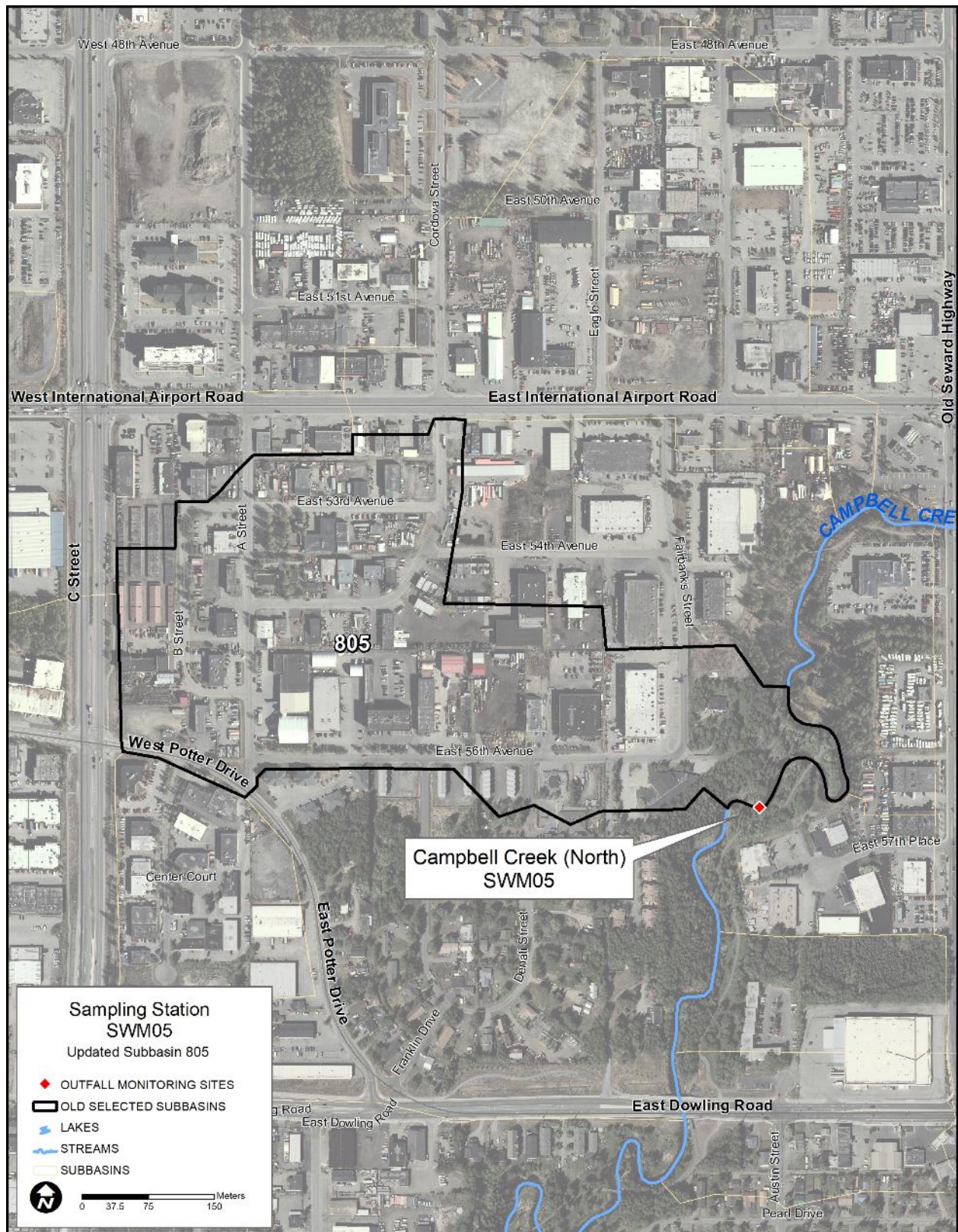


Figure 3. Outfall SWM05, East 56th Avenue (Campbell Creek).

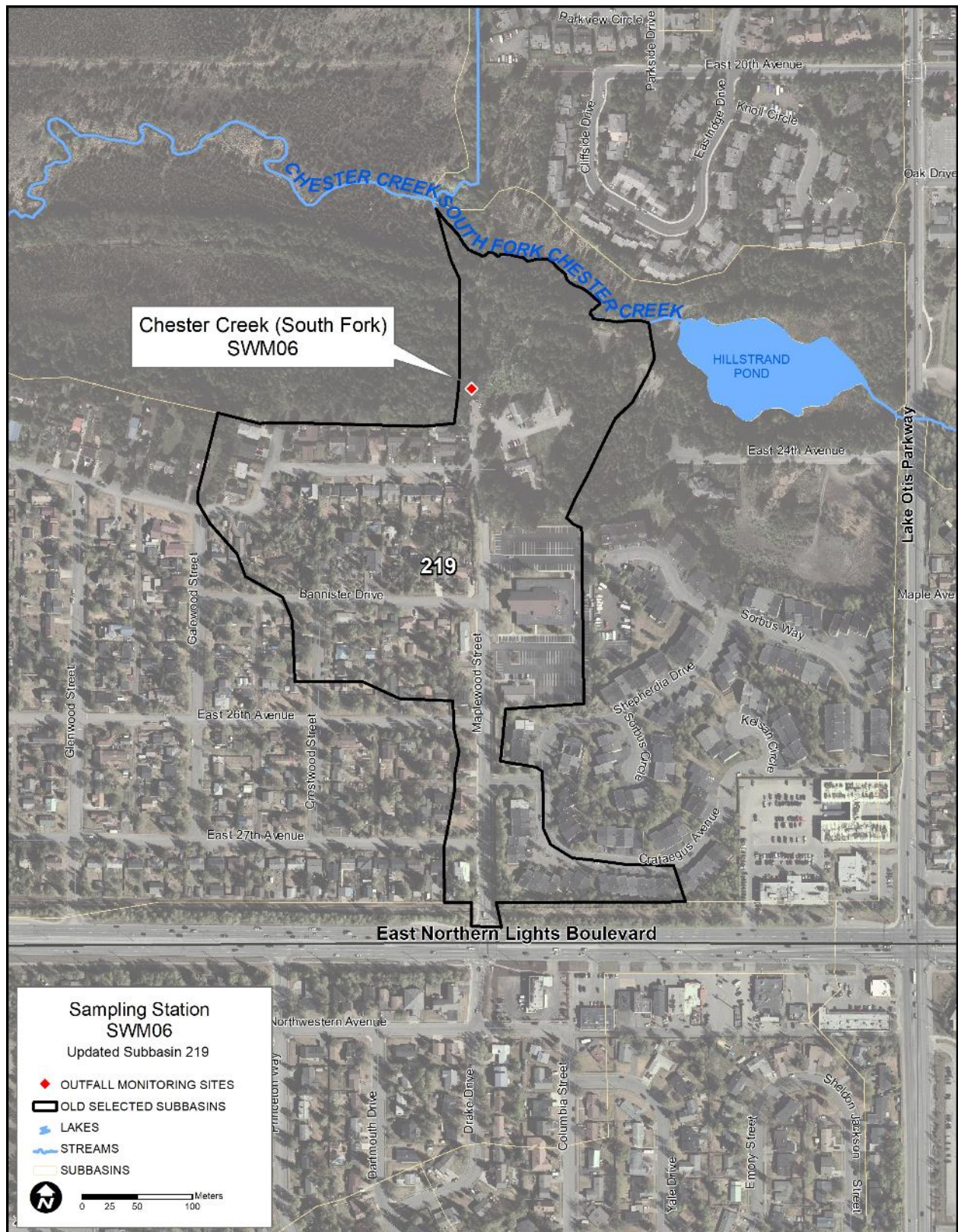


Figure 4. Outfall SWM06, Maplewood Street (South Fork Chester Creek).

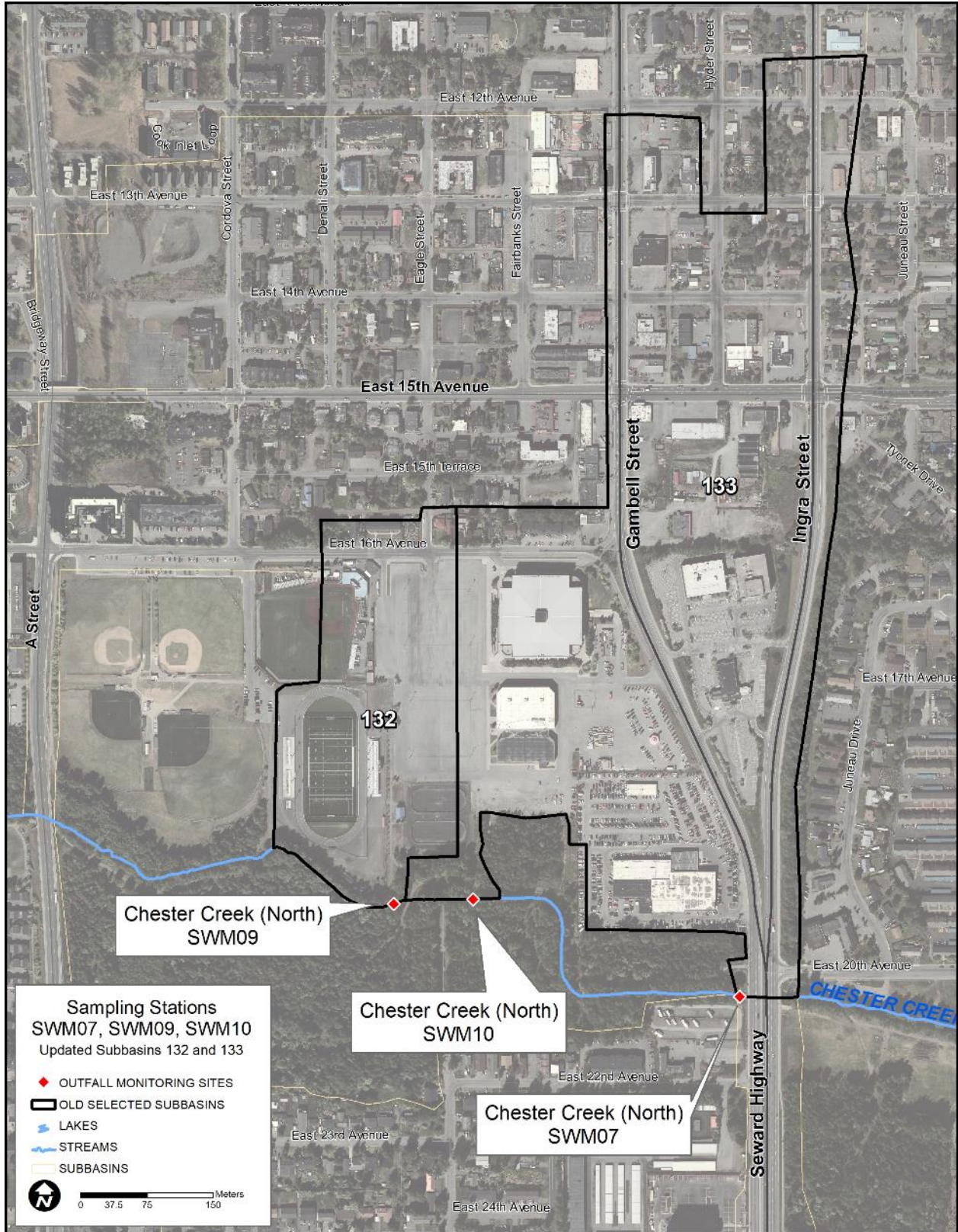


Figure 5. Outfalls SWM07, SWM09, and SWM10 (Chester Creek).

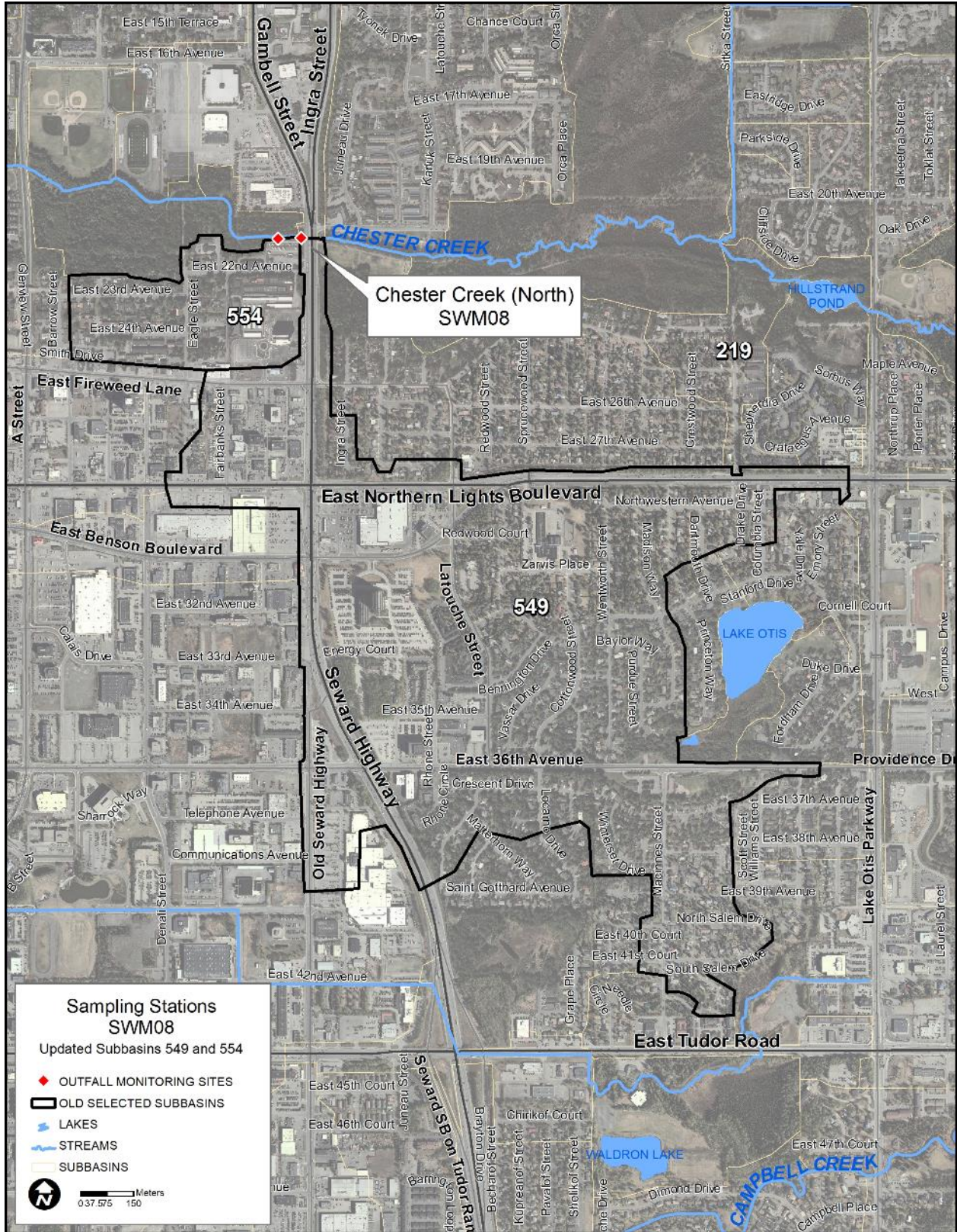


Figure 6. Outfall SWM08, New Seward Highway (Chester Creek).

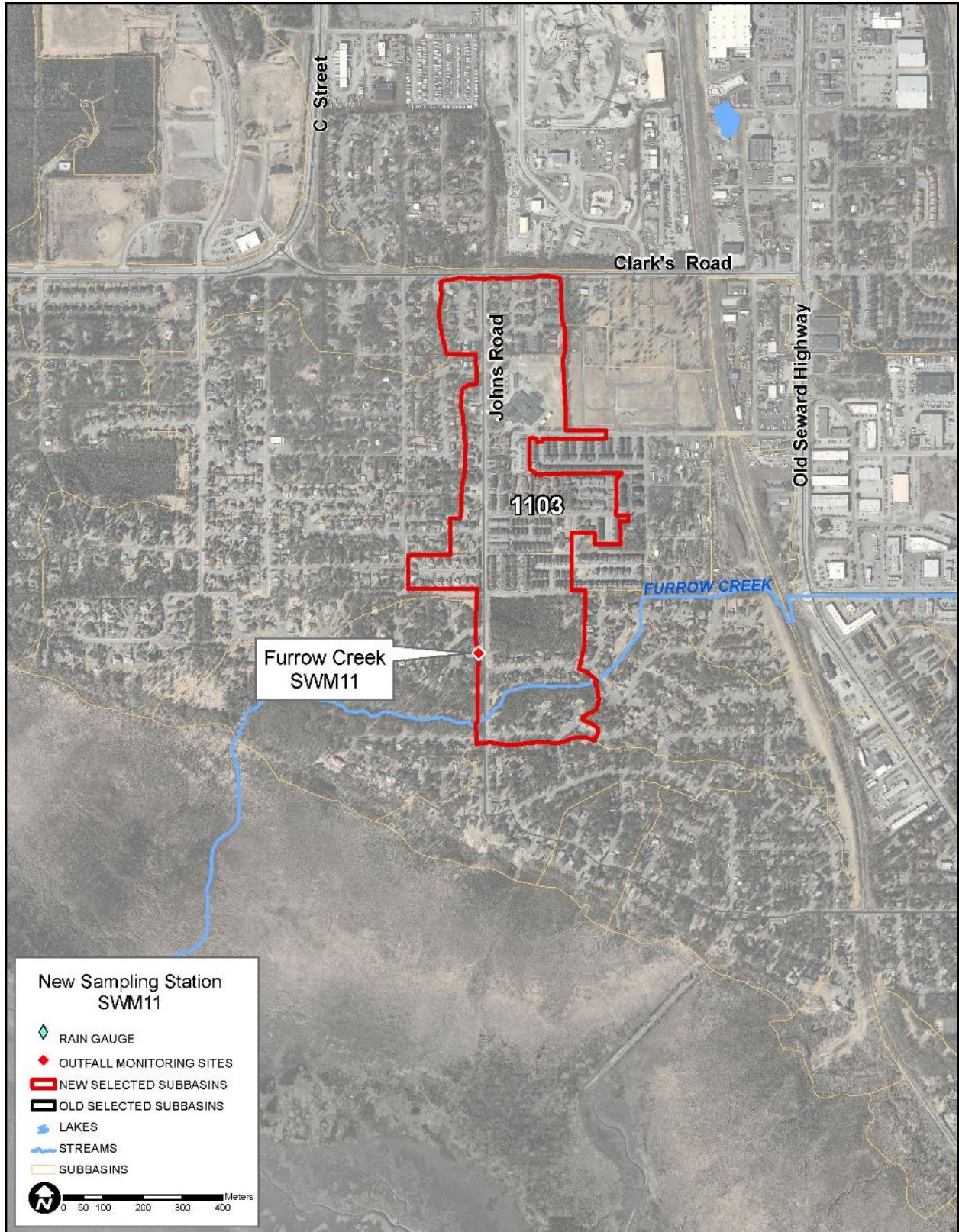


Figure 7. Outfall SWM11, Johns Road and Botanical Circle (Furrow Creek).

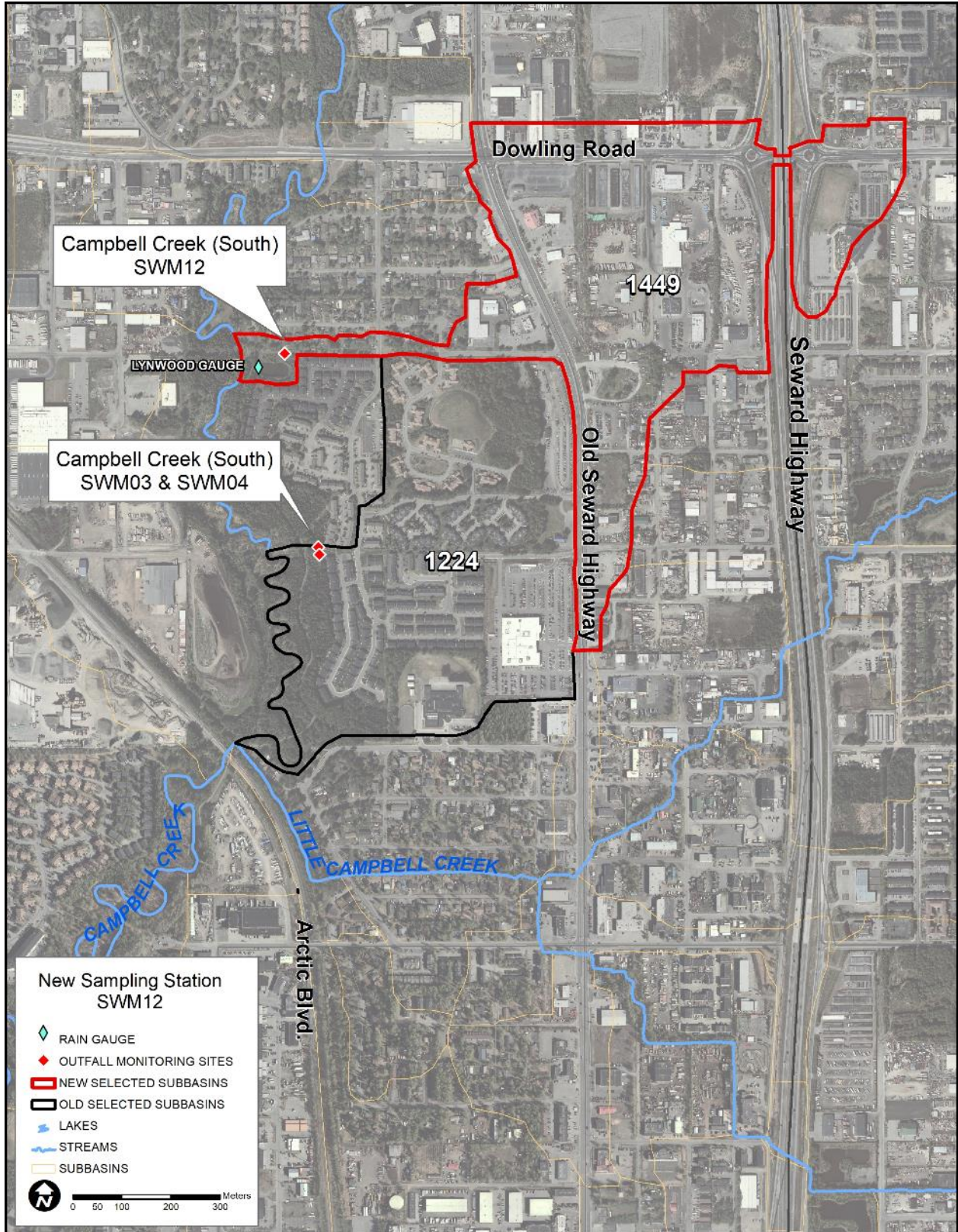


Figure 8. Outfall SWM12, Lynwood Retention Pond (Campbell Creek).

3.3 Measured Parameters

Parameters measured during stormwater outfall monitoring are shown in Table 2. The table includes sample type, measurement type (field or laboratory), analysis method, and purpose of monitoring. Measurement quality objectives for each parameter including precision, accuracy, sensitivity, and measurement range are in the program’s QAP (MOA 2016). In addition to the parameters listed in Table 2, field observations were recorded at each outfall including any evidence of oily sheen, scum, odor, detritus, floating material, water color and clarity, deposits or stains, vegetation, and any other pertinent observations.

Table 2. Measured Parameter, Type, Purpose, and Method of Analysis.

Parameter	Type of Sample*	Measurement Type	Method	Purpose
Flow	IR	Field	Flow meter, or bucket	Characterize flow
Specific Conductance	IR	Field	EPA 120.1/ YSI 556	Stormwater quality
DO	IR	Field	EPA 360.1/ YSI 556	Stormwater quality
pH	IR	Field	EPA 150.2/ YSI 556	Stormwater quality
Temperature	IR	Field	SM2550B/ YSI 556	Stormwater quality
Turbidity	IR/G	Field	EPA 180.1M/ Hach 2100	Stormwater quality
BOD ₅	G	Laboratory	SM 5210 B	Stormwater quality
Fecal Coliform	G	Laboratory	SM 9222D	Stormwater quality & loading
TSS	G	Laboratory	SM 2540D	Stormwater quality
TAH	G	Laboratory	EPA 624	Stormwater quality & loading
TAqH	G	Laboratory	EPA 625 + EPA 624	Stormwater quality & loading
Dissolved Copper	G	Laboratory	EPA 200.8	Stormwater quality
Total Hardness	G	Laboratory	EPA 200.8	Stormwater quality

* IR = instantaneous recording of field analysis; G = grab sample for analysis; M = modified for field use

Four tipping bucket rain gauges installed within the monitoring area recorded precipitation throughout the monitoring period. The rain gauges were located along the north-south sampling corridor in order to provide a good representation of rainfall within each of the sampled subbasins (refer to Figure 1 for rain gage locations).

Table 3 identifies the parameters monitored at each outfall location. The commercial industrial (CI) land use categories in the table represent predominantly commercial and industrial areas with paved collectors, arterial streets, and parking lots. Outfalls with watersheds dominated by these land uses are those most likely to contribute petroleum hydrocarbon pollutants to stormwater. TAH and TAqH were collected at these locations in addition to the other parameters collected at every location. For this monitoring program, two CI subbasin categories were selected that had existing OGS systems, and two others were selected that did not have OGS systems.

Table 3. Parameters Measured at each Subbasin Outfall.

Station ID	Outfall ID	Watershed (Creek)	Contributing Land Use*	OGS Present?	Field Parameters						Lab Samples						
					Flow	Conductivity	pH	Temperature	DO	Turbidity	BOD ₅	Fecal Coliform	TSS	Hardness	Dissolved Cu	TAH	TAqH
SWM03	1224-1	Campbell	R	Yes	x	x	x	x	x	x	x	x	x	x	x		
SWM04	1224-2	Campbell	R	Yes	x	x	x	x	x	x	x	x	x	x			
SWM05	207-1	Campbell	CI	Yes	x	x	x	x	x	x	x	x	x	x	x	x	
SWM06	314-22	Chester	R	Yes	x	x	x	x	x	x	x	x	x	x			
SWM07	484-1	Chester	CI	No	x	x	x	x	x	x	x	x	x	x	x	x	
SWM08	86-1	Chester	M	No	x	x	x	x	x	x	x	x	x	x			
SWM09	499-1	Chester	CI	Yes	x	x	x	x	x	x	x	x	x	x	x	x	
SWM10	525-2	Chester	M	No	x	x	x	x	x	x	x	x	x	x			
SWM11	348-3	Furrow	R	No	x	x	x	x	x	x	x	x	x	x			
SWM12	1454-1	Campbell	CI	No	x	x	x	x	x	x	x	x	x	x	x	x	

*R-Residential, CI-Commercial/Industrial, M-Mixed

3.4 Field Sampling Procedures

Monitoring of precipitation throughout the summer rainfall season was done in order to capture four storms that were representative of typical Anchorage rainfall conditions. Water sampling was conducted during storm events that were both expected to create runoff in the MS4 area and that met antecedent dry weather conditions. Typically, rain events yielding greater than 0.1 inch within a 24-hour (hr) period were sufficient to generate runoff at all sites. Therefore, a minimum of 0.1 inches of rain was required before targeting an event. In addition, all storm events were to be preceded by a relatively dry period. A dry period is defined as rainfall of <0.1 inches in the preceding 24-hr period.

Once a storm event was identified for sampling, the field crew prepared field sampling equipment and laboratory bottles for sampling. All portable water quality measurement instrumentation was calibrated immediately prior to going in the field for each event per the manufacturer’s recommendation as outlined in Appendix H of the QAP. Prior to departing for the field, all bottles were labeled with station location, sample number, number of bottles, and analysis type and method. Date, time, and sampler’s initials were added in the field.

The field sampling team consisted of two people to address safety concerns and to allow one person to be the designated recorder while the second person performed measurements and conducted the grab sampling. Upon arriving on site at the outfall, the field team took flow measurements and placed the YSI 556 multi-probe into the outfall flow in order to allow the probes to equilibrate for at least two minutes prior to taking any measurements.

An acoustic Doppler flow meter and staff gauge were used to collect flow measurements. The flow meter measures the average velocity of the outfall pipe. The average velocity was used in conjunction with the water depth and pipe diameter to calculate the instantaneous flow of each outfall.

After measuring flow, the field crew measured dissolved oxygen (DO), specific conductance, pH, and temperature with a YSI 556 multi-probe system. Turbidity was measured in the field by collecting a discrete sample that was analyzed on site with a portable Hach 2100P/Q turbidimeter. All water quality measurements were obtained from the water flowing out of the end of pipe prior to any mixing with the receiving water body. All field measurements were recorded on project-specific field log forms that were bound in the project field log books along with field instrument calibration logs (refer to Appendix D).

The field crew obtained the water samples for BOD₅, TSS, fecal coliform, dissolved copper, total hardness, TAH, and PAH in laboratory-provided bottles. The water quality samples were collected from the water flowing out the outfall, and extra care was taken not to disturb any accumulated sediment when collecting a water sample. To avoid having to perform decontamination procedures, all samples, with the exception of TAH, were collected directly into their respective sample containers. In the case of TAH, the sample was first collected into a pre-cleaned and certified 1-Liter (L) PAH bottle that was then used to carefully fill the 40-milliliter (mL) vials for TAH analyses. The PAH bottle was then topped off with additional water from the outfall discharge. Since the PAH bottles were pre-cleaned and certified, it was unnecessary to perform equipment rinsate analyses. Once the water samples were collected, the field crew recorded visual observations at each outfall location.

The field crew conducted replicate field measurements and laboratory analyses at a rate of 15 percent (%) per sampling event. This resulted in two additional measurements for all parameters except TAH and TAqH. TAH and TAqH required only one additional field measurement since they are collected at fewer outfalls. Additional water for TAH and TAqH was collected at one station to allow the laboratory to perform matrix spike/matrix spike duplicate (MS/MSD) analyses. TAH analyses also included a trip blank sample, provided by the laboratory, that accompanied the sample bottles in the field.

Precipitation was recorded using a tipping bucket rain gauge and data logger recording in 0.01-inch increments. During precipitation events, the collection cup in the gauge collects precipitation until it reaches the equivalent of 0.01 inches of precipitation whereupon the bucket tips, triggering a reed switch and recording an event with a time stamp. These events are stored in the data logger and downloaded into a computer program where they are summarized over different time intervals or graphed as a time series. Four rain gauges installed for this program were located off Boniface Parkway between Debarr and East Northern Lights Boulevard (“Nunaka”), near Lake Otis Parkway and Tudor Road (“Thomas”), at the Lynwood Retention Basin at SWM12 (“Lynwood”), and in South Anchorage near Elmore and Huffman Roads (“Spencer”) and represent the northern, middle, and southern portions of the study area respectively (refer to Figure 1 for rain gauge locations). In addition, precipitation data collected by the National Weather Service at the Anchorage International Airport (AIA) was utilized to supplement the rain gauge data collected for this program.

3.5 Sampling Handling and Chain of Custody Procedures

BOD₅, TSS, fecal coliform, dissolved Cu, hardness, TAH, and TAqH samples were collected, preserved, and cooled for shipment to the laboratory as described in the QAP. SGS North America, Inc. is located in Anchorage, so no special sample shipping or packaging was required. Upon

sample collection, all samples were kept chilled to 6 °C with gel ice and delivered to the laboratory by the field crew following the sample collection effort. All samples were transferred to the laboratory under chain of custody (COC) procedures as outlined in the QAP. Copies of all completed COCs are included with the laboratory data reports in Appendix B. When necessary, fecal samples were taken to the laboratory in two batches during the storm event to ensure the 6-hr holding time requirement was met.

3.6 Laboratory Analyses

The water quality constituents selected for this program were established based upon the requirements of MOA's APDES Stormwater Permit (AKS-052558). All analyses were conducted by SGS North America, Inc. SGS is certified to conduct such analyses. All analytical methods (refer to Table 2) were based upon approved EPA methodology and included all necessary QA/QC procedures and analyses as outlined in the methodology and detailed in the QAP.

The laboratory QA/QC activities provide information needed to assess potential laboratory contamination, analytical precision and accuracy, and representativeness. Analytical quality assurance for this program included:

- Employing analytical chemists trained in the procedures and analytical methods to be conducted
- Adherence to documented procedures, EPA methods, and laboratory SOPs
- Calibration of analytical instruments
- Use of quality control samples, internal standards, surrogates, and standard reference material (SRMs)
- Complete documentation of sample tracking and analysis

Internal laboratory control checks included the use of internal standards, method blanks, MS/MSDs, duplicates, laboratory control spikes and duplicates (LCS/LCSD), and SRMs as required by the sample analysis methodology. For additional detail on laboratory QA/QC procedures, refer to the QAP.

3.7 Deviation from the QAP

There were no deviations from the QAP during this monitoring year.

3.8 QA/QC and Data Validation Results

QA/QC procedures were followed according to the QAP (MOA 2016). The procedures included analytical checks (field replicates, trip blanks, MS/MSDs); instrument calibration; and procedures to assess data for precision, accuracy, representativeness, comparability, and completeness.

Verification analyses for laboratory parameters were conducted by SGS. The data review focused on criteria for the following QA and QC parameters and their overall effects on the data:

- Sample handling (chain of custody)

- Temperature blank
- Holding time compliance
- MS/MSD and LCS/LCSD results
- Field replicate comparison
- Data validation.

SGS is certified by the EPA and the Alaska Drinking Water Program and has an approved QA/QC program. Analytical methods and testing procedures were in adherence with EPA-approved protocols and guidelines. The analyses for the fecal coliform, BOD₅, TSS, dissolved copper, total hardness, TAqH, and TAH were reported with appropriate method detection limits and report detection limits.

Sample custody was maintained for the samples. The coolers transporting the samples remained at ambient temperatures or were cooled to less than 6 °C before being delivered to the laboratory within a few hours of the sampling event. With the exception of fecal coliform during the second storm event, the holding times for all parameters tested were met and were analyzed within their respective holding time expirations. Fecal coliform analyses for six samples during the second storm were analyzed slightly outside the 8-hr holding time.

The QA/QC officer validated all data reported by the laboratory. Data that was determined to be either biased low or high was flagged based on low or high recovery rates from laboratory control samples. Any data that was considered suspicious was also rejected and flagged as such. For a more detailed summary of field and laboratory data validation results, refer to Appendix C. Other QA/QC procedures in 2018 included a field audit of the sampling to ensure that field protocols were followed and that protocols being used were sufficient to meet program objectives. The field audit concluded that all protocols were followed and were sufficient. The field team was also required to QC all data at the end of each event to insure all data were collected and sampling information was complete.

4.0 Results and Discussion

The 2018 stormwater monitoring at the ten long-term monitoring sites was initiated in July and comprised the eighth year of monitoring for the program. Approximately 5.9 inches of precipitation (including snow) had been measured in 2018 at the National Oceanic and Atmospheric Administration (NOAA) National Weather Service's PANC weather station located at the AIA before the first event was sampled on 11 July (Figure 9). Four stormwater outfall monitoring events were conducted in 2018 as required by the *Stormwater Outfall Monitoring Plan* (MOA 2016) and the APDES permit. Sampling events took place on 11 July, 25 July, 22 September, and 28 September and included successful sampling at all ten outfalls during each storm event. Rainfall amounts for June, July, and August in 2018 were very similar to their long-term averages, with May and September being substantially less than the long-term mean precipitation for those months (Figure 9). The total rainfall in July was slightly below average (1.52 inches) when compared to the long-term mean of 1.83 inches and the long-term maximum of 4.49 inches. The highest monthly precipitation for the year occurred in August with 3.67 inches compared to the long-term average of 3.25 inches. For September, the recorded rainfall was well below average (0.87 inches) when compared to the long-term average of 2.99 inches.

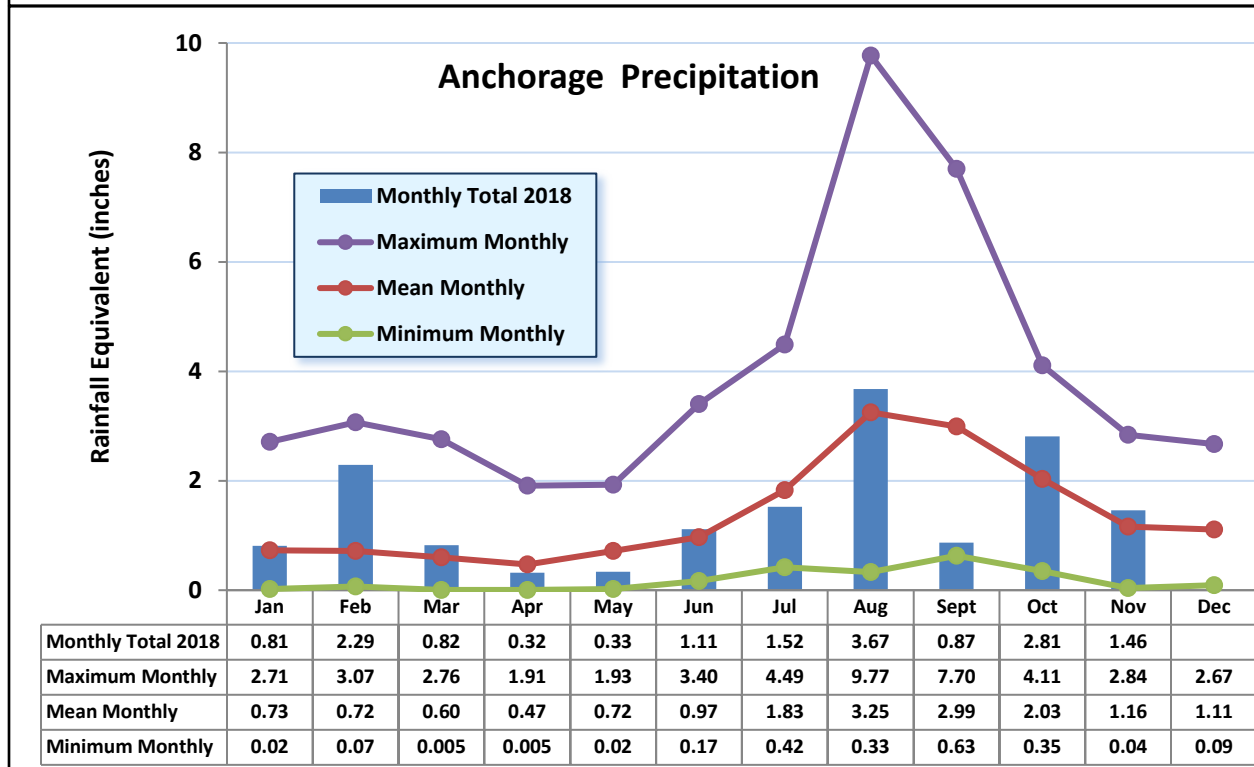
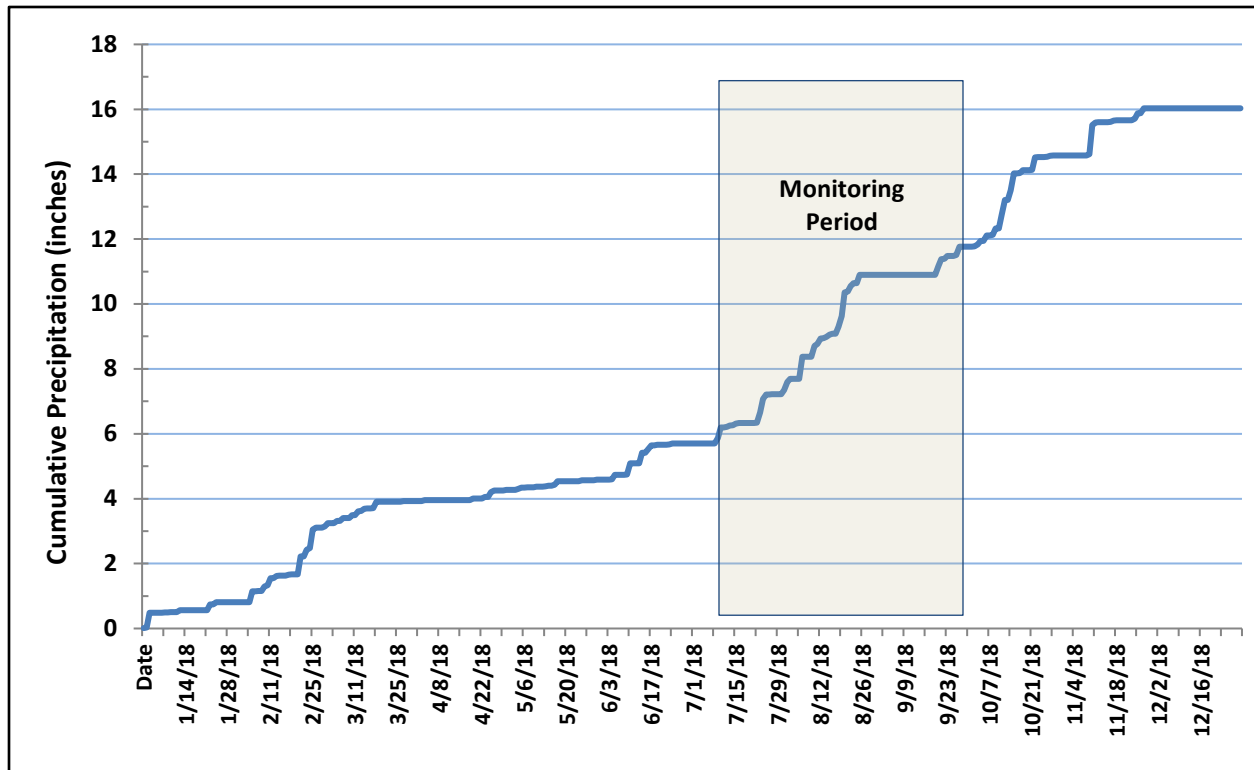
4.1 Precipitation

A total of four events were sampled in 2018 starting on 11 July and ending on 28 September. Total rainfall as measured at PANC and the four project rain gauges during each monitored event ranged from a low of 0.22 inches at PANC during the third event to 0.67 inches at Lynwood during the second event (Table 4). Rainfall during the first event was similar in size to both the third and fourth events with precipitation ranging from 0.22 to 0.40 inches across the five rain gauges for all three events, with the second event being the largest. Some variability was seen across the Anchorage watershed for most of the rain events, although total amounts were fairly similar (Table 4 and Figure 10).

Daily rainfall records are illustrated in Figure 10 for three of the rain gauges located along the sampling corridor. As in past years, rainfall data from the PANC weather station at the AIA were used to supplement the other rain gauges to provide a time series for the entire year and a comparison to the long-term historic record (Table 4).

The first storm event took place on 11 July with rainfall that ranged from 0.29 inches at Nunaka and Spencer to 0.40 inches recorded at Lynwood for that calendar day. Rainfall that was recorded within the study area during the preceding calendar day ranged from 0.04 to 0.09 inches at the four project range gauges which is within the <0.1 inch preceding 24-hr dry weather criterion, although PANC recorded a value of 0.17 inches. Sampling was initiated at 12:05, approximately 12 hrs after the beginning of the storm. Based on the recorded precipitation, the rainfall appeared to be fairly consistent across the Anchorage Bowl for the first event.

The second storm event occurred on 25 July with recorded rainfall that ranged from 0.40 inches at Spencer to 0.67 inches at Lynwood. Rainfall that was recorded within the study area during the preceding calendar day ranged from 0.11 to 0.32 inches with all five gauges exceeding the < 0.1 inch dry weather criterion on a calendar-day basis. However, sampling for the second event



Note: Data for 2018 is incomplete at this time and includes only the period of 1/1/18 through 11/30/18.

Figure 9. Cumulative, Monthly, and Historic Rainfall Measured at the PANC NOAA Weather Station. Snowfall has been Converted to Rain Equivalent.

Table 4. Anchorage Precipitation Data Seven Days Prior to Each Sampling Event.

Date	PANC Airport (inches)*	Lynwood (inches)	Nunaka (inches)	Spencer (inches)	Thomas (inches)
7/4/18	0	0	0	0	0
7/5/18	0	0	0	0	0
7/6/18	0	0	0	0	0
7/7/18	0	0	0	0	0
7/8/18	T	0	0	0	0
7/9/18	T	0	0	0	0
7/10/18	0.17	0.09	0.05	0.04	0.07
7/11/18 (Event 1)	0.33	0.40	0.29	0.29	0.32
7/18/18	0	0	0	0	0
7/19/18	0	0	0	0	0
7/20/18	0	0	0	0	0
7/21/18	0	0	0	0	0
7/22/18	0	0	0	0	0
7/23/18	0.01	0	0	0.04	0
7/24/18	0.32	0.19	0.24	0.16	0.11
7/25/18 (Event 2)	0.41	0.67	0.46	0.40	0.42
9/15/18	0	0	0	0	0
9/16/18	T	0.03	0	0	0
9/17/18	0	0	0	0.01	0
9/18/18	0	0	0	0	0
9/19/18	0	0	0	0	0
9/20/18	T	0	0	0.14	0
9/21/18	0.27	0.19	0.21	0.12	0.17
9/22/18 (Event 3)	0.22	0.26	0.30	0.25	0.23
9/23/18	0.01	0	0	0	0.01
9/24/18	0.08	0.20	0.2	0.24	0.19
9/25/18	0	0	0	0.01	0
9/26/18	0	0	0	0	0
9/27/18	0.03	0.04	0.03	0.04	0.02
9/28/18 (Event 4)	0.26	0.32	0.27	0.30	0.26

* T = Trace level measurement

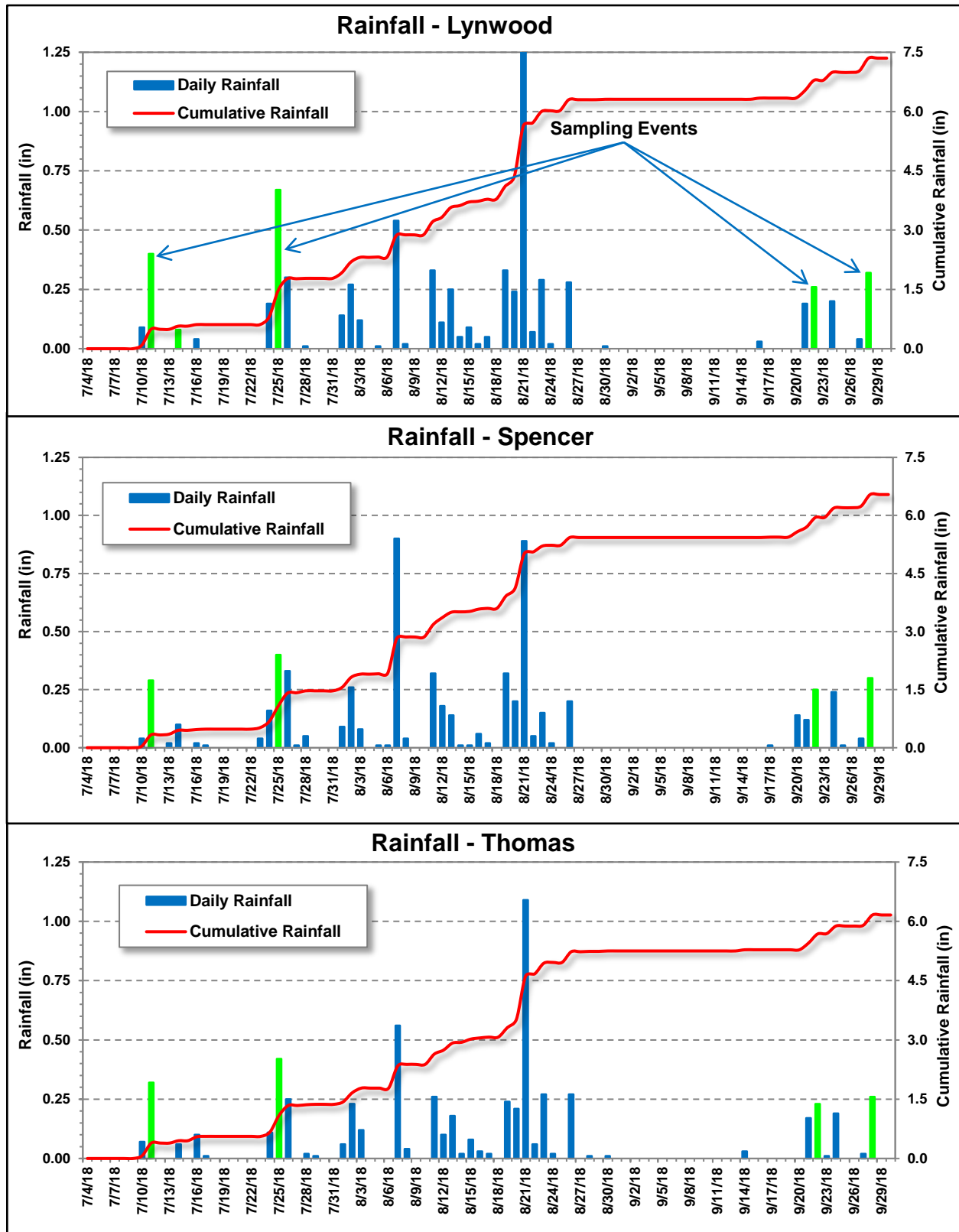


Figure 10. Rainfall Measured at Three Project Rain Gauges. (Note: Sampling days highlighted in green.)

was initiated at 10:45, approximately 16 hrs after the beginning of the storm event, and well within the <0.1 inch criterion for the preceding 24-hr period based on the start of the rain event. Sampling was initiated during a period when the rainfall had slackened but the flow rates at most stations were still elevated. Heavy rainfall was experienced later during the sampling day.

The third event took place on 22 September. On the day of sampling, precipitation ranged from 0.22 inches at PANC to 0.30 inches recorded at Nunaka with little variability across the Anchorage watershed. Rainfall that was recorded within the study area during the preceding calendar day ranged from 0.12 to 0.27 inches which exceeds the <0.1 inch dry weather criterion on a calendar-day basis, but since the storm began during the evening on 21 September, the criterion was met on a 24-hr basis. Sampling for the third event was initiated at 09:52, approximately 15 hrs after the beginning of the storm, during a period when the rainfall had stopped but stormwater flow at all sampling sites was still sufficient for sampling.

The fourth monitoring event took place on 28 September. Precipitation for this event ranged from 0.26 inches at PANC and Thomas to 0.32 inches at Lynwood, with fairly consistent rainfall across the Anchorage watershed. Precipitation on the preceding day ranged from 0.02 to 0.04 inches at the five gauges. Outfall monitoring for the fourth storm event began at 10:00, approximately 7-8 hrs after the beginning of the storm event; rainfall had started to slacken off at the initiation of the sampling effort.

4.2 Field Measurements

The results of field measurements for flow, turbidity, DO, conductivity, pH, and temperature are shown graphically in Figures 11-16 and in Table 5. Where appropriate, field and laboratory measurements were compared against the most stringent Alaska Water Quality Standard (AWQS) numeric criteria for each parameter (refer to Table 9 for AWQS benchmarks used for comparisons). Most of these parameters exhibited similar trends to those observed for other stormwater programs in cooler climates.

Flow rates were highly variable between sites and storm events with SWM08 having the highest flow rates for all four storm events (Table 5 and Figure 11). Flow rates ranged from 0.37 gallons per minute (gpm) at SWM06 during the third storm event to 496 gpm at SWM08 during the first storm event. The highest flows for six of the ten locations occurred during the fourth event on 28 September and for three of the ten locations during the first event in July. The one remaining location (SWM03) had the highest flow during the second storm event. This high variability between stations and events reflects both the spatial and temporal variability that was seen in the precipitation records.

Mean turbidity levels ranged from a low of 13.7 Nephelometric Turbidity Units (NTU) at SWM03 to a high of 167.8 NTU at SWM12, which also had the highest turbidity during the fourth storm event (Table 5 and Figure 12). SWM07 exhibited the highest turbidity levels for the three remaining storm events. The elevated turbidity was also generally evident in TSS samples taken for laboratory analysis at the same locations (Table 6). Overall, large differences between outfalls are expected for turbidity since this parameter is highly dependent on the drainage area and is a function of the type of useage, percent impervious surfaces, amount of disturbed land from construction and other activities, drainage slope, flow rate, and other factors.

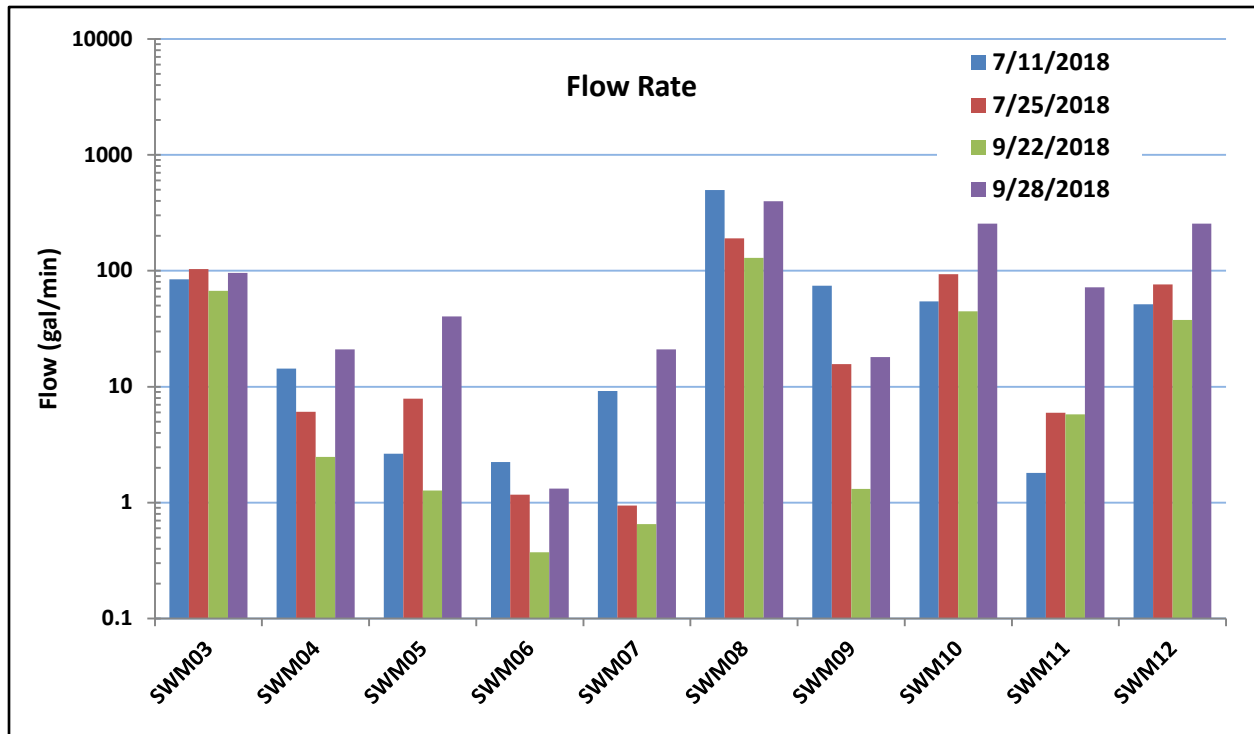


Figure 11. Flow Rates Measured at Monitoring Sites during All Four Events.

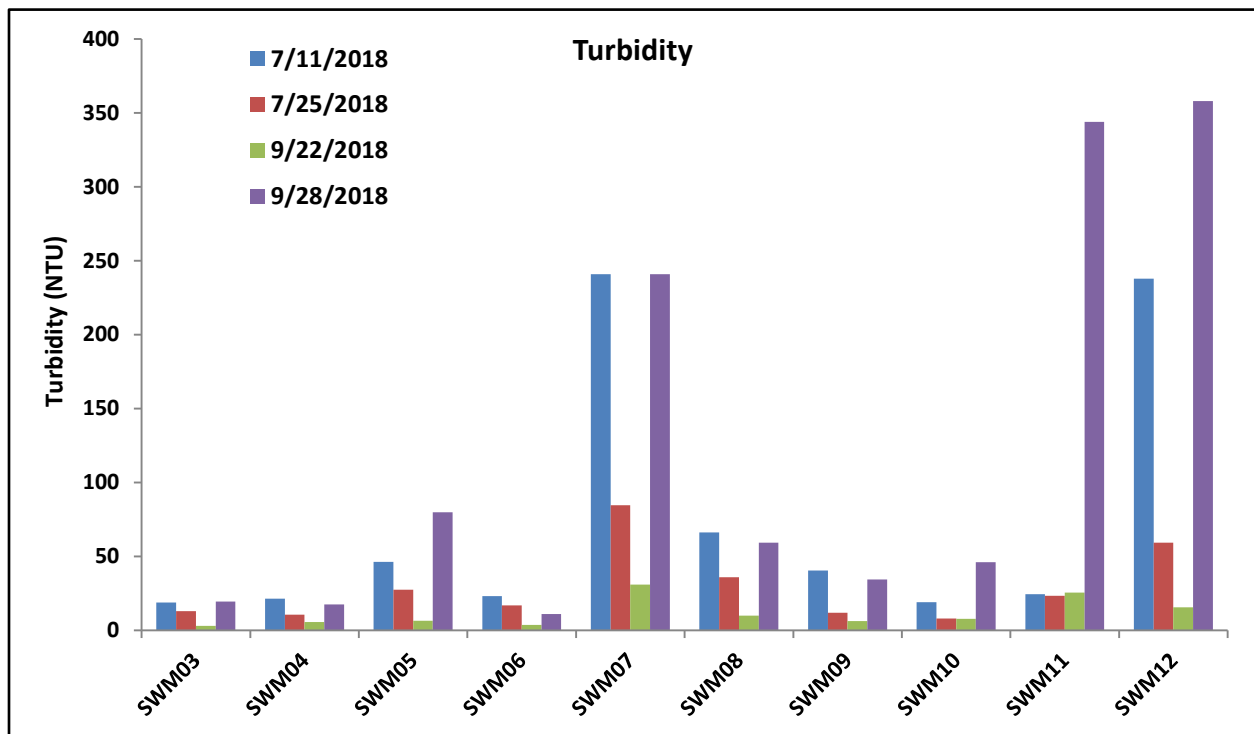


Figure 12. Turbidity Measured in Stormwater Sampled at Monitoring Sites during All Four Events.

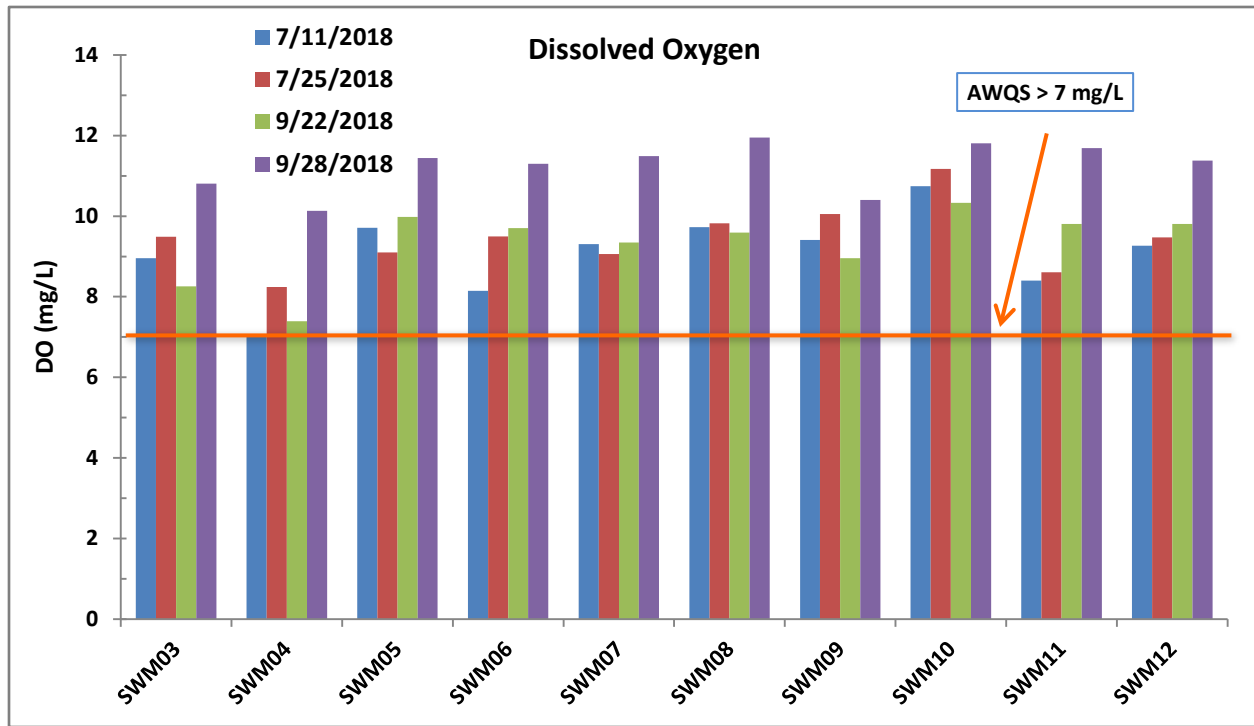


Figure 13. Dissolved Oxygen Measured in Stormwater Sampled at Monitoring Sites during All Four Events. (AWQS Criterion >7 mg/L.)

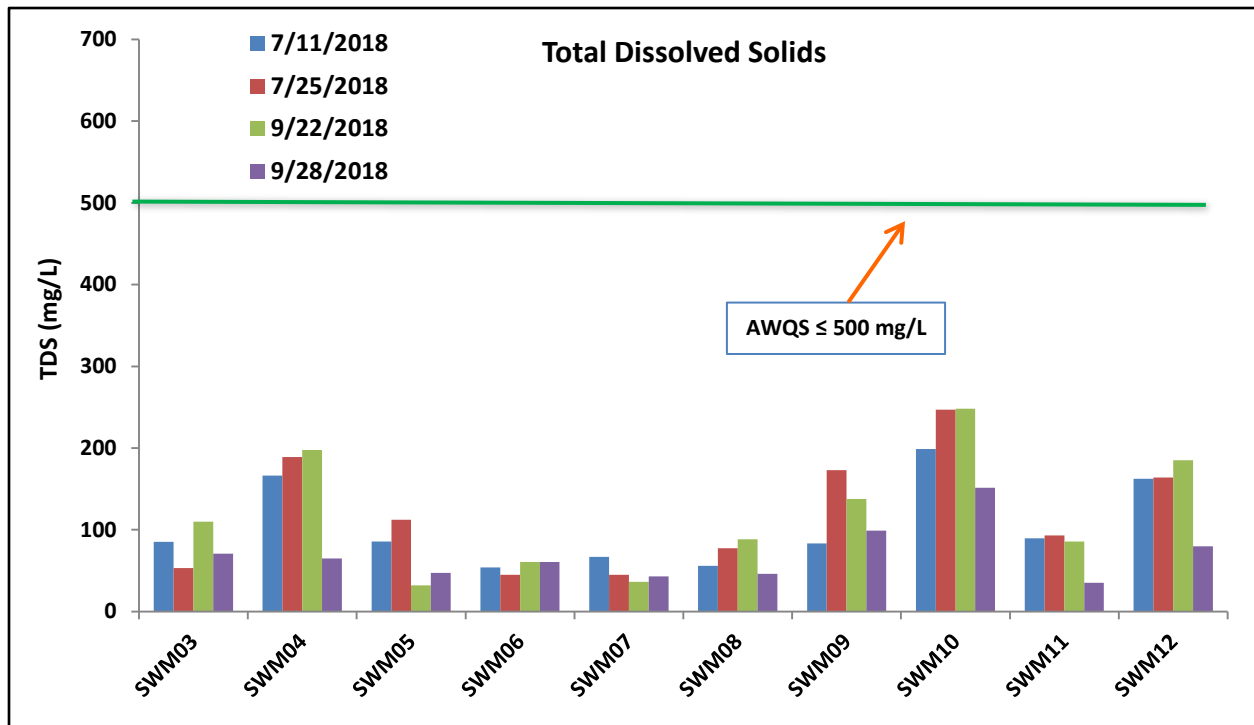
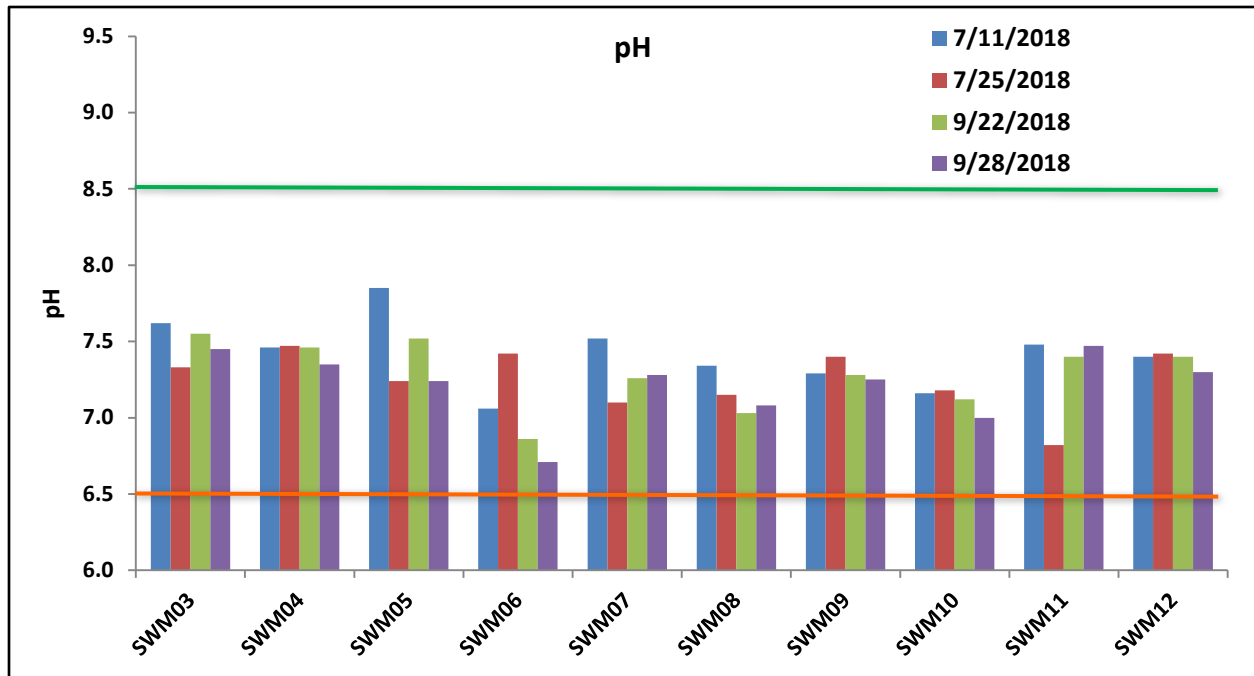
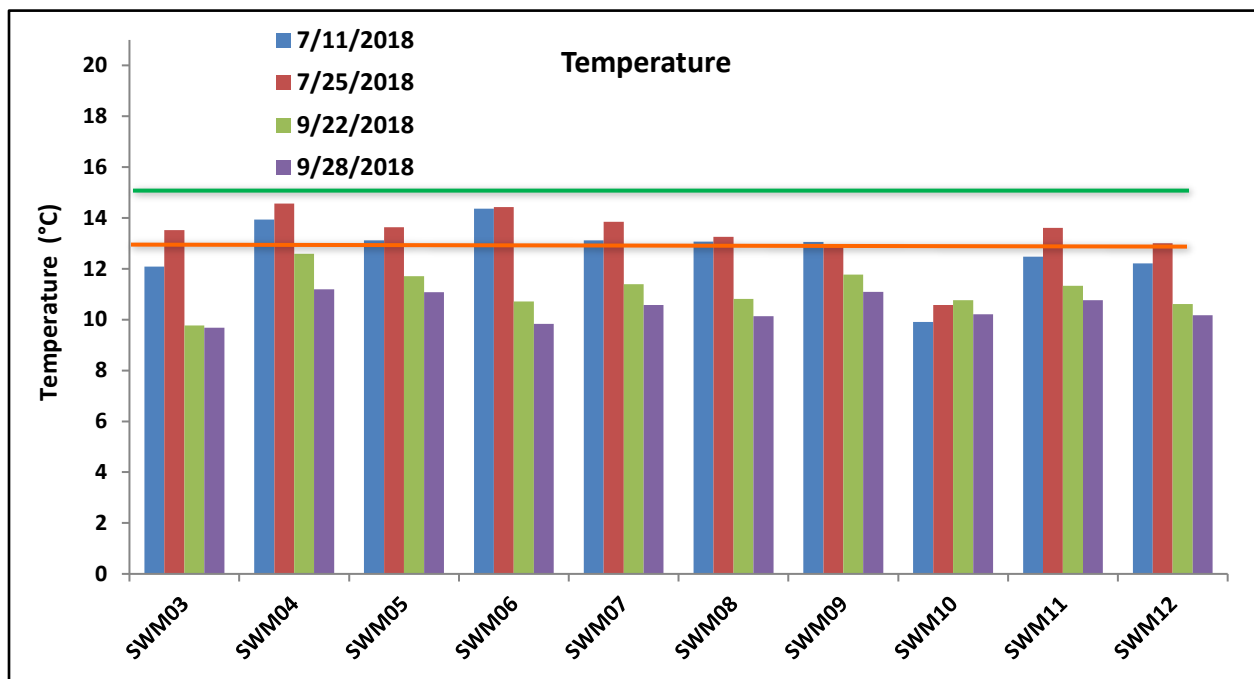


Figure 14. Total Dissolved Solids Measured in Stormwater Sampled at Monitoring Sites during All Four Events. (AWQS Criterion ≤500 mg/L.)



Green line indicates the upper limit of 8.5 and red line indicates the lower limit of 6.5.

Figure 15. pH (units) Measured in Stormwater Sampled at Monitoring Sites during All Four Events. (AWQS Criteria ≥ 6.5 and ≤ 8.5).



Red line indicates the upper limit of 13°C for spawning and green line indicates the upper limit of 15°C for migration.

Figure 16. Temperature ($^{\circ}\text{C}$) Measured in Stormwater Sampled at Monitoring Sites during All Four Events. (AWQS Criteria $\leq 13^{\circ}\text{C}$ for spawning and egg/fry incubation and $\leq 15^{\circ}\text{C}$ for migration routes and rearing areas).

Table 5. In Situ Parameters Measured at Monitoring Sites during All Four Sampling Events.

Station	Event 1 11-Jul-2018	Event 2 25-July-2018	Event 3 22-Sept-2018	Event 4 28-Sept-2018	Mean
<i>Flow Rate (gpm)</i>					
SWM03	84.6	104	66.9	95.7	87.7
SWM04	14.4	6.07	2.47	21.0	11.0
SWM05	2.63	7.87	1.27	40.3	13.0
SWM06	2.23	1.17	0.37	1.32	1.28
SWM07	9.17	0.94	0.65	20.9	7.93
SWM08	496	190	129	397	303.1
SWM09	74.5	15.7	1.31	18.0	27.4
SWM10	54.3	93.2	44.6	255	111.8
SWM11	1.81	5.97	5.78	72.0	21.4
SWM12	51.5	76.2	37.5	254	104.9
<i>Turbidity (NTU)</i>					
SWM03	19.0	13.1	3.14	19.5	13.7
SWM04	21.5	10.7	5.81	17.7	13.9
SWM05	46.4	27.6	6.52	80.0	40.1
SWM06	23.3	16.9	3.67	11.2	13.8
SWM07	241	84.8	31.1	241	149.5
SWM08	66.4	36.1	9.94	59.4	43.0
SWM09	40.5	12.1	6.38	34.5	23.4
SWM10	19.2	8.19	7.95	46.2	20.4
SWM11	24.6	23.5	25.6	344	104.4
SWM12	238	59.4	15.7	358	167.8
<i>Dissolved Oxygen (mg/L)</i>					
SWM03	8.96	9.49	8.26	10.81	9.38
SWM04	7.03	8.24	7.39	10.13	8.20
SWM05	9.71	9.10	9.98	11.44	10.06
SWM06	8.15	9.50	9.70	11.30	9.66
SWM07	9.31	9.06	9.35	11.49	9.80
SWM08	9.73	9.82	9.59	11.95	10.27
SWM09	9.41	10.05	8.96	10.40	9.71
SWM10	10.74	11.17	10.33	11.81	11.01
SWM11	8.40	8.61	9.81	11.69	9.63
SWM12	9.27	9.47	9.81	11.38	9.98

Table 5. Continued.

<i>Total Dissolved Solids (mg/L)</i>					
SWM03	85.2	53.3	109.9	70.9	79.8
SWM04	166.4	189.2	197.6	65.0	154.5
SWM05	85.8	112.5	31.9	47.5	69.4
SWM06	54.0	44.9	60.5	60.5	54.9
SWM07	67.0	44.9	36.4	42.9	47.8
SWM08	55.9	77.4	88.4	46.2	67.0
SWM09	83.2	172.9	137.8	98.8	123.2
SWM10	198.9	247.0	248.3	151.5	211.4
SWM11	89.7	93.0	85.8	35.1	75.9
SWM12	162.5	163.8	185.3	80.0	147.9
<i>pH</i>					
SWM03	7.62	7.33	7.55	7.45	7.33 – 7.62
SWM04	7.46	7.47	7.46	7.35	7.35 – 7.47
SWM05	7.85	7.24	7.52	7.24	7.24 – 7.85
SWM06	7.06	7.42	6.86	6.71	6.71 – 7.42
SWM07	7.52	7.10	7.26	7.28	7.10 – 7.52
SWM08	7.34	7.15	7.03	7.08	7.03 – 7.34
SWM09	7.29	7.40	7.28	7.25	7.25 – 7.40
SWM10	7.16	7.18	7.12	7.00	7.00 – 7.18
SWM11	7.48	6.82	7.40	7.47	6.82 – 7.48
SWM12	7.40	7.42	7.40	7.30	7.30 – 7.42
<i>Temperature (°C)</i>					
SWM03	12.09	13.52	9.77	9.68	11.27
SWM04	13.93	14.57	12.59	11.19	13.07
SWM05	13.12	13.64	11.71	11.08	12.39
SWM06	14.36	14.43	10.72	9.83	12.34
SWM07	13.12	13.85	11.39	10.57	12.23
SWM08	13.07	13.26	10.82	10.13	11.82
SWM09	13.06	12.85	11.77	11.09	12.19
SWM10	9.91	10.58	10.77	10.21	10.37
SWM11	12.48	13.61	11.33	10.76	12.05
SWM12	12.21	13.00	10.61	10.17	11.50

Footnotes: Range rather than mean provided for pH.

Table 6. Concentrations of Microbiological and Conventional Parameters.

Station	Event 1 11-Jul-2018	Event 2 25-July-2018	Event 3 22-Sept-2018	Event 4 28-Sept-2018	Mean
Biological Oxygen Demand (mg/L)					
SWM03	3.82	2U	2.33	2.14	2.32
SWM04	3.47	2U	2.15	2U	1.91
SWM05	3.91	2U	2.75	4.14	2.95
SWM06	3.97	2.11	6.86	19.90	8.21
SWM07	10.70	4.67	6.54	19.80	10.43
SWM08	5.41	5.10	4.96	9.93	6.35
SWM09	5.11	2U	4.25	5.31	3.92
SWM10	2.27	2U	2U	7.92	3.05
SWM11	6.37	2.57	5.70	4.74	4.85
SWM12	21.80	4.09	4.89	8.46	9.81
Total Suspended Solids (mg/L)					
SWM03	7.07	7.14	2.30	11.1	6.9
SWM04	10.1	60.2	7.45	10.0	21.9
SWM05	16.3	9.25	1.67	32.3	14.9
SWM06	16.0	8.25	2.83	6.80	8.5
SWM07	73.0	27.8	9.38	94.5	51.2
SWM08	30.4	14.4	3.76	31.7	20.1
SWM09	15.3	4.15	11.2	14.1	11.2
SWM10	7.92	4.95	4.50	17.2	8.6
SWM11	8.80	12.0	15.6	109	36.4
SWM12	73.5	20.4	5.73	149	62.2
Fecal Coliform (FC/100 mL)					
SWM03	118	809	3400	873	730
SWM04	330	1120	460	991	641
SWM05	11800	19800	618	2600	4402
SWM06	1240	15500	1160	215	1480
SWM07	2900	16800	390	1460	2295
SWM08	3000	43300*	320	800	2401
SWM09	673	3300*	430	1170	1028
SWM10	845	620*	249	350	462
SWM11	2000	TNTC*	3200	3600	2846
SWM12	12400	13500*	718	3500	4529

Footnotes: U = not detected at the associated detection limit that is shown. Mean calculations used geometric mean for fecal coliform and utilized 1/2 the reporting limit where analyte was not detected.

TNTC = Too numerous to count.

* = Fecal coliform samples analyzed outside 8-hr holding time.

Dissolved oxygen (DO) levels were generally fairly high and near saturation. The highest concentrations at all ten locations occurred during the fourth storm event, which was probably a reflection of both the higher turbulent flows and colder water temperatures which raise saturation levels, resulting in higher DO concentrations. Mean DO concentrations ranged from 8.20 to 11.01 milligrams/liter (mg/L; Table 5). The lowest DO level for any of the surveys was seen at SWM04, with a concentration of 7.03 mg/L measured during the first storm event. This level is still above the minimum AWQS criterion of 7.0 mg/L for the growth and propagation of fish, shellfish, and other aquatic life and wildlife (Figure 13).

Although not required by the monitoring plan, specific conductivity was recorded at each site since it was available on the portable multi-parameter meter and is considered useful for interpretation of stormwater data. Specific conductance was converted to total dissolved solid (TDS) concentrations so that comparisons could be made with AWQS criteria. Water from SWM04, SWM09, SWM10, and SWM12 had notably higher TDS levels than other locations, while SWM10 exhibited the highest concentrations for all four storm events. Mean TDS concentrations ranged from 47.8 mg/L at SWM07 to 211.4 mg/L at SWM10 (Table 5). Although elevated TDS can be indicative of contaminants, the highest concentrations measured were well within expected ranges for stormwater (EPA 1983). Also, no TDS concentrations were found that approached or exceeded the most restrictive AWQS criterion of 500 mg/L (Figure 14).

Measurements of pH were all within AWQS criteria for all storm events and locations (Table 5 and Figure 15). pH across all stations ranged from a low of 6.71 pH units to a high of 7.85, which occurred at SWM06 and SWM05, respectively. Rainfall is often slightly acidic, but exposure to minerals in soils typically mitigates any brief depressions. The National Atmospheric Deposition Program (NADP) indicates that rainfall in Alaska is typically in the range of 5.1 to 5.2 pH units (NADP 2018).

In 2018, all but one location had the lowest temperatures recorded during the fourth storm event that occurred in late September; SWM10 had the lowest temperature during the first event (Table 5). The lowest outfall discharge temperatures were seen at SWM10 for two of the four storm events; this station had the lowest mean temperature of 10.37°C. The highest temperatures were seen at SWM04, which drains a small residential area, with a mean temperature of 13.07°C. The majority of temperature values were found to be less than the AWQS of 13°C for fish spawning and egg/fry incubation areas, and all were below the AWQS criterion of 15°C for fish migration routes and rearing areas (Figure 16).

In addition to the standard field measurements, the field crew also recorded observations of any odor and visible water color, clarity, floatables, deposits or stains, sheens, and debris. A hydrocarbon odor was noticed at SWM08 during each of the four sampling efforts; this station receives runoff from a large mixed-use area (refer to field logs in Appendix D). A slight hydrocarbon odor was also observed at SWM07 during the first and fourth storm events. A sheen was observed at SWM05 during the second storm event. Observations of water color and clarity were consistent and matched those outfalls where high turbidity and TSS were observed. No floatables were noted in the field logs. Some stains (rust) were observed at SWM10, which may be an indication of corrosion of the stormwater piping or simply the result of high iron content that is often seen in Anchorage area streams. Other observations included a small amount of scum at one site, some garbage-type debris, leaves, sticks, and algae. Other than hydrocarbons and

turbidity, no attempt has been made to correlate any of the visual observations with the conventional or pollutant measurements.

4.3 Conventional Parameters (BOD₅ and TSS)

The BOD₅ concentrations during 2018 were found to be fairly low at all locations for all four storm events, with the highest concentrations at each site exhibited during either the first or fourth storm event (Table 6 and Figure 17). Concentrations ranged from a low of not detected (ND, or <2 mg/L) at many sites to a high of 21.8 mg/L measured at SWM12 during the first storm event. The highest overall mean BOD₅ concentration was seen at SWM07 with mean of 10.43 mg/L.

As noted earlier, it is expected that TSS levels would be highly correlated with turbidity. SWM12 had the highest mean TSS in 2018 at 62.2 mg/L and also exhibited the highest mean turbidity levels (Tables 5 and 6). TSS concentrations ranged from 1.67 mg/L at SWM05 during the third event to a high of 149 mg/L at SWM12 seen during the fourth storm event (Figure 18). The station mean concentrations ranged from 6.9 mg/L at SWM03 to 62.2 mg/L at SWM12. Large differences can occur for TSS since this parameter is highly dependent on the drainage area and is a function of the type of useage, percent impervious surfaces, slope, flow rate, and other factors.

4.4 Fecal Coliform

Fecal coliform measurements were found to often exceed the 200 fecal coliform (FC)/100 mL AWQS criterion (Table 6 and Figure 19). Overall, concentrations were found to be similar when compared to those seen in prior years. The highest concentrations seen in 2018 occurred at one of the two newer stations, SWM11, with a concentration of “too numerous to count” (TNTC) during the second storm event. Geometric mean concentrations ranged from a low of 462 to 4,529 FC/100 mL. Although the AWQS do not directly apply to stormwater, the limit of 200 FC/100 mL was used as a benchmark comparison since most applicable beneficial use criteria are based on this numeric limit (refer to Table 9). The station with the lowest geometric mean was SWM10 with a concentration of 462 FC/100 mL; stations SWM03 and SWM04 also exhibited low geometric mean fecal coliform levels. Overall, the fecal coliform concentration in only one individual sample from 2018 was less than the 200 FC/100 mL criterion. Studies conducted by EPA in the early 1980s indicated that fecal coliform levels in warm climates were typically in the range of 10,000s to 100,000s FC/100 mL, with a median of 21,000 FC/100 mL (EPA 1983). In colder climates, the median concentration of fecal coliform was typically in the 1,000 FC/100 mL range, which is more comparable to concentrations seen at most locations and storms during 2018.

Despite the fact that established fecal coliform standards were exceeded during most storms at all ten sites, overall mean concentrations were not alarming when compared to typical concentrations seen in urban areas (EPA 1983). The highest mean concentrations were seen at SWM05, SWM07, SWM08, SWM11, and SWM12 with geometric means of 4402, 2295, 2401, 2846, and 4529 FC/100 mL, respectively, although elevated individual samples were also seen at a number of other locations (Table 6). An earlier analysis of fecal coliform in Anchorage streams

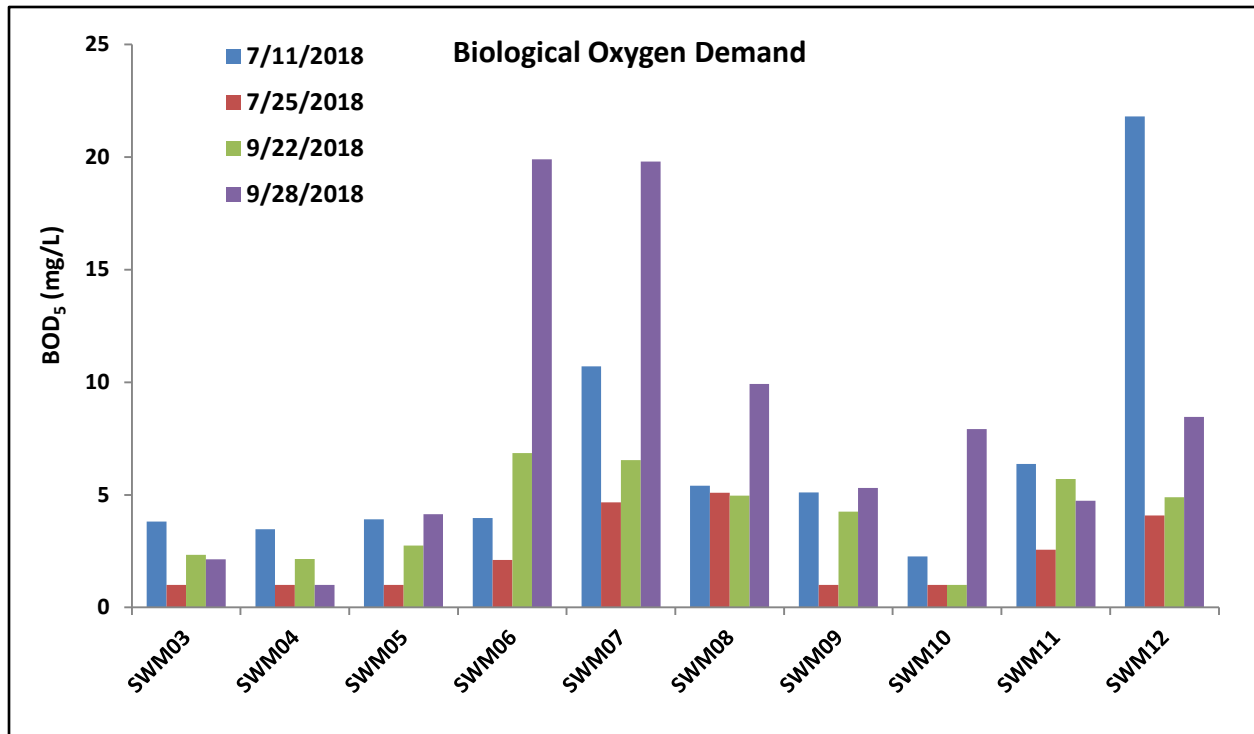


Figure 17. BOD₅ (mg/L) Measured in Stormwater Sampled at Monitoring Sites during All Four Events. (Note: ND ≤1 mg/L.)

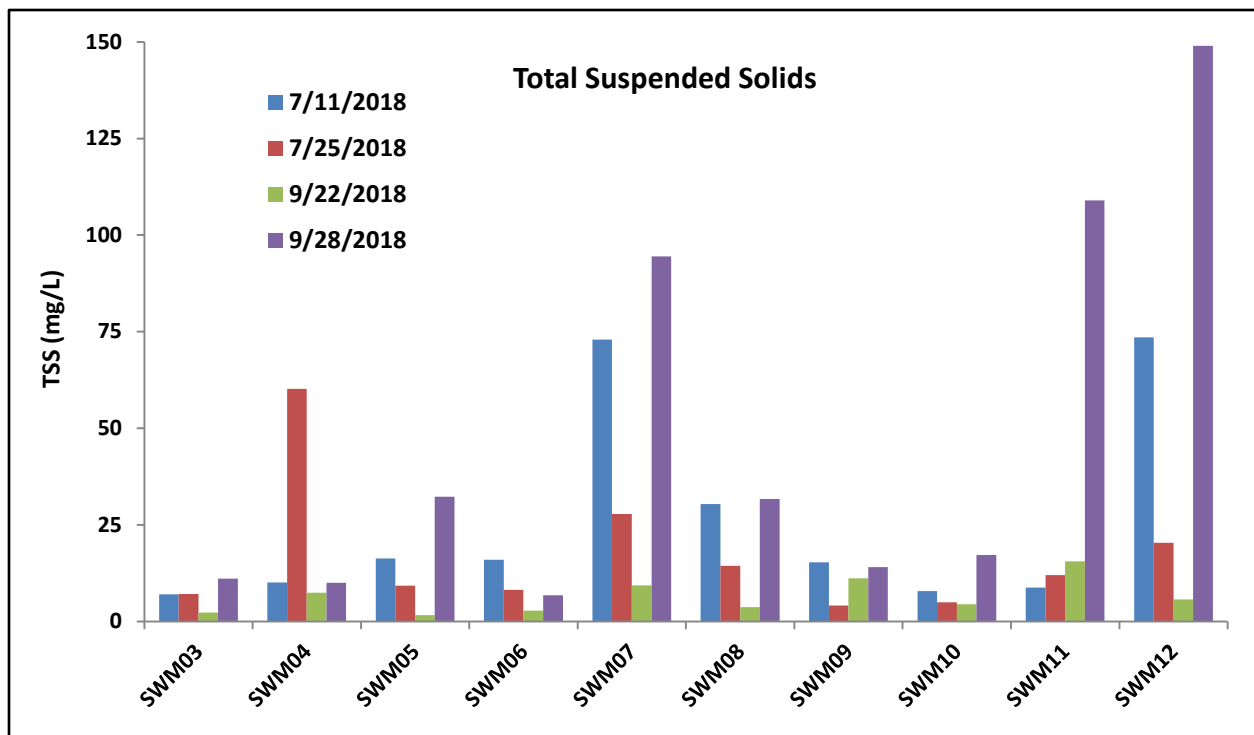


Figure 18. Total Suspended Solids Measured in Stormwater Sampled at Monitoring Sites during All Four Events.

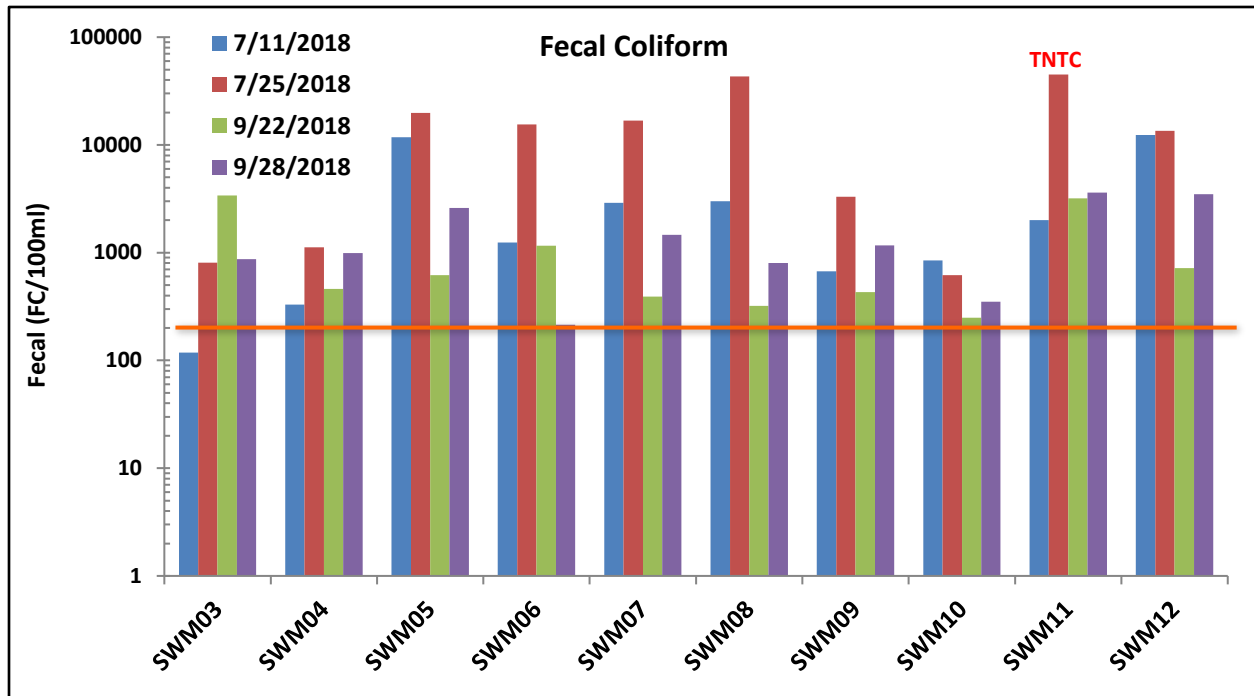


Figure 19. Fecal Coliform (FC/100 mL) Measured in Stormwater Sampled at Monitoring Sites during All Four Events. (AWQS \leq 200 FC/100 mL.)

indicated that highest loads would most likely occur in August/September in association with peak runoff and rainfall (MOA 2003). During 2018, the highest levels were seen at eight of the ten sites in late July during the second event, although the high variability generally seen in fecal coliform measurements between storm events and locations suggests the need to continue monitoring this parameter over a relatively extended time period to better assess performance of control measures.

4.5 Metals and Hardness

Supplemental monitoring of dissolved copper and total water hardness were added to the program in 2016 for all locations and storms. The permit requirements and monitoring conducted in prior years did not include these two parameters.

Hardness was found to be highly variable between locations and events. Hardness concentrations ranged from a low of 15.9 mg/L to a high of 118 mg/L (Table 7 and Figure 20). Mean concentrations ranged from a low of 23.9 mg/L at SWM07 to a high of 94.7 mg/L at SWM10. Typically, within the same water body, hardness is inversely correlated to turbidity and TSS. This relationship was very evident in the 2018 data, where seven of the ten sites had their highest hardness values during the third storm event and all seven of these same sites also experienced their lowest turbidity and TSS levels. One of the three remaining sites also experienced their highest hardness and lowest TSS concentrations during the second storm event. Hardness is an important parameter for freshwater since it affects toxicity and it is used to determine both acute and chronic receiving water criteria for many metals. As hardness increases, so does the corresponding metals criterion. For example, for the State of Alaska, the acute water quality criteria for copper ranges from a concentration of 6.99 $\mu\text{g/L}$ at a hardness of 50 mg/L to a

concentration of 13.44 µg/L at a hardness value of 100 mg/L. However, in order to apply this information directly to the metals data collected in this program, hardness data are needed for the receiving waterbody.

Dissolved copper concentrations were quite variable and ranged from 0.69 micrograms/liter (µg/L) at SWM10 during the third event to a high of 17.5 µg/L at SWM07 during the first storm (Table 7 and Figure 21). Concentrations at this latter station were also elevated during two of the other three storms when compared to the approximate acute criteria level (Figure 21). Mean copper concentrations ranged from 1.43 µg/L at SWM10 to a high of 10.82 µg/L seen at SWM07. The next highest copper concentrations were seen at SWM05 and SWM12 with mean of concentrations of 7.33 and 9.32 µg/L, respectively. These three outfalls also exhibited some of the highest dissolved copper concentrations during 2017.

Table 7. Concentrations of Hardness and Dissolved Copper.

Station	Event 1 11-Jul-2018	Event 2 25-July-2018	Event 3 22-Sept-2018	Event 4 28-Sept-2018	Mean
<i>Hardness (mg/L)</i>					
SWM03	61.5	31.2	75.5	42.2	52.6
SWM04	73.3	98.7	109.0	34.5	78.9
SWM05	46.0	55.3	61.0	26.9	47.3
SWM06	26.5	24.9	36.1	34.9	30.6
SWM07	33.4	18.9	15.9	27.3	23.9
SWM08	26.1	34.6	42.7	25.0	32.1
SWM09	44.1	93.0	78.9	50.2	66.6
SWM10	92.4	102.0	118.0	66.5	94.7
SWM11	50.6	56.8	55.5	34.5	49.4
SWM12	68.1	76.9	102.0	53.7	75.2
<i>Dissolved Copper (µg/L)</i>					
SWM03	5.74	2.23	3.85	2.79	3.65
SWM04	5.32	3.50	2.49	2.87	3.55
SWM05	15.70	6.40	3.50	3.73	7.33
SWM06	5.96	3.04	5.65	3.44	4.52
SWM07	17.50	9.38	3.79	12.60	10.82
SWM08	8.09	6.68	7.59	4.75	6.78
SWM09	5.62	1.67	2.34	2.16	2.95
SWM10	2.48	1.32	0.69	1.21	1.43
SWM11	5.05	4.68	5.35	7.53	5.65
SWM12	14.70	8.96	5.75	7.85	9.32

Footnotes: U = not detected at the associated reporting limit that is shown. Mean calculations utilized 1/2 the reporting limit where analyte was not detected.

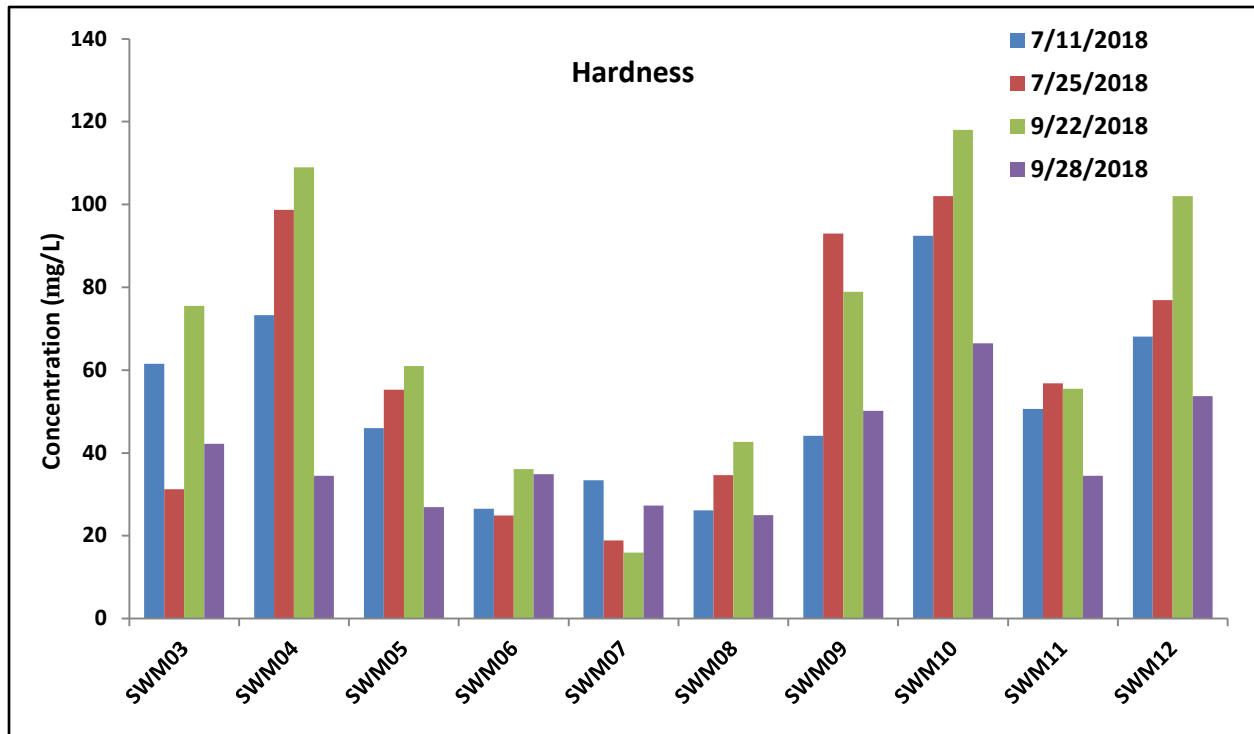


Figure 20. Water Hardness (mg/L) Measured in Stormwater Samples.

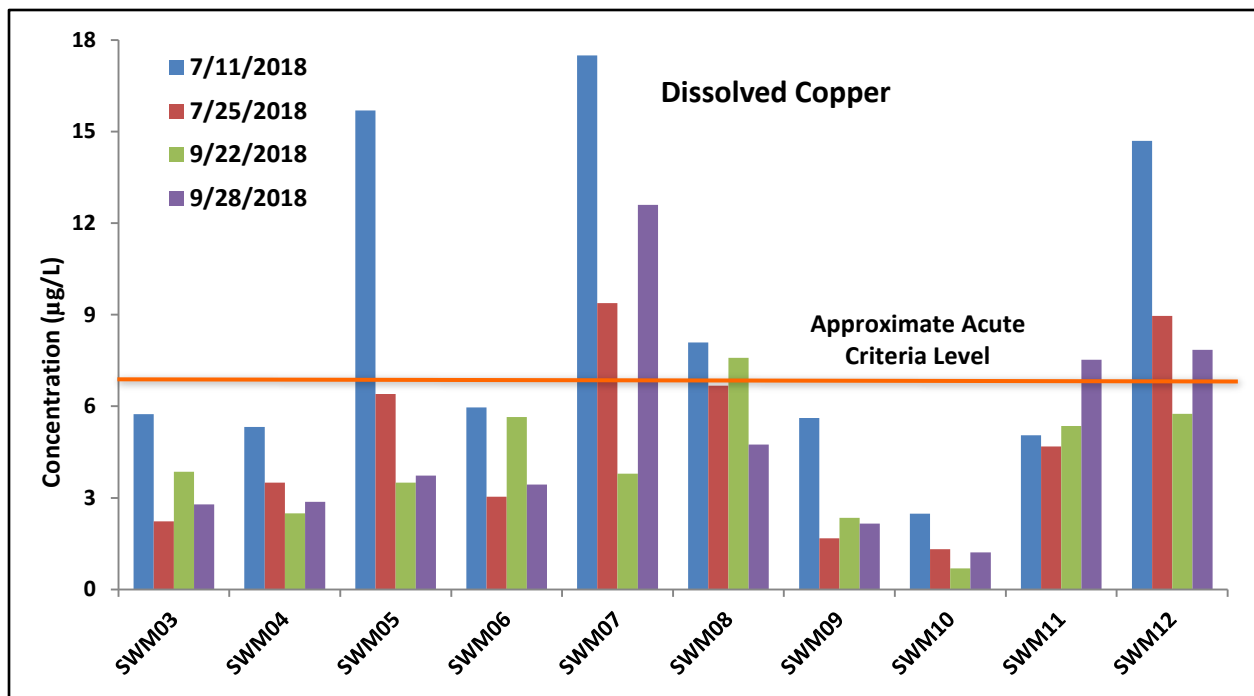


Figure 21. Dissolved Copper (µg/L) Measured in Stormwater Samples. (Acute AWQS based on hardness value of 50 mg/L in the receiving water.)

4.6 Hydrocarbons

Polycyclic aromatic hydrocarbons (PAHs) and total aromatic hydrocarbons (TAH) were measured at four of the monitoring sites: SWM05, SWM07, SWM09, and SWM12. In all cases, total PAH (TPAH) concentrations were low, ranging from ND in two samples (SWM05 and SWM12) to 2.247 $\mu\text{g/L}$ at SWM09, all during the third storm event (Table 8). TAH concentrations were all below detection limits for all sites and all storms in 2018. As shown in Figure 22, all samples were well within the AWQS criteria for both the summed parameter of total aqueous hydrocarbons (TAqH) and TAH measured as benzene, ethylbenzene, toluene, and xylenes (BETX). TAqH is defined in the AWQS as the summation of TPAH and TAH with a criterion of 15 $\mu\text{g/L}$, whereas TAH alone has an AWQS criterion of 10 $\mu\text{g/L}$ (Table 9). The highest concentration of TAqH was 2.247 $\mu\text{g/L}$ at SWM09 during the third sampling event.

PAHs were the most common compounds found at each site and were typically comprised of combustion-related compounds like pyrene, fluoranthene, chrysene, benzo(a)pyrene, benzo(a)anthracene, benzo(g,h,i)perylene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene, although low levels of anthracene, fluorene, naphthalene, and phenanthrene were also seen in a number of samples. Concentrations of individual PAHs were found to be low and with the exception of five analytes in one sample and three in another (all at SWM09), were all less than 0.2 $\mu\text{g/L}$. Some PAHs were seen at all four sites during at least three storm events. The highest PAH concentrations during three of the four storm events were seen at SWM09. There did

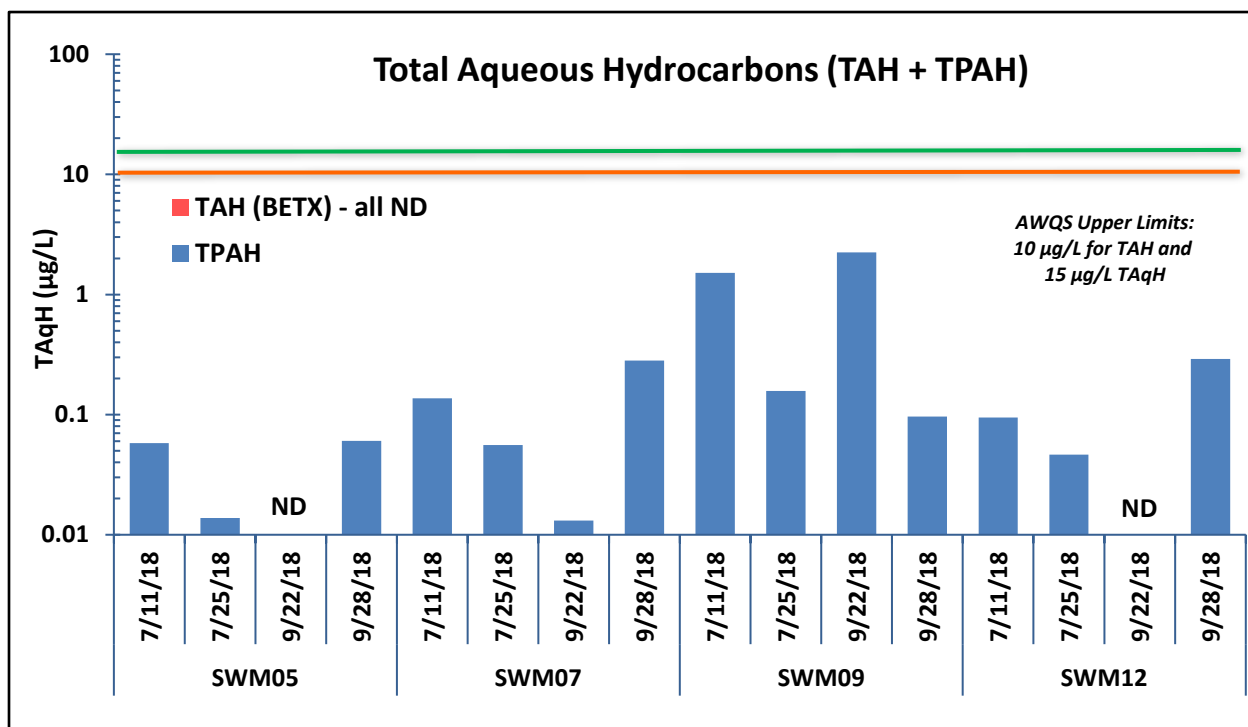


Figure 22. Total Aqueous Hydrocarbons (TAqH = TAH + TPAH) Measured in Stormwater Sampled at Monitoring Sites during All Four Events. (AWQS $\leq 10 \mu\text{g/L}$ for TAH and $\leq 15 \mu\text{g/L}$ for TAqH.)

Table 9. Pertinent Numeric Alaska Water Quality Standard Criteria.

Designated Use	Description of Standard
Fecal Coliform Bacteria	
(A) Water Supply (i) drinking, culinary and food processing	In a 30-day period, the geometric mean may not exceed 20/FC/100 ml, and not more than 10% of the samples may exceed 40 FC/100 ml.
(A) Water Supply (ii) agriculture, including irrigation and stock watering	The geometric mean of samples taken in a 30-day period may not exceed 200 FC/100 ml, and not more than 10% of the samples may exceed 400 FC/100 ml. For products not normally cooked and for dairy sanitation of unpasteurized products, the criteria for drinking water supply, (1)(A)(i), apply.
(A) Water Supply (iii) aquaculture	For products normally cooked, the geometric mean of samples taken in a 30-day period may not exceed 200 FC/100 ml, and not more than 10% of the samples may exceed 400 FC/100 ml. For products not normally cooked, the criteria for drinking water supply, (1)(A)(i), apply.
(A) Water Supply (iii) Industrial	Where worker contact is present, the geometric mean of samples taken in a 30-day period may not exceed 200 FC/100 ml, and not more than 10% of the samples may exceed 400 FC/100 ml.
(B) Water Recreation (iv) contact recreation	In a 30-day period, the geometric mean of samples may not exceed 100 FC/100 ml, and not more than one sample or more than 10% of the samples if there are more than 10 samples, may exceed 200 FC/100 ml.
(B) Water Recreation (ii) secondary contact	In a 30-day period, the geometric mean of samples may not exceed 200 FC/100 ml, and not more than 10% of the total samples may exceed 400 FC/100 ml.
(C) Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	Not applicable.
Dissolved Oxygen (most restrictive shown)	
(A) Water Supply (iii) aquaculture (C) Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	DO must be greater than 7mg/L in surface waters. The concentration of total dissolved gas may not exceed 110% of saturation at any point of sample collection.
pH	
(A) Water Supply (i) drinking, culinary and food processing	May not be less than 6.0 or greater than 8.5.
(A) Water Supply (ii) agriculture, including irrigation and stock watering, & (iv) Industrial	May not be less than 5.0 or greater than 9.0.
(A) Water Supply (iii) aquaculture	May not be less than 6.5 or greater than 8.5. May not vary more than 0.5 pH unit from natural conditions.
(B) Water Recreation (iv) contact recreation	May not be less than 6.5 or greater than 8.5. If natural condition pH is outside this range, substances may not be added that cause an increase in the buffering capacity of the water.
(B) Water Recreation (ii) secondary contact	Same as (6)(A)(iv)
(C) Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	May not be less than 6.5 or greater than 8.5. May not vary more than 0.5 pH unit from natural conditions.
Petroleum Hydrocarbons	
(A) Water Supply (iii) aquaculture & (C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife.	TAQH in the water column may not exceed 15 µg/L. TAH in the water column may not exceed 10 µg/L. Surface waters and adjoining shorelines must be virtually free from floating oil, film, or discoloration.
Dissolved Inorganic Substances (most restrictive shown)	
(A) Water Supply (i) drinking, culinary, and food processing	Total dissolved solids (TDS) from all sources may not exceed 500 mg/L.
Temperature (most restrictive shown)	
(A) Water Supply (iii) aquaculture & (C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife.	The following maximum temperatures may not be exceeded, where applicable: Migration routes and rearing areas: 15°C Spawning areas, egg & fry incubation: 13°C

Table 9. (Continued)

Turbidity						
(A) Water Supply (i) drinking, culinary, and food processing		May not exceed 5 nephelometric turbidity units (NTU) above natural conditions when the natural turbidity is 50 NTU or less, and may not have more than 10% increase in turbidity when the natural turbidity is more than 50 NTU, not to exceed a maximum increase of 25 NTU.				
(A) Water Supply (ii) agriculture, including irrigation and stock watering		May not cause detrimental effects on indicated use.				
(A) Water Supply (iii) aquaculture		May not exceed 25 NTU above natural conditions. For all lake waters, may not exceed 5 NTU above natural conditions.				
(A) Water Supply (iv) industrial		May not cause detrimental effects on established water supply treatment levels.				
(B) Water Recreation (i) contact recreation		May not exceed 5 NTU above natural conditions when the natural turbidity is 50 NTU or less, and may not have more than 10% increase in turbidity when the natural turbidity is more than 50 NTU, not to exceed a maximum increase of 15 NTU. May not exceed 5 NTU above natural turbidity for all lake waters.				
(B) Water Recreation (ii) secondary recreation		May not exceed 10 NTU above natural conditions when natural turbidity is 50 NTU or less, and may not have more than 20% increase in turbidity when the natural turbidity is greater than 50 NTU, not to exceed a maximum increase of 15 NTU. For all lake waters, turbidity may not exceed 5 NTU above natural turbidity.				
(C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife		Same as (12)(A)(iii).				
Dissolved Copper (µg/L)						
Metal	m _A	b _A	m _c	b _c	Freshwater Conversion Factors (CF)	
					Acute (CMC)	Chronic (CCC)
Copper	0.9422	-1.700	0.8545	-1.702	0.960	0.960
Hardness-dependent criteria may be calculated from the following for freshwater metals: Acute (dissolved) = exp {m _A [ln(hardness)] + b _A } (CF) Chronic (dissolved) = exp {m _c [ln(hardness)] + b _c } (CF)						

appear to be noticeable differences in PAH levels at the two sites with an OGS unit versus the two without, in that some of the highest concentrations were actually seen at a SWM09 that has an OGS.

In addition to the laboratory measurements of PAH and TAH, field observations were recorded of any sheens or odors. A sheen was observed at SWM05 during the second event. Although not sampled for hydrocarbons, a hydrocarbon odor was also noted at SWM07 during two storm events and at SWM08 during all four sampling events.

4.7 Site Trends

This report presents the latest of eight years of monitoring for the program. Some general trends between sites were detected that in some cases have persisted across sampling events and between years. General site differences were investigated graphically with box plots that have been prepared for each field and laboratory parameter (Figures 23, 24, and 25). With the exception of the two newer outfalls (SWM11 and SWM12), the box plots constitute the results from 31–32 samples collected at each location during 2011 through 2018 and depict the minimum, maximum, median, 25th-percentile, 75th-percentile, and grand median measurements across all locations. The box plots for SWM11 and SWM12 represent just eight samples from

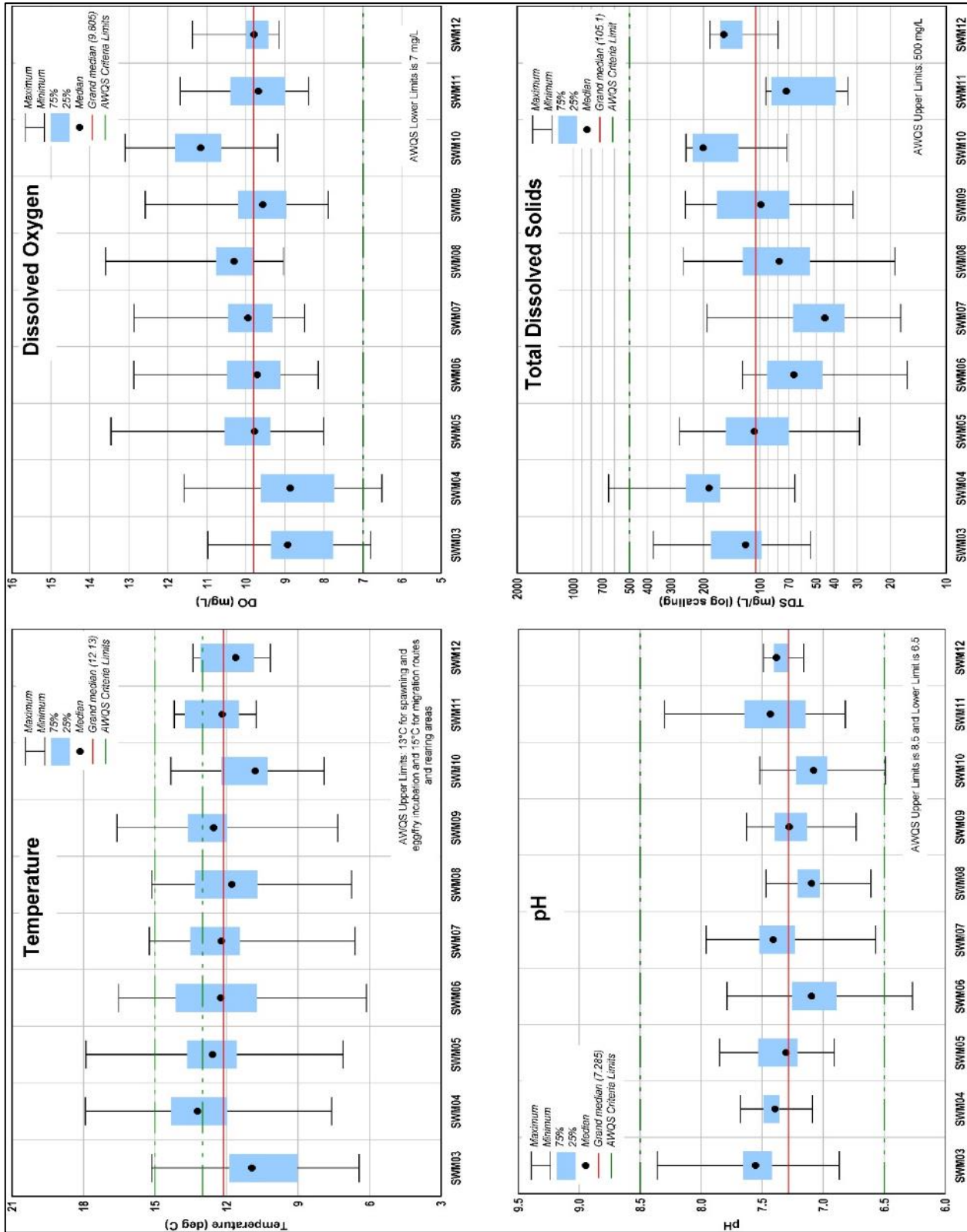


Figure 23. Station Box Plots of pH, Temperature, Total Dissolved Solids, and Dissolved Oxygen for 2011 through 2018.

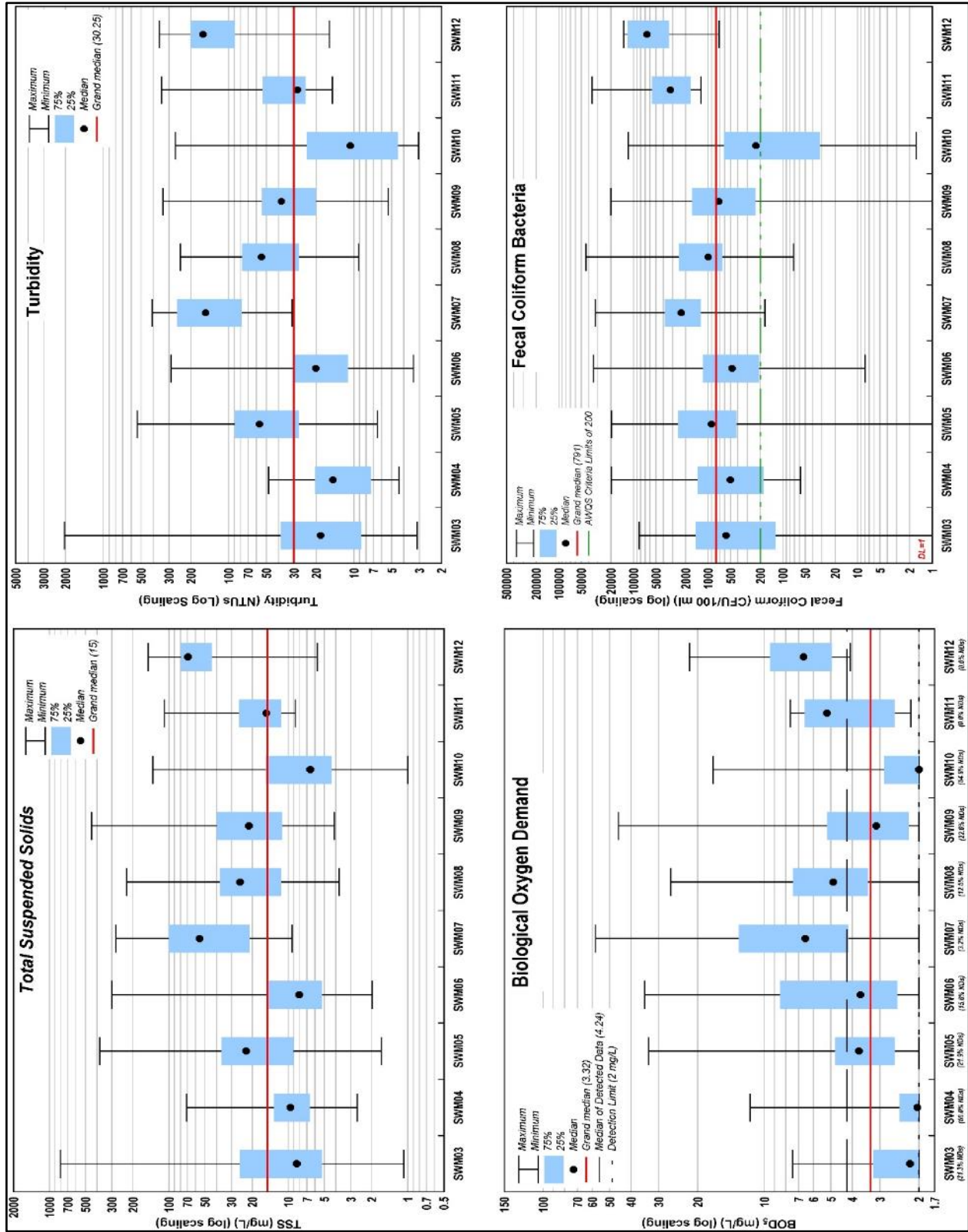


Figure 24. Station Box Plots of Total Suspended Solids, Turbidity, Biological Oxygen Demand, and Fecal Coliform for 2011 through 2018.

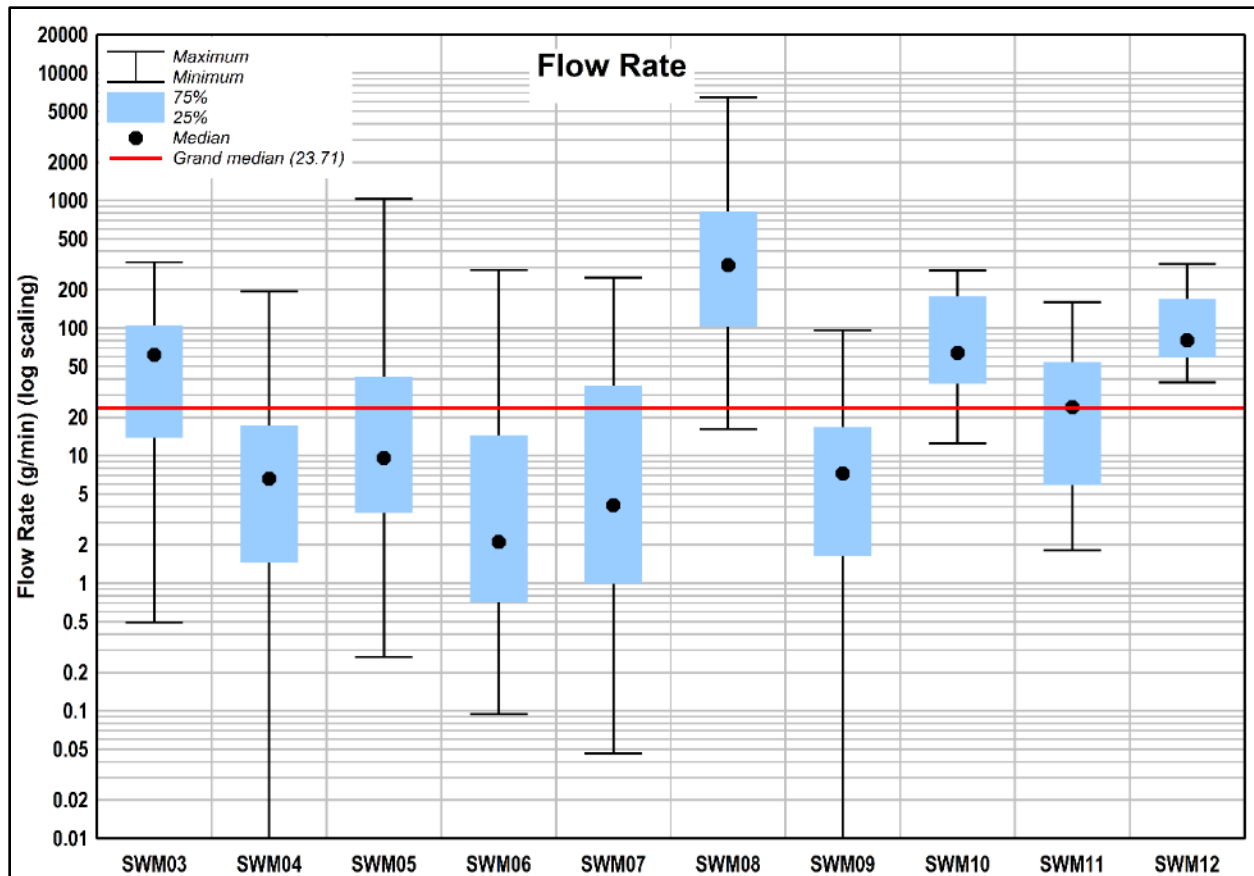


Figure 25. Station Box Plot of Outfall Flow Rate for 2011 through 2018.

2017 and 2018. In addition, AWQS criteria have been plotted where appropriate for each parameter.

In reviewing the box plots, a few locations seem to stand out for each parameter. Temperature was somewhat lower at two locations (SWM03 and SWM10; Figure 23). This may be a function of the duration of which the stormwater flows through a buried storm drain network versus the drainages with more open-channel and overland flow with shorter pipe networks. Water flowing through buried pipes tends to remain cooler than that flowing overland during the summer months.

DO was near saturation at all locations. SWM10 had the highest levels, potentially due to turbulent flow in the outfall pipe prior to discharge (Figure 23). SWM10 was also one of the locations with the lowest BOD₅ concentration (Figure 25). This potential inverse correlation between DO and BOD₅ did not hold true for SWM07, which had a median DO level of ~10 mg/L, slightly above average, but that also had the highest BOD₅ concentration. For BOD₅, SWM07 and SWM12 were somewhat higher which may be a result of vehicle cooling liquid inputs (glycols) from streets and driveways. The drainage areas for both of these outfalls include a high percentage of streets, parking lots, and other impervious surfaces.

For pH, SWM06 was consistently lower than the other locations with a few measurements below the AWQS lower limit of 6.5 pH units, although all measurements were above the lower limit in

2018 (Figure 23). Outfalls SWM03 and SWM11 had the highest median pH concentration. No outfalls or storm events exceeded the upper AWQS pH criterion of 8.5 pH units.

TDS appeared to be slightly higher at both SWM04 and SWM10 and may be an indication of other pollutants such as fertilizer, salts, or other organic ions (Figure 23). Potential sources could be magnesium chloride that MOA uses on the city streets for de-icing/anti-icing purposes, residential/commercial use of deicing salts on walkways and driveways, or residential use of fertilizer. It is expected that use of salts would increase TDS concentrations during the early summer storms, although no seasonal pattern was seen during 2018. Both of these outfalls drain primarily residential areas. U.S. Geological Survey (2006) documented increases in TDS, sodium, and chloride levels in the downstream direction within the Chester Creek drainage that indicated influences from urbanization.

Both TSS and turbidity were highly variable between storms and locations although there was a general positive correlation between TSS and turbidity in the box plot location patterns (Figure 24). The highest median TSS and turbidity concentrations were detected at SWM07 and at one of the newer outfalls, SWM12. Outfall SWM07 has been consistently high for each year of the study, whereas outfall SWM10 has consistently exhibited the lowest TSS and turbidity levels.

For fecal coliform, SWM10 was consistently lower than other locations, and SWM07 has been consistently much higher historically (Figure 24). Fecal coliform concentrations were also found to be high at the two newer outfall locations, SWM11 and SWM12, although the box plot only represents eight samples from these locations. Other elevated locations included SWM05 and SWM08. The sources of the higher concentrations seen at SWM07, SWM11, and SWM12 are unknown, but these observations will be used to guide future efforts and to focus subsequent analyses.

Flow rate was highly variable between locations and between events (Figure 25). Outfall SWM08, which is a large 42-inch pipe that drains the largest basin, had consistently higher flow rates than the other locations. The lowest flow was at SWM06 which drains a small residential area. Flows at SWM03, SWM10, SWM11, and SWM12 were also relatively high when compared to the other five locations, although some of the other locations exhibited high flows during some storm events. For some outfalls, particularly for those with small drainage basins, flow rates responded rapidly to changes in precipitation.

4.8 Yearly and Seasonal Trends

The data were examined for any yearly or seasonal trends to determine if differences in the concentration of any parameter changed dramatically from one year to the next or if there were differences that could be attributed to seasonal timing. For example, historic studies conducted in the Anchorage watersheds have indicated there were seasonal influences in fecal coliform concentrations, presumably tied to air and water temperatures, where concentrations were generally higher during the summer months and lower during spring and fall (MOA 2003). Most of the measurements taken over the eight years of this stormwater study occurred during July and August, although two events in 2018 did occur during September. Data were collected during one storm event during June and one in October, while nine storm events were sampled in September.

With a limited number of storm events sampled outside of the peak summer months, determining seasonal trends is difficult.

Although many differences occurred between years for various parameters, no clear patterns emerged across multiple locations. For example, fecal coliform was clearly higher at one location during 2011, 2012, and 2015, at two locations during 2013 and 2014, at four locations in 2016, and at three locations in both 2017 and 2018, although SWM07 has stood out each year as having some of the highest fecal coliform levels overall. The two new outfalls, SWM11 and SWM12, also exhibited high fecal coliform levels in both 2017 and 2018. Variability fluctuated between years for other parameters as well. In fact, other than TSS and turbidity, no patterns of multiple parameters correspondingly fluctuating across multiple locations and years emerged.

Even with limited data points outside the peak summer months, some seasonal differences occurred in a few of the parameters. Temperature was higher across all locations in July and August than in early June, September, and October (Figure 26). DO typically fluctuates inversely to temperature, with higher DO concentrations during early summer and fall, and lower concentrations during mid-summer. This seasonal trend in DO, as plotted against the day of year (DOY), is clear in the regression plot for all sites and years (Figure 26). Although not as consistent or as highly correlated as temperature or DO, fecal coliform followed a similar trend as that seen in temperature. Fecal coliform counts were generally lower during spring and fall and higher during the summer (Figure 26). Seasonal pattern regression values are presented on each plot where the data have been fitted to a second-order polynomial. Regression values (R coefficient) were 0.520 for temperature, 0.293 for DO, and 0.044 for fecal coliform.

4.9 Annual Loading

The Simple Method to calculate loading estimates was used for determining annual loadings for fecal coliform and hydrocarbons for each of the subbasins that was examined in this study (SMRC 2010). The Simple Method was developed under an EPA grant to provide Phase II communities with tools to protect their local watersheds. This method estimates stormwater runoff pollutant loads for urban areas and requires the following information: subbasin drainage area and percent impervious cover, flow-weighted or event-mean stormwater runoff pollutant concentrations, and annual precipitation. With the Simple Method, calculations can be based on specific land use areas such as residential, commercial, industrial, and roadway to calculate annual pollutant loads for each type of land use. The method can also be used for more generalized pollutant comparisons by land uses such as new suburban areas, older urban areas, central business districts, and highways. Equations and calculation methodology utilized for the Simple Method are detailed in Attachment B-1 of the QAP (MOA 2016).

A major limitation for this method is applying data collected from a single grab sample for each storm event rather than using flow-weighted data that would help eliminate some of the high variability. Available documentation (SMRC 2010) for this method does not address its applicability to organic compounds such as petroleum hydrocarbons, even though comparisons are provided in this report. Loading data are considered estimates that can provide useful information in comparing subbasins and for use as a planning tool, but are not precise enough for comparing similar loading estimates.

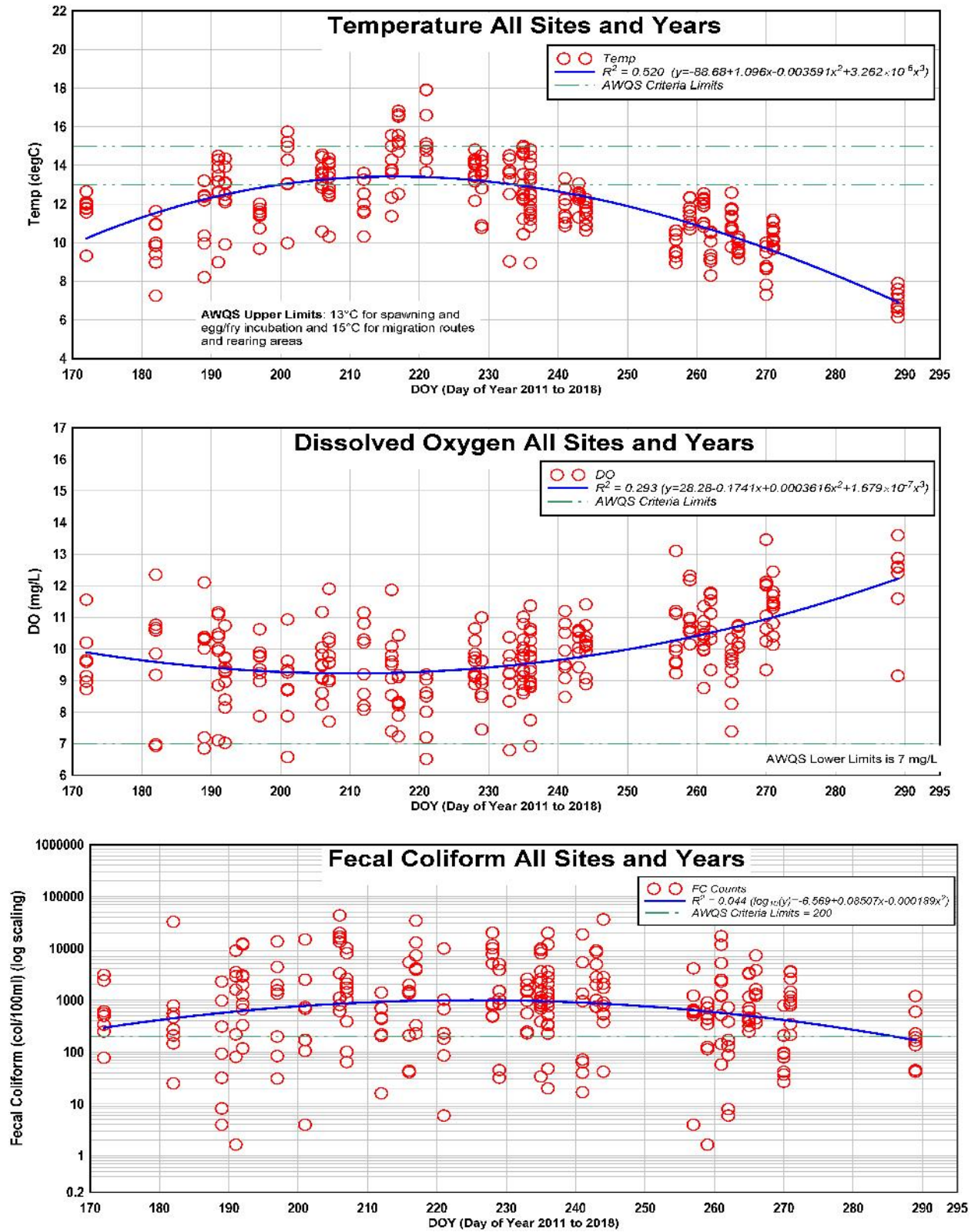


Figure 26. Seasonal Patterns for Temperature, DO, and Fecal Coliform, All Sites and All Years.

Annual loading estimates were determined for fecal coliform and hydrocarbons. Fecal coliform loading calculations (Figure 27) utilized the annual geometric mean for each location to account for some of the high variability. For hydrocarbons, only TPAH was examined since all volatile aromatic hydrocarbons were found to be ND except a single sample in 2011, 2012, and 2017. TPAH loading calculations (Figure 28) utilized the annual arithmetic mean for each location.

SWM07 stands out as the subbasin with the highest annual fecal coliform loading in six of the eight years of the study (Figure 27). During 2015, the fecal loading at SWM07 was substantially lower, but it increased to be the highest again in both 2016 and 2017. Elevated fecal loading at SWM07 was also seen in 2018. In 2018, SWM05 had the highest loading estimate although the loading at SWM11 was biased low due to a value of “too numerous to count” during one storm event. Areas with relatively high fecal coliform loading were SWM03 (residential), SWM05 (commercial/industrial), SWM07 (commercial/industrial), SWM08 (mixed), SWM11 (residential), and SWM12 (commercial/industrial). These locations represent all three of the different land use categories examined in the study (refer to Table 1). The lowest fecal loading values were detected at SWM04 (residential), SWM06 (residential), SWM09 (commercial/industrial), and SWM10 (mixed). SWM10 exhibited elevated levels of fecal coliform loading during 2014, although three of the four storm events were in line with historic measurements. With the exception of SWM11, the residential areas were generally lower in fecal coliform loading when compared to the commercial/industrial areas.

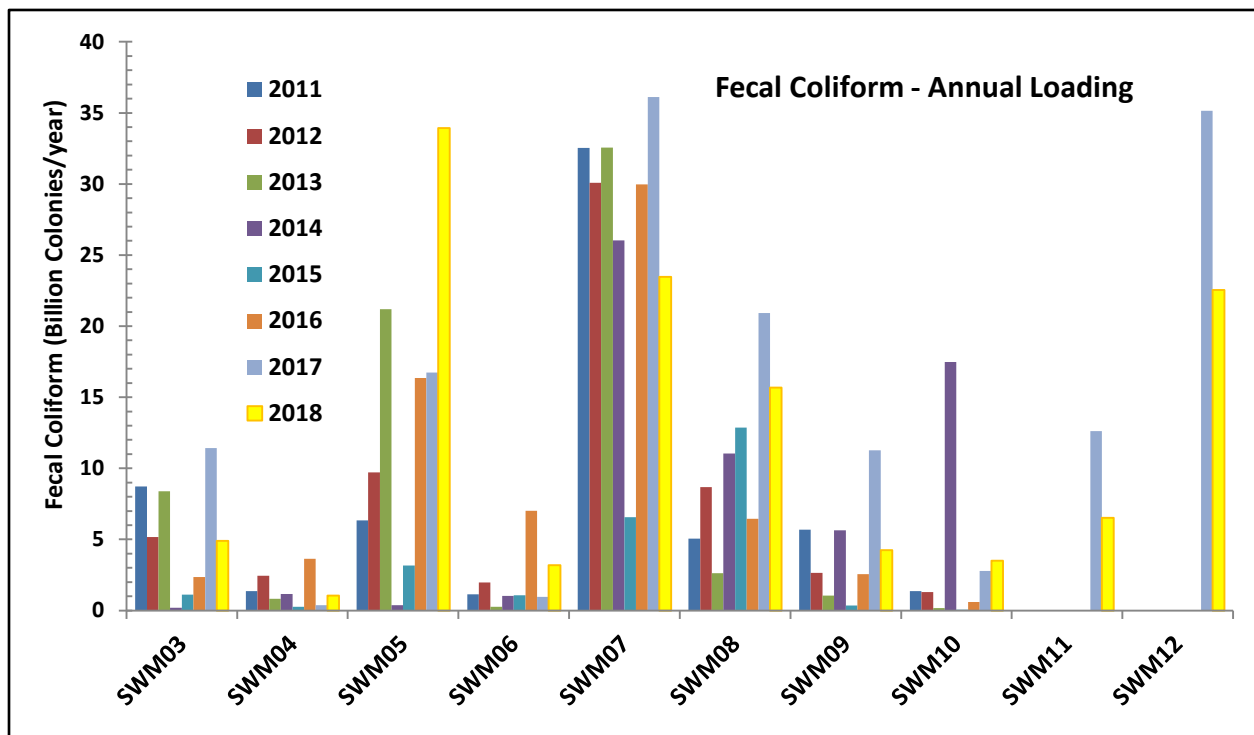


Figure 27. Fecal Coliform Annual Loading by Monitoring Site.

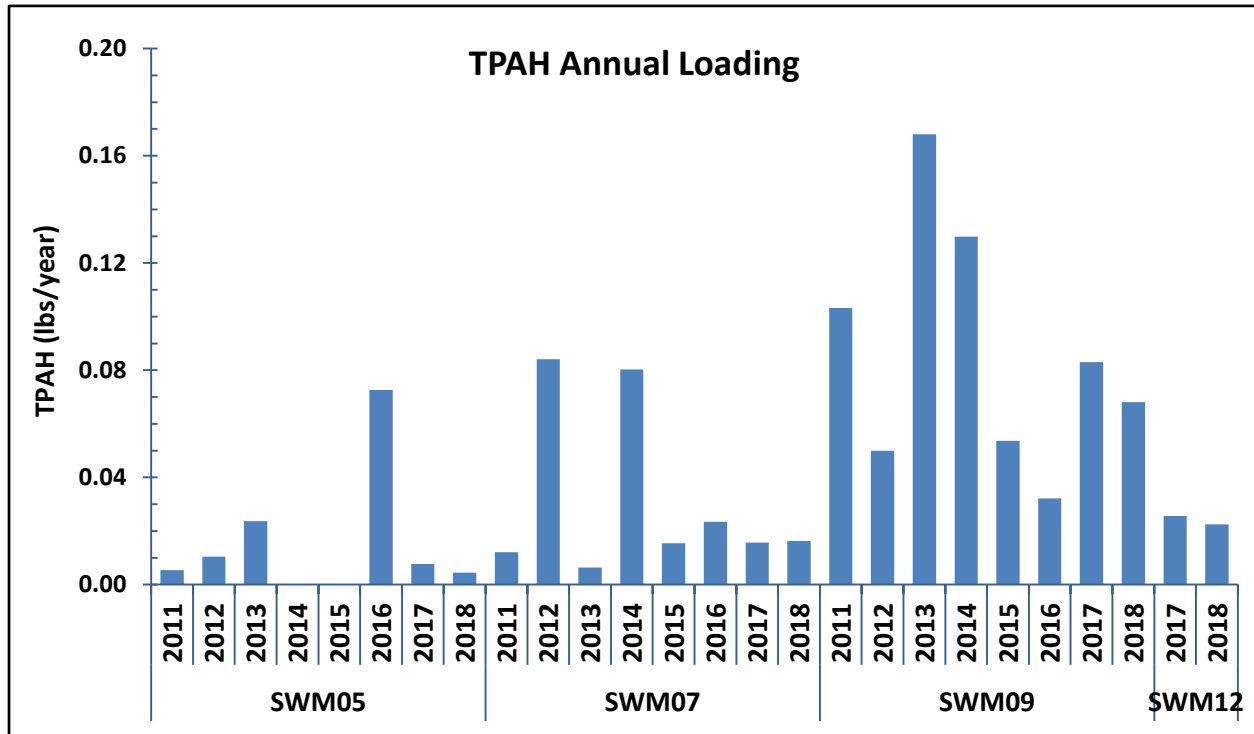


Figure 28. TPAH Annual Loading by Monitoring Site.

Annual hydrocarbon loading, as determined by TPAH measurements, was low at all four locations that were measured (Figure 28). The highest TPAH loading was seen at SWM09, ranging from a low of 0.04 lbs/year in 2016 to a high of 0.17 lbs/year during 2013. Slightly lower levels were seen at both SWM05 and SWM07 during some years, with peak concentrations of around 0.08 lbs/year. No clear pattern was noted between the outfalls that contained OGS units (SWM05 and SWM09) versus those that did not (SWM07 and SWM12); for example, SWM05 had some of the lowest loading values, while SWM09 had some of the highest. Based on these four locations, and given that they were all similar in size in terms of acreage and were from the commercial/industrial land use categories, the efficacy of the OGS units could not be determined. OGS units may be effective in removing oil, grease, and grit, but the hydrocarbons as measured by both TAH and TPAH may not be removed as they are mostly dissolved and likely to pass through an OGS.

Alternatively, there could just be large differences between the four areas examined that make it difficult to determine the effectiveness of the OGS based on this study. The best way to measure the efficacy of an OGS unit would be to take both up- and down-stream measurements so that a direct comparison could be made on the amount of hydrocarbons removed at a specific location. Hydrocarbon concentrations could also be measured in the oil and grit that is collected within the OGS unit itself to obtain a percent removal estimate.

5.0 Summary and Conclusions

This report presents results from the 2018 monitoring and summarizes the results for the entire eight years of sampling conducted under the APDES permit-specified monitoring program. The monitoring program began in 2011 and included sampling at ten representative locations during four storm events each year for a total of 32 storms. Results from this sampling effort allow an initial screening by comparison against all available water quality standards. When benchmark exceedances were identified, the intent was that MOA would determine likely causes and take actions, if necessary, such as education and outreach or implementation of additional BMPs to reduce the pollutant loading.

The eighth year of monitoring successfully sampled all parameters specified for each of the ten selected outfalls during all four monitoring events, meeting the permit requirements. Minor excursions to the QA/QC requirements of the program, including the analysis of six fecal samples just outside of the allowed holding time, did not affect overall data quality.

Overall, there were no significant findings from any of the years 2011 through 2018 that would suggest the need for any special investigations to be initiated at this time. With the exception of elevated fecal coliforms, high TSS/turbidity detected at one location in 2011 and another in 2015, high aromatic hydrocarbons at one location during one storm event in 2012, and one anomalously high copper value in 2016, concentrations of target constituents in the grab samples and in the field measurements were all well within the range of expected values. Although AWQS criteria were commonly exceeded in fecal coliform samples, concentrations were not considered extraordinary and warranting further investigation at this time. Also, it should be noted that AWQS criteria used in this report were for benchmark comparisons purposes only and that any exceedances noted are not considered water quality or permit violations.

The high TSS and turbidity concentrations that were noted at one location during two storm events in 2011 and at a different location during one storm event during 2015 were all believed to be due to commercial construction activities within the subbasins at the time of sampling. Since then, no high turbidity or TSS concentrations have been seen at either location. In 2012, the one high aromatic hydrocarbon sample that was collected adjacent to the Seward Highway is believed to have originated from a gasoline-type source as BETX levels in diesel fuel are typically much lower. A sample taken at the same location three days later during the subsequent storm event did not detect any volatile hydrocarbons.

In the event of any anomalous field observations or if elevated levels of constituents were found in field measurements, the field crew would contact MOA to allow the MOA an opportunity to perform a site inspection and potentially identify the source of the problem. No anomalous field measurements or observations were noted in 2018 that warranted further investigation. In 2016, a high level of dissolved copper was noted at one location during one storm event, but the cause of this anomalously high value could not be determined. It should be noted that monitoring for copper is not a typical permit requirement; this was added in 2016 to provide supplemental information for each of the outfalls. Also, in 2017, elevated fecal concentrations at SWM07 resulted in a supplemental sampling effort to collect additional data.

Data were examined for station, yearly, and seasonal trends to determine if particular locations have pollutant problems, whether significant differences were seen on a year-to-year basis, and whether there were seasonal influences that could be discerned in the data. One location that stood out was SWM07; this location consistently had some of the highest BOD₅, fecal coliform, TSS, and turbidity concentrations. Although BOD₅ was consistently high at this location, the DO levels were higher than those at a majority of other locations. High fecal coliform levels at SWM07 were reflected in the annual loading estimates for that location. This site exhibited the highest annual loading of fecal coliform for six of the eight years of the study. The reason for the high levels of fecal loading at this site is unknown, as it drains a commercial use area located between the two lanes of the Seward Highway north of Chester Creek and south of 12th Avenue, although the drainage area does include a homeless camp and some residential area (refer to Figure 7).

Other trends include a general seasonal trend in temperature, DO, and fecal coliform. Temperature and fecal coliform were highest during the mid-summer months and lower in early summer and fall. DO concentrations had an inverse relationship, with lower values in summer and higher values in early summer and fall as would be expected since colder water has a higher DO saturation level.

Hydrocarbon concentrations were examined in four of the ten subbasins that represented the commercial/industrial land use category. Two of the locations had OGS units and two did not, which allowed comparisons to be made on their efficacy for stormwater pollutant control. Based on TPAH levels, no differences could be attributed to an OGS unit, although the measurement of TPAH may not be the best parameter to be used in this examination. In general, with the exception of three samples with detectable levels of BETX, one of which was elevated, all aromatic hydrocarbon concentrations were below detection levels for all eight years of monitoring. TAqH concentrations were also very low and, when compared to ADEC's TAqH water quality standard, were all well below the criteria. Annual hydrocarbon loading was also very low at all four locations.

6.0 References

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- MOA 2016. Monitoring, Evaluation, and Quality Assurance Plan, APDES Permit No. AKS-052558. Prepared for Alaska Department of Environmental Conservation, Division of Water. Prepared by HDR Alaska, Inc. and Municipality of Anchorage.
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- SMRC 2010. Stormwater Managers Resource Center. Monitoring and Assessment Guidance, The Simple Method. Website: <http://www.stormwatercenter.net>
- USGS 2006. Water-Quality Conditions of Chester Creek, Anchorage, Alaska, 1998-2001. Scientific Investigations Report 2006-5229.

Appendix A

Photographs



Photograph 1. Outfall SWM11 (348-3), Johns Road at Botanical Circle.



Photograph 2. Outfall SWM12 (1454-1), Lynwood Retention Basin.



Photograph 3. Outfall SWM03 (1224-1), Fairweather Loop off Sylvan Drive.



Photograph 4. Outfall SWM04 (1224-2), Fairweather Loop off Sylvan Drive.



Photograph 5. Outfall SWM05 (207-1), East 56th Avenue at Save School.



Photograph 6. Outfall SWM06 (314-22), Maplewood Street off of Northern Lights Boulevard.



Photograph 7. Outfall SWM07 (484-1), New Seward Highway at Chester Creek.



Photograph 8. Outfall SWM08 (86-1), New Seward Highway at Chester Creek.



Photograph 9. Outfall SWM09 (499-1), Anchorage Football Stadium & Ben Boeke Ice Arena.



Photograph 10. Outfall SWM10 (525-2), Eagle Street at Chester Creek.

Appendix B

Laboratory Data Packages & Chain of Custodies

Appendix B1

Laboratory Data Package Storm Event #1



Laboratory Report of Analysis

To: HDR Alaska, Inc.
2525 C St. Ste 500
Anchorage, AK 99503
644-2034

Report Number: **1183618**

Client Project: **MOA Stormwater Management 5078**

Dear Joe Miller,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Justin at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

Justin Nelson
Project Manager
Justin.Nelson@sgs.com

Date

Case Narrative

SGS Client: **HDR Alaska, Inc.**
SGS Project: **1183618**
Project Name/Site: **MOA Stormwater Management 5078**
Project Contact: **Joe Miller**

Refer to sample receipt form for information on sample condition.

SWM12-04 MS (1183618003) BMS

8270D SIM - PAH BMS recovery for several analytes does not meet QC criteria. Refer to the LCS for accuracy requirements.

SWM12-04 MSD (1183618004) BMSD

8270D SIM - PAH BMSD recovery for several analytes does not meet QC criteria. Refer to the LCS for accuracy requirements.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

Print Date: 07/24/2018 12:22:00PM

Report of Manual Integrations

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Analytical Batch</u>	<u>Analyte</u>	<u>Reason</u>
EPA 625M SIM (PAH)				
1183618013	SWM09-04	XMS10888	Benzo[k]fluoranthene	RP
1460105	CVC for HBN 1782654 [XMS/10888	XMS10888	Benzo[k]fluoranthene	RP

Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Print Date: 07/24/2018 12:22:00PM

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 DW Chemistry (Provisionally Certified as of 06/11/2018 for Mercury by EPA245.1, Beryllium and Copper by EPA200.8) & Microbiology & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
SWM11-04	1183618001	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM12-04	1183618002	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM12-04 MS	1183618003	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM12-04 MSD	1183618004	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM12-04 DUP	1183618005	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM03-04	1183618006	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM04-04	1183618007	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM05-04	1183618008	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM06-04	1183618009	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM07-04	1183618010	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM08-04	1183618011	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM08-01 DUP	1183618012	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM09-04	1183618013	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM010-01	1183618014	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
Trip Blank	1183618015	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM11-01	1183618016	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM12-01	1183618017	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM12-04 DUP	1183618018	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM03-01	1183618019	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM04-01	1183618020	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM05-01	1183618021	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM06-01	1183618022	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM07-01	1183618023	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM08-01	1183618024	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM08-01 DUP	1183618025	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM09-01	1183618026	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)
SWM10-01	1183618027	07/11/2018	07/11/2018	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
EPA 602/624	602 Aromatics by 624 (W)
EPA 625M SIM (PAH)	625 Semi-Volatiles GC/MS Liq/Liq ext.
SM21 5210B	Biochemical Oxygen Demand SM21 5210B
SM21 9222D	Fecal Coliform (MF)
SM21 2340B	Hardness as CaCO3 by ICP-MS
EP200.8	Metals in Drinking Water by ICP-MS DISSO
EP200.8	Metals in Water by 200.8 ICP-MS
SM21 2540D	Total Suspended Solids SM20 2540D

Print Date: 07/24/2018 12:22:02PM

Detectable Results Summary

Client Sample ID: **SWM11-04**

Lab Sample ID: 1183618001

**Dissolved Metals by ICP/MS
Microbiology Laboratory**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	5.05	ug/L
Biochemical Oxygen Demand	6.37	mg/L
Fecal Coliform	2000	col/100mL
Total Suspended Solids	8.80	mg/L

Waters Department

Client Sample ID: **SWM12-04**

Lab Sample ID: 1183618002

**Dissolved Metals by ICP/MS
Microbiology Laboratory**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	14.7	ug/L
Biochemical Oxygen Demand	21.8	mg/L
Fecal Coliform	12400	col/100mL
Fluoranthene	0.0284	ug/L
Phenanthrene	0.0268J	ug/L
Pyrene	0.0394J	ug/L
Total Suspended Solids	73.5	mg/L

Polynuclear Aromatics GC/MS

Waters Department

Client Sample ID: **SWM12-04 DUP**

Lab Sample ID: 1183618005

**Dissolved Metals by ICP/MS
Microbiology Laboratory**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	15.0	ug/L
Biochemical Oxygen Demand	20.0	mg/L
Fecal Coliform	12900	col/100mL
Fluoranthene	0.0357	ug/L
Phenanthrene	0.0296J	ug/L
Pyrene	0.0481J	ug/L
Total Suspended Solids	73.5	mg/L

Polynuclear Aromatics GC/MS

Waters Department

Client Sample ID: **SWM03-04**

Lab Sample ID: 1183618006

**Dissolved Metals by ICP/MS
Microbiology Laboratory**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	5.74	ug/L
Biochemical Oxygen Demand	3.82	mg/L
Fecal Coliform	118	col/100mL
Total Suspended Solids	7.07	mg/L

Waters Department

Client Sample ID: **SWM04-04**

Lab Sample ID: 1183618007

**Dissolved Metals by ICP/MS
Microbiology Laboratory**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	5.32	ug/L
Biochemical Oxygen Demand	3.47	mg/L
Fecal Coliform	330	col/100mL
Total Suspended Solids	10.1	mg/L

Waters Department

Detectable Results Summary

Client Sample ID: **SWM05-04**

Lab Sample ID: 1183618008

**Dissolved Metals by ICP/MS
Microbiology Laboratory**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	15.7	ug/L
Biochemical Oxygen Demand	3.91	mg/L
Fecal Coliform	11800	col/100mL
Fluoranthene	0.0283	ug/L
Phenanthrene	0.0110J	ug/L
Pyrene	0.0186J	ug/L
Total Suspended Solids	16.3	mg/L

Polynuclear Aromatics GC/MS

Waters Department

Client Sample ID: **SWM06-04**

Lab Sample ID: 1183618009

**Dissolved Metals by ICP/MS
Microbiology Laboratory**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	5.96	ug/L
Biochemical Oxygen Demand	3.97	mg/L
Fecal Coliform	1240	col/100mL
Total Suspended Solids	16.0	mg/L

Waters Department

Client Sample ID: **SWM07-04**

Lab Sample ID: 1183618010

**Dissolved Metals by ICP/MS
Microbiology Laboratory**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	17.5	ug/L
Biochemical Oxygen Demand	10.7	mg/L
Fecal Coliform	2900	col/100mL
Fluoranthene	0.0428	ug/L
Phenanthrene	0.0332J	ug/L
Pyrene	0.0607	ug/L
Total Suspended Solids	73.0	mg/L

Polynuclear Aromatics GC/MS

Waters Department

Client Sample ID: **SWM08-04**

Lab Sample ID: 1183618011

**Dissolved Metals by ICP/MS
Microbiology Laboratory**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	8.09	ug/L
Biochemical Oxygen Demand	5.41	mg/L
Fecal Coliform	3000	col/100mL
Total Suspended Solids	30.4	mg/L

Waters Department

Client Sample ID: **SWM08-01 DUP**

Lab Sample ID: 1183618012

**Dissolved Metals by ICP/MS
Microbiology Laboratory**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	7.98	ug/L
Biochemical Oxygen Demand	5.86	mg/L
Fecal Coliform	4800	col/100mL
Total Suspended Solids	28.8	mg/L

Waters Department

Detectable Results Summary

Client Sample ID: **SWM09-04**

Lab Sample ID: 1183618013

**Dissolved Metals by ICP/MS
Microbiology Laboratory**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	5.62	ug/L
Biochemical Oxygen Demand	5.11	mg/L
Fecal Coliform	673	col/100mL
Polynuclear Aromatics GC/MS		
Benzo(a)Anthracene	0.0981	ug/L
Benzo[a]pyrene	0.131	ug/L
Benzo[b]Fluoranthene	0.207	ug/L
Benzo[g,h,i]perylene	0.116	ug/L
Benzo[k]fluoranthene	0.0635	ug/L
Chrysene	0.162	ug/L
Fluoranthene	0.307	ug/L
Indeno[1,2,3-c,d] pyrene	0.0962	ug/L
Phenanthrene	0.0977	ug/L
Pyrene	0.232	ug/L
Total Suspended Solids	15.3	mg/L

Waters Department

Client Sample ID: **SWM010-01**

Lab Sample ID: 1183618014

**Dissolved Metals by ICP/MS
Microbiology Laboratory**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	2.48	ug/L
Biochemical Oxygen Demand	2.27	mg/L
Fecal Coliform	845	col/100mL
Total Suspended Solids	7.92	mg/L

Waters Department

Client Sample ID: **SWM11-01**

Lab Sample ID: 1183618016

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	15000	ug/L
Hardness as CaCO ₃	50.6	mg/L
Magnesium	3200	ug/L

Client Sample ID: **SWM12-01**

Lab Sample ID: 1183618017

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	18100	ug/L
Hardness as CaCO ₃	68.1	mg/L
Magnesium	5560	ug/L

Client Sample ID: **SWM12-04 DUP**

Lab Sample ID: 1183618018

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	18200	ug/L
Hardness as CaCO ₃	68.1	mg/L
Magnesium	5480	ug/L

Client Sample ID: **SWM03-01**

Lab Sample ID: 1183618019

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	15400	ug/L
Hardness as CaCO ₃	61.5	mg/L
Magnesium	5590	ug/L

Detectable Results Summary

Client Sample ID: **SWM04-01**

Lab Sample ID: 1183618020

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	18600	ug/L
Hardness as CaCO3	73.3	mg/L
Magnesium	6520	ug/L

Client Sample ID: **SWM05-01**

Lab Sample ID: 1183618021

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	12900	ug/L
Hardness as CaCO3	46.0	mg/L
Magnesium	3350	ug/L

Client Sample ID: **SWM06-01**

Lab Sample ID: 1183618022

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	6700	ug/L
Hardness as CaCO3	26.5	mg/L
Magnesium	2380	ug/L

Client Sample ID: **SWM07-01**

Lab Sample ID: 1183618023

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	7300	ug/L
Hardness as CaCO3	33.4	mg/L
Magnesium	3670	ug/L

Client Sample ID: **SWM08-01**

Lab Sample ID: 1183618024

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	7090	ug/L
Hardness as CaCO3	26.1	mg/L
Magnesium	2050	ug/L

Client Sample ID: **SWM08-01 DUP**

Lab Sample ID: 1183618025

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	7230	ug/L
Hardness as CaCO3	25.5	mg/L
Magnesium	1800	ug/L

Client Sample ID: **SWM09-01**

Lab Sample ID: 1183618026

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	12000	ug/L
Hardness as CaCO3	44.1	mg/L
Magnesium	3430	ug/L

Client Sample ID: **SWM10-01**

Lab Sample ID: 1183618027

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	25200	ug/L
Hardness as CaCO3	92.4	mg/L
Magnesium	7160	ug/L



Results of SWM11-04

Client Sample ID: **SWM11-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618001
Lab Project ID: 1183618

Collection Date: 07/11/18 15:24
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	5.05	1.00	0.310	ug/L	1		07/14/18 12:55

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 12:55
Container ID: 1183618001-E

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM11-04**

Client Sample ID: **SWM11-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618001
Lab Project ID: 1183618

Collection Date: 07/11/18 15:24
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	6.37	2.00	2.00	mg/L	1		07/12/18 12:53

Batch Information

Analytical Batch: BOD6087
Analytical Method: SM21 5210B
Analyst: K.W
Analytical Date/Time: 07/12/18 12:53
Container ID: 1183618001-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	2000	100	100	col/100mL	1		07/11/18 18:43

Batch Information

Analytical Batch: BTF16698
Analytical Method: SM21 9222D
Analyst: NRO
Analytical Date/Time: 07/11/18 18:43
Container ID: 1183618001-A



Results of **SWM11-04**

Client Sample ID: **SWM11-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618001
Lab Project ID: 1183618

Collection Date: 07/11/18 15:24
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	8.80	2.00	0.620	mg/L	1		07/13/18 17:14

Batch Information

Analytical Batch: STS5948
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 07/13/18 17:14
Container ID: 1183618001-C



Results of SWM12-04

Client Sample ID: **SWM12-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618002
Lab Project ID: 1183618

Collection Date: 07/11/18 14:20
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	14.7	1.00	0.310	ug/L	1		07/14/18 13:04

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 13:04
Container ID: 1183618002-E

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM12-04**

Client Sample ID: **SWM12-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618002
Lab Project ID: 1183618

Collection Date: 07/11/18 14:20
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	21.8	2.00	2.00	mg/L	1		07/12/18 12:53

Batch Information

Analytical Batch: BOD6087
Analytical Method: SM21 5210B
Analyst: K.W
Analytical Date/Time: 07/12/18 12:53
Container ID: 1183618002-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	12400	100	100	col/100mL	1		07/11/18 18:43

Batch Information

Analytical Batch: BTF16698
Analytical Method: SM21 9222D
Analyst: NRO
Analytical Date/Time: 07/11/18 18:43
Container ID: 1183618002-A



Results of SWM12-04

Client Sample ID: SWM12-04
Client Project ID: MOA Stormwater Management 5078
Lab Sample ID: 1183618002
Lab Project ID: 1183618

Collection Date: 07/11/18 14:20
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their detection results.

Batch Information

Analytical Batch: XMS10888
Analytical Method: EPA 625M SIM (PAH)
Analyst: BMZ
Analytical Date/Time: 07/17/18 18:20
Container ID: 1183618002-G
Prep Batch: XXX39882
Prep Method: SW3520C
Prep Date/Time: 07/12/18 09:05
Prep Initial Wt./Vol.: 770 mL
Prep Extract Vol: 1 mL



Results of **SWM12-04**

Client Sample ID: **SWM12-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618002
Lab Project ID: 1183618

Collection Date: 07/11/18 14:20
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/12/18 19:40
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/12/18 19:40
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/12/18 19:40
Benzene	0.200 U	0.400	0.120	ug/L	1		07/12/18 19:40
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/12/18 19:40
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		07/12/18 19:40
o-Xylene	0.500 U	1.00	0.310	ug/L	1		07/12/18 19:40
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		07/12/18 19:40
Toluene	0.500 U	1.00	0.310	ug/L	1		07/12/18 19:40
Surrogates							
1,2-Dichloroethane-D4 (surr)	102	81-118		%	1		07/12/18 19:40
4-Bromofluorobenzene (surr)	103	85-114		%	1		07/12/18 19:40
Toluene-d8 (surr)	102	89-112		%	1		07/12/18 19:40

Batch Information

Analytical Batch: VMS17993
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 07/12/18 19:40
Container ID: 1183618002-I

Prep Batch: VXX32603
Prep Method: SW5030B
Prep Date/Time: 07/12/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of SWM12-04

Client Sample ID: **SWM12-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618002
Lab Project ID: 1183618

Collection Date: 07/11/18 14:20
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	73.5	5.00	1.55	mg/L	1		07/13/18 17:14

Batch Information

Analytical Batch: STS5948
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 07/13/18 17:14
Container ID: 1183618002-C



Results of **SWM12-04 DUP**

Client Sample ID: **SWM12-04 DUP**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618005
Lab Project ID: 1183618

Collection Date: 07/11/18 14:20
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Dissolved Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	15.0	1.00	0.310	ug/L	1		07/14/18 13:07

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 13:07
Container ID: 1183618005-D

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM12-04 DUP

Client Sample ID: **SWM12-04 DUP**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618005
Lab Project ID: 1183618

Collection Date: 07/11/18 14:20
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	20.0	2.00	2.00	mg/L	1		07/12/18 12:53

Batch Information

Analytical Batch: BOD6087
Analytical Method: SM21 5210B
Analyst: K.W
Analytical Date/Time: 07/12/18 12:53
Container ID: 1183618005-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	12900	100	100	col/100mL	1		07/11/18 18:43

Batch Information

Analytical Batch: BTF16698
Analytical Method: SM21 9222D
Analyst: NRO
Analytical Date/Time: 07/11/18 18:43
Container ID: 1183618005-A



Results of SWM12-04 DUP

Client Sample ID: SWM12-04 DUP
Client Project ID: MOA Stormwater Management 5078
Lab Sample ID: 1183618005
Lab Project ID: 1183618

Collection Date: 07/11/18 14:20
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their surrogate compounds with associated quality and detection data.

Batch Information

Analytical Batch: XMS10888
Analytical Method: EPA 625M SIM (PAH)
Analyst: BMZ
Analytical Date/Time: 07/17/18 19:22
Container ID: 1183618005-G

Prep Batch: XXX39882
Prep Method: SW3520C
Prep Date/Time: 07/12/18 09:05
Prep Initial Wt./Vol.: 890 mL
Prep Extract Vol: 1 mL



Results of SWM12-04 DUP

Client Sample ID: SWM12-04 DUP
Client Project ID: MOA Stormwater Management 5078
Lab Sample ID: 1183618005
Lab Project ID: 1183618

Collection Date: 07/11/18 14:20
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, Benzene, Chlorobenzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene, and Surrogates (1,2-Dichloroethane-D4, 4-Bromofluorobenzene, Toluene-d8).

Batch Information

Analytical Batch: VMS17993
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 07/12/18 20:47
Container ID: 1183618005-I

Prep Batch: VXX32603
Prep Method: SW5030B
Prep Date/Time: 07/12/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of SWM12-04 DUP

Client Sample ID: **SWM12-04 DUP**
 Client Project ID: **MOA Stormwater Management 5078**
 Lab Sample ID: 1183618005
 Lab Project ID: 1183618

Collection Date: 07/11/18 14:20
 Received Date: 07/11/18 15:58
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	73.5	5.00	1.55	mg/L	1		07/13/18 17:14

Batch Information

Analytical Batch: STS5948
 Analytical Method: SM21 2540D
 Analyst: EWW
 Analytical Date/Time: 07/13/18 17:14
 Container ID: 1183618005-C



Results of SWM03-04

Client Sample ID: **SWM03-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618006
Lab Project ID: 1183618

Collection Date: 07/11/18 15:00
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	5.74	1.00	0.310	ug/L	1		07/14/18 13:10

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 13:10
Container ID: 1183618006-E

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM03-04**

Client Sample ID: **SWM03-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618006
Lab Project ID: 1183618

Collection Date: 07/11/18 15:00
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	3.82	2.00	2.00	mg/L	1		07/12/18 12:53

Batch Information

Analytical Batch: BOD6087
Analytical Method: SM21 5210B
Analyst: K.W
Analytical Date/Time: 07/12/18 12:53
Container ID: 1183618006-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	118	1.00	1.00	col/100mL	1		07/11/18 18:43

Batch Information

Analytical Batch: BTF16698
Analytical Method: SM21 9222D
Analyst: NRO
Analytical Date/Time: 07/11/18 18:43
Container ID: 1183618006-A



Results of SWM03-04

Client Sample ID: **SWM03-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618006
Lab Project ID: 1183618

Collection Date: 07/11/18 15:00
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	7.07	1.09	0.337	mg/L	1		07/13/18 17:14

Batch Information

Analytical Batch: STS5948
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 07/13/18 17:14
Container ID: 1183618006-C



Results of **SWM04-04**

Client Sample ID: **SWM04-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618007
Lab Project ID: 1183618

Collection Date: 07/11/18 15:03
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Dissolved Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	5.32	1.00	0.310	ug/L	1		07/14/18 13:13

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 13:13
Container ID: 1183618007-E

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM04-04**

Client Sample ID: **SWM04-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618007
Lab Project ID: 1183618

Collection Date: 07/11/18 15:03
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	3.47	2.00	2.00	mg/L	1		07/12/18 12:53

Batch Information

Analytical Batch: BOD6087
Analytical Method: SM21 5210B
Analyst: K.W
Analytical Date/Time: 07/12/18 12:53
Container ID: 1183618007-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	330	10.0	10.0	col/100mL	1		07/11/18 18:43

Batch Information

Analytical Batch: BTF16698
Analytical Method: SM21 9222D
Analyst: NRO
Analytical Date/Time: 07/11/18 18:43
Container ID: 1183618007-A



Results of SWM04-04

Client Sample ID: **SWM04-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618007
Lab Project ID: 1183618

Collection Date: 07/11/18 15:03
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	10.1	1.04	0.323	mg/L	1		07/13/18 17:14

Batch Information

Analytical Batch: STS5948
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 07/13/18 17:14
Container ID: 1183618007-C



Results of **SWM05-04**

Client Sample ID: **SWM05-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618008
Lab Project ID: 1183618

Collection Date: 07/11/18 13:50
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Dissolved Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	15.7	1.00	0.310	ug/L	1		07/14/18 13:16

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 13:16
Container ID: 1183618008-E

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM05-04**

Client Sample ID: **SWM05-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618008
Lab Project ID: 1183618

Collection Date: 07/11/18 13:50
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	3.91	2.00	2.00	mg/L	1		07/12/18 12:53

Batch Information

Analytical Batch: BOD6087
Analytical Method: SM21 5210B
Analyst: K.W
Analytical Date/Time: 07/12/18 12:53
Container ID: 1183618008-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	11800	100	100	col/100mL	1		07/11/18 18:43

Batch Information

Analytical Batch: BTF16698
Analytical Method: SM21 9222D
Analyst: NRO
Analytical Date/Time: 07/11/18 18:43
Container ID: 1183618008-A



Results of SWM05-04

Client Sample ID: SWM05-04
Client Project ID: MOA Stormwater Management 5078
Lab Sample ID: 1183618008
Lab Project ID: 1183618

Collection Date: 07/11/18 13:50
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their surrogate compounds with associated quality and detection data.

Batch Information

Analytical Batch: XMS10888
Analytical Method: EPA 625M SIM (PAH)
Analyst: BMZ
Analytical Date/Time: 07/17/18 19:42
Container ID: 1183618008-G

Prep Batch: XXX39882
Prep Method: SW3520C
Prep Date/Time: 07/12/18 09:05
Prep Initial Wt./Vol.: 960 mL
Prep Extract Vol: 1 mL



Results of **SWM05-04**

Client Sample ID: **SWM05-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618008
Lab Project ID: 1183618

Collection Date: 07/11/18 13:50
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/12/18 21:03
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/12/18 21:03
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/12/18 21:03
Benzene	0.200 U	0.400	0.120	ug/L	1		07/12/18 21:03
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/12/18 21:03
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		07/12/18 21:03
o-Xylene	0.500 U	1.00	0.310	ug/L	1		07/12/18 21:03
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		07/12/18 21:03
Toluene	0.500 U	1.00	0.310	ug/L	1		07/12/18 21:03
Surrogates							
1,2-Dichloroethane-D4 (surr)	107	81-118		%	1		07/12/18 21:03
4-Bromofluorobenzene (surr)	103	85-114		%	1		07/12/18 21:03
Toluene-d8 (surr)	101	89-112		%	1		07/12/18 21:03

Batch Information

Analytical Batch: VMS17993
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 07/12/18 21:03
Container ID: 1183618008-I

Prep Batch: VXX32603
Prep Method: SW5030B
Prep Date/Time: 07/12/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of SWM05-04

Client Sample ID: **SWM05-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618008
Lab Project ID: 1183618

Collection Date: 07/11/18 13:50
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	16.3	1.03	0.320	mg/L	1		07/13/18 17:14

Batch Information

Analytical Batch: STS5948
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 07/13/18 17:14
Container ID: 1183618008-C



Results of SWM06-04

Client Sample ID: **SWM06-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618009
Lab Project ID: 1183618

Collection Date: 07/11/18 13:25
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	5.96	1.00	0.310	ug/L	1		07/14/18 13:19

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 13:19
Container ID: 1183618009-E

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM06-04**

Client Sample ID: **SWM06-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618009
Lab Project ID: 1183618

Collection Date: 07/11/18 13:25
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	3.97	2.00	2.00	mg/L	1		07/12/18 12:53

Batch Information

Analytical Batch: BOD6087
Analytical Method: SM21 5210B
Analyst: K.W
Analytical Date/Time: 07/12/18 12:53
Container ID: 1183618009-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	1240	9.09	9.09	col/100mL	1		07/11/18 18:43

Batch Information

Analytical Batch: BTF16698
Analytical Method: SM21 9222D
Analyst: NRO
Analytical Date/Time: 07/11/18 18:43
Container ID: 1183618009-A



Results of **SWM06-04**

Client Sample ID: **SWM06-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618009
Lab Project ID: 1183618

Collection Date: 07/11/18 13:25
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	16.0	2.00	0.620	mg/L	1		07/13/18 17:14

Batch Information

Analytical Batch: STS5948
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 07/13/18 17:14
Container ID: 1183618009-C



Results of **SWM07-04**

Client Sample ID: **SWM07-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618010
Lab Project ID: 1183618

Collection Date: 07/11/18 12:50
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Dissolved Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	17.5	1.00	0.310	ug/L	1		07/14/18 13:22

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 13:22
Container ID: 1183618010-E

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM07-04**

Client Sample ID: **SWM07-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618010
Lab Project ID: 1183618

Collection Date: 07/11/18 12:50
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	10.7	2.00	2.00	mg/L	1		07/12/18 12:53

Batch Information

Analytical Batch: BOD6087
Analytical Method: SM21 5210B
Analyst: K.W
Analytical Date/Time: 07/12/18 12:53
Container ID: 1183618010-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	2900	100	100	col/100mL	1		07/11/18 18:43

Batch Information

Analytical Batch: BTF16698
Analytical Method: SM21 9222D
Analyst: NRO
Analytical Date/Time: 07/11/18 18:43
Container ID: 1183618010-A



Results of SWM07-04

Client Sample ID: **SWM07-04**
 Client Project ID: **MOA Stormwater Management 5078**
 Lab Sample ID: 1183618010
 Lab Project ID: 1183618

Collection Date: 07/11/18 12:50
 Received Date: 07/11/18 15:58
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Acenaphthene	0.00645 U	0.0129	0.00381	ug/L	1		07/17/18 20:03
Acenaphthylene	0.00645 U	0.0129	0.00381	ug/L	1		07/17/18 20:03
Anthracene	0.00645 U	0.0129	0.00381	ug/L	1		07/17/18 20:03
Benzo(a)Anthracene	0.00645 U	0.0129	0.00381	ug/L	1		07/17/18 20:03
Benzo[a]pyrene	0.00258 U	0.00515	0.00155	ug/L	1		07/17/18 20:03
Benzo[b]Fluoranthene	0.00645 U	0.0129	0.00381	ug/L	1		07/17/18 20:03
Benzo[g,h,i]perylene	0.00645 U	0.0129	0.00381	ug/L	1		07/17/18 20:03
Benzo[k]fluoranthene	0.00645 U	0.0129	0.00381	ug/L	1		07/17/18 20:03
Chrysene	0.00645 U	0.0129	0.00381	ug/L	1		07/17/18 20:03
Dibenzo[a,h]anthracene	0.00258 U	0.00515	0.00155	ug/L	1		07/17/18 20:03
Fluoranthene	0.0428	0.0129	0.00381	ug/L	1		07/17/18 20:03
Fluorene	0.00645 U	0.0129	0.00381	ug/L	1		07/17/18 20:03
Indeno[1,2,3-c,d] pyrene	0.00645 U	0.0129	0.00381	ug/L	1		07/17/18 20:03
Naphthalene	0.0129 U	0.0258	0.00804	ug/L	1		07/17/18 20:03
Phenanthrene	0.0332 J	0.0515	0.00381	ug/L	1		07/17/18 20:03
Pyrene	0.0607	0.0515	0.00381	ug/L	1		07/17/18 20:03
Surrogates							
2-Methylnaphthalene-d10 (surr)	58.2	47-106		%	1		07/17/18 20:03
Fluoranthene-d10 (surr)	29.1	24-116		%	1		07/17/18 20:03

Batch Information

Analytical Batch: XMS10888
 Analytical Method: EPA 625M SIM (PAH)
 Analyst: BMZ
 Analytical Date/Time: 07/17/18 20:03
 Container ID: 1183618010-G

Prep Batch: XXX39882
 Prep Method: SW3520C
 Prep Date/Time: 07/12/18 09:05
 Prep Initial Wt./Vol.: 970 mL
 Prep Extract Vol: 1 mL

Results of SWM07-04

Client Sample ID: **SWM07-04**
 Client Project ID: **MOA Stormwater Management 5078**
 Lab Sample ID: 1183618010
 Lab Project ID: 1183618

Collection Date: 07/11/18 12:50
 Received Date: 07/11/18 15:58
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/12/18 21:20
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/12/18 21:20
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/12/18 21:20
Benzene	0.200 U	0.400	0.120	ug/L	1		07/12/18 21:20
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/12/18 21:20
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		07/12/18 21:20
o-Xylene	0.500 U	1.00	0.310	ug/L	1		07/12/18 21:20
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		07/12/18 21:20
Toluene	0.500 U	1.00	0.310	ug/L	1		07/12/18 21:20
Surrogates							
1,2-Dichloroethane-D4 (surr)	108	81-118		%	1		07/12/18 21:20
4-Bromofluorobenzene (surr)	104	85-114		%	1		07/12/18 21:20
Toluene-d8 (surr)	101	89-112		%	1		07/12/18 21:20

Batch Information

Analytical Batch: VMS17993
 Analytical Method: EPA 602/624
 Analyst: FDR
 Analytical Date/Time: 07/12/18 21:20
 Container ID: 1183618010-I

Prep Batch: VXX32603
 Prep Method: SW5030B
 Prep Date/Time: 07/12/18 00:00
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL

Results of SWM07-04

Client Sample ID: **SWM07-04**
 Client Project ID: **MOA Stormwater Management 5078**
 Lab Sample ID: 1183618010
 Lab Project ID: 1183618

Collection Date: 07/11/18 12:50
 Received Date: 07/11/18 15:58
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	73.0	5.00	1.55	mg/L	1		07/13/18 17:14

Batch Information

Analytical Batch: STS5948
 Analytical Method: SM21 2540D
 Analyst: EWW
 Analytical Date/Time: 07/13/18 17:14
 Container ID: 1183618010-C



Results of SWM08-04

Client Sample ID: **SWM08-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618011
Lab Project ID: 1183618

Collection Date: 07/11/18 13:04
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	8.09	1.00	0.310	ug/L	1		07/14/18 13:25

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 13:25
Container ID: 1183618011-E

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM08-04**

Client Sample ID: **SWM08-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618011
Lab Project ID: 1183618

Collection Date: 07/11/18 13:04
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	5.41	2.00	2.00	mg/L	1		07/12/18 12:53

Batch Information

Analytical Batch: BOD6087
Analytical Method: SM21 5210B
Analyst: K.W
Analytical Date/Time: 07/12/18 12:53
Container ID: 1183618011-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	3000	100	100	col/100mL	1		07/11/18 18:43

Batch Information

Analytical Batch: BTF16698
Analytical Method: SM21 9222D
Analyst: NRO
Analytical Date/Time: 07/11/18 18:43
Container ID: 1183618011-A



Results of **SWM08-04**

Client Sample ID: **SWM08-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618011
Lab Project ID: 1183618

Collection Date: 07/11/18 13:04
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	30.4	4.00	1.24	mg/L	1		07/13/18 17:14

Batch Information

Analytical Batch: STS5948
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 07/13/18 17:14
Container ID: 1183618011-C

Results of SWM08-01 DUP

Client Sample ID: **SWM08-01 DUP**
 Client Project ID: **MOA Stormwater Management 5078**
 Lab Sample ID: 1183618012
 Lab Project ID: 1183618

Collection Date: 07/11/18 13:04
 Received Date: 07/11/18 15:58
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	7.98	1.00	0.310	ug/L	1		07/14/18 13:28

Batch Information

Analytical Batch: MMS10240
 Analytical Method: EP200.8
 Analyst: ACF
 Analytical Date/Time: 07/14/18 13:28
 Container ID: 1183618012-E

Prep Batch: MXX31743
 Prep Method: E200.2
 Prep Date/Time: 07/13/18 12:30
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL



Results of **SWM08-01 DUP**

Client Sample ID: **SWM08-01 DUP**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618012
Lab Project ID: 1183618

Collection Date: 07/11/18 13:04
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	5.86	2.00	2.00	mg/L	1		07/12/18 12:53

Batch Information

Analytical Batch: BOD6087
Analytical Method: SM21 5210B
Analyst: K.W
Analytical Date/Time: 07/12/18 12:53
Container ID: 1183618012-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	4800	100	100	col/100mL	1		07/11/18 18:43

Batch Information

Analytical Batch: BTF16698
Analytical Method: SM21 9222D
Analyst: NRO
Analytical Date/Time: 07/11/18 18:43
Container ID: 1183618012-A

Results of SWM08-01 DUP

Client Sample ID: **SWM08-01 DUP**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618012
Lab Project ID: 1183618

Collection Date: 07/11/18 13:04
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	28.8	4.00	1.24	mg/L	1		07/13/18 17:14

Batch Information

Analytical Batch: STS5948
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 07/13/18 17:14
Container ID: 1183618012-C



Results of **SWM09-04**

Client Sample ID: **SWM09-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618013
Lab Project ID: 1183618

Collection Date: 07/11/18 12:05
Received Date: 07/11/18 19:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Dissolved Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	5.62	1.00	0.310	ug/L	1		07/14/18 13:40

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 13:40
Container ID: 1183618013-E

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM09-04**

Client Sample ID: **SWM09-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618013
Lab Project ID: 1183618

Collection Date: 07/11/18 12:05
Received Date: 07/11/18 19:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	5.11	2.00	2.00	mg/L	1		07/12/18 12:53

Batch Information

Analytical Batch: BOD6087
Analytical Method: SM21 5210B
Analyst: K.W
Analytical Date/Time: 07/12/18 12:53
Container ID: 1183618013-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	673	9.09	9.09	col/100mL	1		07/11/18 18:43

Batch Information

Analytical Batch: BTF16698
Analytical Method: SM21 9222D
Analyst: NRO
Analytical Date/Time: 07/11/18 18:43
Container ID: 1183618013-A



Results of SWM09-04

Client Sample ID: **SWM09-04**
 Client Project ID: **MOA Stormwater Management 5078**
 Lab Sample ID: 1183618013
 Lab Project ID: 1183618

Collection Date: 07/11/18 12:05
 Received Date: 07/11/18 19:04
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Acenaphthene	0.00665 U	0.0133	0.00394	ug/L	1		07/17/18 20:23
Acenaphthylene	0.00665 U	0.0133	0.00394	ug/L	1		07/17/18 20:23
Anthracene	0.00665 U	0.0133	0.00394	ug/L	1		07/17/18 20:23
Benzo(a)Anthracene	0.0981	0.0133	0.00394	ug/L	1		07/17/18 20:23
Benzo[a]pyrene	0.131	0.00532	0.00160	ug/L	1		07/17/18 20:23
Benzo[b]Fluoranthene	0.207	0.0133	0.00394	ug/L	1		07/17/18 20:23
Benzo[g,h,i]perylene	0.116	0.0133	0.00394	ug/L	1		07/17/18 20:23
Benzo[k]fluoranthene	0.0635	0.0133	0.00394	ug/L	1		07/17/18 20:23
Chrysene	0.162	0.0133	0.00394	ug/L	1		07/17/18 20:23
Dibenzo[a,h]anthracene	0.00266 U	0.00532	0.00160	ug/L	1		07/17/18 20:23
Fluoranthene	0.307	0.0133	0.00394	ug/L	1		07/17/18 20:23
Fluorene	0.00665 U	0.0133	0.00394	ug/L	1		07/17/18 20:23
Indeno[1,2,3-c,d] pyrene	0.0962	0.0133	0.00394	ug/L	1		07/17/18 20:23
Naphthalene	0.0133 U	0.0266	0.00830	ug/L	1		07/17/18 20:23
Phenanthrene	0.0977	0.0532	0.00394	ug/L	1		07/17/18 20:23
Pyrene	0.232	0.0532	0.00394	ug/L	1		07/17/18 20:23
Surrogates							
2-Methylnaphthalene-d10 (surr)	52.2	47-106		%	1		07/17/18 20:23
Fluoranthene-d10 (surr)	43	24-116		%	1		07/17/18 20:23

Batch Information

Analytical Batch: XMS10888
 Analytical Method: EPA 625M SIM (PAH)
 Analyst: BMZ
 Analytical Date/Time: 07/17/18 20:23
 Container ID: 1183618013-G

Prep Batch: XXX39882
 Prep Method: SW3520C
 Prep Date/Time: 07/12/18 09:05
 Prep Initial Wt./Vol.: 940 mL
 Prep Extract Vol: 1 mL



Results of **SWM09-04**

Client Sample ID: **SWM09-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618013
Lab Project ID: 1183618

Collection Date: 07/11/18 12:05
Received Date: 07/11/18 19:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/12/18 21:37
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/12/18 21:37
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/12/18 21:37
Benzene	0.200 U	0.400	0.120	ug/L	1		07/12/18 21:37
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/12/18 21:37
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		07/12/18 21:37
o-Xylene	0.500 U	1.00	0.310	ug/L	1		07/12/18 21:37
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		07/12/18 21:37
Toluene	0.500 U	1.00	0.310	ug/L	1		07/12/18 21:37
Surrogates							
1,2-Dichloroethane-D4 (surr)	104	81-118		%	1		07/12/18 21:37
4-Bromofluorobenzene (surr)	100	85-114		%	1		07/12/18 21:37
Toluene-d8 (surr)	99.7	89-112		%	1		07/12/18 21:37

Batch Information

Analytical Batch: VMS17993
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 07/12/18 21:37
Container ID: 1183618013-I

Prep Batch: VXX32603
Prep Method: SW5030B
Prep Date/Time: 07/12/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of **SWM09-04**

Client Sample ID: **SWM09-04**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618013
Lab Project ID: 1183618

Collection Date: 07/11/18 12:05
Received Date: 07/11/18 19:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	15.3	2.50	0.775	mg/L	1		07/13/18 17:14

Batch Information

Analytical Batch: STS5948
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 07/13/18 17:14
Container ID: 1183618013-C



Results of **SWM010-01**

Client Sample ID: **SWM010-01**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618014
Lab Project ID: 1183618

Collection Date: 07/11/18 12:30
Received Date: 07/11/18 19:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Dissolved Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	2.48	1.00	0.310	ug/L	1		07/14/18 13:43

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 13:43
Container ID: 1183618014-E

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM010-01**

Client Sample ID: **SWM010-01**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618014
Lab Project ID: 1183618

Collection Date: 07/11/18 12:30
Received Date: 07/11/18 19:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	2.27	2.00	2.00	mg/L	1		07/12/18 12:53

Batch Information

Analytical Batch: BOD6087
Analytical Method: SM21 5210B
Analyst: K.W
Analytical Date/Time: 07/12/18 12:53
Container ID: 1183618014-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	845	9.09	9.09	col/100mL	1		07/11/18 18:43

Batch Information

Analytical Batch: BTF16698
Analytical Method: SM21 9222D
Analyst: NRO
Analytical Date/Time: 07/11/18 18:43
Container ID: 1183618014-A

Results of SWM010-01

Client Sample ID: **SWM010-01**
 Client Project ID: **MOA Stormwater Management 5078**
 Lab Sample ID: 1183618014
 Lab Project ID: 1183618

Collection Date: 07/11/18 12:30
 Received Date: 07/11/18 19:04
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	7.92	1.04	0.323	mg/L	1		07/13/18 17:14

Batch Information

Analytical Batch: STS5948
 Analytical Method: SM21 2540D
 Analyst: EWW
 Analytical Date/Time: 07/13/18 17:14
 Container ID: 1183618014-C



Results of Trip Blank

Client Sample ID: **Trip Blank**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618015
Lab Project ID: 1183618

Collection Date: 07/11/18 12:05
Received Date: 07/11/18 19:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/12/18 18:50
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/12/18 18:50
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/12/18 18:50
Benzene	0.200 U	0.400	0.120	ug/L	1		07/12/18 18:50
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/12/18 18:50
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		07/12/18 18:50
o-Xylene	0.500 U	1.00	0.310	ug/L	1		07/12/18 18:50
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		07/12/18 18:50
Toluene	0.500 U	1.00	0.310	ug/L	1		07/12/18 18:50
Surrogates							
1,2-Dichloroethane-D4 (surr)	106	81-118		%	1		07/12/18 18:50
4-Bromofluorobenzene (surr)	102	85-114		%	1		07/12/18 18:50
Toluene-d8 (surr)	99.8	89-112		%	1		07/12/18 18:50

Batch Information

Analytical Batch: VMS17993
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 07/12/18 18:50
Container ID: 1183618015-A

Prep Batch: VXX32603
Prep Method: SW5030B
Prep Date/Time: 07/12/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of **SWM11-01**

Client Sample ID: **SWM11-01**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618016
Lab Project ID: 1183618

Collection Date: 07/11/18 15:24
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	15000	500	150	ug/L	1		07/14/18 13:46
Magnesium	3200	50.0	15.0	ug/L	1		07/14/18 13:46

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 13:46
Container ID: 1183618016-A

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	50.6	5.00	5.00	mg/L	1		07/14/18 13:46

Batch Information

Analytical Batch: MMS10240
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/14/18 13:46
Container ID: 1183618016-A

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM12-01**

Client Sample ID: **SWM12-01**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618017
Lab Project ID: 1183618

Collection Date: 07/11/18 14:20
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	18100	500	150	ug/L	1		07/14/18 13:49
Magnesium	5560	50.0	15.0	ug/L	1		07/14/18 13:49

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 13:49
Container ID: 1183618017-A

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	68.1	5.00	5.00	mg/L	1		07/14/18 13:49

Batch Information

Analytical Batch: MMS10240
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/14/18 13:49
Container ID: 1183618017-A

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM12-04 DUP

Client Sample ID: SWM12-04 DUP
Client Project ID: MOA Stormwater Management 5078
Lab Sample ID: 1183618018
Lab Project ID: 1183618

Collection Date: 07/11/18 14:20
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Metals by ICP/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Calcium and Magnesium.

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 13:52
Container ID: 1183618018-A
Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row includes Hardness as CaCO3.

Batch Information

Analytical Batch: MMS10240
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/14/18 13:52
Container ID: 1183618018-A
Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM03-01**

Client Sample ID: **SWM03-01**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618019
Lab Project ID: 1183618

Collection Date: 07/11/18 15:00
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	15400	500	150	ug/L	1		07/14/18 13:55
Magnesium	5590	50.0	15.0	ug/L	1		07/14/18 13:55

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 13:55
Container ID: 1183618019-A

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	61.5	5.00	5.00	mg/L	1		07/14/18 13:55

Batch Information

Analytical Batch: MMS10240
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/14/18 13:55
Container ID: 1183618019-A

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM04-01**

Client Sample ID: **SWM04-01**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618020
Lab Project ID: 1183618

Collection Date: 07/11/18 15:03
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	18600	500	150	ug/L	1		07/14/18 13:58
Magnesium	6520	50.0	15.0	ug/L	1		07/14/18 13:58

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 13:58
Container ID: 1183618020-A

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	73.3	5.00	5.00	mg/L	1		07/14/18 13:58

Batch Information

Analytical Batch: MMS10240
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/14/18 13:58
Container ID: 1183618020-A

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM05-01**

Client Sample ID: **SWM05-01**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618021
Lab Project ID: 1183618

Collection Date: 07/11/18 13:50
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	12900	500	150	ug/L	1		07/14/18 14:01
Magnesium	3350	50.0	15.0	ug/L	1		07/14/18 14:01

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 14:01
Container ID: 1183618021-A

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	46.0	5.00	5.00	mg/L	1		07/14/18 14:01

Batch Information

Analytical Batch: MMS10240
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/14/18 14:01
Container ID: 1183618021-A

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 07/13/18 12:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM06-01**

Client Sample ID: **SWM06-01**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618022
Lab Project ID: 1183618

Collection Date: 07/11/18 13:25
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	6700	500	150	ug/L	1		07/20/18 11:19
Magnesium	2380	50.0	15.0	ug/L	1		07/20/18 11:19

Batch Information

Analytical Batch: MMS10248
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 07/20/18 11:19
Container ID: 1183618022-A

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	26.5	5.00	5.00	mg/L	1		07/20/18 11:19

Batch Information

Analytical Batch: MMS10248	Prep Batch: MXX31747
Analytical Method: SM21 2340B	Prep Method: E200.2
Analyst: DSH	Prep Date/Time: 07/16/18 11:45
Analytical Date/Time: 07/20/18 11:19	Prep Initial Wt./Vol.: 20 mL
Container ID: 1183618022-A	Prep Extract Vol: 50 mL



Results of **SWM07-01**

Client Sample ID: **SWM07-01**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618023
Lab Project ID: 1183618

Collection Date: 07/11/18 12:50
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	7300	500	150	ug/L	1		07/14/18 12:19
Magnesium	3670	50.0	15.0	ug/L	1		07/14/18 12:19

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 12:19
Container ID: 1183618023-A

Prep Batch: MXX31737
Prep Method: E200.2
Prep Date/Time: 07/12/18 15:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	33.4	5.00	5.00	mg/L	1		07/14/18 12:19

Batch Information

Analytical Batch: MMS10240
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/14/18 12:19
Container ID: 1183618023-A

Prep Batch: MXX31737
Prep Method: E200.2
Prep Date/Time: 07/12/18 15:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM08-01**

Client Sample ID: **SWM08-01**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618024
Lab Project ID: 1183618

Collection Date: 07/11/18 13:04
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	7090	500	150	ug/L	1		07/14/18 12:28
Magnesium	2050	50.0	15.0	ug/L	1		07/14/18 12:28

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 12:28
Container ID: 1183618024-A

Prep Batch: MXX31737
Prep Method: E200.2
Prep Date/Time: 07/12/18 15:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	26.1	5.00	5.00	mg/L	1		07/14/18 12:28

Batch Information

Analytical Batch: MMS10240
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/14/18 12:28
Container ID: 1183618024-A

Prep Batch: MXX31737
Prep Method: E200.2
Prep Date/Time: 07/12/18 15:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM08-01 DUP

Client Sample ID: SWM08-01 DUP
Client Project ID: MOA Stormwater Management 5078
Lab Sample ID: 1183618025
Lab Project ID: 1183618

Collection Date: 07/11/18 13:04
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Metals by ICP/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows for Calcium and Magnesium.

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 12:31
Container ID: 1183618025-A
Prep Batch: MXX31737
Prep Method: E200.2
Prep Date/Time: 07/12/18 15:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row for Hardness as CaCO3.

Batch Information

Analytical Batch: MMS10240
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/14/18 12:31
Container ID: 1183618025-A
Prep Batch: MXX31737
Prep Method: E200.2
Prep Date/Time: 07/12/18 15:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM09-01**

Client Sample ID: **SWM09-01**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618026
Lab Project ID: 1183618

Collection Date: 07/11/18 12:05
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	12000	500	150	ug/L	1		07/14/18 12:34
Magnesium	3430	50.0	15.0	ug/L	1		07/14/18 12:34

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 12:34
Container ID: 1183618026-A

Prep Batch: MXX31737
Prep Method: E200.2
Prep Date/Time: 07/12/18 15:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	44.1	5.00	5.00	mg/L	1		07/14/18 12:34

Batch Information

Analytical Batch: MMS10240
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/14/18 12:34
Container ID: 1183618026-A

Prep Batch: MXX31737
Prep Method: E200.2
Prep Date/Time: 07/12/18 15:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM10-01**

Client Sample ID: **SWM10-01**
Client Project ID: **MOA Stormwater Management 5078**
Lab Sample ID: 1183618027
Lab Project ID: 1183618

Collection Date: 07/11/18 12:30
Received Date: 07/11/18 15:58
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	25200	500	150	ug/L	1		07/14/18 12:37
Magnesium	7160	50.0	15.0	ug/L	1		07/14/18 12:37

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/14/18 12:37
Container ID: 1183618027-A

Prep Batch: MXX31737
Prep Method: E200.2
Prep Date/Time: 07/12/18 15:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	92.4	5.00	5.00	mg/L	1		07/14/18 12:37

Batch Information

Analytical Batch: MMS10240
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/14/18 12:37
Container ID: 1183618027-A

Prep Batch: MXX31737
Prep Method: E200.2
Prep Date/Time: 07/12/18 15:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Method Blank

Blank ID: MB for HBN 1782384 [BOD/6087]

Matrix: Water (Surface, Eff., Ground)

Blank Lab ID: 1458942

QC for Samples:

1183618001, 1183618002, 1183618005, 1183618006, 1183618007, 1183618008, 1183618009, 1183618010, 1183618011, 1183618012, 1183618013, 1183618014

Results by SM21 5210B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Biochemical Oxygen Demand	2.00U	2.00	2.00	mg/L

Batch Information

Analytical Batch: BOD6087

Analytical Method: SM21 5210B

Instrument:

Analyst: K.W

Analytical Date/Time: 7/12/2018 10:22:34AM

Print Date: 07/24/2018 12:22:10PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1183618 [BOD6087]

Blank Spike Lab ID: 1458943

Date Analyzed: 07/12/2018 10:22

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183618001, 1183618002, 1183618005, 1183618006, 1183618007, 1183618008, 1183618009,
1183618010, 1183618011, 1183618012, 1183618013, 1183618014

Results by SM21 5210B

Parameter	Blank Spike (mg/L)			CL
	Spike	Result	Rec (%)	
Biochemical Oxygen Demand	198	199	101	(84.6-115.4

Batch Information

Analytical Batch: **BOD6087**

Analytical Method: **SM21 5210B**

Instrument:

Analyst: **K.W**

Print Date: 07/24/2018 12:22:11PM



Method Blank

Blank ID: MB for HBN 1782298 [BTF/16698]
Blank Lab ID: 1458706

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1183618001, 1183618002, 1183618005, 1183618006, 1183618007, 1183618008, 1183618009, 1183618010, 1183618011, 1183618012, 1183618013, 1183618014

Results by SM21 9222D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Fecal Coliform	1.00U	1.00	1.00	col/100mL

Batch Information

Analytical Batch: BTF16698
Analytical Method: SM21 9222D
Instrument:
Analyst: NRO
Analytical Date/Time: 7/11/2018 6:43:00PM

Print Date: 07/24/2018 12:22:12PM

Method Blank

Blank ID: MB for HBN 1782380 [MXX/31737]
Blank Lab ID: 1458920

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1183618023, 1183618024, 1183618025, 1183618026, 1183618027

Results by EP200.8

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Calcium	250U	500	150	ug/L
Magnesium	25.0U	50.0	15.0	ug/L

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: ACF
Analytical Date/Time: 7/14/2018 11:16:38AM

Prep Batch: MXX31737
Prep Method: E200.2
Prep Date/Time: 7/12/2018 3:30:29PM
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Print Date: 07/24/2018 12:22:15PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1183618 [MXX31737]
 Blank Spike Lab ID: 1458921
 Date Analyzed: 07/14/2018 11:19

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183618023, 1183618024, 1183618025, 1183618026, 1183618027

Results by EP200.8

Parameter	Blank Spike (ug/L)			CL
	Spike	Result	Rec (%)	
Calcium	10000	9980	100	(85-115)
Magnesium	10000	9920	99	(85-115)

Batch Information

Analytical Batch: **MMS10240**
 Analytical Method: **EP200.8**
 Instrument: **Perkin Elmer Nexlon P5**
 Analyst: **ACF**

Prep Batch: **MXX31737**
 Prep Method: **E200.2**
 Prep Date/Time: **07/12/2018 15:30**
 Spike Init Wt./Vol.: 10000 ug/L Extract Vol: 50 mL
 Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1458928
 MS Sample ID: 1458929 MS
 MSD Sample ID:

Analysis Date: 07/14/2018 12:01
 Analysis Date: 07/14/2018 12:04
 Analysis Date:
 Matrix: Drinking Water

QC for Samples: 1183618023, 1183618024, 1183618025, 1183618026, 1183618027

Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Calcium	1340	10000	11500	102				70-130		
Magnesium	400	10000	10800	104				70-130		

Batch Information

Analytical Batch: MMS10240
 Analytical Method: EP200.8
 Instrument: Perkin Elmer Nexlon P5
 Analyst: ACF
 Analytical Date/Time: 7/14/2018 12:04:57PM

Prep Batch: MXX31737
 Prep Method: DW Digest for Metals on ICP-MS
 Prep Date/Time: 7/12/2018 3:30:29PM
 Prep Initial Wt./Vol.: 20.00mL
 Prep Extract Vol: 50.00mL

Print Date: 07/24/2018 12:22:18PM

Method Blank

Blank ID: MB for HBN 1782430 [MXX/31743]
Blank Lab ID: 1459170

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1183618001, 1183618002, 1183618005, 1183618006, 1183618007, 1183618008, 1183618009, 1183618010, 1183618011, 1183618012, 1183618013, 1183618014, 1183618016, 1183618017, 1183618018, 1183618019, 1183618020, 1183618021

Results by EP200.8

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Calcium	250U	500	150	ug/L
Copper	0.500U	1.00	0.310	ug/L
Magnesium	25.0U	50.0	15.0	ug/L

Batch Information

Analytical Batch: MMS10240
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: ACF
Analytical Date/Time: 7/14/2018 12:43:39PM

Prep Batch: MXX31743
Prep Method: E200.2
Prep Date/Time: 7/13/2018 12:30:11PM
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Print Date: 07/24/2018 12:22:20PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1183618 [MXX31743]
 Blank Spike Lab ID: 1459171
 Date Analyzed: 07/14/2018 12:46

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183618001, 1183618002, 1183618005, 1183618006, 1183618007, 1183618008, 1183618009,
 1183618010, 1183618011, 1183618012, 1183618013, 1183618014, 1183618016, 1183618017,
 1183618018, 1183618019, 1183618020, 1183618021

Results by EP200.8

Parameter	Blank Spike (ug/L)			CL
	Spike	Result	Rec (%)	
Calcium	10000	9930	99	(85-115)
Copper	1000	1030	103	(85-115)
Magnesium	10000	9910	99	(85-115)

Batch Information

Analytical Batch: **MMS10240**
 Analytical Method: **EP200.8**
 Instrument: **Perkin Elmer Nexlon P5**
 Analyst: **ACF**

Prep Batch: **MXX31743**
 Prep Method: **E200.2**
 Prep Date/Time: **07/13/2018 12:30**
 Spike Init Wt./Vol.: 10000 ug/L Extract Vol: 50 mL
 Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1459173
 MS Sample ID: 1459174 MS
 MSD Sample ID:

Analysis Date: 07/14/2018 12:49
 Analysis Date: 07/14/2018 12:52
 Analysis Date:
 Matrix: Drinking Water

QC for Samples: 1183618001, 1183618002, 1183618005, 1183618006, 1183618007, 1183618008, 1183618009, 1183618010, 1183618011, 1183618012

Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Calcium	32100	10000	42000	98				70-130		
Copper	1.05	1000	993	99				70-130		
Magnesium	8750	10000	18400	96				70-130		

Batch Information

Analytical Batch: MMS10240
 Analytical Method: EP200.8
 Instrument: Perkin Elmer Nexlon P5
 Analyst: ACF
 Analytical Date/Time: 7/14/2018 12:52:37PM

Prep Batch: MXX31743
 Prep Method: DW Digest for Metals on ICP-MS
 Prep Date/Time: 7/13/2018 12:30:11PM
 Prep Initial Wt./Vol.: 20.00mL
 Prep Extract Vol: 50.00mL

Print Date: 07/24/2018 12:22:23PM

Matrix Spike Summary

Original Sample ID: 1459175
 MS Sample ID: 1459176 MS
 MSD Sample ID:

Analysis Date: 07/14/2018 13:28
 Analysis Date: 07/14/2018 13:31
 Analysis Date:
 Matrix: Drinking Water

QC for Samples: 1183618001, 1183618002, 1183618005, 1183618006, 1183618007, 1183618008, 1183618009,
 1183618010, 1183618011, 1183618012, 1183618013, 1183618014, 1183618016, 1183618017,
 1183618018, 1183618019, 1183618020, 1183618021

Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Calcium	6690	10000	17200	105				70-130		
Copper	7.98	1000	1060	105				70-130		
Magnesium	1560	10000	12000	104				70-130		

Batch Information

Analytical Batch: MMS10240
 Analytical Method: EP200.8
 Instrument: Perkin Elmer Nexlon P5
 Analyst: ACF
 Analytical Date/Time: 7/14/2018 1:31:27PM

Prep Batch: MXX31743
 Prep Method: DW Digest for Metals on ICP-MS
 Prep Date/Time: 7/13/2018 12:30:11PM
 Prep Initial Wt./Vol.: 20.00mL
 Prep Extract Vol: 50.00mL

Print Date: 07/24/2018 12:22:23PM

Method Blank

Blank ID: MB for HBN 1782460 [STS/5948]

Matrix: Water (Surface, Eff., Ground)

Blank Lab ID: 1459300

QC for Samples:

1183618001, 1183618002, 1183618005, 1183618006, 1183618007, 1183618008, 1183618009, 1183618010, 1183618011, 1183618012, 1183618013, 1183618014

Results by SM21 2540D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Total Suspended Solids	0.500U	1.00	0.310	mg/L

Batch Information

Analytical Batch: STS5948

Analytical Method: SM21 2540D

Instrument:

Analyst: EWW

Analytical Date/Time: 7/13/2018 5:14:49PM

Print Date: 07/24/2018 12:22:28PM

Duplicate Sample Summary

Original Sample ID: 1183618011

Duplicate Sample ID: 1459303

QC for Samples:

1183618001, 1183618002, 1183618005, 1183618006, 1183618007, 1183618008, 1183618009, 1183618010, 1183618011, 1183618012, 1183618013, 1183618014

Analysis Date: 07/13/2018 17:14

Matrix: Water (Surface, Eff., Ground)

Results by SM21 2540D

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Suspended Solids	30.4	30.0	mg/L	1.30	(< 5)

Batch Information

Analytical Batch: STS5948

Analytical Method: SM21 2540D

Instrument:

Analyst: EWW

Print Date: 07/24/2018 12:22:30PM

Duplicate Sample Summary

Original Sample ID: 1183631001

Duplicate Sample ID: 1459304

QC for Samples:

1183618012, 1183618013, 1183618014

Analysis Date: 07/13/2018 17:14

Matrix: Water (Surface, Eff., Ground)

Results by SM21 2540D

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Suspended Solids	395	395	mg/L	0.00	(< 5)

Batch Information

Analytical Batch: STS5948

Analytical Method: SM21 2540D

Instrument:

Analyst: EWW

Print Date: 07/24/2018 12:22:30PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1183618 [STS5948]
 Blank Spike Lab ID: 1459301
 Date Analyzed: 07/13/2018 17:14

Spike Duplicate ID: LCSD for HBN 1183618 [STS5948]
 Spike Duplicate Lab ID: 1459302
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183618001, 1183618002, 1183618005, 1183618006, 1183618007, 1183618008, 1183618009, 1183618010, 1183618011, 1183618012, 1183618013, 1183618014

Results by SM21 2540D

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Total Suspended Solids	25	29.8	119	25	30.3	121	(75-125)	1.70	(< 5)

Batch Information

Analytical Batch: STS5948
 Analytical Method: SM21 2540D
 Instrument:
 Analyst: EWW

Method Blank

Blank ID: MB for HBN 1782419 [VXX/32603]
 Blank Lab ID: 1459096

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
 1183618002, 1183618005, 1183618008, 1183618010, 1183618013, 1183618015

Results by EPA 602/624

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,2-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,3-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,4-Dichlorobenzene	0.250U	0.500	0.150	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Chlorobenzene	0.250U	0.500	0.150	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	103	81-118		%
4-Bromofluorobenzene (surr)	100	85-114		%
Toluene-d8 (surr)	101	89-112		%

Batch Information

Analytical Batch: VMS17993
 Analytical Method: EPA 602/624
 Instrument: Agilent 7890-75MS
 Analyst: FDR
 Analytical Date/Time: 7/12/2018 2:51:00PM

Prep Batch: VXX32603
 Prep Method: SW5030B
 Prep Date/Time: 7/12/2018 12:00:00AM
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1183618 [VXX32603]
 Blank Spike Lab ID: 1459097
 Date Analyzed: 07/12/2018 15:08

Spike Duplicate ID: LCSD for HBN 1183618
 [VXX32603]
 Spike Duplicate Lab ID: 1459098
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183618002, 1183618005, 1183618008, 1183618010, 1183618013, 1183618015

Results by EPA 602/624

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2-Dichlorobenzene	30	31.7	106	30	32.5	108	(80-119)	2.40	(< 20)
1,3-Dichlorobenzene	30	32.0	107	30	33.0	110	(80-119)	3.00	(< 20)
1,4-Dichlorobenzene	30	32.0	107	30	32.9	110	(79-118)	2.90	(< 20)
Benzene	30	30.0	100	30	29.6	99	(79-120)	1.10	(< 20)
Chlorobenzene	30	29.2	97	30	29.1	97	(82-118)	0.31	(< 20)
Ethylbenzene	30	31.7	106	30	31.1	104	(79-121)	1.80	(< 20)
o-Xylene	30	30.6	102	30	30.7	102	(78-122)	0.23	(< 20)
P & M -Xylene	60	63.7	106	60	62.6	104	(80-121)	1.90	(< 20)
Toluene	30	29.9	100	30	29.3	98	(80-121)	2.00	(< 20)

Surrogates

1,2-Dichloroethane-D4 (surr)	30	96.3	96	30	97	97	(81-118)	0.72	
4-Bromofluorobenzene (surr)	30	99.7	100	30	102	102	(85-114)	2.10	
Toluene-d8 (surr)	30	102	102	30	102	102	(89-112)	0.23	

Batch Information

Analytical Batch: **VMS17993**
 Analytical Method: **EPA 602/624**
 Instrument: **Agilent 7890-75MS**
 Analyst: **FDR**

Prep Batch: **VXX32603**
 Prep Method: **SW5030B**
 Prep Date/Time: **07/12/2018 00:00**
 Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL



Matrix Spike Summary

Original Sample ID: 1459099
MS Sample ID: 1459100 MS
MSD Sample ID: 1459101 MSD

Analysis Date: 07/12/2018 19:40
Analysis Date: 07/12/2018 16:03
Analysis Date: 07/12/2018 16:20
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183618002, 1183618005, 1183618008, 1183618010, 1183618013, 1183618015

Results by EPA 602/624

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2-Dichlorobenzene	0.500U	30.0	31.6	105	30.0	31.6	105	80-119	0.03	(< 20)
1,3-Dichlorobenzene	0.500U	30.0	32	107	30.0	31.7	106	80-119	0.85	(< 20)
1,4-Dichlorobenzene	0.250U	30.0	32.1	107	30.0	31.9	106	79-118	0.41	(< 20)
Benzene	0.200U	30.0	30.4	101	30.0	30.1	100	79-120	0.79	(< 20)
Chlorobenzene	0.250U	30.0	29.3	98	30.0	29.3	98	82-118	0.14	(< 20)
Ethylbenzene	0.500U	30.0	31.9	106	30.0	31.5	105	79-121	1.20	(< 20)
o-Xylene	0.500U	30.0	30.9	103	30.0	30.7	102	78-122	0.84	(< 20)
P & M -Xylene	1.00U	60.0	63.4	106	60.0	63.0	105	80-121	0.70	(< 20)
Toluene	0.500U	30.0	29.5	98	30.0	29.7	99	80-121	0.71	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		30.0	29.4	98	30.0	29.0	97	81-118	1.20	
4-Bromofluorobenzene (surr)		30.0	29.8	99	30.0	30.1	100	85-114	1.00	
Toluene-d8 (surr)		30.0	30.1	100	30.0	30.6	102	89-112	1.50	

Batch Information

Analytical Batch: VMS17993
Analytical Method: EPA 602/624
Instrument: Agilent 7890-75MS
Analyst: FDR
Analytical Date/Time: 7/12/2018 4:03:00PM

Prep Batch: VXX32603
Prep Method: Volatiles Extraction 8240/8260 FULL
Prep Date/Time: 7/12/2018 12:00:00AM
Prep Initial Wt./Vol.: 5.00mL
Prep Extract Vol: 5.00mL

Print Date: 07/24/2018 12:22:36PM

Billable Matrix Spike Summary

Original Sample ID: 1183618002
 MS Sample ID: 1183618003 BMS
 MSD Sample ID: 1183618004 BMSD

Analysis Date: 07/12/2018 19:40
 Analysis Date: 07/12/2018 16:03
 Analysis Date: 07/12/2018 16:20
 Matrix: Water (Surface, Eff., Ground)

QC for Samples:

Results by EPA 602/624

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2-Dichlorobenzene	0.500U	30.0	31.6	105	30.0	31.6	105	80-119	0.03	(< 20)
1,3-Dichlorobenzene	0.500U	30.0	32	107	30.0	31.7	106	80-119	0.85	(< 20)
1,4-Dichlorobenzene	0.250U	30.0	32.1	107	30.0	31.9	106	79-118	0.41	(< 20)
Benzene	0.200U	30.0	30.4	101	30.0	30.1	100	79-120	0.79	(< 20)
Chlorobenzene	0.250U	30.0	29.3	98	30.0	29.3	98	82-118	0.14	(< 20)
Ethylbenzene	0.500U	30.0	31.9	106	30.0	31.5	105	79-121	1.20	(< 20)
o-Xylene	0.500U	30.0	30.9	103	30.0	30.7	102	78-122	0.84	(< 20)
P & M -Xylene	1.00U	60.0	63.4	106	60.0	63.0	105	80-121	0.70	(< 20)
Toluene	0.500U	30.0	29.5	98	30.0	29.7	99	80-121	0.71	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		30.0	29.4	98	30.0	29.0	97	81-118	1.20	
4-Bromofluorobenzene (surr)		30.0	29.8	99	30.0	30.1	100	85-114	1.00	
Toluene-d8 (surr)		30.0	30.1	100	30.0	30.6	102	89-112	1.50	

Batch Information

Analytical Batch: VMS17993
 Analytical Method: EPA 602/624
 Instrument: Agilent 7890-75MS
 Analyst: FDR
 Analytical Date/Time: 7/12/2018 4:03:00PM

Prep Batch: VXX32603
 Prep Method: Volatiles Extraction 8240/8260 FULL
 Prep Date/Time: 7/12/2018 12:00:00AM
 Prep Initial Wt./Vol.: 5.00mL
 Prep Extract Vol: 5.00mL



Method Blank

Blank ID: MB for HBN 1782325 [XXX/39882]
Blank Lab ID: 1458727

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1183618002, 1183618005, 1183618008, 1183618010, 1183618013

Results by EPA 625M SIM (PAH)

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Acenaphthene	0.00625U	0.0125	0.00370	ug/L
Acenaphthylene	0.00625U	0.0125	0.00370	ug/L
Anthracene	0.00625U	0.0125	0.00370	ug/L
Benzo(a)Anthracene	0.00625U	0.0125	0.00370	ug/L
Benzo[a]pyrene	0.00250U	0.00500	0.00150	ug/L
Benzo[b]Fluoranthene	0.00625U	0.0125	0.00370	ug/L
Benzo[g,h,i]perylene	0.00625U	0.0125	0.00370	ug/L
Benzo[k]fluoranthene	0.00625U	0.0125	0.00370	ug/L
Chrysene	0.00625U	0.0125	0.00370	ug/L
Dibenzo[a,h]anthracene	0.00250U	0.00500	0.00150	ug/L
Fluoranthene	0.00625U	0.0125	0.00370	ug/L
Fluorene	0.00625U	0.0125	0.00370	ug/L
Indeno[1,2,3-c,d] pyrene	0.00625U	0.0125	0.00370	ug/L
Naphthalene	0.0125U	0.0250	0.00780	ug/L
Phenanthrene	0.0250U	0.0500	0.00370	ug/L
Pyrene	0.0250U	0.0500	0.00370	ug/L
Surrogates				
2-Methylnaphthalene-d10 (surr)	81.6	47-106		%
Fluoranthene-d10 (surr)	83.4	24-116		%

Batch Information

Analytical Batch: XMS10888
Analytical Method: EPA 625M SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 7/17/2018 1:32:00PM

Prep Batch: XXX39882
Prep Method: SW3520C
Prep Date/Time: 7/12/2018 9:05:40AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 1 mL

Print Date: 07/24/2018 12:22:38PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1183618 [XXX39882]

Blank Spike Lab ID: 1458728

Date Analyzed: 07/17/2018 13:53

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183618002, 1183618005, 1183618008, 1183618010, 1183618013

Results by EPA 625M SIM (PAH)

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
Acenaphthene	0.5	0.402	80	(48-114)
Acenaphthylene	0.5	0.369	74	(35-121)
Anthracene	0.5	0.370	74	(53-119)
Benzo(a)Anthracene	0.5	0.377	76	(59-120)
Benzo[a]pyrene	0.5	0.367	74	(53-120)
Benzo[b]Fluoranthene	0.5	0.381	76	(53-126)
Benzo[g,h,i]perylene	0.5	0.343	69	(44-128)
Benzo[k]fluoranthene	0.5	0.384	77	(54-125)
Chrysene	0.5	0.411	82	(57-120)
Dibenzo[a,h]anthracene	0.5	0.302	60	(44-131)
Fluoranthene	0.5	0.393	79	(58-120)
Fluorene	0.5	0.373	75	(50-118)
Indeno[1,2,3-c,d] pyrene	0.5	0.355	71	(48-130)
Naphthalene	0.5	0.375	75	(43-114)
Phenanthrene	0.5	0.352	71	(53-115)
Pyrene	0.5	0.406	81	(53-121)

Surrogates

2-Methylnaphthalene-d10 (surr)	0.5	76.1	76	(47-106)
Fluoranthene-d10 (surr)	0.5	77.3	77	(24-116)

Batch Information

Analytical Batch: XMS10888

Analytical Method: EPA 625M SIM (PAH)

Instrument: SVA Agilent 780/5975 GC/MS

Analyst: BMZ

Prep Batch: XXX39882

Prep Method: SW3520C

Prep Date/Time: 07/12/2018 09:05

Spike Init Wt./Vol.: 0.5 ug/L Extract Vol: 1 mL

Dupe Init Wt./Vol.: Extract Vol:

Billable Matrix Spike Summary

Original Sample ID: 1183618002
 MS Sample ID: 1183618003 BMS
 MSD Sample ID: 1183618004 BMSD

Analysis Date: 07/17/2018 18:20
 Analysis Date: 07/17/2018 18:40
 Analysis Date: 07/17/2018 19:01
 Matrix: Water (Surface, Eff., Ground)

QC for Samples:

Results by EPA 625M SIM (PAH)

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Acenaphthene	0.00810U	0.515	.249	48	0.538	0.255	47 *	48-114	2.20	(< 20)
Acenaphthylene	0.00810U	0.515	.249	48	0.538	0.255	47	35-121	2.40	(< 20)
Anthracene	0.00810U	0.515	.158	31 *	0.538	0.166	31 *	53-119	4.80	(< 20)
Benzo(a)Anthracene	0.00810U	0.515	.0574	11 *	0.538	0.0565	11 *	59-120	1.50	(< 20)
Benzo[a]pyrene	0.00325U	0.515	.0378	7 *	0.538	0.0348	7 *	53-120	8.20	(< 20)
Benzo[b]Fluoranthene	0.00810U	0.515	.0456	9 *	0.538	0.0444	8 *	53-126	2.50	(< 20)
Benzo[g,h,i]perylene	0.00810U	0.515	.0398	8 *	0.538	0.0378	7 *	44-128	5.30	(< 20)
Benzo[k]fluoranthene	0.00810U	0.515	.0431	8 *	0.538	0.0381	7 *	54-125	12.40	(< 20)
Chrysene	0.00810U	0.515	.0858	17 *	0.538	0.0872	16 *	57-120	1.60	(< 20)
Dibenzo[a,h]anthracene	0.00325U	0.515	.0318	6 *	0.538	0.0284	5 *	44-131	11.30	(< 20)
Fluoranthene	0.0284	0.515	.139	21 *	0.538	0.141	21 *	58-120	1.50	(< 20)
Fluorene	0.00810U	0.515	.224	44 *	0.538	0.230	43 *	50-118	2.30	(< 20)
Indeno[1,2,3-c,d] pyrene	0.00810U	0.515	.031	6 *	0.538	0.0288	5 *	48-130	7.40	(< 20)
Naphthalene	0.0163U	0.515	.258	50	0.538	0.259	48	43-114	0.33	(< 20)
Phenanthrene	0.0268J	0.515	.193	32 *	0.538	0.199	32 *	53-115	3.30	(< 20)
Pyrene	0.0394J	0.515	.148	21 *	0.538	0.146	20 *	53-121	1.50	(< 20)
Surrogates										
2-Methylnaphthalene-d10 (surr)		0.515	.259	50	0.538	0.257	48	47-106	0.91	
Fluoranthene-d10 (surr)		0.515	.129	25	0.538	0.137	25	24-116	5.50	

Batch Information

Analytical Batch: XMS10888
 Analytical Method: EPA 625M SIM (PAH)
 Instrument: SVA Agilent 780/5975 GC/MS
 Analyst: BMZ
 Analytical Date/Time: 7/17/2018 6:40:00PM

Prep Batch: XXX39882
 Prep Method: Liquid/Liquid Extraction for 625 SIMS
 Prep Date/Time: 7/12/2018 9:05:40AM
 Prep Initial Wt./Vol.: 970.00mL
 Prep Extract Vol: 1.00mL

Print Date: 07/24/2018 12:22:41PM

Chain of Custody Record

To: KST SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ?????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie	<div style="font-size: 2em; font-weight: bold;">1183618</div>
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Project: MOA Stormwater Management	Matrix: Water	Project #: 5078
Complete by: 2 weeks		
Note: Samples contain sodium thiosulfate for dechlorination		

Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
①A SWM11-04	348-1	7/11/18	15:24	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	①A	
②A SWM12-04	1454-1	"	1420	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	②A	
③A SWM12-04 Dup	1454-1	"	1420	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	③A	
④A SWM03-04	1224-1	"	1500	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	④A	
⑤A SWM04-04	1224-2	"	1503	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑤A	
⑥A SWM05-04	207-1	"	1350	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑥A	
⑦A SWM06-04	314-22	"	1325	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑦A	
⑧A SWM07-04	484-1	"	1250	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑧A	
⑨A SWM08-04	86-1	"	1304	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑨A	
⑩A SWM08-04 Dup	86-1	"	1304	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑩A	
⑪A SWM09-04	499-1	"	1205	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑪A	
⑫A SWM10-04	525-2	"	1230	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑫A	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Temps: 0.6 D30 3.4 D25 HD
1.6 D10 2.7 D26

Sampled and Relinquished By	Date/Time	Transporter	Received By	Date/Time
	7/11/18 1552	hara		
Relinquished By	Date/Time	Transporter	Received By	Date/Time
				7/11/18 1550

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ?????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie
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Project: MOA Stormwater Management Complete by: 2 weeks	Matrix: Water	Project #: 5078
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Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analytes	Container	Pre	No. of Bottles	Lab ID	Condition Upon Receipt
①B SWM11-01	348-1	7/11/18	1524	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	①B	
②B SWM12-01	1454-1	7	1420	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	②B	
③B SWM12-01 Dup	1454-1	7	1420	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	③B	
④B SWM03-01	1224-1	7	1500	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	④B	
⑤B SWM04-01	1224-2	7	1503	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑤B	
⑥B SWM05-01	207-1	7	1350	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑥B	
⑦B SWM06-01	314-22	7	1325	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑦B	
⑧B SWM07-01	484-1	7	1250	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑧B	
⑨B SWM08-01	86-1	7	1304	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑨B	
⑩B SWM08-01 Dup	86-1	7	1304	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑩B	
⑪B SWM09-01	499-1	7	1205	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑪B	
⑫B SWM10-01	525-2	7	1230	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑫B	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments: TCMPS 0.6030 3.4 D25
1.6 D10 2.7 D26

Sampled and Relinquished By	Date/Time	Transporter	Received By	Date/Time
<i>[Signature]</i>	7/11/18 1552	HAND		
Relinquished By	Date/Time	Transporter	Received By	Date/Time
			<i>[Signature]</i> KCT	7/11/18 15:59

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie
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Project: MOA Stormwater Management	Matrix: Water	Project #: 5078
Complete by: 2 weeks		

Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres.	No. of Bottles	Lab ID	Condition Upon Receipt
① SWM11-04	348-1	7/11/18	1524	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	① C	
② SWM12-04	1454-1	7	1420	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	② C	
③ SWM12-04 Dup	1454-1	'	1420	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	③ 5 C	
④ SWM03-04	1224-1	"	1500	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	④ C	
⑤ SWM04-04	1224-2	"	1503	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑤ C	
⑥ SWM05-04	207-1	"	1350	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑥ C	
⑦ SWM06-04	314-22	"	1325	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑦ C	
⑧ SWM07-04	484-1	"	1250	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑧ C	
⑨ SWM08-04	86-1	"	1304	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑨ C	
⑩ SWM08-04 Dup	86-1	"	1304	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑩ C	
⑪ SWM09-04	499-1	"	1205	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑪ C	
⑫ SWM10-04	525-2	"	1230	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑫ C	

7/11 Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments: Temps: 0.6 D 30 3.4 D 25
1.6 D 10 2.7 D 26

Sampled and Relinquished By:	Date/Time	Transporter	Received By:	Date/Time
	7/11/18 1552	HALA		
Relinquished By:	Date/Time	Transporter	Received By:	Date/Time
			RET	7/11/18 1559

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ?????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie
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Project: MOA Stormwater Management Complete by: 2 weeks	Matrix: Water	Project #: 5078
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Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
DA SWM11-04	348-1	7/11/18	1524	Samp	Diss. Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	① D-E	
DA SWM12-04	1454-1		1420	Samp	Diss. Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	② D-E	
DA SWM12-04 Dup	1454-1		1420	Samp	Diss. Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	③ ⑤ D-E	
DA SWM03-04	1224-1		1506	Samp	Diss. Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	④ ⑥ D-E	
DA SWM04-04	1224-2		1503	Samp	Diss. Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	⑤ ⑦ D-E	
DA SWM05-04	207-1		1350	Samp	Diss. Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	⑥ ⑧ D-E	
DA SWM06-04	314-22		1325	Samp	Diss. Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	⑦ ⑨ D-E	
DA SWM07-04	484-1		1250	Samp	Diss. Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	⑧ ⑩ D-E	
DA SWM08-04	86-1		1304	Samp	Diss. Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	⑨ ⑪ D-E	
DA SWM08-04 Dup	86-1		1304	Samp	Diss. Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	⑩ ⑫ D-E	
DA SWM09-04	499-1		1205	Samp	Diss. Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	⑪ ⑬ D-E	
DA SWM10-04	525-2		1230	Samp	Diss. Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	⑫ ⑭ D-E	

KT
7/11

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments: Dissolved Copper must be Filtered & Preserved at Lab

Sampled and Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
<i>AAH</i>	7/11/18 1552	hand	<i>Mri</i> 1251	7/11/18 1555
Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie
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Project: MOA Stormwater Management **Matrix:** Water **Project #:** 5078
Complete by: 2 weeks

Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Flux	No. of Bottles	Lab ID	Condition Upon Receipt
SWM11-04	348-1	7/11/18	1524	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	DEF	16A
SWM12-04	1454-1		1426	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	DEF NEW	17A
SWM12-04 Dup	1454-1		1426	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	DEF DEF	16A 18A
SWM03-04	1224-1		1500	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	DEF DEF	17A 19A
SWM04-04	1224-2		1503	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	DEF DEF	18A 20A
SWM05-04	207-1		1350	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	DEF DEF	19A 21A
SWM06-04	314-22		1325	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	DEF DEF	20A 22A
SWM07-04	484-1		1250	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	DEF DEF	21A 23A
SWM08-04	86-1		1304	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	DEF DEF	22A 24A
SWM08-04 Dup	86-1		1304	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	DEF DEF	23A 25A
SWM09-04	499-1		1205	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	DEF DEF	24A 26A
SWM10-04	525-2		1230	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	DEF DEF	25A 27A

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis/ Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
<i>[Signature]</i>	7/11/18 1552	hand		
Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
			<i>[Signature]</i> KET	7/11/18 1558

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Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ?????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie
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Project: MOA Stormwater Management Complete by: 2 weeks	Matrix: Water	Project #: 5078
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Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres.	No. of Bottles	Lab ID	Condition Upon Receipt
DA-F SWM12-04	1454-1	7/11/18	1420	Samp/MS/MSD	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	6	1 F-G 2 F-G 3 F-G 4 F-G 5 F-G 6 F-G	
DA-B SWM12-04 Dup	1454-1	"	1420	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	1 F-G 2 F-G 3 F-G 4 F-G 5 F-G 6 F-G	
DA-D SWM05-04	207-1	"	1350	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	1 F-G 2 F-G 3 F-G 4 F-G 5 F-G 6 F-G	
DA-B SWM07-04	484-1	"	1250	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	1 F-G 2 F-G 3 F-G 4 F-G 5 F-G 6 F-G	
DA-B SWM09-04	499-1	"	1205	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	1 F-G 2 F-G 3 F-G 4 F-G 5 F-G 6 F-G	
KT 7/R										

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments: Temp: 0.6 D30 3.4 D25
1.6 D10 2.7 D25

Sampled and Relinquished By:	Date/Time	Transporter	Received By:	Date/Time
	7/11/18 1552	hand		
Relinquished By:	Date/Time	Transporter	Received By:	Date/Time
				7/18/18 0015:58

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ?????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie
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Project: MOA Stormwater Management Complete by: 2 weeks	Matrix: Water	Project #: 5078
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1022

Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No of Bottles	Lab ID	Condition Upon Receipt
① SWM12-04	1454-1	7/11/18	1420	Samp/MS/MSD	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	9	② H-S (3) H-S (4) H-S	
② SWM12-04 Dup	1454-1	"	1420	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑤ H-S I-K	
③ SWM05-04	207-1	"	1350	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑧ H-S I-K	
④ SWM07-04	484-1	"	1250	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑩ H-S I-K	
⑤ SWM09-04	499-1	"	1205	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑬ H-S I-K	
⑥ Trip Blank	N/A	N/A	N/A	TB	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑮ A-C-A-C	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments: Temp: 0.6 D30 3.4 D35
1.6 D10 2.7 D26

Sampled and Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
AA	7/11/18 1552	hara		
Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
			KGT	7/11/18 15:58



e-Sample Receipt Form

SGS Workorder #:

1183618



1 1 8 3 6 1 8

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements	<input checked="" type="checkbox"/>	Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	<input type="checkbox"/> n/a	
COC accompanied samples?	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/> **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	<input checked="" type="checkbox"/>	Cooler ID: 1 @ 0.6 °C Therm. ID: D30
	<input checked="" type="checkbox"/>	Cooler ID: 2 @ 1.6 °C Therm. ID: D10
	<input checked="" type="checkbox"/>	Cooler ID: 3 @ 3.4 °C Therm. ID: D25
	<input checked="" type="checkbox"/>	Cooler ID: 4 @ 2.7 °C Therm. ID: D26
	<input type="checkbox"/> n/a	Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	<input type="checkbox"/> n/a	
If <0°C, were sample containers ice free?	<input type="checkbox"/> n/a	
If samples received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	<input checked="" type="checkbox"/>	
Do samples match COC** (i.e., sample IDs, dates/times collected)? **Note: If times differ <1hr, record details & login per COC.	<input type="checkbox"/> no	see below
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	<input checked="" type="checkbox"/>	
Were proper containers (type/mass/volume/preservative***) used?	<input checked="" type="checkbox"/>	<input type="checkbox"/> n/a ***Exemption permitted for metals (e.g. 200.8/6020A).
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	<input checked="" type="checkbox"/>	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	<input type="checkbox"/> no	
Were all soil VOAs field extracted with MeOH+BFB?	<input type="checkbox"/> n/a	
Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.		
Additional notes (if applicable):		
The samples for Total Hardness and Dissolved Cu labels were switched in the field. Confirmed with client to log them in the correct way per JAN. Samples for TAH IDs all ended with 1 on the bottle, in the COC they all end with 4, as the same as the rest of the COC.		



Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1183618001-A	Na2S2O3 for Chlorine Redu	OK	1183618006-K	HCL to pH < 2	OK
1183618001-B	No Preservative Required	OK	1183618007-A	Na2S2O3 for Chlorine Redu	OK
1183618001-C	No Preservative Required	OK	1183618007-B	No Preservative Required	OK
1183618001-D	No Preservative Required	OK	1183618007-C	No Preservative Required	OK
1183618001-E	HNO3 to pH < 2	OK	1183618007-D	No Preservative Required	OK
1183618001-F	HNO3 to pH < 2	OK	1183618007-E	HNO3 to pH < 2	OK
1183618002-A	Na2S2O3 for Chlorine Redu	OK	1183618007-F	HNO3 to pH < 2	OK
1183618002-B	No Preservative Required	OK	1183618007-G	No Preservative Required	OK
1183618002-C	No Preservative Required	OK	1183618007-H	No Preservative Required	OK
1183618002-D	No Preservative Required	OK	1183618007-I	HCL to pH < 2	OK
1183618002-E	HNO3 to pH < 2	OK	1183618007-J	HCL to pH < 2	OK
1183618002-F	HNO3 to pH < 2	OK	1183618007-K	HCL to pH < 2	OK
1183618002-G	No Preservative Required	OK	1183618008-A	Na2S2O3 for Chlorine Redu	OK
1183618002-H	No Preservative Required	OK	1183618008-B	No Preservative Required	OK
1183618002-I	HCL to pH < 2	OK	1183618008-C	No Preservative Required	OK
1183618002-J	HCL to pH < 2	OK	1183618008-D	No Preservative Required	OK
1183618002-K	HCL to pH < 2	OK	1183618008-E	HNO3 to pH < 2	OK
1183618003-A	No Preservative Required	OK	1183618008-F	HNO3 to pH < 2	OK
1183618003-A	No Preservative Required	OK	1183618008-G	No Preservative Required	OK
1183618003-B	No Preservative Required	OK	1183618008-H	No Preservative Required	OK
1183618003-C	HCL to pH < 2	OK	1183618008-I	HCL to pH < 2	OK
1183618003-D	HCL to pH < 2	OK	1183618008-J	HCL to pH < 2	OK
1183618003-E	HCL to pH < 2	OK	1183618008-K	HCL to pH < 2	OK
1183618004-A	No Preservative Required	OK	1183618009-A	Na2S2O3 for Chlorine Redu	OK
1183618004-A	Na2S2O3 for Chlorine Redu	OK	1183618009-B	No Preservative Required	OK
1183618004-B	No Preservative Required	OK	1183618009-C	No Preservative Required	OK
1183618004-C	HCL to pH < 2	OK	1183618009-D	No Preservative Required	OK
1183618004-D	HCL to pH < 2	OK	1183618009-E	HNO3 to pH < 2	OK
1183618004-E	HCL to pH < 2	OK	1183618009-F	HNO3 to pH < 2	OK
1183618005-A	Na2S2O3 for Chlorine Redu	OK	1183618009-G	No Preservative Required	OK
1183618005-B	No Preservative Required	OK	1183618009-H	No Preservative Required	OK
1183618005-C	No Preservative Required	OK	1183618009-I	HCL to pH < 2	OK
1183618005-D	No Preservative Required	OK	1183618009-J	HCL to pH < 2	OK
1183618005-E	HNO3 to pH < 2	OK	1183618009-K	HCL to pH < 2	OK
1183618005-F	HNO3 to pH < 2	OK	1183618010-A	Na2S2O3 for Chlorine Redu	OK
1183618005-G	No Preservative Required	OK	1183618010-B	No Preservative Required	OK
1183618005-H	No Preservative Required	OK	1183618010-C	No Preservative Required	OK
1183618005-I	HCL to pH < 2	OK	1183618010-D	No Preservative Required	OK
1183618005-J	HCL to pH < 2	OK	1183618010-E	HNO3 to pH < 2	OK
1183618005-K	HCL to pH < 2	OK	1183618010-F	HNO3 to pH < 2	OK
1183618006-A	Na2S2O3 for Chlorine Redu	OK	1183618010-G	No Preservative Required	OK
1183618006-B	No Preservative Required	OK	1183618010-H	No Preservative Required	OK
1183618006-C	No Preservative Required	OK	1183618010-I	HCL to pH < 2	OK
1183618006-D	No Preservative Required	OK	1183618010-J	HCL to pH < 2	OK
1183618006-E	HNO3 to pH < 2	OK	1183618010-K	HCL to pH < 2	OK
1183618006-F	HNO3 to pH < 2	OK	1183618011-A	Na2S2O3 for Chlorine Redu	OK
1183618006-G	No Preservative Required	OK	1183618011-B	No Preservative Required	OK
1183618006-H	No Preservative Required	OK	1183618011-C	No Preservative Required	OK
1183618006-I	HCL to pH < 2	OK	1183618011-D	No Preservative Required	OK
1183618006-J	HCL to pH < 2	OK	1183618011-E	HNO3 to pH < 2	OK

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1183618011-F	HNO3 to pH < 2	OK			
1183618011-G	No Preservative Required	OK			
1183618011-H	No Preservative Required	OK			
1183618011-I	HCL to pH < 2	OK			
1183618011-J	HCL to pH < 2	OK			
1183618011-K	HCL to pH < 2	OK			
1183618012-A	Na2S2O3 for Chlorine Redu	OK			
1183618012-B	No Preservative Required	OK			
1183618012-C	No Preservative Required	OK			
1183618012-D	No Preservative Required	OK			
1183618012-E	HNO3 to pH < 2	OK			
1183618012-F	HNO3 to pH < 2	OK			
1183618012-G	No Preservative Required	OK			
1183618012-H	No Preservative Required	OK			
1183618012-I	HCL to pH < 2	OK			
1183618012-J	HCL to pH < 2	OK			
1183618012-K	HCL to pH < 2	OK			
1183618013-A	Na2S2O3 for Chlorine Redu	OK			
1183618013-B	No Preservative Required	OK			
1183618013-C	No Preservative Required	OK			
1183618013-D	No Preservative Required	OK			
1183618013-E	HNO3 to pH < 2	OK			
1183618013-F	HNO3 to pH < 2	OK			
1183618013-G	No Preservative Required	OK			
1183618013-H	No Preservative Required	OK			
1183618013-I	HCL to pH < 2	OK			
1183618013-J	HCL to pH < 2	OK			
1183618013-K	HCL to pH < 2	OK			
1183618014-A	Na2S2O3 for Chlorine Redu	OK			
1183618014-B	No Preservative Required	OK			
1183618014-C	No Preservative Required	OK			
1183618014-D	No Preservative Required	OK			
1183618014-E	HNO3 to pH < 2	OK			
1183618014-F	HNO3 to pH < 2	OK			
1183618014-G	No Preservative Required	OK			
1183618014-H	No Preservative Required	OK			
1183618014-I	HCL to pH < 2	OK			
1183618014-J	HCL to pH < 2	OK			
1183618014-K	HCL to pH < 2	OK			
1183618015-A	HCL to pH < 2	OK			
1183618015-B	HCL to pH < 2	OK			
1183618015-C	HCL to pH < 2	OK			
1183618016-A	HNO3 to pH < 2	OK			
1183618017-A	HNO3 to pH < 2	OK			
1183618018-A	HNO3 to pH < 2	OK			
1183618019-A	HNO3 to pH < 2	OK			
1183618020-A	HNO3 to pH < 2	OK			
1183618021-A	HNO3 to pH < 2	OK			
1183618022-A	HNO3 to pH < 2	OK			
1183618023-A	HNO3 to pH < 2	OK			
1183618024-A	HNO3 to pH < 2	OK			
1183618025-A	HNO3 to pH < 2	OK			
1183618026-A	HNO3 to pH < 2	OK			
1183618027-A	HNO3 to pH < 2	OK			

Container Id

Preservative

Container
Condition

Container Id

Preservative

Container
Condition

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates that an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

BU - The container was received with headspace greater than 6mm.

DM - The container was received damaged.

FR - The container was received frozen and not usable for Bacteria or BOD analyses.

IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

Appendix B2

Laboratory Data Package Storm Event #2

Laboratory Report of Analysis

To: HDR Alaska, Inc.
2525 C St. Ste 500
Anchorage, AK 99503
644-2034

Report Number: **1183933**

Client Project: **5078 MOA Storm Management**

Dear Joe Miller,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Justin at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

Justin Nelson
Project Manager
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Date

Case Narrative

SGS Client: **HDR Alaska, Inc.**
SGS Project: **1183933**
Project Name/Site: **5078 MOA Storm Management**
Project Contact: **Joe Miller**

Refer to sample receipt form for information on sample condition.

SWM06-02 (1183933009) PS

9222D - Sample received with insufficient time and analyzed past 8 hour hold time.

SWM07-02 (1183933010) PS

9222D - Sample received with insufficient time and analyzed past 8 hour hold time.

SWM08-02 (1183933011) PS

9222D - Sample received with insufficient time and analyzed past 8 hour hold time.

SWM08-02 Dup (1183933012) PS

9222D - Sample received with insufficient time and analyzed past 8 hour hold time.

SWM09-02 (1183933013) PS

9222D - Sample received with insufficient time and analyzed past 8 hour hold time.

SWM10-02 (1183933014) PS

9222D - Sample received with insufficient time and analyzed past 8 hour hold time.

SWM12-02 MS (1183933003) BMS

8270D SIM - PAH BMS recovery for several analytes does not meet QC criteria. Refer to the LCS for accuracy requirements.

SWM12-02 MSD (1183933004) BMSD

8270D SIM - PAH BMSD recovery for several analytes does not meet QC criteria. Refer to the LCS for accuracy requirements.

8270D SIM - PAH BMS/BMSD RPD for several analytes does not meet QC criteria. Results for this analyte are considered estimated in the parent sample.

1183933010DUP (1462433) DUP

2540D - Total Suspended Solids - Sample duplicate RPD was outside of acceptance limits. The difference between sample and duplicate results is less than the LOQ.

1183962001DUP (1462436) DUP

2540D - Total Suspended Solids - Sample duplicate RPD was outside of acceptance limits. The difference between sample and duplicate results is less than the LOQ.

MB for HBN 1783110 [BTF/16740] (1462168) MB

9222D - Sample batch size (26) is greater than QC maximum of 20 samples per batch

MB for HBN 1783110 [BTF/16740] (1462169) MB

9222D - Sample batch size (26) is greater than QC maximum of 20 samples per batch

MB for HBN 1783110 [BTF/16740] (1462170) MB

9222D - Sample batch size (26) is greater than QC maximum of 20 samples per batch

MB for HBN 1783140 [BOD/6096] (1462276) MB

Case Narrative

SGS Client: **HDR Alaska, Inc.**
SGS Project: **1183933**
Project Name/Site: **5078 MOA Storm Management**
Project Contact: **Joe Miller**

5210B – BOD - MB (0.27 mg/L) is greater than the recommended limit of 0.2 mg/L. Samples >10X the MB are not significantly affected. Samples <10X the MB results may be biased high

POS for HBN 1783110 [BTF/16740 (1462167) POS

9222D - Sample batch size (26) is greater than QC maximum of 20 samples per batch

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

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Report of Manual Integrations

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Analytical Batch</u>	<u>Analyte</u>	<u>Reason</u>
EPA 625M SIM (PAH)				
1183933013	SWM09-02	XMS10927	Chrysene	BLC

Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Print Date: 08/14/2018 3:23:09PM

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

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SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 DW Chemistry (Provisionally Certified as of 06/11/2018 for Mercury by EPA245.1, Beryllium and Copper by EPA200.8) & Microbiology & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
SWM11-02	1183933001	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM12-02	1183933002	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM12-02 MS	1183933003	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM12-02 MSD	1183933004	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM12-02 Dup	1183933005	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM03-02	1183933006	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM04-02	1183933007	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM05-02	1183933008	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM06-02	1183933009	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM07-02	1183933010	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM08-02	1183933011	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM08-02 Dup	1183933012	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM09-02	1183933013	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM10-02	1183933014	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
Trip Blank	1183933015	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM11-02	1183933016	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM12-04	1183933017	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM12-02 Dup	1183933018	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM03-04	1183933019	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM04-02	1183933020	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM05-02	1183933021	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM06-02	1183933022	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM07-02	1183933023	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM08-02	1183933024	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM08-02 Dup	1183933025	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM09-02	1183933026	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)
SWM10-02	1183933027	07/25/2018	07/25/2018	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
EPA 602/624	602 Aromatics by 624 (W)
EPA 625M SIM (PAH)	625 Semi-Volatiles GC/MS Liq/Liq ext.
SM21 5210B	Biochemical Oxygen Demand SM21 5210B
SM21 9222D	Fecal Coliform (MF)
SM21 2340B	Hardness as CaCO3 by ICP-MS
EP200.8	Metals in Drinking Water by ICP-MS DISSO
EP200.8	Metals in Water by 200.8 ICP-MS
SM21 2540D	Total Suspended Solids SM20 2540D

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Detectable Results Summary

Client Sample ID: **SWM11-02**

Lab Sample ID: 1183933001

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	18000	ug/L
Hardness as CaCO3	56.8	mg/L
Magnesium	2900	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	2.57	mg/L
Fecal Coliform	TNTC	col/100mL
Total Suspended Solids	12.0	mg/L

Waters Department

Client Sample ID: **SWM12-02**

Lab Sample ID: 1183933002

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	22200	ug/L
Hardness as CaCO3	76.9	mg/L
Magnesium	5220	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	4.09	mg/L
Fecal Coliform	13500	col/100mL

Polynuclear Aromatics GC/MS

Fluoranthene	0.0147	ug/L
Phenanthrene	0.0111J	ug/L
Pyrene	0.0205J	ug/L
Total Suspended Solids	20.4	mg/L

Waters Department

Client Sample ID: **SWM12-02 Dup**

Lab Sample ID: 1183933005

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	22400	ug/L
Hardness as CaCO3	77.1	mg/L
Magnesium	5140	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	3.81	mg/L
Fecal Coliform	52000	col/100mL

Polynuclear Aromatics GC/MS

Fluoranthene	0.0140	ug/L
Phenanthrene	0.0112J	ug/L
Pyrene	0.0172J	ug/L
Total Suspended Solids	18.2	mg/L

Waters Department

Client Sample ID: **SWM03-02**

Lab Sample ID: 1183933006

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	7890	ug/L
Hardness as CaCO3	31.2	mg/L
Magnesium	2790	ug/L

Microbiology Laboratory

Fecal Coliform	809	col/100mL
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Waters Department

Total Suspended Solids	7.14	mg/L
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Client Sample ID: **SWM04-02**

Lab Sample ID: 1183933007

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	26300	ug/L
Hardness as CaCO3	98.7	mg/L
Magnesium	8020	ug/L

Microbiology Laboratory

Fecal Coliform	1120	col/100mL
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Waters Department

Total Suspended Solids	60.2	mg/L
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Detectable Results Summary

Client Sample ID: **SWM05-02**

Lab Sample ID: 1183933008

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	16000	ug/L
Hardness as CaCO3	55.3	mg/L
Magnesium	3730	ug/L

Microbiology Laboratory

Polynuclear Aromatics GC/MS

Fecal Coliform	19800	col/100mL
Fluoranthene	0.00756J	ug/L
Pyrene	0.00626J	ug/L
Total Suspended Solids	9.25	mg/L

Waters Department

Client Sample ID: **SWM06-02**

Lab Sample ID: 1183933009

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	6730	ug/L
Hardness as CaCO3	24.9	mg/L
Magnesium	1960	ug/L

Microbiology Laboratory

Waters Department

Client Sample ID: **SWM07-02**

Lab Sample ID: 1183933010

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	4920	ug/L
Hardness as CaCO3	18.9	mg/L
Magnesium	1590	ug/L

Microbiology Laboratory

Polynuclear Aromatics GC/MS

Biochemical Oxygen Demand	4.67	mg/L
Fecal Coliform	16800	col/100mL
Fluoranthene	0.0159	ug/L
Phenanthrene	0.0149J	ug/L
Pyrene	0.0250J	ug/L
Total Suspended Solids	27.8	mg/L

Waters Department

Client Sample ID: **SWM08-02**

Lab Sample ID: 1183933011

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	10200	ug/L
Hardness as CaCO3	34.6	mg/L
Magnesium	2220	ug/L

Microbiology Laboratory

Waters Department

Client Sample ID: **SWM08-02 Dup**

Lab Sample ID: 1183933012

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	10200	ug/L
Hardness as CaCO3	34.7	mg/L
Magnesium	2230	ug/L

Microbiology Laboratory

Waters Department

Biochemical Oxygen Demand	5.08	mg/L
Fecal Coliform	65700	col/100mL
Total Suspended Solids	15.4	mg/L

Detectable Results Summary

Client Sample ID: **SWM09-02**

Lab Sample ID: 1183933013

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	25900	ug/L
Hardness as CaCO3	93.0	mg/L
Magnesium	6890	ug/L
Fecal Coliform	3300	col/100mL

Microbiology Laboratory

Polynuclear Aromatics GC/MS

Benzo(a)Anthracene	0.00650J	ug/L
Chrysene	0.0231	ug/L
Fluoranthene	0.0645	ug/L
Phenanthrene	0.0227J	ug/L
Pyrene	0.0403J	ug/L
Total Suspended Solids	4.15	mg/L

Waters Department

Client Sample ID: **SWM10-02**

Lab Sample ID: 1183933014

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	28700	ug/L
Hardness as CaCO3	102	mg/L
Magnesium	7370	ug/L
Fecal Coliform	620	col/100mL
Total Suspended Solids	4.95	mg/L

Microbiology Laboratory

Waters Department

Client Sample ID: **SWM11-02**

Lab Sample ID: 1183933016

Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	4.68	ug/L

Client Sample ID: **SWM12-04**

Lab Sample ID: 1183933017

Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	8.96	ug/L

Client Sample ID: **SWM12-02 Dup**

Lab Sample ID: 1183933018

Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	8.07	ug/L

Client Sample ID: **SWM03-04**

Lab Sample ID: 1183933019

Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	2.23	ug/L

Client Sample ID: **SWM04-02**

Lab Sample ID: 1183933020

Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	3.50	ug/L

Client Sample ID: **SWM05-02**

Lab Sample ID: 1183933021

Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	6.40	ug/L

Client Sample ID: **SWM06-02**

Lab Sample ID: 1183933022

Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	3.04	ug/L

Detectable Results Summary

Client Sample ID: SWM07-02			
Lab Sample ID: 1183933023	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	9.38	ug/L
Client Sample ID: SWM08-02			
Lab Sample ID: 1183933024	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	6.68	ug/L
Client Sample ID: SWM08-02 Dup			
Lab Sample ID: 1183933025	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	5.58	ug/L
Client Sample ID: SWM09-02			
Lab Sample ID: 1183933026	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	1.67	ug/L
Client Sample ID: SWM10-02			
Lab Sample ID: 1183933027	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	1.32	ug/L

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Results of SWM11-02

Client Sample ID: **SWM11-02**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933001
 Lab Project ID: 1183933

Collection Date: 07/25/18 12:40
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 348-1

Results by Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	18000	500	150	ug/L	1		07/26/18 19:52
Magnesium	2900	50.0	15.0	ug/L	1		07/26/18 19:52

Batch Information

Analytical Batch: MMS10257
 Analytical Method: EP200.8
 Analyst: ACF
 Analytical Date/Time: 07/26/18 19:52
 Container ID: 1183933001-D

Prep Batch: MX31775
 Prep Method: E200.2
 Prep Date/Time: 07/26/18 08:00
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	56.8	5.00	5.00	mg/L	1		07/26/18 19:52

Batch Information

Analytical Batch: MMS10257
 Analytical Method: SM21 2340B
 Analyst: ACF
 Analytical Date/Time: 07/26/18 19:52
 Container ID: 1183933001-D

Prep Batch: MX31775
 Prep Method: E200.2
 Prep Date/Time: 07/26/18 08:00
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL



Results of **SWM11-02**

Client Sample ID: **SWM11-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933001
Lab Project ID: 1183933

Collection Date: 07/25/18 12:40
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 348-1

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	2.57	2.00	2.00	mg/L	1		07/26/18 13:33

Batch Information

Analytical Batch: BOD6096
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 07/26/18 13:33
Container ID: 1183933001-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	TNTC	1.00	1.00	col/100mL	1		07/25/18 19:57

Batch Information

Analytical Batch: BTF16740
Analytical Method: SM21 9222D
Analyst: VDL
Analytical Date/Time: 07/25/18 19:57
Container ID: 1183933001-A



Results of SWM11-02

Client Sample ID: **SWM11-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933001
Lab Project ID: 1183933

Collection Date: 07/25/18 12:40
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 348-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	12.0	0.971	0.301	mg/L	1		07/27/18 14:30

Batch Information

Analytical Batch: STS5960
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 07/27/18 14:30
Container ID: 1183933001-C



Results of **SWM12-02**

Client Sample ID: **SWM12-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933002
Lab Project ID: 1183933

Collection Date: 07/25/18 13:40
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1451-1

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	22200	500	150	ug/L	1		07/26/18 20:33
Magnesium	5220	50.0	15.0	ug/L	1		07/26/18 20:33

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/26/18 20:33
Container ID: 1183933002-I

Prep Batch: MX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	76.9	5.00	5.00	mg/L	1		07/26/18 20:33

Batch Information

Analytical Batch: MMS10257
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/26/18 20:33
Container ID: 1183933002-I

Prep Batch: MX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM12-02

Client Sample ID: **SWM12-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933002
Lab Project ID: 1183933

Collection Date: 07/25/18 13:40
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1451-1

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	4.09	2.00	2.00	mg/L	1		07/26/18 13:33

Batch Information

Analytical Batch: BOD6096
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 07/26/18 13:33
Container ID: 1183933002-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	13500	100	100	col/100mL	1		07/25/18 19:57

Batch Information

Analytical Batch: BTF16740
Analytical Method: SM21 9222D
Analyst: VDL
Analytical Date/Time: 07/25/18 19:57
Container ID: 1183933002-A



Results of SWM12-02

Client Sample ID: SWM12-02
Client Project ID: 5078 MOA Storm Management
Lab Sample ID: 1183933002
Lab Project ID: 1183933

Collection Date: 07/25/18 13:40
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1451-1

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their surrogate compounds with associated quality and detection data.

Batch Information

Analytical Batch: XMS10927
Analytical Method: EPA 625M SIM (PAH)
Analyst: BMZ
Analytical Date/Time: 07/31/18 13:59
Container ID: 1183933002-G

Prep Batch: XXX39998
Prep Method: SW3520C
Prep Date/Time: 07/26/18 08:09
Prep Initial Wt./Vol.: 995 mL
Prep Extract Vol: 1 mL



Results of SWM12-02

Client Sample ID: SWM12-02
Client Project ID: 5078 MOA Storm Management
Lab Sample ID: 1183933002
Lab Project ID: 1183933

Collection Date: 07/25/18 13:40
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1451-1

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, Benzene, Chlorobenzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene, and Surrogates (1,2-Dichloroethane-D4, 4-Bromofluorobenzene, Toluene-d8).

Batch Information

Analytical Batch: VMS18087
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 07/31/18 00:28
Container ID: 1183933002-D

Prep Batch: VXX32746
Prep Method: SW5030B
Prep Date/Time: 07/30/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of SWM12-02

Client Sample ID: **SWM12-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933002
Lab Project ID: 1183933

Collection Date: 07/25/18 13:40
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1451-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	20.4	1.10	0.341	mg/L	1		07/27/18 14:30

Batch Information

Analytical Batch: STS5960
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 07/27/18 14:30
Container ID: 1183933002-C



Results of SWM12-02 Dup

Client Sample ID: SWM12-02 Dup
Client Project ID: 5078 MOA Storm Management
Lab Sample ID: 1183933005
Lab Project ID: 1183933

Collection Date: 07/25/18 13:40
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1451-1

Results by Metals by ICP/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Calcium and Magnesium.

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/26/18 20:36
Container ID: 1183933005-I
Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row includes Hardness as CaCO3.

Batch Information

Analytical Batch: MMS10257
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/26/18 20:36
Container ID: 1183933005-I
Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM12-02 Dup

Client Sample ID: **SWM12-02 Dup**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933005
Lab Project ID: 1183933

Collection Date: 07/25/18 13:40
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1451-1

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	3.81	2.00	2.00	mg/L	1		07/26/18 13:33

Batch Information

Analytical Batch: BOD6096
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 07/26/18 13:33
Container ID: 1183933005-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	52000	100	100	col/100mL	1		07/25/18 19:57

Batch Information

Analytical Batch: BTF16740
Analytical Method: SM21 9222D
Analyst: VDL
Analytical Date/Time: 07/25/18 19:57
Container ID: 1183933005-A



Results of SWM12-02 Dup

Client Sample ID: SWM12-02 Dup
Client Project ID: 5078 MOA Storm Management
Lab Sample ID: 1183933005
Lab Project ID: 1183933

Collection Date: 07/25/18 13:40
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1451-1

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their surrogate compounds with associated quality and detection data.

Batch Information

Analytical Batch: XMS10927
Analytical Method: EPA 625M SIM (PAH)
Analyst: BMZ
Analytical Date/Time: 07/31/18 15:00
Container ID: 1183933005-G

Prep Batch: XXX39998
Prep Method: SW3520C
Prep Date/Time: 07/26/18 08:09
Prep Initial Wt./Vol.: 965 mL
Prep Extract Vol: 1 mL

Results of SWM12-02 Dup

Client Sample ID: **SWM12-02 Dup**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933005
 Lab Project ID: 1183933

Collection Date: 07/25/18 13:40
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 1451-1

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/31/18 00:45
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/31/18 00:45
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/31/18 00:45
Benzene	0.200 U	0.400	0.120	ug/L	1		07/31/18 00:45
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/31/18 00:45
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		07/31/18 00:45
o-Xylene	0.500 U	1.00	0.310	ug/L	1		07/31/18 00:45
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		07/31/18 00:45
Toluene	0.500 U	1.00	0.310	ug/L	1		07/31/18 00:45
Surrogates							
1,2-Dichloroethane-D4 (surr)	102	81-118		%	1		07/31/18 00:45
4-Bromofluorobenzene (surr)	97.1	85-114		%	1		07/31/18 00:45
Toluene-d8 (surr)	99.4	89-112		%	1		07/31/18 00:45

Batch Information

Analytical Batch: VMS18087
 Analytical Method: EPA 602/624
 Analyst: FDR
 Analytical Date/Time: 07/31/18 00:45
 Container ID: 1183933005-D

Prep Batch: VXX32746
 Prep Method: SW5030B
 Prep Date/Time: 07/30/18 00:00
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL

Results of SWM12-02 Dup

Client Sample ID: **SWM12-02 Dup**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933005
 Lab Project ID: 1183933

Collection Date: 07/25/18 13:40
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 1451-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	18.2	2.00	0.620	mg/L	1		07/27/18 14:30

Batch Information

Analytical Batch: STS5960
 Analytical Method: SM21 2540D
 Analyst: EWW
 Analytical Date/Time: 07/27/18 14:30
 Container ID: 1183933005-C



Results of **SWM03-02**

Client Sample ID: **SWM03-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933006
Lab Project ID: 1183933

Collection Date: 07/25/18 13:10
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1224-1

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	7890	500	150	ug/L	1		07/26/18 20:30
Magnesium	2790	50.0	15.0	ug/L	1		07/26/18 20:30

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/26/18 20:30
Container ID: 1183933006-D

Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	31.2	5.00	5.00	mg/L	1		07/26/18 20:30

Batch Information

Analytical Batch: MMS10257
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/26/18 20:30
Container ID: 1183933006-D

Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM03-02

Client Sample ID: **SWM03-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933006
Lab Project ID: 1183933

Collection Date: 07/25/18 13:10
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1224-1

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	2.00 U	2.00	2.00	mg/L	1		07/26/18 13:33

Batch Information

Analytical Batch: BOD6096
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 07/26/18 13:33
Container ID: 1183933006-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	809	9.09	9.09	col/100mL	1		07/25/18 19:57

Batch Information

Analytical Batch: BTF16740
Analytical Method: SM21 9222D
Analyst: VDL
Analytical Date/Time: 07/25/18 19:57
Container ID: 1183933006-A

Results of SWM03-02

Client Sample ID: **SWM03-02**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933006
 Lab Project ID: 1183933

Collection Date: 07/25/18 13:10
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 1224-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	7.14	0.952	0.295	mg/L	1		07/27/18 14:30

Batch Information

Analytical Batch: STS5960
 Analytical Method: SM21 2540D
 Analyst: EWW
 Analytical Date/Time: 07/27/18 14:30
 Container ID: 1183933006-C



Results of SWM04-02

Client Sample ID: **SWM04-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933007
Lab Project ID: 1183933

Collection Date: 07/25/18 13:15
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1224-2

Results by Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	26300	500	150	ug/L	1		07/26/18 21:00
Magnesium	8020	50.0	15.0	ug/L	1		07/26/18 21:00

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/26/18 21:00
Container ID: 1183933007-D

Prep Batch: MX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	98.7	5.00	5.00	mg/L	1		07/26/18 21:00

Batch Information

Analytical Batch: MMS10257
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/26/18 21:00
Container ID: 1183933007-D

Prep Batch: MX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM04-02**

Client Sample ID: **SWM04-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933007
Lab Project ID: 1183933

Collection Date: 07/25/18 13:15
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1224-2

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	2.00 U	2.00	2.00	mg/L	1		07/26/18 13:33

Batch Information

Analytical Batch: BOD6096
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 07/26/18 13:33
Container ID: 1183933007-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	1120	9.09	9.09	col/100mL	1		07/25/18 19:57

Batch Information

Analytical Batch: BTF16740
Analytical Method: SM21 9222D
Analyst: VDL
Analytical Date/Time: 07/25/18 19:57
Container ID: 1183933007-A



Results of **SWM04-02**

Client Sample ID: **SWM04-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933007
Lab Project ID: 1183933

Collection Date: 07/25/18 13:15
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1224-2

Results by **Waters Department**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	60.2	2.00	0.620	mg/L	1		07/27/18 14:30

Batch Information

Analytical Batch: STS5960
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 07/27/18 14:30
Container ID: 1183933007-C



Results of **SWM05-02**

Client Sample ID: **SWM05-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933008
Lab Project ID: 1183933

Collection Date: 07/25/18 14:15
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 207-1

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	16000	500	150	ug/L	1		07/26/18 21:03
Magnesium	3730	50.0	15.0	ug/L	1		07/26/18 21:03

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/26/18 21:03
Container ID: 1183933008-I

Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	55.3	5.00	5.00	mg/L	1		07/26/18 21:03

Batch Information

Analytical Batch: MMS10257
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/26/18 21:03
Container ID: 1183933008-I

Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM05-02**

Client Sample ID: **SWM05-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933008
Lab Project ID: 1183933

Collection Date: 07/25/18 14:15
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 207-1

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	2.00 U	2.00	2.00	mg/L	1		07/26/18 13:33

Batch Information

Analytical Batch: BOD6096
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 07/26/18 13:33
Container ID: 1183933008-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	19800	100	100	col/100mL	1		07/25/18 20:35

Batch Information

Analytical Batch: BTF16740
Analytical Method: SM21 9222D
Analyst: VDL
Analytical Date/Time: 07/25/18 20:35
Container ID: 1183933008-A



Results of **SWM05-02**

Client Sample ID: **SWM05-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933008
Lab Project ID: 1183933

Collection Date: 07/25/18 14:15
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 207-1

Results by **Polynuclear Aromatics GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Acenaphthene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 15:21
Acenaphthylene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 15:21
Anthracene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 15:21
Benzo(a)Anthracene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 15:21
Benzo[a]pyrene	0.00250 U	0.00500	0.00150	ug/L	1		07/31/18 15:21
Benzo[b]Fluoranthene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 15:21
Benzo[g,h,i]perylene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 15:21
Benzo[k]fluoranthene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 15:21
Chrysene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 15:21
Dibenzo[a,h]anthracene	0.00250 U	0.00500	0.00150	ug/L	1		07/31/18 15:21
Fluoranthene	0.00756 J	0.0125	0.00370	ug/L	1		07/31/18 15:21
Fluorene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 15:21
Indeno[1,2,3-c,d] pyrene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 15:21
Naphthalene	0.0125 U	0.0250	0.00780	ug/L	1		07/31/18 15:21
Phenanthrene	0.0250 U	0.0500	0.00370	ug/L	1		07/31/18 15:21
Pyrene	0.00626 J	0.0500	0.00370	ug/L	1		07/31/18 15:21
Surrogates							
2-Methylnaphthalene-d10 (surr)	48.9	47-106		%	1		07/31/18 15:21
Fluoranthene-d10 (surr)	48.1	24-116		%	1		07/31/18 15:21

Batch Information

Analytical Batch: XMS10927
Analytical Method: EPA 625M SIM (PAH)
Analyst: BMZ
Analytical Date/Time: 07/31/18 15:21
Container ID: 1183933008-G

Prep Batch: XXX39998
Prep Method: SW3520C
Prep Date/Time: 07/26/18 08:09
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 1 mL



Results of **SWM05-02**

Client Sample ID: **SWM05-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933008
Lab Project ID: 1183933

Collection Date: 07/25/18 14:15
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 207-1

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/31/18 01:03
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/31/18 01:03
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/31/18 01:03
Benzene	0.200 U	0.400	0.120	ug/L	1		07/31/18 01:03
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/31/18 01:03
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		07/31/18 01:03
o-Xylene	0.500 U	1.00	0.310	ug/L	1		07/31/18 01:03
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		07/31/18 01:03
Toluene	0.500 U	1.00	0.310	ug/L	1		07/31/18 01:03
Surrogates							
1,2-Dichloroethane-D4 (surr)	102	81-118		%	1		07/31/18 01:03
4-Bromofluorobenzene (surr)	101	85-114		%	1		07/31/18 01:03
Toluene-d8 (surr)	99.4	89-112		%	1		07/31/18 01:03

Batch Information

Analytical Batch: VMS18087
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 07/31/18 01:03
Container ID: 1183933008-D

Prep Batch: VXX32746
Prep Method: SW5030B
Prep Date/Time: 07/30/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of SWM05-02

Client Sample ID: **SWM05-02**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933008
 Lab Project ID: 1183933

Collection Date: 07/25/18 14:15
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 207-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	9.25	1.25	0.388	mg/L	1		07/27/18 14:30

Batch Information

Analytical Batch: STS5960
 Analytical Method: SM21 2540D
 Analyst: EWW
 Analytical Date/Time: 07/27/18 14:30
 Container ID: 1183933008-C



Results of **SWM06-02**

Client Sample ID: **SWM06-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933009
Lab Project ID: 1183933

Collection Date: 07/25/18 10:45
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 314-22

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	6730	500	150	ug/L	1		07/26/18 21:06
Magnesium	1960	50.0	15.0	ug/L	1		07/26/18 21:06

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/26/18 21:06
Container ID: 1183933009-D

Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	24.9	5.00	5.00	mg/L	1		07/26/18 21:06

Batch Information

Analytical Batch: MMS10257
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/26/18 21:06
Container ID: 1183933009-D

Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Results of SWM06-02

Client Sample ID: **SWM06-02**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933009
 Lab Project ID: 1183933

Collection Date: 07/25/18 10:45
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 314-22

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	2.11	2.00	2.00	mg/L	1		07/26/18 13:33

Batch Information

Analytical Batch: BOD6096
 Analytical Method: SM21 5210B
 Analyst: A.L
 Analytical Date/Time: 07/26/18 13:33
 Container ID: 1183933009-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	15500	100	100	col/100mL	1		07/25/18 20:35

Batch Information

Analytical Batch: BTF16740
 Analytical Method: SM21 9222D
 Analyst: VDL
 Analytical Date/Time: 07/25/18 20:35
 Container ID: 1183933009-A

Results of SWM06-02

Client Sample ID: **SWM06-02**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933009
 Lab Project ID: 1183933

Collection Date: 07/25/18 10:45
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 314-22

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	8.25	1.25	0.388	mg/L	1		07/27/18 14:30

Batch Information

Analytical Batch: STS5960
 Analytical Method: SM21 2540D
 Analyst: EWW
 Analytical Date/Time: 07/27/18 14:30
 Container ID: 1183933009-C



Results of **SWM07-02**

Client Sample ID: **SWM07-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933010
Lab Project ID: 1183933

Collection Date: 07/25/18 11:10
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 484-1

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	4920	500	150	ug/L	1		07/26/18 20:28
Magnesium	1590	50.0	15.0	ug/L	1		07/26/18 20:28

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/26/18 20:28
Container ID: 1183933010-I

Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	18.9	5.00	5.00	mg/L	1		07/26/18 20:28

Batch Information

Analytical Batch: MMS10257
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/26/18 20:28
Container ID: 1183933010-I

Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Results of SWM07-02

Client Sample ID: **SWM07-02**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933010
 Lab Project ID: 1183933

Collection Date: 07/25/18 11:10
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 484-1

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	4.67	2.00	2.00	mg/L	1		07/26/18 13:33

Batch Information

Analytical Batch: BOD6096
 Analytical Method: SM21 5210B
 Analyst: A.L
 Analytical Date/Time: 07/26/18 13:33
 Container ID: 1183933010-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	16800	100	100	col/100mL	1		07/25/18 20:35

Batch Information

Analytical Batch: BTF16740
 Analytical Method: SM21 9222D
 Analyst: VDL
 Analytical Date/Time: 07/25/18 20:35
 Container ID: 1183933010-A



Results of SWM07-02

Client Sample ID: **SWM07-02**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933010
 Lab Project ID: 1183933

Collection Date: 07/25/18 11:10
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 484-1

Results by Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Acenaphthene	0.00630 U	0.0126	0.00372	ug/L	1		07/31/18 15:42
Acenaphthylene	0.00630 U	0.0126	0.00372	ug/L	1		07/31/18 15:42
Anthracene	0.00630 U	0.0126	0.00372	ug/L	1		07/31/18 15:42
Benzo(a)Anthracene	0.00630 U	0.0126	0.00372	ug/L	1		07/31/18 15:42
Benzo[a]pyrene	0.00251 U	0.00503	0.00151	ug/L	1		07/31/18 15:42
Benzo[b]Fluoranthene	0.00630 U	0.0126	0.00372	ug/L	1		07/31/18 15:42
Benzo[g,h,i]perylene	0.00630 U	0.0126	0.00372	ug/L	1		07/31/18 15:42
Benzo[k]fluoranthene	0.00630 U	0.0126	0.00372	ug/L	1		07/31/18 15:42
Chrysene	0.00630 U	0.0126	0.00372	ug/L	1		07/31/18 15:42
Dibenzo[a,h]anthracene	0.00251 U	0.00503	0.00151	ug/L	1		07/31/18 15:42
Fluoranthene	0.0159	0.0126	0.00372	ug/L	1		07/31/18 15:42
Fluorene	0.00630 U	0.0126	0.00372	ug/L	1		07/31/18 15:42
Indeno[1,2,3-c,d] pyrene	0.00630 U	0.0126	0.00372	ug/L	1		07/31/18 15:42
Naphthalene	0.0126 U	0.0251	0.00784	ug/L	1		07/31/18 15:42
Phenanthrene	0.0149 J	0.0503	0.00372	ug/L	1		07/31/18 15:42
Pyrene	0.0250 J	0.0503	0.00372	ug/L	1		07/31/18 15:42
Surrogates							
2-Methylnaphthalene-d10 (surr)	52.6	47-106		%	1		07/31/18 15:42
Fluoranthene-d10 (surr)	36.2	24-116		%	1		07/31/18 15:42

Batch Information

Analytical Batch: XMS10927
 Analytical Method: EPA 625M SIM (PAH)
 Analyst: BMZ
 Analytical Date/Time: 07/31/18 15:42
 Container ID: 1183933010-G

Prep Batch: XXX39998
 Prep Method: SW3520C
 Prep Date/Time: 07/26/18 08:09
 Prep Initial Wt./Vol.: 995 mL
 Prep Extract Vol: 1 mL



Results of **SWM07-02**

Client Sample ID: **SWM07-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933010
Lab Project ID: 1183933

Collection Date: 07/25/18 11:10
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 484-1

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/31/18 01:20
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/31/18 01:20
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/31/18 01:20
Benzene	0.200 U	0.400	0.120	ug/L	1		07/31/18 01:20
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/31/18 01:20
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		07/31/18 01:20
o-Xylene	0.500 U	1.00	0.310	ug/L	1		07/31/18 01:20
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		07/31/18 01:20
Toluene	0.500 U	1.00	0.310	ug/L	1		07/31/18 01:20
Surrogates							
1,2-Dichloroethane-D4 (surr)	102	81-118		%	1		07/31/18 01:20
4-Bromofluorobenzene (surr)	102	85-114		%	1		07/31/18 01:20
Toluene-d8 (surr)	100	89-112		%	1		07/31/18 01:20

Batch Information

Analytical Batch: VMS18087
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 07/31/18 01:20
Container ID: 1183933010-D

Prep Batch: VXX32746
Prep Method: SW5030B
Prep Date/Time: 07/30/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of SWM07-02

Client Sample ID: **SWM07-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933010
Lab Project ID: 1183933

Collection Date: 07/25/18 11:10
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 484-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	27.8	2.00	0.620	mg/L	1		07/27/18 14:30

Batch Information

Analytical Batch: STS5960
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 07/27/18 14:30
Container ID: 1183933010-C



Results of **SWM08-02**

Client Sample ID: **SWM08-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933011
Lab Project ID: 1183933

Collection Date: 07/25/18 11:15
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 86-1

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	10200	500	150	ug/L	1		07/26/18 20:39
Magnesium	2220	50.0	15.0	ug/L	1		07/26/18 20:39

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/26/18 20:39
Container ID: 1183933011-D

Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	34.6	5.00	5.00	mg/L	1		07/26/18 20:39

Batch Information

Analytical Batch: MMS10257
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/26/18 20:39
Container ID: 1183933011-D

Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM08-02**

Client Sample ID: **SWM08-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933011
Lab Project ID: 1183933

Collection Date: 07/25/18 11:15
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 86-1

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	5.10	2.00	2.00	mg/L	1		07/26/18 13:33

Batch Information

Analytical Batch: BOD6096
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 07/26/18 13:33
Container ID: 1183933011-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	43300	100	100	col/100mL	1		07/25/18 20:35

Batch Information

Analytical Batch: BTF16740
Analytical Method: SM21 9222D
Analyst: VDL
Analytical Date/Time: 07/25/18 20:35
Container ID: 1183933011-A



Results of SWM08-02

Client Sample ID: **SWM08-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933011
Lab Project ID: 1183933

Collection Date: 07/25/18 11:15
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 86-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	14.4	2.00	0.620	mg/L	1		07/27/18 14:30

Batch Information

Analytical Batch: STS5960
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 07/27/18 14:30
Container ID: 1183933011-C



Results of SWM08-02 Dup

Client Sample ID: SWM08-02 Dup
Client Project ID: 5078 MOA Storm Management
Lab Sample ID: 1183933012
Lab Project ID: 1183933

Collection Date: 07/25/18 11:15
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 86-1

Results by Metals by ICP/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Calcium and Magnesium.

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/26/18 20:42
Container ID: 1183933012-D
Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row includes Hardness as CaCO3.

Batch Information

Analytical Batch: MMS10257
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/26/18 20:42
Container ID: 1183933012-D
Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM08-02 Dup

Client Sample ID: **SWM08-02 Dup**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933012
Lab Project ID: 1183933

Collection Date: 07/25/18 11:15
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 86-1

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	5.08	2.00	2.00	mg/L	1		07/26/18 13:33

Batch Information

Analytical Batch: BOD6096
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 07/26/18 13:33
Container ID: 1183933012-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	65700	100	100	col/100mL	1		07/25/18 20:35

Batch Information

Analytical Batch: BTF16740
Analytical Method: SM21 9222D
Analyst: VDL
Analytical Date/Time: 07/25/18 20:35
Container ID: 1183933012-A



Results of SWM08-02 Dup

Client Sample ID: **SWM08-02 Dup**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933012
Lab Project ID: 1183933

Collection Date: 07/25/18 11:15
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 86-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	15.4	1.25	0.388	mg/L	1		07/27/18 14:30

Batch Information

Analytical Batch: STS5960
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 07/27/18 14:30
Container ID: 1183933012-C



Results of **SWM09-02**

Client Sample ID: **SWM09-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933013
Lab Project ID: 1183933

Collection Date: 07/25/18 11:50
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 499-1

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	25900	500	150	ug/L	1		07/26/18 20:45
Magnesium	6890	50.0	15.0	ug/L	1		07/26/18 20:45

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/26/18 20:45
Container ID: 1183933013-I

Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	93.0	5.00	5.00	mg/L	1		07/26/18 20:45

Batch Information

Analytical Batch: MMS10257
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/26/18 20:45
Container ID: 1183933013-I

Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM09-02**

Client Sample ID: **SWM09-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933013
Lab Project ID: 1183933

Collection Date: 07/25/18 11:50
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 499-1

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	2.00 U	2.00	2.00	mg/L	1		07/26/18 13:33

Batch Information

Analytical Batch: BOD6096
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 07/26/18 13:33
Container ID: 1183933013-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	3300	100	100	col/100mL	1		07/25/18 20:35

Batch Information

Analytical Batch: BTF16740
Analytical Method: SM21 9222D
Analyst: VDL
Analytical Date/Time: 07/25/18 20:35
Container ID: 1183933013-A



Results of **SWM09-02**

Client Sample ID: **SWM09-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933013
Lab Project ID: 1183933

Collection Date: 07/25/18 11:50
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 499-1

Results by **Polynuclear Aromatics GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Acenaphthene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 16:02
Acenaphthylene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 16:02
Anthracene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 16:02
Benzo(a)Anthracene	0.00650 J	0.0125	0.00370	ug/L	1		07/31/18 16:02
Benzo[a]pyrene	0.00250 U	0.00500	0.00150	ug/L	1		07/31/18 16:02
Benzo[b]Fluoranthene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 16:02
Benzo[g,h,i]perylene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 16:02
Benzo[k]fluoranthene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 16:02
Chrysene	0.0231	0.0125	0.00370	ug/L	1		07/31/18 16:02
Dibenzo[a,h]anthracene	0.00250 U	0.00500	0.00150	ug/L	1		07/31/18 16:02
Fluoranthene	0.0645	0.0125	0.00370	ug/L	1		07/31/18 16:02
Fluorene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 16:02
Indeno[1,2,3-c,d] pyrene	0.00625 U	0.0125	0.00370	ug/L	1		07/31/18 16:02
Naphthalene	0.0125 U	0.0250	0.00780	ug/L	1		07/31/18 16:02
Phenanthrene	0.0227 J	0.0500	0.00370	ug/L	1		07/31/18 16:02
Pyrene	0.0403 J	0.0500	0.00370	ug/L	1		07/31/18 16:02
Surrogates							
2-Methylnaphthalene-d10 (surr)	61.1	47-106		%	1		07/31/18 16:02
Fluoranthene-d10 (surr)	62.8	24-116		%	1		07/31/18 16:02

Batch Information

Analytical Batch: XMS10927
Analytical Method: EPA 625M SIM (PAH)
Analyst: BMZ
Analytical Date/Time: 07/31/18 16:02
Container ID: 1183933013-G

Prep Batch: XXX39998
Prep Method: SW3520C
Prep Date/Time: 07/26/18 08:09
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 1 mL



Results of **SWM09-02**

Client Sample ID: **SWM09-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933013
Lab Project ID: 1183933

Collection Date: 07/25/18 11:50
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 499-1

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/31/18 01:37
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/31/18 01:37
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/31/18 01:37
Benzene	0.200 U	0.400	0.120	ug/L	1		07/31/18 01:37
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/31/18 01:37
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		07/31/18 01:37
o-Xylene	0.500 U	1.00	0.310	ug/L	1		07/31/18 01:37
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		07/31/18 01:37
Toluene	0.500 U	1.00	0.310	ug/L	1		07/31/18 01:37
Surrogates							
1,2-Dichloroethane-D4 (surr)	103	81-118		%	1		07/31/18 01:37
4-Bromofluorobenzene (surr)	99.7	85-114		%	1		07/31/18 01:37
Toluene-d8 (surr)	100	89-112		%	1		07/31/18 01:37

Batch Information

Analytical Batch: VMS18087
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 07/31/18 01:37
Container ID: 1183933013-D

Prep Batch: VXX32746
Prep Method: SW5030B
Prep Date/Time: 07/30/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of SWM09-02

Client Sample ID: **SWM09-02**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933013
 Lab Project ID: 1183933

Collection Date: 07/25/18 11:50
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 499-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	4.15	0.943	0.292	mg/L	1		07/27/18 14:30

Batch Information

Analytical Batch: STS5960
 Analytical Method: SM21 2540D
 Analyst: EWW
 Analytical Date/Time: 07/27/18 14:30
 Container ID: 1183933013-C



Results of **SWM10-02**

Client Sample ID: **SWM10-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933014
Lab Project ID: 1183933

Collection Date: 07/25/18 12:00
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 525-2

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	28700	500	150	ug/L	1		07/26/18 20:48
Magnesium	7370	50.0	15.0	ug/L	1		07/26/18 20:48

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/26/18 20:48
Container ID: 1183933014-D

Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	102	5.00	5.00	mg/L	1		07/26/18 20:48

Batch Information

Analytical Batch: MMS10257
Analytical Method: SM21 2340B
Analyst: ACF
Analytical Date/Time: 07/26/18 20:48
Container ID: 1183933014-D

Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Results of SWM10-02

Client Sample ID: **SWM10-02**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933014
 Lab Project ID: 1183933

Collection Date: 07/25/18 12:00
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 525-2

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	2.00 U	2.00	2.00	mg/L	1		07/26/18 13:33

Batch Information

Analytical Batch: BOD6096
 Analytical Method: SM21 5210B
 Analyst: A.L
 Analytical Date/Time: 07/26/18 13:33
 Container ID: 1183933014-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	620	10.0	10.0	col/100mL	1		07/25/18 20:35

Batch Information

Analytical Batch: BTF16740
 Analytical Method: SM21 9222D
 Analyst: VDL
 Analytical Date/Time: 07/25/18 20:35
 Container ID: 1183933014-A

Results of SWM10-02

Client Sample ID: **SWM10-02**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933014
 Lab Project ID: 1183933

Collection Date: 07/25/18 12:00
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 525-2

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	4.95	0.971	0.301	mg/L	1		07/27/18 14:30

Batch Information

Analytical Batch: STS5960
 Analytical Method: SM21 2540D
 Analyst: EWW
 Analytical Date/Time: 07/27/18 14:30
 Container ID: 1183933014-C

Results of Trip Blank

Client Sample ID: **Trip Blank**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933015
 Lab Project ID: 1183933

Collection Date: 07/25/18 10:45
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: Trip Blank

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/30/18 23:02
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		07/30/18 23:02
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/30/18 23:02
Benzene	0.200 U	0.400	0.120	ug/L	1		07/30/18 23:02
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		07/30/18 23:02
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		07/30/18 23:02
o-Xylene	0.500 U	1.00	0.310	ug/L	1		07/30/18 23:02
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		07/30/18 23:02
Toluene	0.500 U	1.00	0.310	ug/L	1		07/30/18 23:02
Surrogates							
1,2-Dichloroethane-D4 (surr)	102	81-118		%	1		07/30/18 23:02
4-Bromofluorobenzene (surr)	100	85-114		%	1		07/30/18 23:02
Toluene-d8 (surr)	99.5	89-112		%	1		07/30/18 23:02

Batch Information

Analytical Batch: VMS18087
 Analytical Method: EPA 602/624
 Analyst: FDR
 Analytical Date/Time: 07/30/18 23:02
 Container ID: 1183933015-A

Prep Batch: VXX32746
 Prep Method: SW5030B
 Prep Date/Time: 07/30/18 00:00
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL



Results of **SWM11-02**

Client Sample ID: **SWM11-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933016
Lab Project ID: 1183933

Collection Date: 07/25/18 12:40
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 348-1

Results by **Dissolved Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	4.68	1.00	0.310	ug/L	1		07/26/18 20:22

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/26/18 20:22
Container ID: 1183933016-A

Prep Batch: MXX31775
Prep Method: E200.2
Prep Date/Time: 07/26/18 08:00
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Results of SWM12-04

Client Sample ID: **SWM12-04**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933017
 Lab Project ID: 1183933

Collection Date: 07/25/18 13:40
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 1454-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	8.96	1.00	0.310	ug/L	1		07/26/18 20:57

Batch Information

Analytical Batch: MMS10257
 Analytical Method: EP200.8
 Analyst: ACF
 Analytical Date/Time: 07/26/18 20:57
 Container ID: 1183933017-A

Prep Batch: MXX31775
 Prep Method: E200.2
 Prep Date/Time: 07/26/18 08:00
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

Results of SWM12-02 Dup

Client Sample ID: **SWM12-02 Dup**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933018
 Lab Project ID: 1183933

Collection Date: 07/25/18 13:40
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 1454-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	8.07	1.00	0.310	ug/L	1		07/26/18 19:58

Batch Information

Analytical Batch: MMS10257
 Analytical Method: EP200.8
 Analyst: ACF
 Analytical Date/Time: 07/26/18 19:58
 Container ID: 1183933018-B

Prep Batch: MXX31775
 Prep Method: E200.2
 Prep Date/Time: 07/26/18 08:00
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

Results of SWM03-04

Client Sample ID: **SWM03-04**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933019
 Lab Project ID: 1183933

Collection Date: 07/25/18 13:10
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 1224-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	2.23	1.00	0.310	ug/L	1		07/26/18 20:01

Batch Information

Analytical Batch: MMS10257
 Analytical Method: EP200.8
 Analyst: ACF
 Analytical Date/Time: 07/26/18 20:01
 Container ID: 1183933019-B

Prep Batch: MXX31775
 Prep Method: E200.2
 Prep Date/Time: 07/26/18 08:00
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

Results of SWM04-02

Client Sample ID: **SWM04-02**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933020
 Lab Project ID: 1183933

Collection Date: 07/25/18 13:15
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 1224-2

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	3.50	1.00	0.310	ug/L	1		07/26/18 20:04

Batch Information

Analytical Batch: MMS10257
 Analytical Method: EP200.8
 Analyst: ACF
 Analytical Date/Time: 07/26/18 20:04
 Container ID: 1183933020-B

Prep Batch: MXX31775
 Prep Method: E200.2
 Prep Date/Time: 07/26/18 08:00
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL



Results of SWM05-02

Client Sample ID: **SWM05-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933021
Lab Project ID: 1183933

Collection Date: 07/25/18 14:15
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 207-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	6.40	1.00	0.310	ug/L	1		07/26/18 22:27

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/26/18 22:27
Container ID: 1183933021-B

Prep Batch: MXX31776
Prep Method: E200.2
Prep Date/Time: 07/26/18 13:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Results of SWM06-02

Client Sample ID: **SWM06-02**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933022
 Lab Project ID: 1183933

Collection Date: 07/25/18 10:45
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 314-22

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	3.04	1.00	0.310	ug/L	1		07/26/18 22:30

Batch Information

Analytical Batch: MMS10257
 Analytical Method: EP200.8
 Analyst: ACF
 Analytical Date/Time: 07/26/18 22:30
 Container ID: 1183933022-B

Prep Batch: MXX31776
 Prep Method: E200.2
 Prep Date/Time: 07/26/18 13:30
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL



Results of SWM07-02

Client Sample ID: **SWM07-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933023
Lab Project ID: 1183933

Collection Date: 07/25/18 11:10
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 484-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	9.38	1.00	0.310	ug/L	1		07/26/18 22:33

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/26/18 22:33
Container ID: 1183933023-B

Prep Batch: MXX31776
Prep Method: E200.2
Prep Date/Time: 07/26/18 13:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM08-02

Client Sample ID: **SWM08-02**
Client Project ID: **5078 MOA Storm Management**
Lab Sample ID: 1183933024
Lab Project ID: 1183933

Collection Date: 07/25/18 11:15
Received Date: 07/25/18 14:53
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 86-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	6.68	1.00	0.310	ug/L	1		07/26/18 21:15

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Analyst: ACF
Analytical Date/Time: 07/26/18 21:15
Container ID: 1183933024-B

Prep Batch: MXX31776
Prep Method: E200.2
Prep Date/Time: 07/26/18 13:30
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Results of SWM08-02 Dup

Client Sample ID: **SWM08-02 Dup**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933025
 Lab Project ID: 1183933

Collection Date: 07/25/18 11:15
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 86-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	5.58	1.00	0.310	ug/L	1		07/26/18 21:18

Batch Information

Analytical Batch: MMS10257
 Analytical Method: EP200.8
 Analyst: ACF
 Analytical Date/Time: 07/26/18 21:18
 Container ID: 1183933025-B

Prep Batch: MXX31776
 Prep Method: E200.2
 Prep Date/Time: 07/26/18 13:30
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

Results of SWM09-02

Client Sample ID: **SWM09-02**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933026
 Lab Project ID: 1183933

Collection Date: 07/25/18 11:50
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 499-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	1.67	1.00	0.310	ug/L	1		07/26/18 21:21

Batch Information

Analytical Batch: MMS10257
 Analytical Method: EP200.8
 Analyst: ACF
 Analytical Date/Time: 07/26/18 21:21
 Container ID: 1183933026-B

Prep Batch: MXX31776
 Prep Method: E200.2
 Prep Date/Time: 07/26/18 13:30
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

Results of SWM10-02

Client Sample ID: **SWM10-02**
 Client Project ID: **5078 MOA Storm Management**
 Lab Sample ID: 1183933027
 Lab Project ID: 1183933

Collection Date: 07/25/18 12:00
 Received Date: 07/25/18 14:53
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 525-2

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	1.32	1.00	0.310	ug/L	1		07/26/18 21:24

Batch Information

Analytical Batch: MMS10257
 Analytical Method: EP200.8
 Analyst: ACF
 Analytical Date/Time: 07/26/18 21:24
 Container ID: 1183933027-B

Prep Batch: MXX31776
 Prep Method: E200.2
 Prep Date/Time: 07/26/18 13:30
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

Method Blank

Blank ID: MB for HBN 1783140 [BOD/6096]

Matrix: Water (Surface, Eff., Ground)

Blank Lab ID: 1462276

QC for Samples:

1183933001, 1183933002, 1183933005, 1183933006, 1183933007, 1183933008, 1183933009, 1183933010, 1183933011, 1183933012, 1183933013, 1183933014

Results by SM21 5210B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Biochemical Oxygen Demand	2.00U	2.00	2.00	mg/L

Batch Information

Analytical Batch: BOD6096

Analytical Method: SM21 5210B

Instrument:

Analyst: A.L

Analytical Date/Time: 7/26/2018 1:33:38PM

Print Date: 08/14/2018 3:23:18PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1183933 [BOD6096]

Blank Spike Lab ID: 1462277

Date Analyzed: 07/26/2018 13:33

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183933001, 1183933002, 1183933005, 1183933006, 1183933007, 1183933008, 1183933009,
1183933010, 1183933011, 1183933012, 1183933013, 1183933014

Results by SM21 5210B

Parameter	Blank Spike (mg/L)			CL
	Spike	Result	Rec (%)	
Biochemical Oxygen Demand	198	201	102	(84.6-115.4

Batch Information

Analytical Batch: **BOD6096**
Analytical Method: **SM21 5210B**
Instrument:
Analyst: **A.L**

Print Date: 08/14/2018 3:23:19PM



Method Blank

Blank ID: MB for HBN 1783110 [BTF/16740]
Blank Lab ID: 1462168

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1183933001, 1183933002, 1183933005, 1183933006, 1183933007, 1183933008

Results by SM21 9222D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Fecal Coliform	1.00U	1.00	1.00	col/100mL

Batch Information

Analytical Batch: BTF16740
Analytical Method: SM21 9222D
Instrument:
Analyst: VDL
Analytical Date/Time: 7/25/2018 6:58:00PM

Print Date: 08/14/2018 3:23:21PM



Method Blank

Blank ID: MB for HBN 1783110 [BTF/16740]

Matrix: Water (Surface, Eff., Ground)

Blank Lab ID: 1462169

QC for Samples:

1183933001, 1183933002, 1183933005, 1183933006, 1183933007, 1183933008, 1183933009, 1183933010, 1183933011, 1183933012, 1183933013

Results by SM21 9222D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Fecal Coliform	1.00U	1.00	1.00	col/100mL

Batch Information

Analytical Batch: BTF16740

Analytical Method: SM21 9222D

Instrument:

Analyst: VDL

Analytical Date/Time: 7/25/2018 7:57:00PM

Print Date: 08/14/2018 3:23:21PM

Method Blank

Blank ID: MB for HBN 1783110 [BTF/16740]

Matrix: Water (Surface, Eff., Ground)

Blank Lab ID: 1462170

QC for Samples:

1183933009, 1183933010, 1183933011, 1183933012, 1183933013, 1183933014

Results by SM21 9222D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Fecal Coliform	1.00U	1.00	1.00	col/100mL

Batch Information

Analytical Batch: BTF16740

Analytical Method: SM21 9222D

Instrument:

Analyst: VDL

Analytical Date/Time: 7/25/2018 8:35:00PM

Print Date: 08/14/2018 3:23:21PM

Method Blank

Blank ID: MB for HBN 1783085 [MXX/31775]
 Blank Lab ID: 1462049

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1183933001, 1183933002, 1183933005, 1183933006, 1183933007, 1183933008, 1183933009, 1183933010, 1183933011, 1183933012, 1183933013, 1183933014, 1183933016, 1183933017, 1183933018, 1183933019, 1183933020

Results by EP200.8

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Calcium	250U	500	150	ug/L
Copper	0.500U	1.00	0.310	ug/L
Magnesium	25.0U	50.0	15.0	ug/L

Batch Information

Analytical Batch: MMS10257
 Analytical Method: EP200.8
 Instrument: Perkin Elmer Nexlon P5
 Analyst: ACF
 Analytical Date/Time: 7/26/2018 7:46:11PM

Prep Batch: MXX31775
 Prep Method: E200.2
 Prep Date/Time: 7/26/2018 8:00:25AM
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1183933 [MXX31775]
 Blank Spike Lab ID: 1462050
 Date Analyzed: 07/26/2018 19:49

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183933001, 1183933002, 1183933005, 1183933006, 1183933007, 1183933008, 1183933009,
 1183933010, 1183933011, 1183933012, 1183933013, 1183933014, 1183933016, 1183933017,
 1183933018, 1183933019, 1183933020

Results by EP200.8

Parameter	Blank Spike (ug/L)			CL
	Spike	Result	Rec (%)	
Calcium	10000	9950	100	(85-115)
Copper	1000	983	98	(85-115)
Magnesium	10000	10200	102	(85-115)

Batch Information

Analytical Batch: **MMS10257**
 Analytical Method: **EP200.8**
 Instrument: **Perkin Elmer Nexlon P5**
 Analyst: **ACF**

Prep Batch: **MXX31775**
 Prep Method: **E200.2**
 Prep Date/Time: **07/26/2018 08:00**
 Spike Init Wt./Vol.: 10000 ug/L Extract Vol: 50 mL
 Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1462051
 MS Sample ID: 1462052 MS
 MSD Sample ID:

Analysis Date: 07/26/2018 19:52
 Analysis Date: 07/26/2018 19:55
 Analysis Date:
 Matrix: Drinking Water

QC for Samples: 1183933001, 1183933002, 1183933005, 1183933006, 1183933007, 1183933008, 1183933009,
 1183933010, 1183933011, 1183933012, 1183933013, 1183933014, 1183933016

Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Calcium	18000	10000	29100	111				70-130		
Copper	6.76	1000	1030	102				70-130		
Magnesium	2900	10000	13500	106				70-130		

Batch Information

Analytical Batch: MMS10257
 Analytical Method: EP200.8
 Instrument: Perkin Elmer Nexlon P5
 Analyst: ACF
 Analytical Date/Time: 7/26/2018 7:55:08PM

Prep Batch: MXX31775
 Prep Method: DW Digest for Metals on ICP-MS
 Prep Date/Time: 7/26/2018 8:00:25AM
 Prep Initial Wt./Vol.: 20.00mL
 Prep Extract Vol: 50.00mL

Print Date: 08/14/2018 3:23:25PM

Matrix Spike Summary

Original Sample ID: 1462055
 MS Sample ID: 1462056 MS
 MSD Sample ID:

Analysis Date: 07/26/2018 20:22
 Analysis Date: 07/26/2018 20:25
 Analysis Date:
 Matrix: Drinking Water

QC for Samples: 1183933002, 1183933005, 1183933006, 1183933007, 1183933008, 1183933009, 1183933010,
 1183933011, 1183933012, 1183933013, 1183933014, 1183933016, 1183933017, 1183933018,
 1183933019, 1183933020

Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Calcium	17800	10000	28000	101				70-130		
Copper	4.68	1000	989	98				70-130		
Magnesium	2760	10000	13100	103				70-130		

Batch Information

Analytical Batch: MMS10257
 Analytical Method: EP200.8
 Instrument: Perkin Elmer Nexlon P5
 Analyst: ACF
 Analytical Date/Time: 7/26/2018 8:25:01PM

Prep Batch: MXX31775
 Prep Method: DW Digest for Metals on ICP-MS
 Prep Date/Time: 7/26/2018 8:00:25AM
 Prep Initial Wt./Vol.: 20.00mL
 Prep Extract Vol: 50.00mL

Print Date: 08/14/2018 3:23:25PM

Method Blank

Blank ID: MB for HBN 1783141 [MXX/31776]
Blank Lab ID: 1462278

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1183933021, 1183933022, 1183933023, 1183933024, 1183933025, 1183933026, 1183933027

Results by EP200.8

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Copper	0.500U	1.00	0.310	ug/L

Batch Information

Analytical Batch: MMS10257
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: ACF
Analytical Date/Time: 7/26/2018 9:33:43PM

Prep Batch: MXX31776
Prep Method: E200.2
Prep Date/Time: 7/26/2018 1:30:22PM
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Print Date: 08/14/2018 3:23:28PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1183933 [MXX31776]
 Blank Spike Lab ID: 1462279
 Date Analyzed: 07/26/2018 21:36

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183933021, 1183933022, 1183933023, 1183933024, 1183933025, 1183933026, 1183933027

Results by EP200.8

Parameter	Blank Spike (ug/L)			CL
	Spike	Result	Rec (%)	
Copper	1000	1020	102	(85-115)

Batch Information

Analytical Batch: **MMS10257**
 Analytical Method: **EP200.8**
 Instrument: **Perkin Elmer Nexlon P5**
 Analyst: **ACF**

Prep Batch: **MXX31776**
 Prep Method: **E200.2**
 Prep Date/Time: **07/26/2018 13:30**
 Spike Init Wt./Vol.: 1000 ug/L Extract Vol: 50 mL
 Dupe Init Wt./Vol.: Extract Vol:

Print Date: 08/14/2018 3:23:30PM

Matrix Spike Summary

Original Sample ID: 1462281
 MS Sample ID: 1462282 MS
 MSD Sample ID:

Analysis Date: 07/26/2018 22:18
 Analysis Date: 07/26/2018 22:21
 Analysis Date:
 Matrix: Drinking Water

QC for Samples: 1183933021, 1183933022, 1183933023, 1183933024, 1183933025, 1183933026, 1183933027

Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Copper	14.1	1000	1010	99				70-130		

Batch Information

Analytical Batch: MMS10257
 Analytical Method: EP200.8
 Instrument: Perkin Elmer Nexlon P5
 Analyst: ACF
 Analytical Date/Time: 7/26/2018 10:21:30PM

Prep Batch: MXX31776
 Prep Method: DW Digest for Metals on ICP-MS
 Prep Date/Time: 7/26/2018 1:30:22PM
 Prep Initial Wt./Vol.: 20.00mL
 Prep Extract Vol: 50.00mL

Print Date: 08/14/2018 3:23:30PM

Matrix Spike Summary

Original Sample ID: 1462283
 MS Sample ID: 1462284 MS
 MSD Sample ID:

Analysis Date: 07/26/2018 21:39
 Analysis Date: 07/26/2018 21:42
 Analysis Date:
 Matrix: Drinking Water

QC for Samples: 1183933021, 1183933022, 1183933023, 1183933024, 1183933025, 1183933026, 1183933027

Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Copper	89.5	1000	1090	100				70-130		

Batch Information

Analytical Batch: MMS10257
 Analytical Method: EP200.8
 Instrument: Perkin Elmer Nexlon P5
 Analyst: ACF
 Analytical Date/Time: 7/26/2018 9:42:40PM

Prep Batch: MXX31776
 Prep Method: DW Digest for Metals on ICP-MS
 Prep Date/Time: 7/26/2018 1:30:22PM
 Prep Initial Wt./Vol.: 20.00mL
 Prep Extract Vol: 50.00mL

Print Date: 08/14/2018 3:23:30PM

Method Blank

Blank ID: MB for HBN 1783168 [STS/5960]

Matrix: Water (Surface, Eff., Ground)

Blank Lab ID: 1462430

QC for Samples:

1183933001, 1183933002, 1183933005, 1183933006, 1183933007, 1183933008, 1183933009, 1183933010, 1183933011, 1183933012, 1183933013, 1183933014

Results by SM21 2540D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Total Suspended Solids	0.500U	1.00	0.310	mg/L

Batch Information

Analytical Batch: STS5960

Analytical Method: SM21 2540D

Instrument:

Analyst: EWW

Analytical Date/Time: 7/27/2018 2:30:15PM

Print Date: 08/14/2018 3:23:31PM

Duplicate Sample Summary

Original Sample ID: 1183933010

Duplicate Sample ID: 1462433

QC for Samples:

1183933001, 1183933002, 1183933005, 1183933006, 1183933007, 1183933008, 1183933009, 1183933010, 1183933011, 1183933012, 1183933013, 1183933014

Analysis Date: 07/27/2018 14:30

Matrix: Water (Surface, Eff., Ground)

Results by SM21 2540D

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Suspended Solids	27.8	29.4	mg/L	5.60*	(< 5)

Batch Information

Analytical Batch: STS5960

Analytical Method: SM21 2540D

Instrument:

Analyst: EWW

Print Date: 08/14/2018 3:23:32PM

Duplicate Sample Summary

Original Sample ID: 1183962001

Duplicate Sample ID: 1462436

QC for Samples:

1183933011, 1183933012, 1183933013, 1183933014

Analysis Date: 07/27/2018 14:30

Matrix: Water (Surface, Eff., Ground)

Results by SM21 2540D

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Suspended Solids	148	125	mg/L	16.50*	(< 5)

Batch Information

Analytical Batch: STS5960

Analytical Method: SM21 2540D

Instrument:

Analyst: EWW

Print Date: 08/14/2018 3:23:32PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1183933 [STS5960]
 Blank Spike Lab ID: 1462431
 Date Analyzed: 07/27/2018 14:30

Spike Duplicate ID: LCSD for HBN 1183933 [STS5960]
 Spike Duplicate Lab ID: 1462432
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183933001, 1183933002, 1183933005, 1183933006, 1183933007, 1183933008, 1183933009, 1183933010, 1183933011, 1183933012, 1183933013, 1183933014

Results by SM21 2540D

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Total Suspended Solids	25	24.5	98	25	24.6	98	(75-125)	0.41	(< 5)

Batch Information

Analytical Batch: STS5960
 Analytical Method: SM21 2540D
 Instrument:
 Analyst: EWW

Method Blank

Blank ID: MB for HBN 1783388 [VXX/32746]

Matrix: Water (Surface, Eff., Ground)

Blank Lab ID: 1463379

QC for Samples:

1183933002, 1183933005, 1183933008, 1183933010, 1183933013, 1183933015

Results by EPA 602/624

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,2-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,3-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,4-Dichlorobenzene	0.250U	0.500	0.150	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Chlorobenzene	0.250U	0.500	0.150	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	102	81-118		%
4-Bromofluorobenzene (surr)	101	85-114		%
Toluene-d8 (surr)	99.9	89-112		%

Batch Information

Analytical Batch: VMS18087
 Analytical Method: EPA 602/624
 Instrument: VPA 780/5975 GC/MS
 Analyst: FDR
 Analytical Date/Time: 7/30/2018 8:26:00PM

Prep Batch: VXX32746
 Prep Method: SW5030B
 Prep Date/Time: 7/30/2018 12:00:00AM
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL

Print Date: 08/14/2018 3:23:34PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1183933 [VXX32746]
 Blank Spike Lab ID: 1463380
 Date Analyzed: 07/30/2018 20:43

Spike Duplicate ID: LCSD for HBN 1183933 [VXX32746]
 Spike Duplicate Lab ID: 1463381
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183933002, 1183933005, 1183933008, 1183933010, 1183933013, 1183933015

Results by EPA 602/624

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2-Dichlorobenzene	30	31.7	106	30	31.7	106	(80-119)	0.03	(< 20)
1,3-Dichlorobenzene	30	32.2	107	30	31.9	106	(80-119)	1.20	(< 20)
1,4-Dichlorobenzene	30	31.9	106	30	31.6	105	(79-118)	1.00	(< 20)
Benzene	30	31.5	105	30	31.3	104	(79-120)	0.89	(< 20)
Chlorobenzene	30	31.6	105	30	31.1	104	(82-118)	1.60	(< 20)
Ethylbenzene	30	32.5	108	30	32.4	108	(79-121)	0.40	(< 20)
o-Xylene	30	32.9	110	30	32.3	108	(78-122)	1.80	(< 20)
P & M -Xylene	60	66.4	111	60	64.9	108	(80-121)	2.30	(< 20)
Toluene	30	30.7	102	30	30.6	102	(80-121)	0.16	(< 20)

Surrogates

1,2-Dichloroethane-D4 (surr)	30	98.2	98	30	98	98	(81-118)	0.24	
4-Bromofluorobenzene (surr)	30	99.1	99	30	99.1	99	(85-114)	0.07	
Toluene-d8 (surr)	30	100	100	30	100	100	(89-112)	0.17	

Batch Information

Analytical Batch: **VMS18087**
 Analytical Method: **EPA 602/624**
 Instrument: **VPA 780/5975 GC/MS**
 Analyst: **FDR**

Prep Batch: **VXX32746**
 Prep Method: **SW5030B**
 Prep Date/Time: **07/30/2018 00:00**
 Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

Matrix Spike Summary

Original Sample ID: 1463382
 MS Sample ID: 1463383 MS
 MSD Sample ID: 1463384 MSD

Analysis Date: 07/30/2018 23:54
 Analysis Date: 07/30/2018 21:18
 Analysis Date: 07/30/2018 21:35
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183933002, 1183933005, 1183933008, 1183933010, 1183933013, 1183933015

Results by EPA 602/624

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2-Dichlorobenzene	0.500U	30.0	32.2	107	30.0	31.9	106	80-119	0.94	(< 20)
1,3-Dichlorobenzene	0.500U	30.0	32.4	108	30.0	31.8	106	80-119	2.00	(< 20)
1,4-Dichlorobenzene	0.250U	30.0	32	107	30.0	31.4	105	79-118	1.80	(< 20)
Benzene	0.200U	30.0	31.7	106	30.0	31.2	104	79-120	1.80	(< 20)
Chlorobenzene	0.250U	30.0	31.4	105	30.0	30.8	103	82-118	1.90	(< 20)
Ethylbenzene	0.500U	30.0	32.8	109	30.0	32.1	107	79-121	2.10	(< 20)
o-Xylene	0.500U	30.0	32.8	109	30.0	32.4	108	78-122	1.10	(< 20)
P & M -Xylene	1.00U	60.0	66.6	111	60.0	65.3	109	80-121	2.00	(< 20)
Toluene	0.560J	30.0	31.6	103	30.0	30.6	100	80-121	3.10	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		30.0	29.2	97	30.0	29.6	99	81-118	1.30	
4-Bromofluorobenzene (surr)		30.0	29.7	99	30.0	29.6	99	85-114	0.47	
Toluene-d8 (surr)		30.0	30.1	100	30.0	29.8	99	89-112	0.93	

Batch Information

Analytical Batch: VMS18087
 Analytical Method: EPA 602/624
 Instrument: VPA 780/5975 GC/MS
 Analyst: FDR
 Analytical Date/Time: 7/30/2018 9:18:00PM

Prep Batch: VXX32746
 Prep Method: Volatiles Extraction 8240/8260 FULL
 Prep Date/Time: 7/30/2018 12:00:00AM
 Prep Initial Wt./Vol.: 5.00mL
 Prep Extract Vol: 5.00mL

Billable Matrix Spike Summary

Original Sample ID: 1183933002
 MS Sample ID: 1183933003 BMS
 MSD Sample ID: 1183933004 BMSD

Analysis Date: 07/31/2018 0:28
 Analysis Date: 07/30/2018 21:53
 Analysis Date: 07/30/2018 22:10
 Matrix: Water (Surface, Eff., Ground)

QC for Samples:

Results by EPA 602/624

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2-Dichlorobenzene	0.500U	30.0	32	107	30.0	31.8	106	80-119	0.66	(< 20)
1,3-Dichlorobenzene	0.500U	30.0	32.3	108	30.0	32.3	108	80-119	0.06	(< 20)
1,4-Dichlorobenzene	0.250U	30.0	32.4	108	30.0	32.2	107	79-118	0.68	(< 20)
Benzene	0.200U	30.0	32	107	30.0	31.5	105	79-120	1.70	(< 20)
Chlorobenzene	0.250U	30.0	31.4	105	30.0	30.7	102	82-118	2.20	(< 20)
Ethylbenzene	0.500U	30.0	33	110	30.0	31.5	105	79-121	4.60	(< 20)
o-Xylene	0.500U	30.0	33	110	30.0	32.1	107	78-122	2.90	(< 20)
P & M -Xylene	1.00U	60.0	67	112	60.0	65.2	109	80-121	2.70	(< 20)
Toluene	0.500U	30.0	31	103	30.0	30.3	101	80-121	2.20	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		30.0	29.3	98	30.0	29.9	100	81-118	2.00	
4-Bromofluorobenzene (surr)		30.0	29.3	98	30.0	29.8	99	85-114	1.70	
Toluene-d8 (surr)		30.0	29.9	100	30.0	29.7	99	89-112	0.60	

Batch Information

Analytical Batch: VMS18087
 Analytical Method: EPA 602/624
 Instrument: VPA 780/5975 GC/MS
 Analyst: FDR
 Analytical Date/Time: 7/30/2018 9:53:00PM

Prep Batch: VXX32746
 Prep Method: Volatiles Extraction 8240/8260 FULL
 Prep Date/Time: 7/30/2018 12:00:00AM
 Prep Initial Wt./Vol.: 5.00mL
 Prep Extract Vol: 5.00mL



Method Blank

Blank ID: MB for HBN 1783084 [XXX/39998]
Blank Lab ID: 1462045

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1183933002, 1183933005, 1183933008, 1183933010, 1183933013

Results by EPA 625M SIM (PAH)

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Acenaphthene	0.00625U	0.0125	0.00370	ug/L
Acenaphthylene	0.00625U	0.0125	0.00370	ug/L
Anthracene	0.00625U	0.0125	0.00370	ug/L
Benzo(a)Anthracene	0.00625U	0.0125	0.00370	ug/L
Benzo[a]pyrene	0.00250U	0.00500	0.00150	ug/L
Benzo[b]Fluoranthene	0.00625U	0.0125	0.00370	ug/L
Benzo[g,h,i]perylene	0.00625U	0.0125	0.00370	ug/L
Benzo[k]fluoranthene	0.00625U	0.0125	0.00370	ug/L
Chrysene	0.00625U	0.0125	0.00370	ug/L
Dibenzo[a,h]anthracene	0.00250U	0.00500	0.00150	ug/L
Fluoranthene	0.00625U	0.0125	0.00370	ug/L
Fluorene	0.00625U	0.0125	0.00370	ug/L
Indeno[1,2,3-c,d] pyrene	0.00625U	0.0125	0.00370	ug/L
Naphthalene	0.0125U	0.0250	0.00780	ug/L
Phenanthrene	0.0250U	0.0500	0.00370	ug/L
Pyrene	0.0250U	0.0500	0.00370	ug/L
Surrogates				
2-Methylnaphthalene-d10 (surr)	69.3	47-106		%
Fluoranthene-d10 (surr)	73.8	24-116		%

Batch Information

Analytical Batch: XMS10927
Analytical Method: EPA 625M SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 7/31/2018 11:56:00AM

Prep Batch: XXX39998
Prep Method: SW3520C
Prep Date/Time: 7/26/2018 8:09:41AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 1 mL

Print Date: 08/14/2018 3:23:38PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1183933 [XXX39998]

Blank Spike Lab ID: 1462046

Date Analyzed: 07/31/2018 12:16

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183933002, 1183933005, 1183933008, 1183933010, 1183933013

Results by EPA 625M SIM (PAH)

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
Acenaphthene	0.5	0.416	83	(48-114)
Acenaphthylene	0.5	0.387	77	(35-121)
Anthracene	0.5	0.392	78	(53-119)
Benzo(a)Anthracene	0.5	0.393	79	(59-120)
Benzo[a]pyrene	0.5	0.378	76	(53-120)
Benzo[b]Fluoranthene	0.5	0.389	78	(53-126)
Benzo[g,h,i]perylene	0.5	0.343	69	(44-128)
Benzo[k]fluoranthene	0.5	0.376	75	(54-125)
Chrysene	0.5	0.420	84	(57-120)
Dibenzo[a,h]anthracene	0.5	0.311	62	(44-131)
Fluoranthene	0.5	0.413	83	(58-120)
Fluorene	0.5	0.389	78	(50-118)
Indeno[1,2,3-c,d] pyrene	0.5	0.357	72	(48-130)
Naphthalene	0.5	0.377	75	(43-114)
Phenanthrene	0.5	0.370	74	(53-115)
Pyrene	0.5	0.429	86	(53-121)

Surrogates

2-Methylnaphthalene-d10 (surr)	0.5	74.9	75	(47-106)
Fluoranthene-d10 (surr)	0.5	78.2	78	(24-116)

Batch Information

Analytical Batch: XMS10927

Analytical Method: EPA 625M SIM (PAH)

Instrument: SVA Agilent 780/5975 GC/MS

Analyst: BMZ

Prep Batch: XXX39998

Prep Method: SW3520C

Prep Date/Time: 07/26/2018 08:09

Spike Init Wt./Vol.: 0.5 ug/L Extract Vol: 1 mL

Dupe Init Wt./Vol.: Extract Vol:



Billable Matrix Spike Summary

Original Sample ID: 1183933002
 MS Sample ID: 1183933003 BMS
 MSD Sample ID: 1183933004 BMSD

Analysis Date: 07/31/2018 13:59
 Analysis Date: 07/31/2018 14:19
 Analysis Date: 07/31/2018 14:40
 Matrix: Water (Surface, Eff., Ground)

QC for Samples:

Results by EPA 625M SIM (PAH)

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Acenaphthene	0.00630U	0.515	.331	64	0.513	0.257	50	48-114	25.40	* (< 20)
Acenaphthylene	0.00630U	0.515	.314	61	0.513	0.247	48	35-121	24.10	* (< 20)
Anthracene	0.00630U	0.515	.259	50 *	0.513	0.202	39 *	53-119	24.60	* (< 20)
Benzo(a)Anthracene	0.00630U	0.515	.112	22 *	0.513	0.0763	15 *	59-120	37.60	* (< 20)
Benzo[a]pyrene	0.00251U	0.515	.066	13 *	0.513	0.0430	8 *	53-120	42.40	* (< 20)
Benzo[b]Fluoranthene	0.00630U	0.515	.0736	14 *	0.513	0.0458	9 *	53-126	46.60	* (< 20)
Benzo[g,h,i]perylene	0.00630U	0.515	.0455	9 *	0.513	0.0301	6 *	44-128	40.90	* (< 20)
Benzo[k]fluoranthene	0.00630U	0.515	.0701	14 *	0.513	0.0474	9 *	54-125	38.60	* (< 20)
Chrysene	0.00630U	0.515	.134	26 *	0.513	0.0932	18 *	57-120	35.70	* (< 20)
Dibenzo[a,h]anthracene	0.00251U	0.515	.0484	9 *	0.513	0.0315	6 *	44-131	42.20	* (< 20)
Fluoranthene	0.0147	0.515	.237	43 *	0.513	0.177	32 *	58-120	29.10	* (< 20)
Fluorene	0.00630U	0.515	.304	59	0.513	0.240	47 *	50-118	23.50	* (< 20)
Indeno[1,2,3-c,d] pyrene	0.00630U	0.515	.0466	9 *	0.513	0.0308	6 *	48-130	40.70	* (< 20)
Naphthalene	0.0126U	0.515	.308	60	0.513	0.239	47	43-114	24.90	* (< 20)
Phenanthrene	0.0111J	0.515	.273	51 *	0.513	0.210	39 *	53-115	26.00	* (< 20)
Pyrene	0.0205J	0.515	.239	42 *	0.513	0.176	30 *	53-121	30.40	* (< 20)
Surrogates										
2-Methylnaphthalene-d10 (surr)		0.515	.301	58	0.513	0.243	47	47-106	21.40	
Fluoranthene-d10 (surr)		0.515	.23	45	0.513	0.177	35	24-116	26.10	

Batch Information


Analytical Batch: XMS10927
 Analytical Method: EPA 625M SIM (PAH)
 Instrument: SVA Agilent 780/5975 GC/MS
 Analyst: BMZ
 Analytical Date/Time: 7/31/2018 2:19:00PM

Prep Batch: XXX39998
 Prep Method: Liquid/Liquid Extraction for 625 SIMS
 Prep Date/Time: 7/26/2018 8:09:41AM
 Prep Initial Wt./Vol.: 970.00mL
 Prep Extract Vol: 1.00mL

Print Date: 08/14/2018 3:23:40PM

REVIEWED S.D

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ?????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie	1183933 
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Project: MOA Stormwater Management **Matrix:** Water **Project #:** 5078
Complete by: 2 weeks **Note:** Samples contain sodium thiosulfate for dechlorination

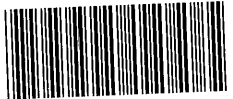
Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM11-04	348-1	7-25-18	1240	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	①A	
SWM12-04	1454-1		1340	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	②A ②A	
SWM12-04 Dup	1454-1		1340	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑤A	
SWM03-04	1224-1		1310	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑥A	
SWM04-04	1224-2		1315	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑦A	
SWM05-04	207-1		1415	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑧A	
SWM06-04	314-22		1045	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑨A	
SWM07-04	484-1		1110	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑩A	
SWM08-04	86-1		1115	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑪A	
SWM08-04 Dup	86-1		1115	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑫A	
SWM09-04	499-1		1150	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑬A	
SWM10-04	525-2	1200	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑭A		

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

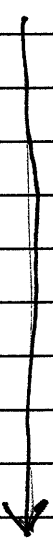
Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>Maria Ann</i>	7/25/18 1451	hand	<i>[Signature]</i>	
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>[Signature]</i>			<i>[Signature]</i> 1500	7/25/18 14:53

Chain of Custody Record




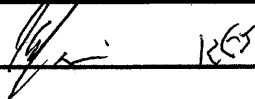
To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie	<b style="font-size: 24pt;">1183933 
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Project: MOA Stormwater Management Complete by: 2 weeks	Matrix: Water	Project #: 5078
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Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM11-02	348-1	7/25/18	1240	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	①B	
SWM12-02	1454-1		1340	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	②B	
SWM12-02 Dup	1454-1		1340	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑤B	
SWM03-02	1224-1		1310	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑥B	
SWM04-02	1224-2		1315	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑦B	
SWM05-02	207-1		1415	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑧B	
SWM06-02	314-22		1045	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑨B	
SWM07-02	484-1		1110	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑩B	
SWM08-02	86-1		1115	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑪B	
SWM08-02 Dup	86-1		1115	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑫B	
SWM09-02	499-1		1150	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑬B	
SWM10-02	525-2	1200	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑭B		

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
	7/25/18 1451	head		
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
			 KES	7/25/18 1453

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie	<b style="font-size: 24pt;">1183933 
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Project: MOA Stormwater Management Complete by: 2 weeks	Matrix: Water	Project #: 5078
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Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM11-04	348-1	7/25/18	1240	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	① C	
SWM12-04	1454-1	↓	1340	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	② C	
SWM12-04 Dup	1454-1		1340	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑤ C	
SWM03-04	1224-1		1310	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑥ C	
SWM04-04	1224-2		1315	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑦ C	
SWM05-04	207-1		1415	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑧ C	
SWM06-04	314-22		1045	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑨ C	
SWM07-04	484-1		1110	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑩ C	
SWM08-04	86-1		1115	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑪ C	
SWM08-04 Dup	86-1		⑫ 1150/1115	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑫ C	
SWM09-04	499-1		1150	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑬ C	
SWM10-04	525-2		1200	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑭ C	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>Manah</i>	7/25/18 1451	<i>head</i>	_____	
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
_____		_____	<i>MSL</i> <i>KST</i>	7/25/18 1453

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie	<h1 style="margin: 0;">1183933</h1>
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Project: MOA Stormwater Management	Matrix: Water	Project #: 5078
Complete by: 2 weeks		

Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM12-04	1454-1	7-25-18	1340	Samp/MS/MSD	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	9	② D-F ③ D-F ④ D-F A-C A-C	
SWM12-04 Dup	1454-1	↓	1340	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑤ D-F	
SWM05-04	207-1	↓	1415	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑧ D-F	
SWM07-04	484-1	↓	1110	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑩ D-F	
SWM09-04	499-1	↓	1150	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑬ D-F	
Trip Blank	N/A	N/A	N/A	TB	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑮ A-C	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>Mark A</i>	7/25/18 1451	<i>hand</i>	<i>[Signature]</i>	
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>[Signature]</i>			<i>[Signature]</i>	7/25/18 14:53

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie
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Project: MOA Stormwater Management Complete by: 2 weeks	Matrix: Water	Project #: 5078
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Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM12-04	1454-1	7-25-18	1340	Samp/MS/MSD	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	6	② G-H ③ G-H ④ G-H D-6 <small>NSW</small>	
SWM12-04 Dup	1454-1		1340	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	⑤ G-H	
SWM05-04	207-1		1415	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	⑧ G-H	
SWM07-04	484-1		1110	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	⑩ G-H	
SWM09-04	499-1		1150	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	⑬ G-H	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>Manah</i>	7/25/18 1457	<i>hand</i>	_____	
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
_____		_____	<i>KET</i>	7/25/18 1453

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie
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Project: MOA Stormwater Management Complete by: 2 weeks	Matrix: Water	Project #: 5078
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Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM11-04	348-1	7-25-18	1240	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	① D	
SWM12-04	1454-1		1340	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	② I	
SWM12-04 Dup	1454-1		1340	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑤ I	
SWM03-04	1224-1		1310	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑥ ^{NSW} I D	
SWM04-04	1224-2		1315	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑦ ^{NSW} I D	
SWM05-04	207-1		1415	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑧ I	
SWM06-04	314-22		1045	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑨ D	
SWM07-04	484-1		1110	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑩ I	
SWM08-04	86-1		1115	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑪ D	
SWM08-04 Dup	86-1		1115 1150	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑫ D	
SWM09-04	499-1		1150	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑬ I	
SWM10-04	525-2		1200	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑭ D	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>Maura [Signature]</i>	7/25/18 1450	<i>hand</i>	<i>[Signature]</i>	
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>[Signature]</i>			<i>[Signature]</i> KET	7/25/18 1453

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ?????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie
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Project: MOA Stormwater Management **Matrix:** Water **Project #:** 5078
Complete by: 2 weeks

Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM11-04	348-1	7-25-18	1240	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	16A	
SWM12-04	1454-1		1340	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	17A	
SWM12-04 Dup	1454-1		1340	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	18A	
SWM03-04	1224-1		1310	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	19A	
SWM04-04	1224-2		1315	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	20A	
SWM05-04	207-1		1415	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	21A	
SWM06-04	314-22		1045	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	22A	
SWM07-04	484-1		1110	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	23A	
SWM08-04	86-1		1115	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	24A	
SWM08-04 Dup	86-1		1115	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	25A	
SWM09-04	499-1		1150	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	26A	
SWM10-04	525-2	1200	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	27A		

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments: Dissolved Copper must be Filtered & Preserved at Lab

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
	7/25/18 1451	hand		
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
			JLH KLI	7/25/18 14:53



e-Sample Receipt Form

SGS Workorder #:

1183933



1 1 8 3 9 3 3

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		<input checked="" type="checkbox"/> Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	<input type="checkbox"/> n/a	handdelivered
COC accompanied samples?	<input checked="" type="checkbox"/> yes	
<input checked="" type="checkbox"/> **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	<input type="checkbox"/> n/a	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/> n/a	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/> n/a	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/> n/a	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/> n/a	Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	<input checked="" type="checkbox"/> yes	
If <0°C, were sample containers ice free?	<input type="checkbox"/> n/a	
If samples received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	<input checked="" type="checkbox"/> yes	
Do samples match COC** (i.e., sample IDs, dates/times collected)? **Note: If times differ <1hr, record details & login per COC.	<input type="checkbox"/> no	Samples logged in with suffix "-02" per containers (COC lists some samples with the suffix "-04".)
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	<input checked="" type="checkbox"/> yes	
Were proper containers (type/mass/volume/preservative***) used?	<input checked="" type="checkbox"/> yes	<input type="checkbox"/> n/a ***Exemption permitted for metals (e.g.200.8/6020A).
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	<input checked="" type="checkbox"/> yes	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	<input checked="" type="checkbox"/> yes	
Were all soil VOAs field extracted with MeOH+BFB?	<input type="checkbox"/> n/a	
Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.		
Additional notes (if applicable):		



Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1183933001-A	Na2S2O3 for Chlorine Redu	OK	1183933009-B	No Preservative Required	OK
1183933001-B	No Preservative Required	OK	1183933009-C	No Preservative Required	OK
1183933001-C	No Preservative Required	OK	1183933009-D	HNO3 to pH < 2	OK
1183933001-D	HNO3 to pH < 2	OK	1183933010-A	Na2S2O3 for Chlorine Redu	OK
1183933002-A	Na2S2O3 for Chlorine Redu	OK	1183933010-B	No Preservative Required	OK
1183933002-B	No Preservative Required	OK	1183933010-C	No Preservative Required	OK
1183933002-C	No Preservative Required	OK	1183933010-D	HCL to pH < 2	OK
1183933002-D	HCL to pH < 2	OK	1183933010-E	HCL to pH < 2	OK
1183933002-E	HCL to pH < 2	OK	1183933010-F	HCL to pH < 2	OK
1183933002-F	HCL to pH < 2	OK	1183933010-G	No Preservative Required	OK
1183933002-G	No Preservative Required	OK	1183933010-H	No Preservative Required	OK
1183933002-H	No Preservative Required	OK	1183933010-I	HNO3 to pH < 2	OK
1183933002-I	HNO3 to pH < 2	OK	1183933011-A	Na2S2O3 for Chlorine Redu	OK
1183933003-A	HCL to pH < 2	OK	1183933011-B	No Preservative Required	OK
1183933003-B	HCL to pH < 2	OK	1183933011-C	No Preservative Required	OK
1183933003-C	HCL to pH < 2	OK	1183933011-D	HNO3 to pH < 2	OK
1183933003-D	No Preservative Required	OK	1183933012-A	Na2S2O3 for Chlorine Redu	OK
1183933003-E	No Preservative Required	OK	1183933012-B	No Preservative Required	OK
1183933004-A	HCL to pH < 2	OK	1183933012-C	No Preservative Required	OK
1183933004-B	HCL to pH < 2	OK	1183933012-D	HNO3 to pH < 2	OK
1183933004-C	HCL to pH < 2	OK	1183933013-A	Na2S2O3 for Chlorine Redu	OK
1183933004-D	No Preservative Required	OK	1183933013-B	No Preservative Required	OK
1183933004-E	No Preservative Required	OK	1183933013-C	No Preservative Required	OK
1183933005-A	Na2S2O3 for Chlorine Redu	OK	1183933013-D	HCL to pH < 2	OK
1183933005-B	No Preservative Required	OK	1183933013-E	HCL to pH < 2	OK
1183933005-C	No Preservative Required	OK	1183933013-F	HCL to pH < 2	OK
1183933005-D	HCL to pH < 2	OK	1183933013-G	No Preservative Required	OK
1183933005-E	HCL to pH < 2	OK	1183933013-H	No Preservative Required	OK
1183933005-F	HCL to pH < 2	OK	1183933013-I	HNO3 to pH < 2	OK
1183933005-G	No Preservative Required	OK	1183933014-A	Na2S2O3 for Chlorine Redu	OK
1183933005-H	No Preservative Required	OK	1183933014-B	No Preservative Required	OK
1183933005-I	HNO3 to pH < 2	OK	1183933014-C	No Preservative Required	OK
1183933006-A	Na2S2O3 for Chlorine Redu	OK	1183933014-D	HNO3 to pH < 2	OK
1183933006-B	No Preservative Required	OK	1183933015-A	HCL to pH < 2	OK
1183933006-C	No Preservative Required	OK	1183933015-B	HCL to pH < 2	OK
1183933006-D	HNO3 to pH < 2	OK	1183933015-C	HCL to pH < 2	OK
1183933007-A	Na2S2O3 for Chlorine Redu	OK	1183933016-A	HNO3 to pH < 2	OK
1183933007-B	No Preservative Required	OK	1183933016-B	No Preservative Required	OK
1183933007-C	No Preservative Required	OK	1183933017-A	HNO3 to pH < 2	OK
1183933007-D	HNO3 to pH < 2	OK	1183933017-B	No Preservative Required	OK
1183933008-A	Na2S2O3 for Chlorine Redu	OK	1183933018-A	No Preservative Required	OK
1183933008-B	No Preservative Required	OK	1183933018-B	HNO3 to pH < 2	OK
1183933008-C	No Preservative Required	OK	1183933019-A	No Preservative Required	OK
1183933008-D	HCL to pH < 2	OK	1183933019-B	HNO3 to pH < 2	OK
1183933008-E	HCL to pH < 2	OK	1183933020-A	No Preservative Required	OK
1183933008-F	HCL to pH < 2	OK	1183933020-B	HNO3 to pH < 2	OK
1183933008-G	No Preservative Required	OK	1183933021-A	No Preservative Required	OK
1183933008-H	No Preservative Required	OK	1183933021-B	HNO3 to pH < 2	OK
1183933008-I	HNO3 to pH < 2	OK	1183933022-A	No Preservative Required	OK
1183933009-A	Na2S2O3 for Chlorine Redu	OK	1183933022-B	HNO3 to pH < 2	OK

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1183933023-A	No Preservative Required	OK			
1183933023-B	HNO3 to pH < 2	OK			
1183933024-A	No Preservative Required	OK			
1183933024-B	HNO3 to pH < 2	OK			
1183933025-A	No Preservative Required	OK			
1183933025-B	HNO3 to pH < 2	OK			
1183933026-A	No Preservative Required	OK			
1183933026-B	HNO3 to pH < 2	OK			
1183933027-A	No Preservative Required	OK			
1183933027-B	HNO3 to pH < 2	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

BU - The container was received with headspace greater than 6mm.

DM - The container was received damaged.

FR - The container was received frozen and not usable for Bacteria or BOD analyses.

IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

Appendix B3

Laboratory Data Package Storm Event #3



Laboratory Report of Analysis

To: HDR Alaska, Inc.
2525 C St. Ste 500
Anchorage, AK 99503
644-2034

Report Number: **1185435**

Client Project: **5078 MOA Stormwater Management**

Dear Joe Miller,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Justin at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

Justin Nelson
Project Manager
Justin.Nelson@sgs.com

Date

Case Narrative

SGS Client: **HDR Alaska, Inc.**
SGS Project: **1185435**
Project Name/Site: **5078 MOA Stormwater Management**
Project Contact: **Joe Miller**

Refer to sample receipt form for information on sample condition.

SWM12-03 Dup (1185435003) PS

8270D SIM - PAH surrogate recovery for 2-Methylnaphthalene-d10 does not meet QC criteria. The sample was re-extracted outside of hold-time. Surrogate recovery was within QC criteria and results are comparables. The in-hold data is reported.

SWM05-03 (1185435006) PS

8270D SIM - PAH surrogate recovery for 2-Methylnaphthalene-d10 does not meet QC criteria. The sample was re-extracted outside of hold-time. Surrogate recovery was within QC criteria and results are comparables. The in-hold data is reported.

SWM12-03 MS (1185435013) BMS

8270D SIM - PAH BMS recovery for several analytes does not meet QC criteria. Refer to the LCS for accuracy requirements.

8270D SIM - PAH surrogate recovery for 2-Methylnaphthalene-d10 does not meet QC criteria. Confirmed in BMS/BMSD.

SWM12-03 MSD (1185435014) BMSD

8270D SIM - PAH BMSD recovery for several analytes does not meet QC criteria. Refer to the LCS for accuracy requirements.

8270D SIM - PAH surrogate recovery for 2-Methylnaphthalene-d10 does not meet QC criteria. Confirmed in BMS/BMSD.

MB for HBN 1786569 [BOD/6150] (1477474) MB

5210-BOD-MB (0.31 mg/L) is greater than the recommended limit of 0.2 mg/L. Samples >10X the MB are not significantly affected. Samples <10X the MB results may be biased high.

Trip Blank (1185435015) TB

This sample was received with headspace bubbles of >6mm in all containers, and was not analyzed.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

Print Date: 10/12/2018 3:14:10PM

Report of Manual Integrations

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Analytical Batch</u>	<u>Analyte</u>	<u>Reason</u>
EPA 625M SIM (PAH)				
1185435011	SWM09-03	XMS11111	Benzo[k]fluoranthene	RP

Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Print Date: 10/12/2018 3:14:11PM

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
SWM11-03	1185435001	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM12-03	1185435002	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM12-03 Dup	1185435003	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM03-03	1185435004	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM04-03	1185435005	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM05-03	1185435006	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM06-03	1185435007	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM07-03	1185435008	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM08-03	1185435009	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM08-03 Dup	1185435010	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM09-03	1185435011	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM10-03	1185435012	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM12-03 MS	1185435013	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM12-03 MSD	1185435014	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
Trip Blank	1185435015	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM11-03	1185435016	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM12-03	1185435017	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM12-03 Dup	1185435018	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM03-03	1185435019	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM04-03	1185435020	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM05-03	1185435021	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM06-03	1185435022	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM07-03	1185435023	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM08-03	1185435024	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM08-03 Dup	1185435025	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM09-03	1185435026	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)
SWM10-03	1185435027	09/22/2018	09/22/2018	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
EPA 602/624	602 Aromatics by 624 (W)
EPA 625M SIM (PAH)	625 Semi-Volatiles GC/MS Liq/Liq ext.
SM21 5210B	Biochemical Oxygen Demand SM21 5210B
SM21 9222D	Fecal Coliform (MF)
SM21 2340B	Hardness as CaCO3 by ICP-MS
EP200.8	Metals in Drinking Water by ICP-MS DISSO
EP200.8	Metals in Water by 200.8 ICP-MS
SM21 2540D	Total Suspended Solids SM20 2540D

Print Date: 10/12/2018 3:14:13PM

Detectable Results Summary

Client Sample ID: **SWM11-03**

Lab Sample ID: 1185435001

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	17400	ug/L
Hardness as CaCO3	55.5	mg/L
Magnesium	2950	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	5.70	mg/L
Fecal Coliform	3200	col/100mL
Total Suspended Solids	15.6	mg/L

Waters Department

Client Sample ID: **SWM12-03**

Lab Sample ID: 1185435002

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	28000	ug/L
Hardness as CaCO3	102	mg/L
Magnesium	7880	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	4.89	mg/L
Fecal Coliform	718	col/100mL
Total Suspended Solids	5.73	mg/L

Waters Department

Client Sample ID: **SWM12-03 Dup**

Lab Sample ID: 1185435003

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	28500	ug/L
Hardness as CaCO3	104	mg/L
Magnesium	7990	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	4.98	mg/L
Fecal Coliform	682	col/100mL
Total Suspended Solids	5.73	mg/L

Waters Department

Client Sample ID: **SWM03-03**

Lab Sample ID: 1185435004

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	17700	ug/L
Hardness as CaCO3	75.5	mg/L
Magnesium	7600	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	2.33	mg/L
Fecal Coliform	3400	col/100mL
Total Suspended Solids	2.30	mg/L

Waters Department

Client Sample ID: **SWM04-03**

Lab Sample ID: 1185435005

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	27900	ug/L
Hardness as CaCO3	109	mg/L
Magnesium	9570	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	2.15	mg/L
Fecal Coliform	460	col/100mL
Total Suspended Solids	7.45	mg/L

Waters Department

Detectable Results Summary

Client Sample ID: **SWM05-03**

Lab Sample ID: 1185435006

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	17600	ug/L
Hardness as CaCO ₃	61.0	mg/L
Magnesium	4120	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	2.75	mg/L
Fecal Coliform	618	col/100mL
Total Suspended Solids	1.67	mg/L

Waters Department

Client Sample ID: **SWM06-03**

Lab Sample ID: 1185435007

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	9910	ug/L
Hardness as CaCO ₃	36.1	mg/L
Magnesium	2750	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	6.86	mg/L
Fecal Coliform	1160	col/100mL
Total Suspended Solids	2.83	mg/L

Waters Department

Client Sample ID: **SWM07-03**

Lab Sample ID: 1185435008

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	4540	ug/L
Hardness as CaCO ₃	15.9	mg/L
Magnesium	1100	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	6.54	mg/L
Fecal Coliform	390	col/100mL

Polynuclear Aromatics GC/MS

Waters Department

Pyrene	0.0131J	ug/L
Total Suspended Solids	9.38	mg/L

Client Sample ID: **SWM08-03**

Lab Sample ID: 1185435009

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	12500	ug/L
Hardness as CaCO ₃	42.7	mg/L
Magnesium	2800	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	4.96	mg/L
Fecal Coliform	320	col/100mL

Waters Department

Total Suspended Solids	3.76	mg/L
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Client Sample ID: **SWM08-03 Dup**

Lab Sample ID: 1185435010

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	12500	ug/L
Hardness as CaCO ₃	42.8	mg/L
Magnesium	2820	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	4.92	mg/L
Fecal Coliform	290	col/100mL

Waters Department

Total Suspended Solids	3.92	mg/L
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Detectable Results Summary

Client Sample ID: **SWM09-03**

Lab Sample ID: 1185435011

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	22700	ug/L
Hardness as CaCO3	78.9	mg/L
Magnesium	5400	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	4.25	mg/L
Fecal Coliform	430	col/100mL

Polynuclear Aromatics GC/MS

Anthracene	0.0225	ug/L
Benzo(a)Anthracene	0.167	ug/L
Benzo[a]pyrene	0.213	ug/L
Benzo[b]Fluoranthene	0.322	ug/L
Benzo[g,h,i]perylene	0.179	ug/L
Benzo[k]fluoranthene	0.100	ug/L
Chrysene	0.208	ug/L
Dibenzo[a,h]anthracene	0.0369	ug/L
Fluoranthene	0.385	ug/L
Fluorene	0.0100J	ug/L
Indeno[1,2,3-c,d] pyrene	0.154	ug/L
Phenanthrene	0.144	ug/L
Pyrene	0.306	ug/L
Total Suspended Solids	11.2	mg/L

Waters Department

Client Sample ID: **SWM10-03**

Lab Sample ID: 1185435012

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	32600	ug/L
Hardness as CaCO3	118	mg/L
Magnesium	8890	ug/L

Microbiology Laboratory

Fecal Coliform	249	col/100mL
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Waters Department

Total Suspended Solids	4.50	mg/L
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Client Sample ID: **SWM11-03**

Lab Sample ID: 1185435016

Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	5.35	ug/L

Client Sample ID: **SWM12-03**

Lab Sample ID: 1185435017

Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	5.75	ug/L

Client Sample ID: **SWM12-03 Dup**

Lab Sample ID: 1185435018

Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	13.2	ug/L

Client Sample ID: **SWM03-03**

Lab Sample ID: 1185435019

Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	3.85	ug/L

Client Sample ID: **SWM04-03**

Lab Sample ID: 1185435020

Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	2.49	ug/L

Print Date: 10/12/2018 3:14:14PM

Detectable Results Summary

Client Sample ID: SWM05-03			
Lab Sample ID: 1185435021	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	3.50	ug/L
Client Sample ID: SWM06-03			
Lab Sample ID: 1185435022	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	5.65	ug/L
Client Sample ID: SWM07-03			
Lab Sample ID: 1185435023	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	3.79	ug/L
Client Sample ID: SWM08-03			
Lab Sample ID: 1185435024	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	7.59	ug/L
Client Sample ID: SWM08-03 Dup			
Lab Sample ID: 1185435025	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	3.29	ug/L
Client Sample ID: SWM09-03			
Lab Sample ID: 1185435026	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	2.34	ug/L
Client Sample ID: SWM10-03			
Lab Sample ID: 1185435027	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	0.690J	ug/L

Print Date: 10/12/2018 3:14:14PM



Results of **SWM11-03**

Client Sample ID: **SWM11-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435001
Lab Project ID: 1185435

Collection Date: 09/22/18 11:40
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 348-1

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	17400	500	150	ug/L	1		10/03/18 13:45
Magnesium	2950	50.0	15.0	ug/L	1		10/03/18 13:45

Batch Information

Analytical Batch: MMS10337
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/03/18 13:45
Container ID: 1185435001-C

Prep Batch: MXX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	55.5	5.00	5.00	mg/L	1		10/03/18 13:45

Batch Information

Analytical Batch: MMS10337
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/03/18 13:45
Container ID: 1185435001-C

Prep Batch: MXX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM11-03**

Client Sample ID: **SWM11-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435001
Lab Project ID: 1185435

Collection Date: 09/22/18 11:40
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 348-1

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	5.70	2.00	2.00	mg/L	1		09/23/18 12:51

Batch Information

Analytical Batch: BOD6150
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/23/18 12:51
Container ID: 1185435001-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	3200	100	100	col/100mL	1		09/22/18 17:15

Batch Information

Analytical Batch: BTF16905
Analytical Method: SM21 9222D
Analyst: NAB
Analytical Date/Time: 09/22/18 17:15
Container ID: 1185435001-A

Results of SWM11-03

Client Sample ID: **SWM11-03**
 Client Project ID: **5078 MOA Stormwater Management**
 Lab Sample ID: 1185435001
 Lab Project ID: 1185435

Collection Date: 09/22/18 11:40
 Received Date: 09/22/18 13:43
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 348-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	15.6	0.980	0.304	mg/L	1		09/25/18 16:33

Batch Information

Analytical Batch: STS6034
 Analytical Method: SM21 2540D
 Analyst: EWW
 Analytical Date/Time: 09/25/18 16:33
 Container ID: 1185435001-D



Results of **SWM12-03**

Client Sample ID: **SWM12-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435002
Lab Project ID: 1185435

Collection Date: 09/22/18 12:30
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1454-1

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	28000	500	150	ug/L	1		10/03/18 13:54
Magnesium	7880	50.0	15.0	ug/L	1		10/03/18 13:54

Batch Information

Analytical Batch: MMS10337
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/03/18 13:54
Container ID: 1185435002-F

Prep Batch: MX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	102	5.00	5.00	mg/L	1		10/03/18 13:54

Batch Information

Analytical Batch: MMS10337
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/03/18 13:54
Container ID: 1185435002-F

Prep Batch: MX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM12-03**

Client Sample ID: **SWM12-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435002
Lab Project ID: 1185435

Collection Date: 09/22/18 12:30
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1454-1

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	4.89	2.00	2.00	mg/L	1		09/23/18 12:51

Batch Information

Analytical Batch: BOD6150
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/23/18 12:51
Container ID: 1185435002-E

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	718	9.09	9.09	col/100mL	1		09/22/18 17:15

Batch Information

Analytical Batch: BTF16905
Analytical Method: SM21 9222D
Analyst: NAB
Analytical Date/Time: 09/22/18 17:15
Container ID: 1185435002-A



Results of SWM12-03

Client Sample ID: **SWM12-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435002
Lab Project ID: 1185435

Collection Date: 09/22/18 12:30
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1454-1

Results by Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Acenaphthene	0.00650 U	0.0130	0.00383	ug/L	1		09/28/18 12:54
Acenaphthylene	0.00650 U	0.0130	0.00383	ug/L	1		09/28/18 12:54
Anthracene	0.00650 U	0.0130	0.00383	ug/L	1		09/28/18 12:54
Benzo(a)Anthracene	0.00650 U	0.0130	0.00383	ug/L	1		09/28/18 12:54
Benzo[a]pyrene	0.00259 U	0.00518	0.00155	ug/L	1		09/28/18 12:54
Benzo[b]Fluoranthene	0.00650 U	0.0130	0.00383	ug/L	1		09/28/18 12:54
Benzo[g,h,i]perylene	0.00650 U	0.0130	0.00383	ug/L	1		09/28/18 12:54
Benzo[k]fluoranthene	0.00650 U	0.0130	0.00383	ug/L	1		09/28/18 12:54
Chrysene	0.00650 U	0.0130	0.00383	ug/L	1		09/28/18 12:54
Dibenzo[a,h]anthracene	0.00259 U	0.00518	0.00155	ug/L	1		09/28/18 12:54
Fluoranthene	0.00650 U	0.0130	0.00383	ug/L	1		09/28/18 12:54
Fluorene	0.00650 U	0.0130	0.00383	ug/L	1		09/28/18 12:54
Indeno[1,2,3-c,d] pyrene	0.00650 U	0.0130	0.00383	ug/L	1		09/28/18 12:54
Naphthalene	0.0130 U	0.0259	0.00808	ug/L	1		09/28/18 12:54
Phenanthrene	0.0259 U	0.0518	0.00383	ug/L	1		09/28/18 12:54
Pyrene	0.0259 U	0.0518	0.00383	ug/L	1		09/28/18 12:54
Surrogates							
2-Methylnaphthalene-d10 (surr)	48.3	47-106		%	1		09/28/18 12:54
Fluoranthene-d10 (surr)	40.5	24-116		%	1		09/28/18 12:54

Batch Information

Analytical Batch: XMS11111
Analytical Method: EPA 625M SIM (PAH)
Analyst: DSD
Analytical Date/Time: 09/28/18 12:54
Container ID: 1185435002-H

Prep Batch: XXX40557
Prep Method: SW3520C
Prep Date/Time: 09/24/18 08:45
Prep Initial Wt./Vol.: 965 mL
Prep Extract Vol: 1 mL



Results of **SWM12-03**

Client Sample ID: **SWM12-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435002
Lab Project ID: 1185435

Collection Date: 09/22/18 12:30
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1454-1

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		09/25/18 12:55
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		09/25/18 12:55
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		09/25/18 12:55
Benzene	0.200 U	0.400	0.120	ug/L	1		09/25/18 12:55
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		09/25/18 12:55
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		09/25/18 12:55
o-Xylene	0.500 U	1.00	0.310	ug/L	1		09/25/18 12:55
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		09/25/18 12:55
Toluene	0.500 U	1.00	0.310	ug/L	1		09/25/18 12:55
Surrogates							
1,2-Dichloroethane-D4 (surr)	103	81-118		%	1		09/25/18 12:55
4-Bromofluorobenzene (surr)	103	85-114		%	1		09/25/18 12:55
Toluene-d8 (surr)	105	89-112		%	1		09/25/18 12:55

Batch Information

Analytical Batch: VMS18352
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 09/25/18 12:55
Container ID: 1185435002-B

Prep Batch: VXX33184
Prep Method: SW5030B
Prep Date/Time: 09/25/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of SWM12-03

Client Sample ID: **SWM12-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435002
Lab Project ID: 1185435

Collection Date: 09/22/18 12:30
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1454-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	5.73	1.04	0.323	mg/L	1		09/25/18 16:33

Batch Information

Analytical Batch: STS6034
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 09/25/18 16:33
Container ID: 1185435002-G



Results of SWM12-03 Dup

Client Sample ID: SWM12-03 Dup
Client Project ID: 5078 MOA Stormwater Management
Lab Sample ID: 1185435003
Lab Project ID: 1185435

Collection Date: 09/22/18 12:30
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1454-1

Results by Metals by ICP/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Calcium and Magnesium.

Batch Information

Analytical Batch: MMS10337
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/03/18 13:57
Container ID: 1185435003-F
Prep Batch: MX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row includes Hardness as CaCO3.

Batch Information

Analytical Batch: MMS10337
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/03/18 13:57
Container ID: 1185435003-F
Prep Batch: MX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM12-03 Dup

Client Sample ID: **SWM12-03 Dup**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435003
Lab Project ID: 1185435

Collection Date: 09/22/18 12:30
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1454-1

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	4.98	2.00	2.00	mg/L	1		09/23/18 12:51

Batch Information

Analytical Batch: BOD6150
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/23/18 12:51
Container ID: 1185435003-E

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	682	9.09	9.09	col/100mL	1		09/22/18 17:15

Batch Information

Analytical Batch: BTF16905
Analytical Method: SM21 9222D
Analyst: NAB
Analytical Date/Time: 09/22/18 17:15
Container ID: 1185435003-A



Results of SWM12-03 Dup

Client Sample ID: **SWM12-03 Dup**
 Client Project ID: **5078 MOA Stormwater Management**
 Lab Sample ID: 1185435003
 Lab Project ID: 1185435

Collection Date: 09/22/18 12:30
 Received Date: 09/22/18 13:43
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 1454-1

Results by Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Acenaphthene	0.00700 U	0.0140	0.00416	ug/L	1		09/28/18 13:15
Acenaphthylene	0.00700 U	0.0140	0.00416	ug/L	1		09/28/18 13:15
Anthracene	0.00700 U	0.0140	0.00416	ug/L	1		09/28/18 13:15
Benzo(a)Anthracene	0.00700 U	0.0140	0.00416	ug/L	1		09/28/18 13:15
Benzo[a]pyrene	0.00281 U	0.00562	0.00169	ug/L	1		09/28/18 13:15
Benzo[b]Fluoranthene	0.00700 U	0.0140	0.00416	ug/L	1		09/28/18 13:15
Benzo[g,h,i]perylene	0.00700 U	0.0140	0.00416	ug/L	1		09/28/18 13:15
Benzo[k]fluoranthene	0.00700 U	0.0140	0.00416	ug/L	1		09/28/18 13:15
Chrysene	0.00700 U	0.0140	0.00416	ug/L	1		09/28/18 13:15
Dibenzo[a,h]anthracene	0.00281 U	0.00562	0.00169	ug/L	1		09/28/18 13:15
Fluoranthene	0.00700 U	0.0140	0.00416	ug/L	1		09/28/18 13:15
Fluorene	0.00700 U	0.0140	0.00416	ug/L	1		09/28/18 13:15
Indeno[1,2,3-c,d] pyrene	0.00700 U	0.0140	0.00416	ug/L	1		09/28/18 13:15
Naphthalene	0.0141 U	0.0281	0.00876	ug/L	1		09/28/18 13:15
Phenanthrene	0.0281 U	0.0562	0.00416	ug/L	1		09/28/18 13:15
Pyrene	0.0281 U	0.0562	0.00416	ug/L	1		09/28/18 13:15
Surrogates							
2-Methylnaphthalene-d10 (surr)	45	*	47-106	%	1		09/28/18 13:15
Fluoranthene-d10 (surr)	37.1		24-116	%	1		09/28/18 13:15

Batch Information

Analytical Batch: XMS11111
 Analytical Method: EPA 625M SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 09/28/18 13:15
 Container ID: 1185435003-H

Prep Batch: XXX40557
 Prep Method: SW3520C
 Prep Date/Time: 09/24/18 08:45
 Prep Initial Wt./Vol.: 890 mL
 Prep Extract Vol: 1 mL



Results of SWM12-03 Dup

Client Sample ID: **SWM12-03 Dup**
 Client Project ID: **5078 MOA Stormwater Management**
 Lab Sample ID: 1185435003
 Lab Project ID: 1185435

Collection Date: 09/22/18 12:30
 Received Date: 09/22/18 13:43
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 1454-1

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		09/25/18 14:54
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		09/25/18 14:54
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		09/25/18 14:54
Benzene	0.200 U	0.400	0.120	ug/L	1		09/25/18 14:54
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		09/25/18 14:54
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		09/25/18 14:54
o-Xylene	0.500 U	1.00	0.310	ug/L	1		09/25/18 14:54
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		09/25/18 14:54
Toluene	0.500 U	1.00	0.310	ug/L	1		09/25/18 14:54
Surrogates							
1,2-Dichloroethane-D4 (surr)	103	81-118		%	1		09/25/18 14:54
4-Bromofluorobenzene (surr)	102	85-114		%	1		09/25/18 14:54
Toluene-d8 (surr)	105	89-112		%	1		09/25/18 14:54

Batch Information

Analytical Batch: VMS18352
 Analytical Method: EPA 602/624
 Analyst: FDR
 Analytical Date/Time: 09/25/18 14:54
 Container ID: 1185435003-B

Prep Batch: VXX33184
 Prep Method: SW5030B
 Prep Date/Time: 09/25/18 00:00
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL

Results of SWM12-03 Dup

Client Sample ID: **SWM12-03 Dup**
 Client Project ID: **5078 MOA Stormwater Management**
 Lab Sample ID: 1185435003
 Lab Project ID: 1185435

Collection Date: 09/22/18 12:30
 Received Date: 09/22/18 13:43
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 1454-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	5.73	1.04	0.323	mg/L	1		09/25/18 16:33

Batch Information

Analytical Batch: STS6034
 Analytical Method: SM21 2540D
 Analyst: EWW
 Analytical Date/Time: 09/25/18 16:33
 Container ID: 1185435003-G



Results of **SWM03-03**

Client Sample ID: **SWM03-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435004
Lab Project ID: 1185435

Collection Date: 09/22/18 12:00
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1224-1

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	17700	500	150	ug/L	1		10/03/18 14:00
Magnesium	7600	50.0	15.0	ug/L	1		10/03/18 14:00

Batch Information

Analytical Batch: MMS10337
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/03/18 14:00
Container ID: 1185435004-C

Prep Batch: MX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	75.5	5.00	5.00	mg/L	1		10/03/18 14:00

Batch Information

Analytical Batch: MMS10337
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/03/18 14:00
Container ID: 1185435004-C

Prep Batch: MX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM03-03**

Client Sample ID: **SWM03-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435004
Lab Project ID: 1185435

Collection Date: 09/22/18 12:00
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1224-1

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	2.33	2.00	2.00	mg/L	1		09/23/18 12:51

Batch Information

Analytical Batch: BOD6150
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/23/18 12:51
Container ID: 1185435004-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	3400	100	100	col/100mL	1		09/22/18 17:15

Batch Information

Analytical Batch: BTF16905
Analytical Method: SM21 9222D
Analyst: NAB
Analytical Date/Time: 09/22/18 17:15
Container ID: 1185435004-A



Results of SWM03-03

Client Sample ID: **SWM03-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435004
Lab Project ID: 1185435

Collection Date: 09/22/18 12:00
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1224-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	2.30	1.00	0.310	mg/L	1		09/25/18 16:33

Batch Information

Analytical Batch: STS6034
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 09/25/18 16:33
Container ID: 1185435004-D



Results of **SWM04-03**

Client Sample ID: **SWM04-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435005
Lab Project ID: 1185435

Collection Date: 09/22/18 12:10
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1224-2

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	27900	500	150	ug/L	1		10/03/18 14:08
Magnesium	9570	50.0	15.0	ug/L	1		10/03/18 14:08

Batch Information

Analytical Batch: MMS10337
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/03/18 14:08
Container ID: 1185435005-C

Prep Batch: MX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	109	5.00	5.00	mg/L	1		10/03/18 14:08

Batch Information

Analytical Batch: MMS10337
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/03/18 14:08
Container ID: 1185435005-C

Prep Batch: MX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM04-03**

Client Sample ID: **SWM04-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435005
Lab Project ID: 1185435

Collection Date: 09/22/18 12:10
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1224-2

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	2.15	2.00	2.00	mg/L	1		09/23/18 12:51

Batch Information

Analytical Batch: BOD6150
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/23/18 12:51
Container ID: 1185435005-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	460	10.0	10.0	col/100mL	1		09/22/18 17:15

Batch Information

Analytical Batch: BTF16905
Analytical Method: SM21 9222D
Analyst: NAB
Analytical Date/Time: 09/22/18 17:15
Container ID: 1185435005-A



Results of SWM04-03

Client Sample ID: **SWM04-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435005
Lab Project ID: 1185435

Collection Date: 09/22/18 12:10
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1224-2

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	7.45	0.980	0.304	mg/L	1		09/25/18 16:33

Batch Information

Analytical Batch: STS6034
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 09/25/18 16:33
Container ID: 1185435005-D



Results of **SWM05-03**

Client Sample ID: **SWM05-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435006
Lab Project ID: 1185435

Collection Date: 09/22/18 13:05
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 207-1

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	17600	500	150	ug/L	1		10/03/18 14:11
Magnesium	4120	50.0	15.0	ug/L	1		10/03/18 14:11

Batch Information

Analytical Batch: MMS10337
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/03/18 14:11
Container ID: 1185435006-F

Prep Batch: MX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	61.0	5.00	5.00	mg/L	1		10/03/18 14:11

Batch Information

Analytical Batch: MMS10337
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/03/18 14:11
Container ID: 1185435006-F

Prep Batch: MX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM05-03**

Client Sample ID: **SWM05-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435006
Lab Project ID: 1185435

Collection Date: 09/22/18 13:05
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 207-1

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	2.75	2.00	2.00	mg/L	1		09/23/18 12:51

Batch Information

Analytical Batch: BOD6150
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/23/18 12:51
Container ID: 1185435006-E

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	618	9.09	9.09	col/100mL	1		09/22/18 17:15

Batch Information

Analytical Batch: BTF16905
Analytical Method: SM21 9222D
Analyst: NAB
Analytical Date/Time: 09/22/18 17:15
Container ID: 1185435006-A



Results of SWM05-03

Client Sample ID: SWM05-03
Client Project ID: 5078 MOA Stormwater Management
Lab Sample ID: 1185435006
Lab Project ID: 1185435

Collection Date: 09/22/18 13:05
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 207-1

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their surrogate compounds with associated quality and detection data.

Batch Information

Analytical Batch: XMS11111
Analytical Method: EPA 625M SIM (PAH)
Analyst: DSD
Analytical Date/Time: 09/28/18 13:35
Container ID: 1185435006-H

Prep Batch: XXX40557
Prep Method: SW3520C
Prep Date/Time: 09/24/18 08:45
Prep Initial Wt./Vol.: 930 mL
Prep Extract Vol: 1 mL



Results of **SWM05-03**

Client Sample ID: **SWM05-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435006
Lab Project ID: 1185435

Collection Date: 09/22/18 13:05
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 207-1

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		09/25/18 15:11
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		09/25/18 15:11
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		09/25/18 15:11
Benzene	0.200 U	0.400	0.120	ug/L	1		09/25/18 15:11
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		09/25/18 15:11
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		09/25/18 15:11
o-Xylene	0.500 U	1.00	0.310	ug/L	1		09/25/18 15:11
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		09/25/18 15:11
Toluene	0.500 U	1.00	0.310	ug/L	1		09/25/18 15:11
Surrogates							
1,2-Dichloroethane-D4 (surr)	103	81-118		%	1		09/25/18 15:11
4-Bromofluorobenzene (surr)	102	85-114		%	1		09/25/18 15:11
Toluene-d8 (surr)	104	89-112		%	1		09/25/18 15:11

Batch Information

Analytical Batch: VMS18352
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 09/25/18 15:11
Container ID: 1185435006-B

Prep Batch: VXX33184
Prep Method: SW5030B
Prep Date/Time: 09/25/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of SWM05-03

Client Sample ID: **SWM05-03**
 Client Project ID: **5078 MOA Stormwater Management**
 Lab Sample ID: 1185435006
 Lab Project ID: 1185435

Collection Date: 09/22/18 13:05
 Received Date: 09/22/18 13:43
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 207-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	1.67	1.04	0.323	mg/L	1		09/25/18 16:33

Batch Information

Analytical Batch: STS6034
 Analytical Method: SM21 2540D
 Analyst: EWW
 Analytical Date/Time: 09/25/18 16:33
 Container ID: 1185435006-G



Results of **SWM06-03**

Client Sample ID: **SWM06-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435007
Lab Project ID: 1185435

Collection Date: 09/22/18 09:52
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 314-22

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	9910	500	150	ug/L	1		10/03/18 14:14
Magnesium	2750	50.0	15.0	ug/L	1		10/03/18 14:14

Batch Information

Analytical Batch: MMS10337
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/03/18 14:14
Container ID: 1185435007-C

Prep Batch: MXX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	36.1	5.00	5.00	mg/L	1		10/03/18 14:14

Batch Information

Analytical Batch: MMS10337
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/03/18 14:14
Container ID: 1185435007-C

Prep Batch: MXX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM06-03**

Client Sample ID: **SWM06-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435007
Lab Project ID: 1185435

Collection Date: 09/22/18 09:52
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 314-22

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	6.86	2.00	2.00	mg/L	1		09/23/18 12:51

Batch Information

Analytical Batch: BOD6150
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/23/18 12:51
Container ID: 1185435007-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	1160	9.09	9.09	col/100mL	1		09/22/18 17:15

Batch Information

Analytical Batch: BTF16905
Analytical Method: SM21 9222D
Analyst: NAB
Analytical Date/Time: 09/22/18 17:15
Container ID: 1185435007-A



Results of SWM06-03

Client Sample ID: **SWM06-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435007
Lab Project ID: 1185435

Collection Date: 09/22/18 09:52
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 314-22

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	2.83	1.01	0.313	mg/L	1		09/25/18 16:33

Batch Information

Analytical Batch: STS6034
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 09/25/18 16:33
Container ID: 1185435007-D



Results of **SWM07-03**

Client Sample ID: **SWM07-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435008
Lab Project ID: 1185435

Collection Date: 09/22/18 10:10
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 484-1

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	4540	500	150	ug/L	1		10/03/18 14:17
Magnesium	1100	50.0	15.0	ug/L	1		10/03/18 14:17

Batch Information

Analytical Batch: MMS10337
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/03/18 14:17
Container ID: 1185435008-F

Prep Batch: MXX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	15.9	5.00	5.00	mg/L	1		10/03/18 14:17

Batch Information

Analytical Batch: MMS10337
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/03/18 14:17
Container ID: 1185435008-F

Prep Batch: MXX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM07-03**

Client Sample ID: **SWM07-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435008
Lab Project ID: 1185435

Collection Date: 09/22/18 10:10
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 484-1

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	6.54	2.00	2.00	mg/L	1		09/23/18 12:51

Batch Information

Analytical Batch: BOD6150
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/23/18 12:51
Container ID: 1185435008-E

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	390	10.0	10.0	col/100mL	1		09/22/18 17:15

Batch Information

Analytical Batch: BTF16905
Analytical Method: SM21 9222D
Analyst: NAB
Analytical Date/Time: 09/22/18 17:15
Container ID: 1185435008-A



Results of SWM07-03

Client Sample ID: SWM07-03
Client Project ID: 5078 MOA Stormwater Management
Lab Sample ID: 1185435008
Lab Project ID: 1185435

Collection Date: 09/22/18 10:10
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 484-1

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their surrogate compounds with associated quality and detection data.

Batch Information

Analytical Batch: XMS11111
Analytical Method: EPA 625M SIM (PAH)
Analyst: DSD
Analytical Date/Time: 09/28/18 13:56
Container ID: 1185435008-H

Prep Batch: XXX40557
Prep Method: SW3520C
Prep Date/Time: 09/24/18 08:45
Prep Initial Wt./Vol.: 845 mL
Prep Extract Vol: 1 mL



Results of **SWM07-03**

Client Sample ID: **SWM07-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435008
Lab Project ID: 1185435

Collection Date: 09/22/18 10:10
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 484-1

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		09/25/18 15:46
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		09/25/18 15:46
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		09/25/18 15:46
Benzene	0.200 U	0.400	0.120	ug/L	1		09/25/18 15:46
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		09/25/18 15:46
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		09/25/18 15:46
o-Xylene	0.500 U	1.00	0.310	ug/L	1		09/25/18 15:46
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		09/25/18 15:46
Toluene	0.500 U	1.00	0.310	ug/L	1		09/25/18 15:46
Surrogates							
1,2-Dichloroethane-D4 (surr)	104	81-118		%	1		09/25/18 15:46
4-Bromofluorobenzene (surr)	103	85-114		%	1		09/25/18 15:46
Toluene-d8 (surr)	104	89-112		%	1		09/25/18 15:46

Batch Information

Analytical Batch: VMS18352
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 09/25/18 15:46
Container ID: 1185435008-B

Prep Batch: VXX33184
Prep Method: SW5030B
Prep Date/Time: 09/25/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of SWM07-03

Client Sample ID: **SWM07-03**
 Client Project ID: **5078 MOA Stormwater Management**
 Lab Sample ID: 1185435008
 Lab Project ID: 1185435

Collection Date: 09/22/18 10:10
 Received Date: 09/22/18 13:43
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 484-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	9.38	2.08	0.646	mg/L	1		09/25/18 16:33

Batch Information

Analytical Batch: STS6034
 Analytical Method: SM21 2540D
 Analyst: EWW
 Analytical Date/Time: 09/25/18 16:33
 Container ID: 1185435008-G



Results of **SWM08-03**

Client Sample ID: **SWM08-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435009
Lab Project ID: 1185435

Collection Date: 09/22/18 10:25
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 86-1

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	12500	500	150	ug/L	1		10/03/18 14:20
Magnesium	2800	50.0	15.0	ug/L	1		10/03/18 14:20

Batch Information

Analytical Batch: MMS10337
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/03/18 14:20
Container ID: 1185435009-C

Prep Batch: MX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	42.7	5.00	5.00	mg/L	1		10/03/18 14:20

Batch Information

Analytical Batch: MMS10337
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/03/18 14:20
Container ID: 1185435009-C

Prep Batch: MX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM08-03**

Client Sample ID: **SWM08-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435009
Lab Project ID: 1185435

Collection Date: 09/22/18 10:25
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 86-1

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	4.96	2.00	2.00	mg/L	1		09/23/18 12:51

Batch Information

Analytical Batch: BOD6150
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/23/18 12:51
Container ID: 1185435009-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	320	10.0	10.0	col/100mL	1		09/22/18 17:15

Batch Information

Analytical Batch: BTF16905
Analytical Method: SM21 9222D
Analyst: NAB
Analytical Date/Time: 09/22/18 17:15
Container ID: 1185435009-A



Results of SWM08-03

Client Sample ID: **SWM08-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435009
Lab Project ID: 1185435

Collection Date: 09/22/18 10:25
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 86-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	3.76	0.990	0.307	mg/L	1		09/25/18 16:33

Batch Information

Analytical Batch: STS6034
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 09/25/18 16:33
Container ID: 1185435009-D



Results of SWM08-03 Dup

Client Sample ID: SWM08-03 Dup
Client Project ID: 5078 MOA Stormwater Management
Lab Sample ID: 1185435010
Lab Project ID: 1185435

Collection Date: 09/22/18 10:25
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 86-1

Results by Metals by ICP/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows for Calcium and Magnesium.

Batch Information

Analytical Batch: MMS10337
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/03/18 14:29
Container ID: 1185435010-C
Prep Batch: MXX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row for Hardness as CaCO3.

Batch Information

Analytical Batch: MMS10337
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/03/18 14:29
Container ID: 1185435010-C
Prep Batch: MXX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM08-03 Dup

Client Sample ID: **SWM08-03 Dup**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435010
Lab Project ID: 1185435

Collection Date: 09/22/18 10:25
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 86-1

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	4.92	2.00	2.00	mg/L	1		09/23/18 12:51

Batch Information

Analytical Batch: BOD6150
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/23/18 12:51
Container ID: 1185435010-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	290	10.0	10.0	col/100mL	1		09/22/18 17:15

Batch Information

Analytical Batch: BTF16905
Analytical Method: SM21 9222D
Analyst: NAB
Analytical Date/Time: 09/22/18 17:15
Container ID: 1185435010-A

Results of SWM08-03 Dup

Client Sample ID: **SWM08-03 Dup**
 Client Project ID: **5078 MOA Stormwater Management**
 Lab Sample ID: 1185435010
 Lab Project ID: 1185435

Collection Date: 09/22/18 10:25
 Received Date: 09/22/18 13:43
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 86-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	3.92	0.980	0.304	mg/L	1		09/25/18 16:33

Batch Information

Analytical Batch: STS6034
 Analytical Method: SM21 2540D
 Analyst: EWW
 Analytical Date/Time: 09/25/18 16:33
 Container ID: 1185435010-D



Results of **SWM09-03**

Client Sample ID: **SWM09-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435011
Lab Project ID: 1185435

Collection Date: 09/22/18 10:50
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 499-1

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	22700	500	150	ug/L	1		10/03/18 14:32
Magnesium	5400	50.0	15.0	ug/L	1		10/03/18 14:32

Batch Information

Analytical Batch: MMS10337
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/03/18 14:32
Container ID: 1185435011-F

Prep Batch: MXX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	78.9	5.00	5.00	mg/L	1		10/03/18 14:32

Batch Information

Analytical Batch: MMS10337
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/03/18 14:32
Container ID: 1185435011-F

Prep Batch: MXX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM09-03**

Client Sample ID: **SWM09-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435011
Lab Project ID: 1185435

Collection Date: 09/22/18 10:50
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 499-1

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	4.25	2.00	2.00	mg/L	1		09/23/18 12:51

Batch Information

Analytical Batch: BOD6150
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/23/18 12:51
Container ID: 1185435011-E

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	430	10.0	10.0	col/100mL	1		09/22/18 17:15

Batch Information

Analytical Batch: BTF16905
Analytical Method: SM21 9222D
Analyst: NAB
Analytical Date/Time: 09/22/18 17:15
Container ID: 1185435011-A



Results of SWM09-03

Client Sample ID: **SWM09-03**
 Client Project ID: **5078 MOA Stormwater Management**
 Lab Sample ID: 1185435011
 Lab Project ID: 1185435

Collection Date: 09/22/18 10:50
 Received Date: 09/22/18 13:43
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 499-1

Results by Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Acenaphthene	0.00640 U	0.0128	0.00379	ug/L	1		09/28/18 14:16
Acenaphthylene	0.00640 U	0.0128	0.00379	ug/L	1		09/28/18 14:16
Anthracene	0.0225	0.0128	0.00379	ug/L	1		09/28/18 14:16
Benzo(a)Anthracene	0.167	0.0128	0.00379	ug/L	1		09/28/18 14:16
Benzo[a]pyrene	0.213	0.00513	0.00154	ug/L	1		09/28/18 14:16
Benzo[b]Fluoranthene	0.322	0.0128	0.00379	ug/L	1		09/28/18 14:16
Benzo[g,h,i]perylene	0.179	0.0128	0.00379	ug/L	1		09/28/18 14:16
Benzo[k]fluoranthene	0.100	0.0128	0.00379	ug/L	1		09/28/18 14:16
Chrysene	0.208	0.0128	0.00379	ug/L	1		09/28/18 14:16
Dibenzo[a,h]anthracene	0.0369	0.00513	0.00154	ug/L	1		09/28/18 14:16
Fluoranthene	0.385	0.0128	0.00379	ug/L	1		09/28/18 14:16
Fluorene	0.0100 J	0.0128	0.00379	ug/L	1		09/28/18 14:16
Indeno[1,2,3-c,d] pyrene	0.154	0.0128	0.00379	ug/L	1		09/28/18 14:16
Naphthalene	0.0128 U	0.0256	0.00800	ug/L	1		09/28/18 14:16
Phenanthrene	0.144	0.0513	0.00379	ug/L	1		09/28/18 14:16
Pyrene	0.306	0.0513	0.00379	ug/L	1		09/28/18 14:16
Surrogates							
2-Methylnaphthalene-d10 (surr)	50.4	47-106		%	1		09/28/18 14:16
Fluoranthene-d10 (surr)	46.4	24-116		%	1		09/28/18 14:16

Batch Information

Analytical Batch: XMS11111
 Analytical Method: EPA 625M SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 09/28/18 14:16
 Container ID: 1185435011-H

Prep Batch: XXX40557
 Prep Method: SW3520C
 Prep Date/Time: 09/24/18 08:45
 Prep Initial Wt./Vol.: 975 mL
 Prep Extract Vol: 1 mL



Results of **SWM09-03**

Client Sample ID: **SWM09-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435011
Lab Project ID: 1185435

Collection Date: 09/22/18 10:50
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 499-1

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		09/25/18 16:03
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		09/25/18 16:03
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		09/25/18 16:03
Benzene	0.200 U	0.400	0.120	ug/L	1		09/25/18 16:03
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		09/25/18 16:03
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		09/25/18 16:03
o-Xylene	0.500 U	1.00	0.310	ug/L	1		09/25/18 16:03
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		09/25/18 16:03
Toluene	0.500 U	1.00	0.310	ug/L	1		09/25/18 16:03
Surrogates							
1,2-Dichloroethane-D4 (surr)	103	81-118		%	1		09/25/18 16:03
4-Bromofluorobenzene (surr)	101	85-114		%	1		09/25/18 16:03
Toluene-d8 (surr)	104	89-112		%	1		09/25/18 16:03

Batch Information

Analytical Batch: VMS18352
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 09/25/18 16:03
Container ID: 1185435011-B

Prep Batch: VXX33184
Prep Method: SW5030B
Prep Date/Time: 09/25/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of SWM09-03

Client Sample ID: **SWM09-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435011
Lab Project ID: 1185435

Collection Date: 09/22/18 10:50
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 499-1

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	11.2	0.980	0.304	mg/L	1		09/25/18 16:33

Batch Information

Analytical Batch: STS6034
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 09/25/18 16:33
Container ID: 1185435011-G



Results of **SWM10-03**

Client Sample ID: **SWM10-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435012
Lab Project ID: 1185435

Collection Date: 09/22/18 11:00
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 525-2

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	32600	500	150	ug/L	1		10/03/18 14:35
Magnesium	8890	50.0	15.0	ug/L	1		10/03/18 14:35

Batch Information

Analytical Batch: MMS10337
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/03/18 14:35
Container ID: 1185435012-C

Prep Batch: MX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	118	5.00	5.00	mg/L	1		10/03/18 14:35

Batch Information

Analytical Batch: MMS10337
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/03/18 14:35
Container ID: 1185435012-C

Prep Batch: MX31977
Prep Method: E200.2
Prep Date/Time: 09/24/18 13:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM10-03

Client Sample ID: **SWM10-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435012
Lab Project ID: 1185435

Collection Date: 09/22/18 11:00
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 525-2

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	2.00 U	2.00	2.00	mg/L	1		09/23/18 12:51

Batch Information

Analytical Batch: BOD6150
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/23/18 12:51
Container ID: 1185435012-B

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	249	1.64	1.64	col/100mL	1		09/22/18 17:15

Batch Information

Analytical Batch: BTF16905
Analytical Method: SM21 9222D
Analyst: NAB
Analytical Date/Time: 09/22/18 17:15
Container ID: 1185435012-A



Results of SWM10-03

Client Sample ID: **SWM10-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435012
Lab Project ID: 1185435

Collection Date: 09/22/18 11:00
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 525-2

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	4.50	1.00	0.310	mg/L	1		09/25/18 16:33

Batch Information

Analytical Batch: STS6034
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 09/25/18 16:33
Container ID: 1185435012-D

Results of SWM11-03

Client Sample ID: **SWM11-03**
 Client Project ID: **5078 MOA Stormwater Management**
 Lab Sample ID: 1185435016
 Lab Project ID: 1185435

Collection Date: 09/22/18 11:40
 Received Date: 09/22/18 13:43
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 348-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	5.35	1.00	0.310	ug/L	1		10/01/18 13:20

Batch Information

Analytical Batch: MMS10334
 Analytical Method: EP200.8
 Analyst: DSH
 Analytical Date/Time: 10/01/18 13:20
 Container ID: 1185435016-B

Prep Batch: MXX31973
 Prep Method: E200.2
 Prep Date/Time: 09/25/18 12:35
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

Results of SWM12-03

Client Sample ID: **SWM12-03**
 Client Project ID: **5078 MOA Stormwater Management**
 Lab Sample ID: 1185435017
 Lab Project ID: 1185435

Collection Date: 09/22/18 12:30
 Received Date: 09/22/18 13:43
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 1454-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	5.75	1.00	0.310	ug/L	1		10/01/18 14:11

Batch Information

Analytical Batch: MMS10334
 Analytical Method: EP200.8
 Analyst: DSH
 Analytical Date/Time: 10/01/18 14:11
 Container ID: 1185435017-B

Prep Batch: MXX31973
 Prep Method: E200.2
 Prep Date/Time: 09/25/18 12:35
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL



Results of SWM12-03 Dup

Client Sample ID: **SWM12-03 Dup**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435018
Lab Project ID: 1185435

Collection Date: 09/22/18 12:30
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1454-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	13.2	1.00	0.310	ug/L	1		10/01/18 14:14

Batch Information

Analytical Batch: MMS10334
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/01/18 14:14
Container ID: 1185435018-B

Prep Batch: MXX31973
Prep Method: E200.2
Prep Date/Time: 09/25/18 12:35
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM03-03

Client Sample ID: **SWM03-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435019
Lab Project ID: 1185435

Collection Date: 09/22/18 12:00
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 1224-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	3.85	1.00	0.310	ug/L	1		10/01/18 14:32

Batch Information

Analytical Batch: MMS10334
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/01/18 14:32
Container ID: 1185435019-B

Prep Batch: MXX31973
Prep Method: E200.2
Prep Date/Time: 09/25/18 12:35
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Results of SWM04-03

Client Sample ID: **SWM04-03**
 Client Project ID: **5078 MOA Stormwater Management**
 Lab Sample ID: 1185435020
 Lab Project ID: 1185435

Collection Date: 09/22/18 12:10
 Received Date: 09/22/18 13:43
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 1224-2

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	2.49	1.00	0.310	ug/L	1		10/01/18 14:35

Batch Information

Analytical Batch: MMS10334
 Analytical Method: EP200.8
 Analyst: DSH
 Analytical Date/Time: 10/01/18 14:35
 Container ID: 1185435020-B

Prep Batch: MXX31973
 Prep Method: E200.2
 Prep Date/Time: 09/25/18 12:35
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

Results of SWM05-03

Client Sample ID: **SWM05-03**
 Client Project ID: **5078 MOA Stormwater Management**
 Lab Sample ID: 1185435021
 Lab Project ID: 1185435

Collection Date: 09/22/18 13:05
 Received Date: 09/22/18 13:43
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 207-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	3.50	1.00	0.310	ug/L	1		10/01/18 14:38

Batch Information

Analytical Batch: MMS10334
 Analytical Method: EP200.8
 Analyst: DSH
 Analytical Date/Time: 10/01/18 14:38
 Container ID: 1185435021-B

Prep Batch: MX31973
 Prep Method: E200.2
 Prep Date/Time: 09/25/18 12:35
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL



Results of SWM06-03

Client Sample ID: **SWM06-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435022
Lab Project ID: 1185435

Collection Date: 09/22/18 09:52
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 314-22

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	5.65	1.00	0.310	ug/L	1		10/01/18 14:41

Batch Information

Analytical Batch: MMS10334
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/01/18 14:41
Container ID: 1185435022-B

Prep Batch: MXX31973
Prep Method: E200.2
Prep Date/Time: 09/25/18 12:35
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Results of SWM07-03

Client Sample ID: **SWM07-03**
 Client Project ID: **5078 MOA Stormwater Management**
 Lab Sample ID: 1185435023
 Lab Project ID: 1185435

Collection Date: 09/22/18 10:10
 Received Date: 09/22/18 13:43
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 484-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	3.79	1.00	0.310	ug/L	1		10/01/18 14:44

Batch Information

Analytical Batch: MMS10334
 Analytical Method: EP200.8
 Analyst: DSH
 Analytical Date/Time: 10/01/18 14:44
 Container ID: 1185435023-B

Prep Batch: MXX31973
 Prep Method: E200.2
 Prep Date/Time: 09/25/18 12:35
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL



Results of SWM08-03

Client Sample ID: **SWM08-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435024
Lab Project ID: 1185435

Collection Date: 09/22/18 10:25
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 86-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	7.59	1.00	0.310	ug/L	1		10/01/18 14:47

Batch Information

Analytical Batch: MMS10334
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/01/18 14:47
Container ID: 1185435024-B

Prep Batch: MXX31973
Prep Method: E200.2
Prep Date/Time: 09/25/18 12:35
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Results of SWM08-03 Dup

Client Sample ID: **SWM08-03 Dup**
 Client Project ID: **5078 MOA Stormwater Management**
 Lab Sample ID: 1185435025
 Lab Project ID: 1185435

Collection Date: 09/22/18 10:25
 Received Date: 09/22/18 13:43
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location: 86-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	3.29	1.00	0.310	ug/L	1		10/01/18 14:50

Batch Information

Analytical Batch: MMS10334
 Analytical Method: EP200.8
 Analyst: DSH
 Analytical Date/Time: 10/01/18 14:50
 Container ID: 1185435025-B

Prep Batch: MXX31973
 Prep Method: E200.2
 Prep Date/Time: 09/25/18 12:35
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL



Results of SWM09-03

Client Sample ID: **SWM09-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435026
Lab Project ID: 1185435

Collection Date: 09/22/18 10:50
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 499-1

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	2.34	1.00	0.310	ug/L	1		10/01/18 14:53

Batch Information

Analytical Batch: MMS10334
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/01/18 14:53
Container ID: 1185435026-B

Prep Batch: MXX31973
Prep Method: E200.2
Prep Date/Time: 09/25/18 12:35
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM10-03

Client Sample ID: **SWM10-03**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185435027
Lab Project ID: 1185435

Collection Date: 09/22/18 11:00
Received Date: 09/22/18 13:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: 525-2

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	0.690 J	1.00	0.310	ug/L	1		10/01/18 14:56

Batch Information

Analytical Batch: MMS10334
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/01/18 14:56
Container ID: 1185435027-B

Prep Batch: MXX31973
Prep Method: E200.2
Prep Date/Time: 09/25/18 12:35
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Method Blank

Blank ID: MB for HBN 1786569 [BOD/6150]

Matrix: Water (Surface, Eff., Ground)

Blank Lab ID: 1477474

QC for Samples:

1185435001, 1185435002, 1185435003, 1185435004, 1185435005, 1185435006, 1185435007, 1185435008, 1185435009, 1185435010, 1185435011, 1185435012

Results by SM21 5210B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Biochemical Oxygen Demand	2.00U	2.00	2.00	mg/L

Batch Information

Analytical Batch: BOD6150

Analytical Method: SM21 5210B

Instrument:

Analyst: A.L

Analytical Date/Time: 9/23/2018 12:51:29PM

Print Date: 10/12/2018 3:14:22PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1185435 [BOD6150]

Blank Spike Lab ID: 1477475

Date Analyzed: 09/23/2018 12:51

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185435001, 1185435002, 1185435003, 1185435004, 1185435005, 1185435006, 1185435007, 1185435008, 1185435009, 1185435010, 1185435011, 1185435012

Results by SM21 5210B

Parameter	Blank Spike (mg/L)			CL
	Spike	Result	Rec (%)	
Biochemical Oxygen Demand	198	220	111	(84.6-115.4

Batch Information

Analytical Batch: BOD6150

Analytical Method: SM21 5210B

Instrument:

Analyst: A.L



Method Blank

Blank ID: MB for HBN 1786581 [BTF/16905]
Blank Lab ID: 1477510

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1185435001, 1185435002, 1185435003, 1185435004, 1185435005, 1185435006, 1185435007, 1185435008, 1185435009, 1185435010, 1185435011, 1185435012

Results by SM21 9222D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Fecal Coliform	1.00U	1.00	1.00	col/100mL

Batch Information

Analytical Batch: BTF16905
Analytical Method: SM21 9222D
Instrument:
Analyst: NAB
Analytical Date/Time: 9/22/2018 5:15:00PM

Print Date: 10/12/2018 3:14:25PM

Method Blank

Blank ID: MB for HBN 1786589 [MXX/31973]
Blank Lab ID: 1477543

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1185435016, 1185435017, 1185435018, 1185435019, 1185435020, 1185435021, 1185435022, 1185435023, 1185435024,
1185435025, 1185435026, 1185435027

Results by EP200.8

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Copper	0.500U	1.00	0.310	ug/L

Batch Information

Analytical Batch: MMS10334
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 10/1/2018 1:14:49PM

Prep Batch: MXX31973
Prep Method: E200.2
Prep Date/Time: 9/25/2018 12:35:09PM
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Print Date: 10/12/2018 3:14:27PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1185435 [MXX31973]
 Blank Spike Lab ID: 1477544
 Date Analyzed: 10/01/2018 13:17

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185435016, 1185435017, 1185435018, 1185435019, 1185435020, 1185435021, 1185435022,
 1185435023, 1185435024, 1185435025, 1185435026, 1185435027

Results by EP200.8

Parameter	Blank Spike (ug/L)			CL
	Spike	Result	Rec (%)	
Copper	1000	1050	105	(85-115)

Batch Information

Analytical Batch: **MMS10334**

Analytical Method: **EP200.8**

Instrument: **Perkin Elmer Nexlon P5**

Analyst: **DSH**

Prep Batch: **MXX31973**

Prep Method: **E200.2**

Prep Date/Time: **09/25/2018 12:35**

Spike Init Wt./Vol.: 1000 ug/L Extract Vol: 50 mL

Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1477547
 MS Sample ID: 1477548 MS
 MSD Sample ID:

Analysis Date: 10/01/2018 13:20
 Analysis Date: 10/01/2018 13:23
 Analysis Date:
 Matrix: Drinking Water

QC for Samples: 1185435016, 1185435017, 1185435018

Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Copper	5.35	1000	981	98				70-130		

Batch Information

Analytical Batch: MMS10334
 Analytical Method: EP200.8
 Instrument: Perkin Elmer Nexlon P5
 Analyst: DSH
 Analytical Date/Time: 10/1/2018 1:23:45PM

Prep Batch: MXX31973
 Prep Method: DW Digest for Metals on ICP-MS
 Prep Date/Time: 9/25/2018 12:35:09PM
 Prep Initial Wt./Vol.: 20.00mL
 Prep Extract Vol: 50.00mL

Print Date: 10/12/2018 3:14:29PM



Matrix Spike Summary

Original Sample ID: 1477549
MS Sample ID: 1477550 MS
MSD Sample ID:

Analysis Date: 10/01/2018 14:14
Analysis Date: 10/01/2018 14:17
Analysis Date:
Matrix: Drinking Water

QC for Samples: 1185435017, 1185435018, 1185435019, 1185435020, 1185435021, 1185435022, 1185435023, 1185435024, 1185435025, 1185435026, 1185435027

Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Copper	13.2	1000	1020	101				70-130		

Batch Information

Analytical Batch: MMS10334
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 10/1/2018 2:17:23PM

Prep Batch: MXX31973
Prep Method: DW Digest for Metals on ICP-MS
Prep Date/Time: 9/25/2018 12:35:09PM
Prep Initial Wt./Vol.: 20.00mL
Prep Extract Vol: 50.00mL

Print Date: 10/12/2018 3:14:29PM



Method Blank

Blank ID: MB for HBN 1786645 [MXX/31977]
Blank Lab ID: 1477808

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1185435001, 1185435002, 1185435003, 1185435004, 1185435005, 1185435006, 1185435007, 1185435008, 1185435009, 1185435010, 1185435011, 1185435012

Results by EP200.8

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Calcium	250U	500	150	ug/L
Magnesium	25.0U	50.0	15.0	ug/L

Batch Information

Analytical Batch: MMS10337
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 10/3/2018 1:18:17PM

Prep Batch: MXX31977
Prep Method: E200.2
Prep Date/Time: 9/24/2018 1:45:09PM
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Print Date: 10/12/2018 3:14:30PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1185435 [MXX31977]

Blank Spike Lab ID: 1477809

Date Analyzed: 10/03/2018 13:21

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185435001, 1185435002, 1185435003, 1185435004, 1185435005, 1185435006, 1185435007, 1185435008, 1185435009, 1185435010, 1185435011, 1185435012

Results by EP200.8

Parameter	Blank Spike (ug/L)			CL
	Spike	Result	Rec (%)	
Calcium	10000	10700	107	(85-115)
Magnesium	10000	11000	110	(85-115)

Batch Information

Analytical Batch: **MMS10337**

Analytical Method: **EP200.8**

Instrument: **Perkin Elmer Nexlon P5**

Analyst: **DSH**

Prep Batch: **MXX31977**

Prep Method: **E200.2**

Prep Date/Time: **09/24/2018 13:45**

Spike Init Wt./Vol.: 10000 ug/L Extract Vol: 50 mL

Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1477815
 MS Sample ID: 1477816 MS
 MSD Sample ID:

Analysis Date: 10/03/2018 14:03
 Analysis Date: 10/03/2018 14:06
 Analysis Date:
 Matrix: Drinking Water

QC for Samples: 1185435001, 1185435002, 1185435003, 1185435004, 1185435005, 1185435006, 1185435007,
 1185435008, 1185435009, 1185435010, 1185435011, 1185435012

Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Calcium	949	10000	11200	102				70-130		
Magnesium	239	10000	9990	98				70-130		

Batch Information

Analytical Batch: MMS10337
 Analytical Method: EP200.8
 Instrument: Perkin Elmer Nexlon P5
 Analyst: DSH
 Analytical Date/Time: 10/3/2018 2:06:01PM

Prep Batch: MXX31977
 Prep Method: DW Digest for Metals on ICP-MS
 Prep Date/Time: 9/24/2018 1:45:09PM
 Prep Initial Wt./Vol.: 20.00mL
 Prep Extract Vol: 50.00mL

Print Date: 10/12/2018 3:14:31PM

Matrix Spike Summary

Original Sample ID: 1477814
 MS Sample ID: 1477817 MS
 MSD Sample ID:

Analysis Date: 10/03/2018 13:24
 Analysis Date: 10/03/2018 13:27
 Analysis Date:
 Matrix: Drinking Water

QC for Samples: 1185435001, 1185435002, 1185435003, 1185435004

Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Calcium	32000	10000	41000	90				70-130		
Magnesium	8550	10000	19000	104				70-130		

Batch Information

Analytical Batch: MMS10337
 Analytical Method: EP200.8
 Instrument: Perkin Elmer Nexlon P5
 Analyst: DSH
 Analytical Date/Time: 10/3/2018 1:27:15PM

Prep Batch: MXX31977
 Prep Method: DW Digest for Metals on ICP-MS
 Prep Date/Time: 9/24/2018 1:45:09PM
 Prep Initial Wt./Vol.: 20.00mL
 Prep Extract Vol: 50.00mL

Print Date: 10/12/2018 3:14:31PM

Method Blank

Blank ID: MB for HBN 1786689 [STS/6034]

Matrix: Water (Surface, Eff., Ground)

Blank Lab ID: 1478005

QC for Samples:

1185435001, 1185435002, 1185435003, 1185435004, 1185435005, 1185435006, 1185435007, 1185435008, 1185435009, 1185435010, 1185435011, 1185435012

Results by SM21 2540D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Total Suspended Solids	0.500U	1.00	0.310	mg/L

Batch Information

Analytical Batch: STS6034

Analytical Method: SM21 2540D

Instrument:

Analyst: EWW

Analytical Date/Time: 9/25/2018 4:33:36PM

Print Date: 10/12/2018 3:14:34PM

Duplicate Sample Summary

Original Sample ID: 1185435008

Duplicate Sample ID: 1478008

QC for Samples:

1185435001, 1185435002, 1185435003, 1185435004, 1185435005, 1185435006, 1185435007, 1185435008, 1185435009, 1185435010, 1185435011, 1185435012

Analysis Date: 09/25/2018 16:33

Matrix: Water (Surface, Eff., Ground)

Results by SM21 2540D

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Suspended Solids	9.38	9.58	mg/L	2.20	(< 5)

Batch Information

Analytical Batch: STS6034

Analytical Method: SM21 2540D

Instrument:

Analyst: EWW

Print Date: 10/12/2018 3:14:35PM

Duplicate Sample Summary

Original Sample ID: 1185458003

Duplicate Sample ID: 1478009

QC for Samples:

1185435009, 1185435010, 1185435011, 1185435012

Analysis Date: 09/25/2018 16:33

Matrix: Water (Surface, Eff., Ground)

Results by SM21 2540D

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Suspended Solids	261	265	mg/L	1.30	(< 5)

Batch Information

Analytical Batch: STS6034

Analytical Method: SM21 2540D

Instrument:

Analyst: EWW

Print Date: 10/12/2018 3:14:35PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1185435 [STS6034]
 Blank Spike Lab ID: 1478006
 Date Analyzed: 09/25/2018 16:33

Spike Duplicate ID: LCSD for HBN 1185435 [STS6034]
 Spike Duplicate Lab ID: 1478007
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185435001, 1185435002, 1185435003, 1185435004, 1185435005, 1185435006, 1185435007, 1185435008, 1185435009, 1185435010, 1185435011, 1185435012

Results by SM21 2540D

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Total Suspended Solids	25	23.8	95	25	23.5	94	(75-125)	1.30	(< 5)

Batch Information

Analytical Batch: STS6034
 Analytical Method: SM21 2540D
 Instrument:
 Analyst: EWW

Method Blank

Blank ID: MB for HBN 1786682 [VXX/33184]
 Blank Lab ID: 1477974

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
 1185435002, 1185435003, 1185435006, 1185435008, 1185435011

Results by EPA 602/624

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,2-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,3-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,4-Dichlorobenzene	0.250U	0.500	0.150	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Chlorobenzene	0.250U	0.500	0.150	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	101	81-118		%
4-Bromofluorobenzene (surr)	101	85-114		%
Toluene-d8 (surr)	103	89-112		%

Batch Information

Analytical Batch: VMS18352
 Analytical Method: EPA 602/624
 Instrument: VPA 780/5975 GC/MS
 Analyst: FDR
 Analytical Date/Time: 9/25/2018 8:45:00AM

Prep Batch: VXX33184
 Prep Method: SW5030B
 Prep Date/Time: 9/25/2018 12:00:00AM
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL

Leaching Blank

Blank ID: LB for HBN 1786649 [TCLP/9701]
 Blank Lab ID: 1477836

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
 1185435002, 1185435003, 1185435006, 1185435008, 1185435011

Results by EPA 602/624

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,4-Dichlorobenzene	12.5U	25.0	7.50	ug/L
Benzene	10.0U	20.0	6.00	ug/L
Chlorobenzene	12.5U	25.0	7.50	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	103	81-118		%
4-Bromofluorobenzene (surr)	102	85-114		%
Toluene-d8 (surr)	104	89-112		%

Batch Information

Analytical Batch: VMS18352
 Analytical Method: EPA 602/624
 Instrument: VPA 780/5975 GC/MS
 Analyst: FDR
 Analytical Date/Time: 9/25/2018 12:20:00PM

Prep Batch: VXX33184
 Prep Method: SW5030B
 Prep Date/Time: 9/25/2018 12:00:00AM
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1185435 [VXX33184]
 Blank Spike Lab ID: 1477975
 Date Analyzed: 09/25/2018 09:02

Spike Duplicate ID: LCSD for HBN 1185435
 [VXX33184]
 Spike Duplicate Lab ID: 1477976
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185435002, 1185435003, 1185435006, 1185435008, 1185435011

Results by EPA 602/624

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2-Dichlorobenzene	30	32.5	108	30	31.4	105	(80-119)	3.60	(< 20)
1,3-Dichlorobenzene	30	32.8	109	30	31.6	105	(80-119)	3.70	(< 20)
1,4-Dichlorobenzene	30	32.4	108	30	31.5	105	(79-118)	2.80	(< 20)
Benzene	30	30.2	101	30	29.6	99	(79-120)	2.30	(< 20)
Chlorobenzene	30	30.4	101	30	29.6	99	(82-118)	2.80	(< 20)
Ethylbenzene	30	31.0	103	30	30.5	102	(79-121)	1.50	(< 20)
o-Xylene	30	30.7	102	30	30.3	101	(78-122)	1.30	(< 20)
P & M -Xylene	60	62.0	103	60	60.6	101	(80-121)	2.20	(< 20)
Toluene	30	30.2	101	30	29.3	98	(80-121)	3.10	(< 20)

Surrogates

1,2-Dichloroethane-D4 (surr)	30	97.9	98	30	97.4	97	(81-118)	0.44
4-Bromofluorobenzene (surr)	30	105	105	30	104	104	(85-114)	0.10
Toluene-d8 (surr)	30	102	102	30	101	101	(89-112)	0.98

Batch Information

Analytical Batch: **VMS18352**
 Analytical Method: **EPA 602/624**
 Instrument: **VPA 780/5975 GC/MS**
 Analyst: **FDR**

Prep Batch: **VXX33184**
 Prep Method: **SW5030B**
 Prep Date/Time: **09/25/2018 00:00**
 Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL



Matrix Spike Summary

Original Sample ID: 1478250
 MS Sample ID: 1478251 MS
 MSD Sample ID: 1478252 MSD

Analysis Date: 09/25/2018 12:55
 Analysis Date: 09/25/2018 17:28
 Analysis Date: 09/25/2018 17:45
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185435002, 1185435003, 1185435006, 1185435008, 1185435011

Results by EPA 602/624

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2-Dichlorobenzene	0.500U	30.0	33	110	30.0	32.8	109	80-119	0.76	(< 20)
1,3-Dichlorobenzene	0.500U	30.0	33.7	112	30.0	33.0	110	80-119	2.00	(< 20)
1,4-Dichlorobenzene	0.250U	30.0	33	110	30.0	32.9	110	79-118	0.27	(< 20)
Benzene	0.200U	30.0	30.9	103	30.0	30.8	103	79-120	0.32	(< 20)
Chlorobenzene	0.250U	30.0	31.5	105	30.0	31.5	105	82-118	0.06	(< 20)
Ethylbenzene	0.500U	30.0	32.2	107	30.0	32.0	107	79-121	0.68	(< 20)
o-Xylene	0.500U	30.0	31.6	105	30.0	31.6	105	78-122	0.13	(< 20)
P & M -Xylene	1.00U	60.0	64	107	60.0	63.7	106	80-121	0.61	(< 20)
Toluene	0.500U	30.0	30.8	103	30.0	30.8	103	80-121	0.19	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		30.0	29.6	99	30.0	29.6	99	81-118	0.14	
4-Bromofluorobenzene (surr)		30.0	30.8	103	30.0	30.6	102	85-114	0.72	
Toluene-d8 (surr)		30.0	30.8	103	30.0	31.0	103	89-112	0.39	

Batch Information

Analytical Batch: VMS18352
 Analytical Method: EPA 602/624
 Instrument: VPA 780/5975 GC/MS
 Analyst: FDR
 Analytical Date/Time: 9/25/2018 5:28:00PM

Prep Batch: VXX33184
 Prep Method: Volatiles Extraction 8240/8260 FULL
 Prep Date/Time: 9/25/2018 12:00:00AM
 Prep Initial Wt./Vol.: 5.00mL
 Prep Extract Vol: 5.00mL

Print Date: 10/12/2018 3:14:39PM

Billable Matrix Spike Summary

Original Sample ID: 1185435002
 MS Sample ID: 1185435013 BMS
 MSD Sample ID: 1185435014 BMSD

Analysis Date: 09/25/2018 12:55
 Analysis Date: 09/25/2018 17:28
 Analysis Date: 09/25/2018 17:45
 Matrix: Water (Surface, Eff., Ground)

QC for Samples:

Results by EPA 602/624

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2-Dichlorobenzene	0.500U	30.0	33	110	30.0	32.8	109	80-119	0.76	(< 20)
1,3-Dichlorobenzene	0.500U	30.0	33.7	112	30.0	33.0	110	80-119	2.00	(< 20)
1,4-Dichlorobenzene	0.250U	30.0	33	110	30.0	32.9	110	79-118	0.27	(< 20)
Benzene	0.200U	30.0	30.9	103	30.0	30.8	103	79-120	0.32	(< 20)
Chlorobenzene	0.250U	30.0	31.5	105	30.0	31.5	105	82-118	0.06	(< 20)
Ethylbenzene	0.500U	30.0	32.2	107	30.0	32.0	107	79-121	0.68	(< 20)
o-Xylene	0.500U	30.0	31.6	105	30.0	31.6	105	78-122	0.13	(< 20)
P & M -Xylene	1.00U	60.0	64	107	60.0	63.7	106	80-121	0.61	(< 20)
Toluene	0.500U	30.0	30.8	103	30.0	30.8	103	80-121	0.19	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		30.0	29.6	99	30.0	29.6	99	81-118	0.14	
4-Bromofluorobenzene (surr)		30.0	30.8	103	30.0	30.6	102	85-114	0.72	
Toluene-d8 (surr)		30.0	30.8	103	30.0	31.0	103	89-112	0.39	

Batch Information

Analytical Batch: VMS18352
 Analytical Method: EPA 602/624
 Instrument: VPA 780/5975 GC/MS
 Analyst: FDR
 Analytical Date/Time: 9/25/2018 5:28:00PM

Prep Batch: VXX33184
 Prep Method: Volatiles Extraction 8240/8260 FULL
 Prep Date/Time: 9/25/2018 12:00:00AM
 Prep Initial Wt./Vol.: 5.00mL
 Prep Extract Vol: 5.00mL



Method Blank

Blank ID: MB for HBN 1786571 [XXX/40557]
Blank Lab ID: 1477479

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1185435002, 1185435003, 1185435006, 1185435008, 1185435011

Results by EPA 625M SIM (PAH)

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Acenaphthene	0.00625U	0.0125	0.00370	ug/L
Acenaphthylene	0.00625U	0.0125	0.00370	ug/L
Anthracene	0.00625U	0.0125	0.00370	ug/L
Benzo(a)Anthracene	0.00625U	0.0125	0.00370	ug/L
Benzo[a]pyrene	0.00250U	0.00500	0.00150	ug/L
Benzo[b]Fluoranthene	0.00625U	0.0125	0.00370	ug/L
Benzo[g,h,i]perylene	0.00625U	0.0125	0.00370	ug/L
Benzo[k]fluoranthene	0.00625U	0.0125	0.00370	ug/L
Chrysene	0.00625U	0.0125	0.00370	ug/L
Dibenzo[a,h]anthracene	0.00250U	0.00500	0.00150	ug/L
Fluoranthene	0.00625U	0.0125	0.00370	ug/L
Fluorene	0.00625U	0.0125	0.00370	ug/L
Indeno[1,2,3-c,d] pyrene	0.00625U	0.0125	0.00370	ug/L
Naphthalene	0.0125U	0.0250	0.00780	ug/L
Phenanthrene	0.0250U	0.0500	0.00370	ug/L
Pyrene	0.0250U	0.0500	0.00370	ug/L

Surrogates

2-Methylnaphthalene-d10 (surr)	70.9	47-106	%
Fluoranthene-d10 (surr)	70	24-116	%

Batch Information

Analytical Batch: XMS11111
Analytical Method: EPA 625M SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: DSD
Analytical Date/Time: 9/28/2018 12:14:00PM

Prep Batch: XXX40557
Prep Method: SW3520C
Prep Date/Time: 9/24/2018 8:45:02AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 1 mL

Print Date: 10/12/2018 3:14:39PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1185435 [XXX40557]

Blank Spike Lab ID: 1477480

Date Analyzed: 09/28/2018 12:34

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185435002, 1185435003, 1185435006, 1185435008, 1185435011

Results by EPA 625M SIM (PAH)

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
Acenaphthene	0.5	0.350	70	(48-114)
Acenaphthylene	0.5	0.313	63	(35-121)
Anthracene	0.5	0.341	68	(53-119)
Benzo(a)Anthracene	0.5	0.332	66	(59-120)
Benzo[a]pyrene	0.5	0.342	68	(53-120)
Benzo[b]Fluoranthene	0.5	0.371	74	(53-126)
Benzo[g,h,i]perylene	0.5	0.329	66	(44-128)
Benzo[k]fluoranthene	0.5	0.378	76	(54-125)
Chrysene	0.5	0.360	72	(57-120)
Dibenzo[a,h]anthracene	0.5	0.312	62	(44-131)
Fluoranthene	0.5	0.317	63	(58-120)
Fluorene	0.5	0.336	67	(50-118)
Indeno[1,2,3-c,d] pyrene	0.5	0.343	69	(48-130)
Naphthalene	0.5	0.293	59	(43-114)
Phenanthrene	0.5	0.320	64	(53-115)
Pyrene	0.5	0.326	65	(53-121)

Surrogates

2-Methylnaphthalene-d10 (surr)	0.5	63.8	64	(47-106)
Fluoranthene-d10 (surr)	0.5	66.2	66	(24-116)

Batch Information

Analytical Batch: XMS11111

Analytical Method: EPA 625M SIM (PAH)

Instrument: SVA Agilent 780/5975 GC/MS

Analyst: DSD

Prep Batch: XXX40557

Prep Method: SW3520C

Prep Date/Time: 09/24/2018 08:45

Spike Init Wt./Vol.: 0.5 ug/L Extract Vol: 1 mL

Dupe Init Wt./Vol.: Extract Vol:



Billable Matrix Spike Summary

Original Sample ID: 1185435002
MS Sample ID: 1185435013 BMS
MSD Sample ID: 1185435014 BMSD

Analysis Date: 09/28/2018 12:54
Analysis Date: 09/28/2018 14:37
Analysis Date: 09/28/2018 14:57
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

Results by EPA 625M SIM (PAH)

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
		Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Acenaphthene	0.00650U	0.552	.255	46 *	0.549	0.254	46 *	48-114	0.34	(< 20)
Acenaphthylene	0.00650U	0.552	.237	43	0.549	0.237	43	35-121	0.19	(< 20)
Anthracene	0.00650U	0.552	.238	43 *	0.549	0.228	42 *	53-119	4.20	(< 20)
Benzo(a)Anthracene	0.00650U	0.552	.136	25 *	0.549	0.134	24 *	59-120	1.80	(< 20)
Benzo[a]pyrene	0.00259U	0.552	.0762	14 *	0.549	0.0757	14 *	53-120	0.64	(< 20)
Benzo[b]Fluoranthene	0.00650U	0.552	.0867	16 *	0.549	0.0849	16 *	53-126	2.00	(< 20)
Benzo[g,h,i]perylene	0.00650U	0.552	.0483	9 *	0.549	0.0480	9 *	44-128	0.62	(< 20)
Benzo[k]fluoranthene	0.00650U	0.552	.0833	15 *	0.549	0.0800	15 *	54-125	4.10	(< 20)
Chrysene	0.00650U	0.552	.151	27 *	0.549	0.146	27 *	57-120	3.40	(< 20)
Dibenzo[a,h]anthracene	0.00259U	0.552	.0509	9 *	0.549	0.0506	9 *	44-131	0.57	(< 20)
Fluoranthene	0.00650U	0.552	.199	36 *	0.549	0.197	36 *	58-120	1.10	(< 20)
Fluorene	0.00650U	0.552	.247	45 *	0.549	0.246	45 *	50-118	0.50	(< 20)
Indeno[1,2,3-c,d] pyrene	0.00650U	0.552	.0491	9 *	0.549	0.0497	9 *	48-130	1.20	(< 20)
Naphthalene	0.0130U	0.552	.222	40 *	0.549	0.225	41 *	43-114	1.80	(< 20)
Phenanthrene	0.0259U	0.552	.24	43 *	0.549	0.236	43 *	53-115	1.40	(< 20)
Pyrene	0.0259U	0.552	.204	37 *	0.549	0.199	36 *	53-121	2.50	(< 20)
Surrogates										
2-Methylnaphthalene-d10 (surr)		0.552	.246	45 *	0.549	0.250	46 *	47-106	1.80	
Fluoranthene-d10 (surr)		0.552	.209	38	0.549	0.209	38	24-116	0.03	

Batch Information


Analytical Batch: XMS11111
Analytical Method: EPA 625M SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: DSD
Analytical Date/Time: 9/28/2018 2:37:00PM

Prep Batch: XXX40557
Prep Method: Liquid/Liquid Extraction for 625 SIMS
Prep Date/Time: 9/24/2018 8:45:02AM
Prep Initial Wt./Vol.: 905.00mL
Prep Extract Vol: 1.00mL

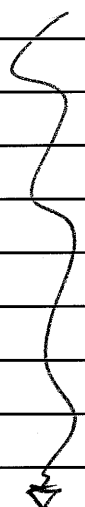
Print Date: 10/12/2018 3:14:41PM

REVIEWED JCT

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ?????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie	1185435 
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Project: MOA Stormwater Management **Matrix:** Water **Project #:** 5078
Complete by: 2 weeks **Note:** Samples contain sodium thiosulfate for dechlorination

Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
①A SWM11-03	348-1	9/22/18	1140	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	①A	
②A SWM12-03	1454-1		1230	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	②A	
③A SWM12-03 Dup	1454-1		1230	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	③A	
④A SWM03-03	1224-1		1200	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	④A	
⑤A SWM04-03	1224-2		1210	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑤A	
⑥A SWM05-03	207-1		1305	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑥A	
⑦A SWM06-03	314-22		0952	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑦A	
⑧A SWM07-03	484-1		1010	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑧A	
⑨A SWM08-03	86-1		1025	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑨A	
⑩A SWM08-03 Dup	86-1		1025	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑩A	
⑪A SWM09-03	499-1		1050	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑪A	
⑫A SWM10-03	525-2	9/22/18	1100	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑫A	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>A. Ly</i>	9/22 1335	<i>hand</i>		
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
			<i>SM Mark SD</i>	9/22/18 13:43

#1 0.0 D35 #2 4.7 D44 #3 6.4 D45 #4 9.4 D36

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ?????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie	<h1 style="margin: 0;">1185435</h1>
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Project: MOA Stormwater Management	Matrix: Water	Project #: 5078
Complete by: 2 weeks		


Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM12-03	1454-1	9/22/18	1230	Samp/MS/MSD	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	9	②B-D ⑬A-C ⑭A-C	
SWM12-03 Dup	1454-1		1230	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	③B-D	
SWM05-03	207-1		1305	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑥B-D	
SWM07-03	484-1		1010	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑧B-D	
SWM09-03	499-1	9/22/18	1050	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑩B-D	
Trip Blank	N/A	N/A	N/A	TB	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑮A-C	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

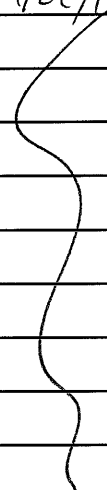
Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
	9/22 1335	hand		
Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
				9/22/18 13:43

Chain of Custody Record



To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie	<b style="font-size: 24pt;">1185435 
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Project: MOA Stormwater Management Complete by: 2 weeks	Matrix: Water	Project #: 5078
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Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM11-03	348-1	9/22/18	1140	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	① B	
SWM12-03	1454-1		1230	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	② E	
SWM12-03 Dup	1454-1		1230	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	③ E	
SWM03-03	1224-1		1200	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	④ B	
SWM04-03	1224-2		1210	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑤ B	
SWM05-03	207-1		1305	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑥ E	
SWM06-03	314-22		0952	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑦ B	
SWM07-03	484-1		1010	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑧ E	
SWM08-03	86-1		1025	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑨ B	
SWM08-03 Dup	86-1		1025	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑩ B	
SWM09-03	499-1		▽	1050	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑪ E
SWM10-03	525-2	9/22/18	1100	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑫ B	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
	9/22/18 1335	harru		
Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
				9/22/18 13:43

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie	<h1 style="margin: 0;">1185435</h1>
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Project: MOA Stormwater Management Complete by: 2 weeks	Matrix: Water	Project #: 5078
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Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM11-03	348-1	9/22/18	1140	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	① C	
SWM12-03	1454-1		1230	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	② F	
SWM12-03 Dup	1454-1		1230	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	③ F	
SWM03-03	1224-1		1200	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	④ C	
SWM04-03	1224-2		1210	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑤ C	
SWM05-03	207-1		1305	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑥ F	
SWM06-03	314-22		0952	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑦ C	
SWM07-03	484-1		1010	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑧ F	
SWM08-03	86-1		1025	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑨ C	
SWM08-03 Dup	86-1		1025	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑩ C	
SWM09-03	499-1		1050	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑪ F	
SWM10-03	525-2	9/22/18	1100	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑫ C	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.


Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
<i>A. Gerlek</i>	9/22/18 1335	hand		
Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
			<i>Mark Savoie</i>	9/22/18 12:43

Chain of Custody Record



To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ?????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie	<h1 style="margin: 0;">1185435</h1> 
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Project: MOA Stormwater Management Complete by: 2 weeks	Matrix: Water	Project #: 5078
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Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres.	No. of Bottles	Lab ID	Condition Upon Receipt	
SWM11-03	348-1	9/22/18	1146	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	① D		
SWM12-03	1454-1		1236	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	② G		
SWM12-03 Dup	1454-1		1230	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	③ G		
SWM03-03	1224-1		1260	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	④ D		
SWM04-03	1224-2		1210	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑤ D		
SWM05-03	207-1		1305	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑥ G		
SWM06-03	314-22		0952	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑦ D		
SWM07-03	484-1		1010	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑧ G		
SWM08-03	86-1		1025	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑨ D		
SWM08-03 Dup	86-1		1025	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑩ D		
SWM09-03	499-1		1050	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑪ G		
SWM10-03	525-2		9/22/18	1100	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑫ D	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
	9/22/18 1335	hand		
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
				9/22/18 1343

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie	<h1 style="margin: 0;">1185435</h1> 
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Project: MOA Stormwater Management	Matrix: Water	Project #: 5078
Complete by: 2 weeks		

Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM12-03	1454-1	9/22/18	1230	Samp/MS/MSD	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	6	② H-I ⑬ D-E ⑭ D-E	
SWM12-03 Dup	1454-1	↙	1230	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	③ H-I	
SWM05-03	207-1	↙	1305	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	⑥ H-I	
SWM07-03	484-1	↙	1010	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	⑧ H-I	
SWM09-03	499-1	9/22/18	1050	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	⑩ H-I	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
<i>AG</i>	9/22/18 1335	hand		
Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
			<i>SM Mr SP</i>	9/22/18 13:43

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie	<h1 style="margin: 0;">1185435</h1>
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Project: MOA Stormwater Management Complete by: 2 weeks	Matrix: Water	Project #: 5078
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Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM11-03	348-1	9/22/18	1140	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	(16) A-B	
SWM12-03	1454-1	↓	1230	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	(17) A-B	
SWM12-03 Dup	1454-1		1230	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	(18) A-B	
SWM03-03	1224-1		1200	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	(19) A-B	
SWM04-03	1224-2		1210	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	(20) A-B	
SWM05-03	207-1		1305	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	(21) A-B	
SWM06-03	314-22		0952	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	(22) A-B	
SWM07-03	484-1		1010	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	(23) A-B	
SWM08-03	86-1		1025	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	(24) A-B	
SWM08-03 Dup	86-1		1050	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	(25) A-B	
SWM09-03	499-1		1050	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	(26) A-B	
SWM10-03	525-2	9/22/18	1100	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	(27) A-B	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments: Dissolved Copper must be Filtered & Preserved at Lab

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>AG</i>	9/22/18 1335	hand		
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
			<i>SMW SD</i>	9/22/18 1343



e-Sample Receipt Form

SGS Workorder #:

1185435



1 1 8 5 4 3 5

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements	<input checked="" type="checkbox"/>	Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	<input type="checkbox"/> n/a	hand delivered
COC accompanied samples?	<input checked="" type="checkbox"/> yes	
<input type="checkbox"/> n/a	**Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required	
Temperature blank compliant* (i.e., 0-6 °C after CF)?	<input checked="" type="checkbox"/> yes	Cooler ID: 1 @ 0.0 °C Therm. ID: D35
	<input checked="" type="checkbox"/> yes	Cooler ID: 2 @ 4.7 °C Therm. ID: D44
	<input checked="" type="checkbox"/> yes	Cooler ID: 3 @ 6.4 °C Therm. ID: D45
	<input checked="" type="checkbox"/> yes	Cooler ID: 4 @ 9.4 °C Therm. ID: D36
	<input type="checkbox"/>	Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	<input type="checkbox"/> n/a	
If <0°C, were sample containers ice free?	<input type="checkbox"/> n/a	
If samples received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements	Note: Refer to form F-083 "Sample Guide" for specific holding times.	
Were samples received within holding time?	<input checked="" type="checkbox"/> yes	
Do samples match COC ** (i.e., sample IDs, dates/times collected)?	<input checked="" type="checkbox"/> yes	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	<input checked="" type="checkbox"/> yes	
Were proper containers (type/mass/volume/preservative***) used?	<input checked="" type="checkbox"/> yes	<input type="checkbox"/> n/a ***Exemption permitted for metals (e.g.200.8/6020A).
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	<input type="checkbox"/> no	Trip blank was not received in cooler with VOA samples. Trip blank vials all had bubbles greater than 6mm.
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	<input type="checkbox"/> no	
Were all soil VOAs field extracted with MeOH+BFB?	<input type="checkbox"/> n/a	
Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.		
Additional notes (if applicable):		



Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1185435001-A	Na2S2O3 for Chlorine Redu	OK	1185435008-H	No Preservative Required	OK
1185435001-B	No Preservative Required	OK	1185435008-I	No Preservative Required	OK
1185435001-C	HNO3 to pH < 2	OK	1185435009-A	Na2S2O3 for Chlorine Redu	OK
1185435001-D	No Preservative Required	OK	1185435009-B	No Preservative Required	OK
1185435002-A	Na2S2O3 for Chlorine Redu	OK	1185435009-C	HNO3 to pH < 2	OK
1185435002-B	HCL to pH < 2	OK	1185435009-D	No Preservative Required	OK
1185435002-C	HCL to pH < 2	OK	1185435010-A	Na2S2O3 for Chlorine Redu	OK
1185435002-D	HCL to pH < 2	OK	1185435010-B	No Preservative Required	OK
1185435002-E	No Preservative Required	OK	1185435010-C	HNO3 to pH < 2	OK
1185435002-F	HNO3 to pH < 2	OK	1185435010-D	No Preservative Required	OK
1185435002-G	No Preservative Required	OK	1185435011-A	Na2S2O3 for Chlorine Redu	OK
1185435002-H	No Preservative Required	OK	1185435011-B	HCL to pH < 2	OK
1185435002-I	No Preservative Required	OK	1185435011-C	HCL to pH < 2	OK
1185435003-A	Na2S2O3 for Chlorine Redu	OK	1185435011-D	HCL to pH < 2	OK
1185435003-B	HCL to pH < 2	OK	1185435011-E	No Preservative Required	OK
1185435003-C	HCL to pH < 2	OK	1185435011-F	HNO3 to pH < 2	OK
1185435003-D	HCL to pH < 2	OK	1185435011-G	No Preservative Required	OK
1185435003-E	No Preservative Required	OK	1185435011-H	No Preservative Required	OK
1185435003-F	HNO3 to pH < 2	OK	1185435011-I	No Preservative Required	OK
1185435003-G	No Preservative Required	OK	1185435012-A	Na2S2O3 for Chlorine Redu	OK
1185435003-H	No Preservative Required	OK	1185435012-B	No Preservative Required	OK
1185435003-I	No Preservative Required	OK	1185435012-C	HNO3 to pH < 2	OK
1185435004-A	Na2S2O3 for Chlorine Redu	OK	1185435012-D	No Preservative Required	OK
1185435004-B	No Preservative Required	OK	1185435013-A	HCL to pH < 2	OK
1185435004-C	HNO3 to pH < 2	OK	1185435013-B	HCL to pH < 2	OK
1185435004-D	No Preservative Required	OK	1185435013-C	HCL to pH < 2	OK
1185435005-A	Na2S2O3 for Chlorine Redu	OK	1185435013-D	No Preservative Required	OK
1185435005-B	No Preservative Required	OK	1185435013-E	No Preservative Required	OK
1185435005-C	HNO3 to pH < 2	OK	1185435014-A	HCL to pH < 2	OK
1185435005-D	No Preservative Required	OK	1185435014-B	HCL to pH < 2	OK
1185435006-A	Na2S2O3 for Chlorine Redu	OK	1185435014-C	HCL to pH < 2	OK
1185435006-B	HCL to pH < 2	OK	1185435014-D	No Preservative Required	OK
1185435006-C	HCL to pH < 2	OK	1185435014-E	No Preservative Required	OK
1185435006-D	HCL to pH < 2	OK	1185435015-A	HCL to pH < 2	OK
1185435006-E	No Preservative Required	OK	1185435015-B	HCL to pH < 2	OK
1185435006-F	HNO3 to pH < 2	OK	1185435015-C	HCL to pH < 2	OK
1185435006-G	No Preservative Required	OK	1185435016-A	No Preservative Required	OK
1185435006-H	No Preservative Required	OK	1185435016-B	HNO3 to pH < 2	OK
1185435006-I	No Preservative Required	OK	1185435017-A	No Preservative Required	OK
1185435007-A	Na2S2O3 for Chlorine Redu	OK	1185435017-B	HNO3 to pH < 2	OK
1185435007-B	No Preservative Required	OK	1185435018-A	No Preservative Required	OK
1185435007-C	HNO3 to pH < 2	OK	1185435018-B	HNO3 to pH < 2	OK
1185435007-D	No Preservative Required	OK	1185435019-A	No Preservative Required	OK
1185435008-A	Na2S2O3 for Chlorine Redu	OK	1185435019-B	HNO3 to pH < 2	OK
1185435008-B	HCL to pH < 2	OK	1185435020-A	No Preservative Required	OK
1185435008-C	HCL to pH < 2	OK	1185435020-B	HNO3 to pH < 2	OK
1185435008-D	HCL to pH < 2	OK	1185435021-A	No Preservative Required	OK
1185435008-E	No Preservative Required	OK	1185435021-B	HNO3 to pH < 2	OK
1185435008-F	HNO3 to pH < 2	OK	1185435022-A	No Preservative Required	OK
1185435008-G	No Preservative Required	OK	1185435022-B	HNO3 to pH < 2	OK

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1185435023-A	No Preservative Required	OK			
1185435023-B	HNO3 to pH < 2	OK			
1185435024-A	No Preservative Required	OK			
1185435024-B	HNO3 to pH < 2	OK			
1185435025-A	No Preservative Required	OK			
1185435025-B	HNO3 to pH < 2	OK			
1185435026-A	No Preservative Required	OK			
1185435026-B	HNO3 to pH < 2	OK			
1185435027-A	No Preservative Required	OK			
1185435027-B	HNO3 to pH < 2	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

BU - The container was received with headspace greater than 6mm.

DM - The container was received damaged.

FR - The container was received frozen and not usable for Bacteria or BOD analyses.

IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

Appendix B4

Laboratory Data Package Storm Event #4



Laboratory Report of Analysis

To: HDR Alaska, Inc.
2525 C St. Ste 500
Anchorage, AK 99503
644-2034

Report Number: **1185564**

Client Project: **5078 MOA Stormwater Management**

Dear Joe Miller,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Justin at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

Justin Nelson
Project Manager
Justin.Nelson@sgs.com

Date

Case Narrative

SGS Client: **HDR Alaska, Inc.**
SGS Project: **1185564**
Project Name/Site: **5078 MOA Stormwater Management**
Project Contact: **Joe Miller**

Refer to sample receipt form for information on sample condition.

SWM12-04 (1185564002) PS

625M SIM - PAH surrogate recovery for 2-Methylnaphthalene-d10 does not meet QC criteria.

SWM12-04 MS (1185564013) BMS

625M SIM - PAH BMS recovery for several analytes does not meet QC criteria. Refer to the LCS for accuracy requirements.

SWM12-04 MSD (1185564014) BMSD

625M SIM - PAH BMSD recovery for several analytes does not meet QC criteria. Refer to the LCS for accuracy requirements.

MB for HBN 1786967 [BOD/6155] (1479300) MB

5210B – BOD - MB depletion (0.38 mg/L) is greater than the recommended limit of 0.2 mg/L. Samples >10X the MB are not significantly affected; Samples <10X the MB results may be biased high.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

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Report of Manual Integrations

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Analytical Batch</u>	<u>Analyte</u>	<u>Reason</u>
EPA 625M SIM (PAH)				
1185564002	SWM12-04	XMS11143	Chrysene	RP
1185564003	SWM12-04 Dup	XMS11143	Chrysene	RP
1185564008	SWM07-04	XMS11143	Chrysene	RP

Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
SWM11-04	1185564001	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM12-04	1185564002	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM12-04 Dup	1185564003	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM03-04	1185564004	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM04-04	1185564005	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM05-04	1185564006	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM06-04	1185564007	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM07-04	1185564008	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM08-04	1185564009	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM08-04 Dup	1185564010	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM09-04	1185564011	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM10-04	1185564012	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM12-04 MS	1185564013	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM12-04 MSD	1185564014	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
Trip Blank	1185564015	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM11-04	1185564016	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM12-04	1185564017	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM12-04 Dup	1185564018	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM03-04	1185564019	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM04-04	1185564020	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM05-04	1185564021	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM06-04	1185564022	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM07-04	1185564023	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM08-04	1185564024	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM08-04 Dup	1185564025	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM09-04	1185564026	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)
SWM10-04	1185564027	09/28/2018	09/28/2018	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
EPA 602/624	602 Aromatics by 624 (W)
EPA 625M SIM (PAH)	625 Semi-Volatiles GC/MS Liq/Liq ext.
SM21 5210B	Biochemical Oxygen Demand SM21 5210B
SM21 9222D	Fecal Coliform (MF)
SM21 2340B	Hardness as CaCO3 by ICP-MS
EP200.8	Metals in Drinking Water by ICP-MS DISSO
EP200.8	Metals in Water by 200.8 ICP-MS
SM21 2540D	Total Suspended Solids SM20 2540D

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Detectable Results Summary

Client Sample ID: **SWM11-04**

Lab Sample ID: 1185564001

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	8220	ug/L
Hardness as CaCO ₃	34.5	mg/L
Magnesium	3400	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	4.74	mg/L
Fecal Coliform	3600	col/100mL
Total Suspended Solids	109	mg/L

Waters Department

Client Sample ID: **SWM12-04**

Lab Sample ID: 1185564002

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	13800	ug/L
Hardness as CaCO ₃	53.7	mg/L
Magnesium	4690	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	8.46	mg/L
Fecal Coliform	3500	col/100mL

Polynuclear Aromatics GC/MS

Benzo[g,h,i]perylene	0.0359	ug/L
Chrysene	0.0189	ug/L
Fluoranthene	0.0688	ug/L
Naphthalene	0.0165J	ug/L
Phenanthrene	0.0615	ug/L
Pyrene	0.0894	ug/L
Total Suspended Solids	149	mg/L

Waters Department

Client Sample ID: **SWM12-04 Dup**

Lab Sample ID: 1185564003

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	14000	ug/L
Hardness as CaCO ₃	54.2	mg/L
Magnesium	4680	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	9.33	mg/L
Fecal Coliform	4000	col/100mL

Polynuclear Aromatics GC/MS

Benzo[g,h,i]perylene	0.0420	ug/L
Chrysene	0.0215	ug/L
Fluoranthene	0.0704	ug/L
Naphthalene	0.0168J	ug/L
Phenanthrene	0.0624	ug/L
Pyrene	0.0939	ug/L
Total Suspended Solids	148	mg/L

Waters Department

Client Sample ID: **SWM03-04**

Lab Sample ID: 1185564004

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	10700	ug/L
Hardness as CaCO ₃	42.2	mg/L
Magnesium	3750	ug/L

Microbiology Laboratory

Biochemical Oxygen Demand	2.14	mg/L
Fecal Coliform	873	col/100mL

Waters Department

Total Suspended Solids	11.1	mg/L
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Detectable Results Summary

Client Sample ID: **SWM04-04**

Lab Sample ID: 1185564005

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	9420	ug/L
Hardness as CaCO ₃	34.5	mg/L
Magnesium	2670	ug/L
Fecal Coliform	991	col/100mL
Total Suspended Solids	10.0	mg/L

Microbiology Laboratory

Waters Department

Client Sample ID: **SWM05-04**

Lab Sample ID: 1185564006

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	7520	ug/L
Hardness as CaCO ₃	26.9	mg/L
Magnesium	1980	ug/L
Biochemical Oxygen Demand	4.14	mg/L
Fecal Coliform	2600	col/100mL
Fluoranthene	0.0170	ug/L
Naphthalene	0.0136J	ug/L
Phenanthrene	0.0163J	ug/L
Pyrene	0.0135J	ug/L
Total Suspended Solids	32.3	mg/L

Microbiology Laboratory

Polynuclear Aromatics GC/MS

Waters Department

Client Sample ID: **SWM06-04**

Lab Sample ID: 1185564007

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	9350	ug/L
Hardness as CaCO ₃	34.9	mg/L
Magnesium	2820	ug/L
Biochemical Oxygen Demand	19.9	mg/L
Fecal Coliform	215	col/100mL
Total Suspended Solids	6.80	mg/L

Microbiology Laboratory

Waters Department

Client Sample ID: **SWM07-04**

Lab Sample ID: 1185564008

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	7070	ug/L
Hardness as CaCO ₃	27.3	mg/L
Magnesium	2340	ug/L
Biochemical Oxygen Demand	19.8	mg/L
Fecal Coliform	1460	col/100mL
Benzo[g,h,i]perylene	0.0405	ug/L
Chrysene	0.0215	ug/L
Fluoranthene	0.0609	ug/L
Naphthalene	0.0159J	ug/L
Phenanthrene	0.0496J	ug/L
Pyrene	0.0933	ug/L
Total Suspended Solids	94.5	mg/L

Microbiology Laboratory

Polynuclear Aromatics GC/MS

Waters Department



Detectable Results Summary

Client Sample ID: **SWM08-04**

Lab Sample ID: 1185564009

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	6980	ug/L
Hardness as CaCO3	25.0	mg/L
Magnesium	1840	ug/L
Biochemical Oxygen Demand	9.93	mg/L
Fecal Coliform	800	col/100mL
Total Suspended Solids	31.7	mg/L

Microbiology Laboratory

Waters Department

Client Sample ID: **SWM08-04 Dup**

Lab Sample ID: 1185564010

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	6830	ug/L
Hardness as CaCO3	24.4	mg/L
Magnesium	1770	ug/L
Biochemical Oxygen Demand	10.0	mg/L
Fecal Coliform	791	col/100mL
Total Suspended Solids	32.0	mg/L

Microbiology Laboratory

Waters Department

Client Sample ID: **SWM09-04**

Lab Sample ID: 1185564011

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	14500	ug/L
Hardness as CaCO3	50.2	mg/L
Magnesium	3390	ug/L
Biochemical Oxygen Demand	5.31	mg/L
Fecal Coliform	1170	col/100mL
Fluoranthene	0.0434	ug/L
Phenanthrene	0.0212J	ug/L
Pyrene	0.0317J	ug/L
Total Suspended Solids	14.1	mg/L

Microbiology Laboratory

Polynuclear Aromatics GC/MS

Waters Department

Client Sample ID: **SWM10-04**

Lab Sample ID: 1185564012

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	18900	ug/L
Hardness as CaCO3	66.5	mg/L
Magnesium	4720	ug/L
Biochemical Oxygen Demand	7.92	mg/L
Fecal Coliform	350	col/100mL
Total Suspended Solids	17.2	mg/L

Microbiology Laboratory

Waters Department

Client Sample ID: **SWM11-04**

Lab Sample ID: 1185564016

Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	7.53	ug/L

Client Sample ID: **SWM12-04**

Lab Sample ID: 1185564017

Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	7.85	ug/L

Client Sample ID: **SWM12-04 Dup**

Lab Sample ID: 1185564018

Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Copper	8.43	ug/L

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Detectable Results Summary

Client Sample ID: SWM03-04			
Lab Sample ID: 1185564019	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	2.79	ug/L
Client Sample ID: SWM04-04			
Lab Sample ID: 1185564020	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	2.87	ug/L
Client Sample ID: SWM05-04			
Lab Sample ID: 1185564021	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	3.73	ug/L
Client Sample ID: SWM06-04			
Lab Sample ID: 1185564022	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	3.44	ug/L
Client Sample ID: SWM07-04			
Lab Sample ID: 1185564023	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	12.6	ug/L
Client Sample ID: SWM08-04			
Lab Sample ID: 1185564024	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	4.75	ug/L
Client Sample ID: SWM08-04 Dup			
Lab Sample ID: 1185564025	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	6.95	ug/L
Client Sample ID: SWM09-04			
Lab Sample ID: 1185564026	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	2.16	ug/L
Client Sample ID: SWM10-04			
Lab Sample ID: 1185564027	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Dissolved Metals by ICP/MS	Copper	1.21	ug/L

Print Date: 10/12/2018 4:43:51PM



Results of **SWM11-04**

Client Sample ID: **SWM11-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564001
Lab Project ID: 1185564

Collection Date: 09/28/18 11:25
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	8220	2500	750	ug/L	5		10/01/18 16:22
Magnesium	3400	250	75.0	ug/L	5		10/01/18 16:22

Batch Information

Analytical Batch: MMS10334
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/01/18 16:22
Container ID: 1185564001-B

Prep Batch: MXX31993
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	34.5	25.0	25.0	mg/L	5		10/01/18 16:22

Batch Information

Analytical Batch: MMS10334
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/01/18 16:22
Container ID: 1185564001-B

Prep Batch: MXX31993
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM11-04

Client Sample ID: **SWM11-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564001
Lab Project ID: 1185564

Collection Date: 09/28/18 11:25
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	4.74	2.00	2.00	mg/L	1		09/28/18 18:21

Batch Information

Analytical Batch: BOD6155
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/28/18 18:21
Container ID: 1185564001-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	3600	100	100	col/100mL	1		09/28/18 16:20

Batch Information

Analytical Batch: BTF16922
Analytical Method: SM21 9222D
Analyst: K.W
Analytical Date/Time: 09/28/18 16:20
Container ID: 1185564001-A



Results of SWM11-04

Client Sample ID: **SWM11-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564001
Lab Project ID: 1185564

Collection Date: 09/28/18 11:25
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	109	5.00	1.55	mg/L	1		10/01/18 17:47

Batch Information

Analytical Batch: STS6041
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 10/01/18 17:47
Container ID: 1185564001-D



Results of **SWM12-04**

Client Sample ID: **SWM12-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564002
Lab Project ID: 1185564

Collection Date: 09/28/18 12:10
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	13800	2500	750	ug/L	5		10/01/18 16:25
Magnesium	4690	250	75.0	ug/L	5		10/01/18 16:25

Batch Information

Analytical Batch: MMS10334
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/01/18 16:25
Container ID: 1185564002-B

Prep Batch: MXX31993
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	53.7	25.0	25.0	mg/L	5		10/01/18 16:25

Batch Information

Analytical Batch: MMS10334
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/01/18 16:25
Container ID: 1185564002-B

Prep Batch: MXX31993
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM12-04**

Client Sample ID: **SWM12-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564002
Lab Project ID: 1185564

Collection Date: 09/28/18 12:10
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	8.46	2.00	2.00	mg/L	1		09/28/18 18:21

Batch Information

Analytical Batch: BOD6155
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/28/18 18:21
Container ID: 1185564002-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	3500	100	100	col/100mL	1		09/28/18 16:20

Batch Information

Analytical Batch: BTF16922
Analytical Method: SM21 9222D
Analyst: K.W
Analytical Date/Time: 09/28/18 16:20
Container ID: 1185564002-A



Results of SWM12-04

Client Sample ID: SWM12-04
Client Project ID: 5078 MOA Stormwater Management
Lab Sample ID: 1185564002
Lab Project ID: 1185564

Collection Date: 09/28/18 12:10
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their detection results.

Batch Information

Analytical Batch: XMS11143
Analytical Method: EPA 625M SIM (PAH)
Analyst: BMZ
Analytical Date/Time: 10/10/18 11:41
Container ID: 1185564002-H

Prep Batch: XXX40612
Prep Method: SW3520C
Prep Date/Time: 09/29/18 08:38
Prep Initial Wt./Vol.: 930 mL
Prep Extract Vol: 1 mL



Results of **SWM12-04**

Client Sample ID: **SWM12-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564002
Lab Project ID: 1185564

Collection Date: 09/28/18 12:10
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 19:21
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 19:21
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/01/18 19:21
Benzene	0.200 U	0.400	0.120	ug/L	1		10/01/18 19:21
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/01/18 19:21
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 19:21
o-Xylene	0.500 U	1.00	0.310	ug/L	1		10/01/18 19:21
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		10/01/18 19:21
Toluene	0.500 U	1.00	0.310	ug/L	1		10/01/18 19:21
Surrogates							
1,2-Dichloroethane-D4 (surr)	101	81-118		%	1		10/01/18 19:21
4-Bromofluorobenzene (surr)	105	85-114		%	1		10/01/18 19:21
Toluene-d8 (surr)	103	89-112		%	1		10/01/18 19:21

Batch Information

Analytical Batch: VMS18389
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 10/01/18 19:21
Container ID: 1185564002-E

Prep Batch: VXX33241
Prep Method: SW5030B
Prep Date/Time: 10/01/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of SWM12-04

Client Sample ID: **SWM12-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564002
Lab Project ID: 1185564

Collection Date: 09/28/18 12:10
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	149	6.67	2.07	mg/L	1		10/01/18 17:47

Batch Information

Analytical Batch: STS6041
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 10/01/18 17:47
Container ID: 1185564002-D



Results of SWM12-04 Dup

Client Sample ID: SWM12-04 Dup
Client Project ID: 5078 MOA Stormwater Management
Lab Sample ID: 1185564003
Lab Project ID: 1185564

Collection Date: 09/28/18 12:10
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Metals by ICP/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows for Calcium and Magnesium.

Batch Information

Analytical Batch: MMS10334
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/01/18 16:28
Container ID: 1185564003-B
Prep Batch: MXX31993
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row for Hardness as CaCO3.

Batch Information

Analytical Batch: MMS10334
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/01/18 16:28
Container ID: 1185564003-B
Prep Batch: MXX31993
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM12-04 Dup

Client Sample ID: **SWM12-04 Dup**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564003
Lab Project ID: 1185564

Collection Date: 09/28/18 12:10
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	9.33	2.00	2.00	mg/L	1		09/28/18 18:21

Batch Information

Analytical Batch: BOD6155
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/28/18 18:21
Container ID: 1185564003-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	4000	100	100	col/100mL	1		09/28/18 16:20

Batch Information

Analytical Batch: BTF16922
Analytical Method: SM21 9222D
Analyst: K.W
Analytical Date/Time: 09/28/18 16:20
Container ID: 1185564003-A



Results of SWM12-04 Dup

Client Sample ID: SWM12-04 Dup
Client Project ID: 5078 MOA Stormwater Management
Lab Sample ID: 1185564003
Lab Project ID: 1185564

Collection Date: 09/28/18 12:10
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their surrogate compounds with associated quality and detection data.

Batch Information

Analytical Batch: XMS11143
Analytical Method: EPA 625M SIM (PAH)
Analyst: BMZ
Analytical Date/Time: 10/10/18 12:01
Container ID: 1185564003-H

Prep Batch: XXX40612
Prep Method: SW3520C
Prep Date/Time: 09/29/18 08:38
Prep Initial Wt./Vol.: 940 mL
Prep Extract Vol: 1 mL



Results of SWM12-04 Dup

Client Sample ID: **SWM12-04 Dup**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564003
Lab Project ID: 1185564

Collection Date: 09/28/18 12:10
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 19:38
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 19:38
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/01/18 19:38
Benzene	0.200 U	0.400	0.120	ug/L	1		10/01/18 19:38
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/01/18 19:38
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 19:38
o-Xylene	0.500 U	1.00	0.310	ug/L	1		10/01/18 19:38
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		10/01/18 19:38
Toluene	0.500 U	1.00	0.310	ug/L	1		10/01/18 19:38
Surrogates							
1,2-Dichloroethane-D4 (surr)	101	81-118		%	1		10/01/18 19:38
4-Bromofluorobenzene (surr)	106	85-114		%	1		10/01/18 19:38
Toluene-d8 (surr)	103	89-112		%	1		10/01/18 19:38

Batch Information

Analytical Batch: VMS18389
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 10/01/18 19:38
Container ID: 1185564003-E

Prep Batch: VXX33241
Prep Method: SW5030B
Prep Date/Time: 10/01/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of SWM12-04 Dup

Client Sample ID: **SWM12-04 Dup**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564003
Lab Project ID: 1185564

Collection Date: 09/28/18 12:10
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	148	8.33	2.58	mg/L	1		10/01/18 17:47

Batch Information

Analytical Batch: STS6041
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 10/01/18 17:47
Container ID: 1185564003-D



Results of **SWM03-04**

Client Sample ID: **SWM03-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564004
Lab Project ID: 1185564

Collection Date: 09/28/18 11:50
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	10700	2500	750	ug/L	5		10/01/18 16:31
Magnesium	3750	250	75.0	ug/L	5		10/01/18 16:31

Batch Information

Analytical Batch: MMS10334
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/01/18 16:31
Container ID: 1185564004-B

Prep Batch: MXX31993
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	42.2	25.0	25.0	mg/L	5		10/01/18 16:31

Batch Information

Analytical Batch: MMS10334
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/01/18 16:31
Container ID: 1185564004-B

Prep Batch: MXX31993
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM03-04

Client Sample ID: **SWM03-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564004
Lab Project ID: 1185564

Collection Date: 09/28/18 11:50
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	2.14	2.00	2.00	mg/L	1		09/28/18 18:21

Batch Information

Analytical Batch: BOD6155
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/28/18 18:21
Container ID: 1185564004-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	873	9.09	9.09	col/100mL	1		09/28/18 16:20

Batch Information

Analytical Batch: BTF16922
Analytical Method: SM21 9222D
Analyst: K.W
Analytical Date/Time: 09/28/18 16:20
Container ID: 1185564004-A



Results of SWM03-04

Client Sample ID: **SWM03-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564004
Lab Project ID: 1185564

Collection Date: 09/28/18 11:50
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	11.1	1.03	0.320	mg/L	1		10/01/18 17:47

Batch Information

Analytical Batch: STS6041
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 10/01/18 17:47
Container ID: 1185564004-D



Results of **SWM04-04**

Client Sample ID: **SWM04-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564005
Lab Project ID: 1185564

Collection Date: 09/28/18 11:55
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	9420	500	150	ug/L	1		10/11/18 14:31
Magnesium	2670	50.0	15.0	ug/L	1		10/11/18 14:31

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 14:31
Container ID: 1185564005-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	34.5	5.00	5.00	mg/L	1		10/11/18 14:31

Batch Information

Analytical Batch: MMS10345
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/11/18 14:31
Container ID: 1185564005-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM04-04**

Client Sample ID: **SWM04-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564005
Lab Project ID: 1185564

Collection Date: 09/28/18 11:55
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	2.00 U	2.00	2.00	mg/L	1		09/28/18 18:21

Batch Information

Analytical Batch: BOD6155
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/28/18 18:21
Container ID: 1185564005-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	991	9.09	9.09	col/100mL	1		09/28/18 16:20

Batch Information

Analytical Batch: BTF16922
Analytical Method: SM21 9222D
Analyst: K.W
Analytical Date/Time: 09/28/18 16:20
Container ID: 1185564005-A



Results of **SWM04-04**

Client Sample ID: **SWM04-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564005
Lab Project ID: 1185564

Collection Date: 09/28/18 11:55
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	10.0	1.00	0.310	mg/L	1		10/01/18 17:47

Batch Information

Analytical Batch: STS6041
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 10/01/18 17:47
Container ID: 1185564005-D



Results of **SWM05-04**

Client Sample ID: **SWM05-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564006
Lab Project ID: 1185564

Collection Date: 09/28/18 12:40
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	7520	500	150	ug/L	1		10/11/18 14:37
Magnesium	1980	50.0	15.0	ug/L	1		10/11/18 14:37

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 14:37
Container ID: 1185564006-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	26.9	5.00	5.00	mg/L	1		10/11/18 14:37

Batch Information

Analytical Batch: MMS10345
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/11/18 14:37
Container ID: 1185564006-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM05-04**

Client Sample ID: **SWM05-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564006
Lab Project ID: 1185564

Collection Date: 09/28/18 12:40
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	4.14	2.00	2.00	mg/L	1		09/28/18 18:21

Batch Information

Analytical Batch: BOD6155
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/28/18 18:21
Container ID: 1185564006-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	2600	100	100	col/100mL	1		09/28/18 16:20

Batch Information

Analytical Batch: BTF16922
Analytical Method: SM21 9222D
Analyst: K.W
Analytical Date/Time: 09/28/18 16:20
Container ID: 1185564006-A



Results of SWM05-04

Client Sample ID: SWM05-04
Client Project ID: 5078 MOA Stormwater Management
Lab Sample ID: 1185564006
Lab Project ID: 1185564

Collection Date: 09/28/18 12:40
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their surrogate compounds with associated quality and detection data.

Batch Information

Analytical Batch: XMS11143
Analytical Method: EPA 625M SIM (PAH)
Analyst: BMZ
Analytical Date/Time: 10/10/18 12:22
Container ID: 1185564006-H

Prep Batch: XXX40612
Prep Method: SW3520C
Prep Date/Time: 09/29/18 08:38
Prep Initial Wt./Vol.: 960 mL
Prep Extract Vol: 1 mL



Results of **SWM05-04**

Client Sample ID: **SWM05-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564006
Lab Project ID: 1185564

Collection Date: 09/28/18 12:40
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 19:55
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 19:55
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/01/18 19:55
Benzene	0.200 U	0.400	0.120	ug/L	1		10/01/18 19:55
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/01/18 19:55
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 19:55
o-Xylene	0.500 U	1.00	0.310	ug/L	1		10/01/18 19:55
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		10/01/18 19:55
Toluene	0.500 U	1.00	0.310	ug/L	1		10/01/18 19:55
Surrogates							
1,2-Dichloroethane-D4 (surr)	99.6	81-118		%	1		10/01/18 19:55
4-Bromofluorobenzene (surr)	106	85-114		%	1		10/01/18 19:55
Toluene-d8 (surr)	104	89-112		%	1		10/01/18 19:55

Batch Information

Analytical Batch: VMS18389
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 10/01/18 19:55
Container ID: 1185564006-E

Prep Batch: VXX33241
Prep Method: SW5030B
Prep Date/Time: 10/01/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of SWM05-04

Client Sample ID: **SWM05-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564006
Lab Project ID: 1185564

Collection Date: 09/28/18 12:40
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	32.3	3.33	1.03	mg/L	1		10/01/18 17:47

Batch Information

Analytical Batch: STS6041
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 10/01/18 17:47
Container ID: 1185564006-D



Results of **SWM06-04**

Client Sample ID: **SWM06-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564007
Lab Project ID: 1185564

Collection Date: 09/28/18 10:00
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	9350	500	150	ug/L	1		10/11/18 14:40
Magnesium	2820	50.0	15.0	ug/L	1		10/11/18 14:40

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 14:40
Container ID: 1185564007-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	34.9	5.00	5.00	mg/L	1		10/11/18 14:40

Batch Information

Analytical Batch: MMS10345
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/11/18 14:40
Container ID: 1185564007-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM06-04**

Client Sample ID: **SWM06-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564007
Lab Project ID: 1185564

Collection Date: 09/28/18 10:00
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	19.9	2.00	2.00	mg/L	1		09/28/18 18:21

Batch Information

Analytical Batch: BOD6155
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/28/18 18:21
Container ID: 1185564007-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	215	1.64	1.64	col/100mL	1		09/28/18 16:20

Batch Information

Analytical Batch: BTF16922
Analytical Method: SM21 9222D
Analyst: K.W
Analytical Date/Time: 09/28/18 16:20
Container ID: 1185564007-A



Results of SWM06-04

Client Sample ID: **SWM06-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564007
Lab Project ID: 1185564

Collection Date: 09/28/18 10:00
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	6.80	2.00	0.620	mg/L	1		10/01/18 17:47

Batch Information

Analytical Batch: STS6041
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 10/01/18 17:47
Container ID: 1185564007-D



Results of **SWM07-04**

Client Sample ID: **SWM07-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564008
Lab Project ID: 1185564

Collection Date: 09/28/18 10:20
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	7070	500	150	ug/L	1		10/11/18 14:43
Magnesium	2340	50.0	15.0	ug/L	1		10/11/18 14:43

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 14:43
Container ID: 1185564008-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	27.3	5.00	5.00	mg/L	1		10/11/18 14:43

Batch Information

Analytical Batch: MMS10345
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/11/18 14:43
Container ID: 1185564008-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM07-04**

Client Sample ID: **SWM07-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564008
Lab Project ID: 1185564

Collection Date: 09/28/18 10:20
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	19.8	2.00	2.00	mg/L	1		09/28/18 18:21

Batch Information

Analytical Batch: BOD6155
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/28/18 18:21
Container ID: 1185564008-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	1460	9.09	9.09	col/100mL	1		09/28/18 16:20

Batch Information

Analytical Batch: BTF16922
Analytical Method: SM21 9222D
Analyst: K.W
Analytical Date/Time: 09/28/18 16:20
Container ID: 1185564008-A



Results of **SWM07-04**

Client Sample ID: **SWM07-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564008
Lab Project ID: 1185564

Collection Date: 09/28/18 10:20
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Polynuclear Aromatics GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Acenaphthene	0.00755 U	0.0151	0.00446	ug/L	1		10/10/18 12:42
Acenaphthylene	0.00755 U	0.0151	0.00446	ug/L	1		10/10/18 12:42
Anthracene	0.00755 U	0.0151	0.00446	ug/L	1		10/10/18 12:42
Benzo(a)Anthracene	0.00755 U	0.0151	0.00446	ug/L	1		10/10/18 12:42
Benzo[a]pyrene	0.00301 U	0.00602	0.00181	ug/L	1		10/10/18 12:42
Benzo[b]Fluoranthene	0.00755 U	0.0151	0.00446	ug/L	1		10/10/18 12:42
Benzo[g,h,i]perylene	0.0405	0.0151	0.00446	ug/L	1		10/10/18 12:42
Benzo[k]fluoranthene	0.00755 U	0.0151	0.00446	ug/L	1		10/10/18 12:42
Chrysene	0.0215	0.0151	0.00446	ug/L	1		10/10/18 12:42
Dibenzo[a,h]anthracene	0.00301 U	0.00602	0.00181	ug/L	1		10/10/18 12:42
Fluoranthene	0.0609	0.0151	0.00446	ug/L	1		10/10/18 12:42
Fluorene	0.00755 U	0.0151	0.00446	ug/L	1		10/10/18 12:42
Indeno[1,2,3-c,d] pyrene	0.00755 U	0.0151	0.00446	ug/L	1		10/10/18 12:42
Naphthalene	0.0159 J	0.0301	0.00940	ug/L	1		10/10/18 12:42
Phenanthrene	0.0496 J	0.0602	0.00446	ug/L	1		10/10/18 12:42
Pyrene	0.0933	0.0602	0.00446	ug/L	1		10/10/18 12:42
Surrogates							
2-Methylnaphthalene-d10 (surr)	50	47-106		%	1		10/10/18 12:42
Fluoranthene-d10 (surr)	29.5	24-116		%	1		10/10/18 12:42

Batch Information

Analytical Batch: XMS11143
Analytical Method: EPA 625M SIM (PAH)
Analyst: BMZ
Analytical Date/Time: 10/10/18 12:42
Container ID: 1185564008-H

Prep Batch: XXX40612
Prep Method: SW3520C
Prep Date/Time: 09/29/18 08:38
Prep Initial Wt./Vol.: 830 mL
Prep Extract Vol: 1 mL



Results of **SWM07-04**

Client Sample ID: **SWM07-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564008
Lab Project ID: 1185564

Collection Date: 09/28/18 10:20
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 20:12
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 20:12
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/01/18 20:12
Benzene	0.200 U	0.400	0.120	ug/L	1		10/01/18 20:12
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/01/18 20:12
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 20:12
o-Xylene	0.500 U	1.00	0.310	ug/L	1		10/01/18 20:12
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		10/01/18 20:12
Toluene	0.500 U	1.00	0.310	ug/L	1		10/01/18 20:12
Surrogates							
1,2-Dichloroethane-D4 (surr)	104	81-118		%	1		10/01/18 20:12
4-Bromofluorobenzene (surr)	105	85-114		%	1		10/01/18 20:12
Toluene-d8 (surr)	103	89-112		%	1		10/01/18 20:12

Batch Information

Analytical Batch: VMS18389
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 10/01/18 20:12
Container ID: 1185564008-E

Prep Batch: VXX33241
Prep Method: SW5030B
Prep Date/Time: 10/01/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of SWM07-04

Client Sample ID: **SWM07-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564008
Lab Project ID: 1185564

Collection Date: 09/28/18 10:20
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	94.5	5.00	1.55	mg/L	1		10/01/18 17:47

Batch Information

Analytical Batch: STS6041
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 10/01/18 17:47
Container ID: 1185564008-D



Results of **SWM08-04**

Client Sample ID: **SWM08-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564009
Lab Project ID: 1185564

Collection Date: 09/28/18 10:25
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	6980	500	150	ug/L	1		10/11/18 14:46
Magnesium	1840	50.0	15.0	ug/L	1		10/11/18 14:46

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 14:46
Container ID: 1185564009-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	25.0	5.00	5.00	mg/L	1		10/11/18 14:46

Batch Information

Analytical Batch: MMS10345
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/11/18 14:46
Container ID: 1185564009-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM08-04**

Client Sample ID: **SWM08-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564009
Lab Project ID: 1185564

Collection Date: 09/28/18 10:25
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	9.93	2.00	2.00	mg/L	1		09/28/18 18:21

Batch Information

Analytical Batch: BOD6155
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/28/18 18:21
Container ID: 1185564009-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	800	9.09	9.09	col/100mL	1		09/28/18 16:20

Batch Information

Analytical Batch: BTF16922
Analytical Method: SM21 9222D
Analyst: K.W
Analytical Date/Time: 09/28/18 16:20
Container ID: 1185564009-A



Results of **SWM08-04**

Client Sample ID: **SWM08-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564009
Lab Project ID: 1185564

Collection Date: 09/28/18 10:25
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	31.7	3.33	1.03	mg/L	1		10/01/18 17:47

Batch Information

Analytical Batch: STS6041
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 10/01/18 17:47
Container ID: 1185564009-D



Results of SWM08-04 Dup

Client Sample ID: SWM08-04 Dup
Client Project ID: 5078 MOA Stormwater Management
Lab Sample ID: 1185564010
Lab Project ID: 1185564

Collection Date: 09/28/18 10:25
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Metals by ICP/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Calcium and Magnesium.

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 14:49
Container ID: 1185564010-B
Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row includes Hardness as CaCO3.

Batch Information

Analytical Batch: MMS10345
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/11/18 14:49
Container ID: 1185564010-B
Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM08-04 Dup

Client Sample ID: **SWM08-04 Dup**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564010
Lab Project ID: 1185564

Collection Date: 09/28/18 10:25
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	10.0	2.00	2.00	mg/L	1		09/28/18 18:21

Batch Information

Analytical Batch: BOD6155
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/28/18 18:21
Container ID: 1185564010-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	791	9.09	9.09	col/100mL	1		09/28/18 16:20

Batch Information

Analytical Batch: BTF16922
Analytical Method: SM21 9222D
Analyst: K.W
Analytical Date/Time: 09/28/18 16:20
Container ID: 1185564010-A



Results of SWM08-04 Dup

Client Sample ID: **SWM08-04 Dup**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564010
Lab Project ID: 1185564

Collection Date: 09/28/18 10:25
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	32.0	3.33	1.03	mg/L	1		10/01/18 17:47

Batch Information

Analytical Batch: STS6041
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 10/01/18 17:47
Container ID: 1185564010-D



Results of **SWM09-04**

Client Sample ID: **SWM09-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564011
Lab Project ID: 1185564

Collection Date: 09/28/18 10:50
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	14500	500	150	ug/L	1		10/11/18 14:52
Magnesium	3390	50.0	15.0	ug/L	1		10/11/18 14:52

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 14:52
Container ID: 1185564011-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	50.2	5.00	5.00	mg/L	1		10/11/18 14:52

Batch Information

Analytical Batch: MMS10345
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/11/18 14:52
Container ID: 1185564011-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM09-04**

Client Sample ID: **SWM09-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564011
Lab Project ID: 1185564

Collection Date: 09/28/18 10:50
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	5.31	2.00	2.00	mg/L	1		09/28/18 18:21

Batch Information

Analytical Batch: BOD6155
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/28/18 18:21
Container ID: 1185564011-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	1170	9.09	9.09	col/100mL	1		09/28/18 16:20

Batch Information

Analytical Batch: BTF16922
Analytical Method: SM21 9222D
Analyst: K.W
Analytical Date/Time: 09/28/18 16:20
Container ID: 1185564011-A



Results of SWM09-04

Client Sample ID: SWM09-04
Client Project ID: 5078 MOA Stormwater Management
Lab Sample ID: 1185564011
Lab Project ID: 1185564

Collection Date: 09/28/18 10:50
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their detection results.

Batch Information

Analytical Batch: XMS11143
Analytical Method: EPA 625M SIM (PAH)
Analyst: BMZ
Analytical Date/Time: 10/10/18 13:03
Container ID: 1185564011-H

Prep Batch: XXX40612
Prep Method: SW3520C
Prep Date/Time: 09/29/18 08:38
Prep Initial Wt./Vol.: 950 mL
Prep Extract Vol: 1 mL



Results of **SWM09-04**

Client Sample ID: **SWM09-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564011
Lab Project ID: 1185564

Collection Date: 09/28/18 10:50
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 20:29
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 20:29
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/01/18 20:29
Benzene	0.200 U	0.400	0.120	ug/L	1		10/01/18 20:29
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/01/18 20:29
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 20:29
o-Xylene	0.500 U	1.00	0.310	ug/L	1		10/01/18 20:29
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		10/01/18 20:29
Toluene	0.500 U	1.00	0.310	ug/L	1		10/01/18 20:29
Surrogates							
1,2-Dichloroethane-D4 (surr)	102	81-118		%	1		10/01/18 20:29
4-Bromofluorobenzene (surr)	105	85-114		%	1		10/01/18 20:29
Toluene-d8 (surr)	103	89-112		%	1		10/01/18 20:29

Batch Information

Analytical Batch: VMS18389
Analytical Method: EPA 602/624
Analyst: FDR
Analytical Date/Time: 10/01/18 20:29
Container ID: 1185564011-E

Prep Batch: VXX33241
Prep Method: SW5030B
Prep Date/Time: 10/01/18 00:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of SWM09-04

Client Sample ID: **SWM09-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564011
Lab Project ID: 1185564

Collection Date: 09/28/18 10:50
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	14.1	1.20	0.373	mg/L	1		10/01/18 17:47

Batch Information

Analytical Batch: STS6041
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 10/01/18 17:47
Container ID: 1185564011-D



Results of **SWM10-04**

Client Sample ID: **SWM10-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564012
Lab Project ID: 1185564

Collection Date: 09/28/18 10:55
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	18900	500	150	ug/L	1		10/11/18 15:01
Magnesium	4720	50.0	15.0	ug/L	1		10/11/18 15:01

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 15:01
Container ID: 1185564012-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	66.5	5.00	5.00	mg/L	1		10/11/18 15:01

Batch Information

Analytical Batch: MMS10345
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 10/11/18 15:01
Container ID: 1185564012-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM10-04

Client Sample ID: **SWM10-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564012
Lab Project ID: 1185564

Collection Date: 09/28/18 10:55
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Biochemical Oxygen Demand	7.92	2.00	2.00	mg/L	1		09/28/18 18:21

Batch Information

Analytical Batch: BOD6155
Analytical Method: SM21 5210B
Analyst: A.L
Analytical Date/Time: 09/28/18 18:21
Container ID: 1185564012-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	350	10.0	10.0	col/100mL	1		09/28/18 16:20

Batch Information

Analytical Batch: BTF16922
Analytical Method: SM21 9222D
Analyst: K.W
Analytical Date/Time: 09/28/18 16:20
Container ID: 1185564012-A



Results of SWM10-04

Client Sample ID: **SWM10-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564012
Lab Project ID: 1185564

Collection Date: 09/28/18 10:55
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	17.2	2.00	0.620	mg/L	1		10/01/18 17:47

Batch Information

Analytical Batch: STS6041
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 10/01/18 17:47
Container ID: 1185564012-D



Results of Trip Blank

Client Sample ID: **Trip Blank**
 Client Project ID: **5078 MOA Stormwater Management**
 Lab Sample ID: 1185564015
 Lab Project ID: 1185564

Collection Date: 09/28/18 10:20
 Received Date: 09/28/18 13:01
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 18:13
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 18:13
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/01/18 18:13
Benzene	0.200 U	0.400	0.120	ug/L	1		10/01/18 18:13
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/01/18 18:13
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/01/18 18:13
o-Xylene	0.500 U	1.00	0.310	ug/L	1		10/01/18 18:13
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		10/01/18 18:13
Toluene	0.500 U	1.00	0.310	ug/L	1		10/01/18 18:13
Surrogates							
1,2-Dichloroethane-D4 (surr)	100	81-118		%	1		10/01/18 18:13
4-Bromofluorobenzene (surr)	106	85-114		%	1		10/01/18 18:13
Toluene-d8 (surr)	103	89-112		%	1		10/01/18 18:13

Batch Information

Analytical Batch: VMS18389
 Analytical Method: EPA 602/624
 Analyst: FDR
 Analytical Date/Time: 10/01/18 18:13
 Container ID: 1185564015-A

Prep Batch: VXX33241
 Prep Method: SW5030B
 Prep Date/Time: 10/01/18 00:00
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL



Results of SWM11-04

Client Sample ID: **SWM11-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564016
Lab Project ID: 1185564

Collection Date: 09/28/18 11:25
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	7.53	1.00	0.310	ug/L	1		10/11/18 15:04

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 15:04
Container ID: 1185564016-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM12-04

Client Sample ID: **SWM12-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564017
Lab Project ID: 1185564

Collection Date: 09/28/18 12:10
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	7.85	1.00	0.310	ug/L	1		10/11/18 15:07

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 15:07
Container ID: 1185564017-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM12-04 Dup

Client Sample ID: **SWM12-04 Dup**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564018
Lab Project ID: 1185564

Collection Date: 09/28/18 12:10
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	8.43	1.00	0.310	ug/L	1		10/11/18 15:10

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 15:10
Container ID: 1185564018-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM03-04

Client Sample ID: **SWM03-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564019
Lab Project ID: 1185564

Collection Date: 09/28/18 11:50
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	2.79	1.00	0.310	ug/L	1		10/11/18 15:16

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 15:16
Container ID: 1185564019-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM04-04**

Client Sample ID: **SWM04-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564020
Lab Project ID: 1185564

Collection Date: 09/28/18 11:55
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Dissolved Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	2.87	1.00	0.310	ug/L	1		10/11/18 15:19

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 15:19
Container ID: 1185564020-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM05-04**

Client Sample ID: **SWM05-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564021
Lab Project ID: 1185564

Collection Date: 09/28/18 12:40
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Dissolved Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	3.73	1.00	0.310	ug/L	1		10/11/18 15:22

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 15:22
Container ID: 1185564021-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM06-04**

Client Sample ID: **SWM06-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564022
Lab Project ID: 1185564

Collection Date: 09/28/18 10:00
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Dissolved Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	3.44	1.00	0.310	ug/L	1		10/11/18 15:25

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 15:25
Container ID: 1185564022-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM07-04

Client Sample ID: **SWM07-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564023
Lab Project ID: 1185564

Collection Date: 09/28/18 10:20
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	12.6	1.00	0.310	ug/L	1		10/11/18 15:28

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 15:28
Container ID: 1185564023-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM08-04**

Client Sample ID: **SWM08-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564024
Lab Project ID: 1185564

Collection Date: 09/28/18 10:25
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Dissolved Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	4.75	1.00	0.310	ug/L	1		10/11/18 15:37

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 15:37
Container ID: 1185564024-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM08-04 Dup

Client Sample ID: **SWM08-04 Dup**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564025
Lab Project ID: 1185564

Collection Date: 09/28/18 10:25
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	6.95	1.00	0.310	ug/L	1		10/11/18 15:39

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 15:39
Container ID: 1185564025-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of **SWM09-04**

Client Sample ID: **SWM09-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564026
Lab Project ID: 1185564

Collection Date: 09/28/18 10:50
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Dissolved Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	2.16	1.00	0.310	ug/L	1		10/11/18 15:42

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 15:42
Container ID: 1185564026-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Results of SWM10-04

Client Sample ID: **SWM10-04**
Client Project ID: **5078 MOA Stormwater Management**
Lab Sample ID: 1185564027
Lab Project ID: 1185564

Collection Date: 09/28/18 10:55
Received Date: 09/28/18 13:01
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Copper	1.21	1.00	0.310	ug/L	1		10/11/18 15:45

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 10/11/18 15:45
Container ID: 1185564027-B

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/01/18 07:45
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL



Method Blank

Blank ID: MB for HBN 1786967 [BOD/6155]
Blank Lab ID: 1479300

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1185564001, 1185564002, 1185564003, 1185564004, 1185564005, 1185564006, 1185564007, 1185564008, 1185564009, 1185564010, 1185564011, 1185564012

Results by SM21 5210B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Biochemical Oxygen Demand	2.00U	2.00	2.00	mg/L

Batch Information

Analytical Batch: BOD6155
Analytical Method: SM21 5210B
Instrument:
Analyst: A.L
Analytical Date/Time: 9/28/2018 6:21:00PM

Print Date: 10/12/2018 4:43:55PM



Blank Spike Summary

Blank Spike ID: LCS for HBN 1185564 [BOD6155]

Blank Spike Lab ID: 1479301

Date Analyzed: 09/28/2018 18:21

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185564001, 1185564002, 1185564003, 1185564004, 1185564005, 1185564006, 1185564007, 1185564008, 1185564009, 1185564010, 1185564011, 1185564012

Results by SM21 5210B

Parameter	Blank Spike (mg/L)			CL
	Spike	Result	Rec (%)	
Biochemical Oxygen Demand	198	217	110	(84.6-115.4

Batch Information

Analytical Batch: BOD6155
Analytical Method: SM21 5210B
Instrument:
Analyst: A.L

Print Date: 10/12/2018 4:43:58PM



Method Blank

Blank ID: MB for HBN 1786951 [BTF/16922]
Blank Lab ID: 1479208

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1185564001, 1185564002, 1185564003, 1185564004, 1185564005, 1185564006, 1185564007, 1185564008, 1185564009, 1185564010, 1185564011, 1185564012

Results by SM21 9222D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Fecal Coliform	1.00U	1.00	1.00	col/100mL

Batch Information

Analytical Batch: BTF16922
Analytical Method: SM21 9222D
Instrument:
Analyst: K.W
Analytical Date/Time: 9/28/2018 4:20:00PM

Print Date: 10/12/2018 4:44:00PM



Method Blank

Blank ID: MB for HBN 1786988 [MXX/31993]
Blank Lab ID: 1479389

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1185564001, 1185564002, 1185564003, 1185564004

Results by EP200.8

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Calcium	250U	500	150	ug/L
Magnesium	25.0U	50.0	15.0	ug/L

Batch Information

Analytical Batch: MMS10334
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 10/1/2018 3:08:06PM

Prep Batch: MXX31993
Prep Method: E200.2
Prep Date/Time: 10/1/2018 7:45:45AM
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Print Date: 10/12/2018 4:44:03PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1185564 [MXX31993]

Blank Spike Lab ID: 1479390

Date Analyzed: 10/01/2018 15:11

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185564001, 1185564002, 1185564003, 1185564004

Results by EP200.8

Parameter	Blank Spike (ug/L)			CL
	Spike	Result	Rec (%)	
Calcium	10000	10600	106	(85-115)
Magnesium	10000	10500	105	(85-115)

Batch Information

Analytical Batch: **MMS10334**

Analytical Method: **EP200.8**

Instrument: **Perkin Elmer Nexlon P5**

Analyst: **DSH**

Prep Batch: **MXX31993**

Prep Method: **E200.2**

Prep Date/Time: **10/01/2018 07:45**

Spike Init Wt./Vol.: 10000 ug/L Extract Vol: 50 mL

Dupe Init Wt./Vol.: Extract Vol:



Matrix Spike Summary

Original Sample ID: 1479393
MS Sample ID: 1479394 MS
MSD Sample ID:

Analysis Date: 10/01/2018 15:55
Analysis Date: 10/01/2018 15:58
Analysis Date:
Matrix: Drinking Water

QC for Samples: 1185564001, 1185564002, 1185564003, 1185564004

Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Calcium	15000	10000	25100	101				70-130		
Magnesium	4310	10000	14500	102				70-130		

Batch Information

Analytical Batch: MMS10334
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 10/1/2018 3:58:50PM

Prep Batch: MXX31993
Prep Method: DW Digest for Metals on ICP-MS
Prep Date/Time: 10/1/2018 7:45:45AM
Prep Initial Wt./Vol.: 20.00mL
Prep Extract Vol: 50.00mL

Print Date: 10/12/2018 4:44:05PM



Method Blank

Blank ID: MB for HBN 1786989 [MXX/31994]
Blank Lab ID: 1479395

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1185564005, 1185564006, 1185564007, 1185564008, 1185564009, 1185564010, 1185564011, 1185564012, 1185564016,
1185564017, 1185564018, 1185564019, 1185564020, 1185564021, 1185564022, 1185564023, 1185564024, 1185564025,
1185564026, 1185564027

Results by EP200.8

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Calcium	250U	500	150	ug/L
Copper	0.500U	1.00	0.310	ug/L
Magnesium	25.0U	50.0	15.0	ug/L

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 10/11/2018 2:25:28PM

Prep Batch: MXX31994
Prep Method: E200.2
Prep Date/Time: 10/1/2018 7:45:20AM
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Print Date: 10/12/2018 4:44:08PM



Blank Spike Summary

Blank Spike ID: LCS for HBN 1185564 [MXX31994]

Blank Spike Lab ID: 1479396

Date Analyzed: 10/11/2018 14:28

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185564005, 1185564006, 1185564007, 1185564008, 1185564009, 1185564010, 1185564011, 1185564012, 1185564016, 1185564017, 1185564018, 1185564019, 1185564020, 1185564021, 1185564022, 1185564023, 1185564024, 1185564025, 1185564026, 1185564027

Results by EP200.8

Parameter	Blank Spike (ug/L)			CL
	Spike	Result	Rec (%)	
Calcium	10000	10100	101	(85-115)
Copper	1000	1040	104	(85-115)
Magnesium	10000	10600	106	(85-115)

Batch Information

Analytical Batch: **MMS10345**

Analytical Method: **EP200.8**

Instrument: **Perkin Elmer Nexlon P5**

Analyst: **DSH**

Prep Batch: **MXX31994**

Prep Method: **E200.2**

Prep Date/Time: **10/01/2018 07:45**

Spike Init Wt./Vol.: 10000 ug/L Extract Vol: 50 mL

Dupe Init Wt./Vol.: Extract Vol:

Print Date: 10/12/2018 4:44:09PM



Matrix Spike Summary

Original Sample ID: 1185564018
MS Sample ID: 1479402 MS
MSD Sample ID:

Analysis Date: 10/11/2018 15:10
Analysis Date: 10/11/2018 15:13
Analysis Date:
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185564006, 1185564007, 1185564008, 1185564009, 1185564010, 1185564011, 1185564012, 1185564016, 1185564017, 1185564018, 1185564019, 1185564020, 1185564021, 1185564022, 1185564023, 1185564024, 1185564025, 1185564026, 1185564027

Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Copper	8.43	1000	1070	106				70-130		

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 10/11/2018 3:13:09PM

Prep Batch: MXX31994
Prep Method: DW Digest for Metals on ICP-MS
Prep Date/Time: 10/1/2018 7:45:20AM
Prep Initial Wt./Vol.: 20.00mL
Prep Extract Vol: 50.00mL

Print Date: 10/12/2018 4:44:10PM



Matrix Spike Summary

Original Sample ID: 1185564005
MS Sample ID: 1479403 MS
MSD Sample ID:

Analysis Date: 10/11/2018 14:31
Analysis Date: 10/11/2018 14:34
Analysis Date:
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185564005, 1185564006, 1185564007, 1185564008, 1185564009, 1185564010, 1185564011,
1185564012, 1185564016, 1185564017, 1185564018

Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Calcium	9420	10000	18900	95				70-130		
Magnesium	2670	10000	13000	103				70-130		

Batch Information

Analytical Batch: MMS10345
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 10/11/2018 2:34:24PM

Prep Batch: MXX31994
Prep Method: DW Digest for Metals on ICP-MS
Prep Date/Time: 10/1/2018 7:45:20AM
Prep Initial Wt./Vol.: 20.00mL
Prep Extract Vol: 50.00mL

Print Date: 10/12/2018 4:44:10PM



Method Blank

Blank ID: MB for HBN 1787009 [STS/6041]

Matrix: Water (Surface, Eff., Ground)

Blank Lab ID: 1479477

QC for Samples:

1185564001, 1185564002, 1185564003, 1185564004, 1185564005, 1185564006, 1185564007, 1185564008, 1185564009, 1185564010, 1185564011, 1185564012

Results by SM21 2540D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Total Suspended Solids	0.500U	1.00	0.310	mg/L

Batch Information

Analytical Batch: STS6041

Analytical Method: SM21 2540D

Instrument:

Analyst: EWW

Analytical Date/Time: 10/1/2018 5:47:42PM

Print Date: 10/12/2018 4:44:13PM



Duplicate Sample Summary

Original Sample ID: 1185564001

Duplicate Sample ID: 1479480

QC for Samples:

1185564001, 1185564002

Analysis Date: 10/01/2018 17:47

Matrix: Water (Surface, Eff., Ground)

Results by SM21 2540D

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Suspended Solids	109	110	mg/L	0.91	(< 5)

Batch Information

Analytical Batch: STS6041

Analytical Method: SM21 2540D

Instrument:

Analyst: EWW

Print Date: 10/12/2018 4:44:14PM



Duplicate Sample Summary

Original Sample ID: 1185564002

Duplicate Sample ID: 1479481

Analysis Date: 10/01/2018 17:47

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1185564002, 1185564003, 1185564004, 1185564005, 1185564006, 1185564007, 1185564008, 1185564009, 1185564010, 1185564011, 1185564012

Results by SM21 2540D

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Suspended Solids	149	150	mg/L	0.89	(< 5)

Batch Information

Analytical Batch: STS6041

Analytical Method: SM21 2540D

Instrument:

Analyst: EWW

Print Date: 10/12/2018 4:44:14PM



Blank Spike Summary

Blank Spike ID: LCS for HBN 1185564 [STS6041]
Blank Spike Lab ID: 1479478
Date Analyzed: 10/01/2018 17:47

Spike Duplicate ID: LCSD for HBN 1185564 [STS6041]
Spike Duplicate Lab ID: 1479479
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185564001, 1185564002, 1185564003, 1185564004, 1185564005, 1185564006, 1185564007, 1185564008, 1185564009, 1185564010, 1185564011, 1185564012

Results by SM21 2540D

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Total Suspended Solids	25	25.0	100	25	24.5	98	(75-125)	2.00	(< 5)

Batch Information

Analytical Batch: STS6041
Analytical Method: SM21 2540D
Instrument:
Analyst: EWW

Print Date: 10/12/2018 4:44:15PM



Method Blank

Blank ID: MB for HBN 1787078 [VXX/33241]
Blank Lab ID: 1479833

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1185564002, 1185564003, 1185564006, 1185564008, 1185564011, 1185564015

Results by EPA 602/624

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,2-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,3-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,4-Dichlorobenzene	0.250U	0.500	0.150	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Chlorobenzene	0.250U	0.500	0.150	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	101	81-118		%
4-Bromofluorobenzene (surr)	106	85-114		%
Toluene-d8 (surr)	103	89-112		%

Batch Information

Analytical Batch: VMS18389
Analytical Method: EPA 602/624
Instrument: VPA 780/5975 GC/MS
Analyst: FDR
Analytical Date/Time: 10/1/2018 3:33:00PM

Prep Batch: VXX33241
Prep Method: SW5030B
Prep Date/Time: 10/1/2018 12:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/12/2018 4:44:16PM



Blank Spike Summary

Blank Spike ID: LCS for HBN 1185564 [VXX33241]
 Blank Spike Lab ID: 1479834
 Date Analyzed: 10/01/2018 15:50

Spike Duplicate ID: LCSD for HBN 1185564 [VXX33241]
 Spike Duplicate Lab ID: 1479835
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185564002, 1185564003, 1185564006, 1185564008, 1185564011, 1185564015

Results by EPA 602/624

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2-Dichlorobenzene	30	29.4	98	30	29.7	99	(80-119)	1.10	(< 20)
1,3-Dichlorobenzene	30	30.1	100	30	30.3	101	(80-119)	0.60	(< 20)
1,4-Dichlorobenzene	30	30.1	100	30	29.8	100	(79-118)	0.73	(< 20)
Benzene	30	27.8	93	30	28.1	94	(79-120)	1.10	(< 20)
Chlorobenzene	30	28.0	93	30	27.7	92	(82-118)	0.97	(< 20)
Ethylbenzene	30	29.0	97	30	28.6	95	(79-121)	1.50	(< 20)
o-Xylene	30	28.4	95	30	28.3	94	(78-122)	0.32	(< 20)
P & M -Xylene	60	56.9	95	60	56.7	95	(80-121)	0.37	(< 20)
Toluene	30	28.0	93	30	27.7	92	(80-121)	1.20	(< 20)

Surrogates

1,2-Dichloroethane-D4 (surr)	30	94.6	95	30	95.4	95	(81-118)	0.81
4-Bromofluorobenzene (surr)	30	105	105	30	105	105	(85-114)	0.19
Toluene-d8 (surr)	30	102	102	30	102	102	(89-112)	0.52

Batch Information

Analytical Batch: **VMS18389**
 Analytical Method: **EPA 602/624**
 Instrument: **VPA 780/5975 GC/MS**
 Analyst: **FDR**

Prep Batch: **VXX33241**
 Prep Method: **SW5030B**
 Prep Date/Time: **10/01/2018 00:00**
 Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

Print Date: 10/12/2018 4:44:17PM



Matrix Spike Summary

Original Sample ID: 1479836
 MS Sample ID: 1479837 MS
 MSD Sample ID: 1479838 MSD

Analysis Date: 10/01/2018 19:21
 Analysis Date: 10/01/2018 17:04
 Analysis Date: 10/01/2018 17:21
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185564002, 1185564003, 1185564006, 1185564008, 1185564011, 1185564015

Results by EPA 602/624

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2-Dichlorobenzene	0.500U	30.0	29.6	99	30.0	29.4	98	80-119	0.68	(< 20)
1,3-Dichlorobenzene	0.500U	30.0	30.3	101	30.0	29.9	100	80-119	1.20	(< 20)
1,4-Dichlorobenzene	0.250U	30.0	30	100	30.0	29.7	99	79-118	1.10	(< 20)
Benzene	0.200U	30.0	28.6	95	30.0	28.5	95	79-120	0.28	(< 20)
Chlorobenzene	0.250U	30.0	28.1	94	30.0	27.9	93	82-118	0.68	(< 20)
Ethylbenzene	0.500U	30.0	28.8	96	30.0	28.7	96	79-121	0.17	(< 20)
o-Xylene	0.500U	30.0	28.3	94	30.0	28.2	94	78-122	0.35	(< 20)
P & M -Xylene	1.00U	60.0	56.4	94	60.0	56.6	94	80-121	0.28	(< 20)
Toluene	0.500U	30.0	28.3	94	30.0	28.5	95	80-121	0.70	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		30.0	28.5	95	30.0	28.7	96	81-118	0.67	
4-Bromofluorobenzene (surr)		30.0	31.4	105	30.0	31.4	105	85-114	0.06	
Toluene-d8 (surr)		30.0	30.8	103	30.0	30.9	103	89-112	0.39	

Batch Information

Analytical Batch: VMS18389
 Analytical Method: EPA 602/624
 Instrument: VPA 780/5975 GC/MS
 Analyst: FDR
 Analytical Date/Time: 10/1/2018 5:04:00PM

Prep Batch: VXX33241
 Prep Method: Volatiles Extraction 8240/8260 FULL
 Prep Date/Time: 10/1/2018 12:00:00AM
 Prep Initial Wt./Vol.: 5.00mL
 Prep Extract Vol: 5.00mL

Print Date: 10/12/2018 4:44:18PM



Billable Matrix Spike Summary

Original Sample ID: 1185564002
MS Sample ID: 1185564013 BMS
MSD Sample ID: 1185564014 BMSD

Analysis Date: 10/01/2018 19:21
Analysis Date: 10/01/2018 17:04
Analysis Date: 10/01/2018 17:21
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

Results by EPA 602/624

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2-Dichlorobenzene	0.500U	30.0	29.6	99	30.0	29.4	98	80-119	0.68	(< 20)
1,3-Dichlorobenzene	0.500U	30.0	30.3	101	30.0	29.9	100	80-119	1.20	(< 20)
1,4-Dichlorobenzene	0.250U	30.0	30	100	30.0	29.7	99	79-118	1.10	(< 20)
Benzene	0.200U	30.0	28.6	95	30.0	28.5	95	79-120	0.28	(< 20)
Chlorobenzene	0.250U	30.0	28.1	94	30.0	27.9	93	82-118	0.68	(< 20)
Ethylbenzene	0.500U	30.0	28.8	96	30.0	28.7	96	79-121	0.17	(< 20)
o-Xylene	0.500U	30.0	28.3	94	30.0	28.2	94	78-122	0.35	(< 20)
P & M -Xylene	1.00U	60.0	56.4	94	60.0	56.6	94	80-121	0.28	(< 20)
Toluene	0.500U	30.0	28.3	94	30.0	28.5	95	80-121	0.70	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		30.0	28.5	95	30.0	28.7	96	81-118	0.67	
4-Bromofluorobenzene (surr)		30.0	31.4	105	30.0	31.4	105	85-114	0.06	
Toluene-d8 (surr)		30.0	30.8	103	30.0	30.9	103	89-112	0.39	

Batch Information

Analytical Batch: VMS18389
Analytical Method: EPA 602/624
Instrument: VPA 780/5975 GC/MS
Analyst: FDR
Analytical Date/Time: 10/1/2018 5:04:00PM

Prep Batch: VXX33241
Prep Method: Volatiles Extraction 8240/8260 FULL
Prep Date/Time: 10/1/2018 12:00:00AM
Prep Initial Wt./Vol.: 5.00mL
Prep Extract Vol: 5.00mL

Print Date: 10/12/2018 4:44:18PM



Method Blank

Blank ID: MB for HBN 1786969 [XXX/40612]
Blank Lab ID: 1479306

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1185564002, 1185564003, 1185564006, 1185564008, 1185564011

Results by EPA 625M SIM (PAH)

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Acenaphthene	0.00625U	0.0125	0.00370	ug/L
Acenaphthylene	0.00625U	0.0125	0.00370	ug/L
Anthracene	0.00625U	0.0125	0.00370	ug/L
Benzo(a)Anthracene	0.00625U	0.0125	0.00370	ug/L
Benzo[a]pyrene	0.00250U	0.00500	0.00150	ug/L
Benzo[b]Fluoranthene	0.00625U	0.0125	0.00370	ug/L
Benzo[g,h,i]perylene	0.00625U	0.0125	0.00370	ug/L
Benzo[k]fluoranthene	0.00625U	0.0125	0.00370	ug/L
Chrysene	0.00625U	0.0125	0.00370	ug/L
Dibenzo[a,h]anthracene	0.00250U	0.00500	0.00150	ug/L
Fluoranthene	0.00625U	0.0125	0.00370	ug/L
Fluorene	0.00625U	0.0125	0.00370	ug/L
Indeno[1,2,3-c,d] pyrene	0.00625U	0.0125	0.00370	ug/L
Naphthalene	0.0125U	0.0250	0.00780	ug/L
Phenanthrene	0.0250U	0.0500	0.00370	ug/L
Pyrene	0.0250U	0.0500	0.00370	ug/L
Surrogates				
2-Methylnaphthalene-d10 (surr)	73.4	47-106		%
Fluoranthene-d10 (surr)	73.2	24-116		%

Batch Information

Analytical Batch: XMS11143
Analytical Method: EPA 625M SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 10/10/2018 11:00:00AM

Prep Batch: XXX40612
Prep Method: SW3520C
Prep Date/Time: 9/29/2018 8:38:45AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 1 mL

Print Date: 10/12/2018 4:44:18PM



Blank Spike Summary

Blank Spike ID: LCS for HBN 1185564 [XXX40612]

Blank Spike Lab ID: 1479307

Date Analyzed: 10/10/2018 11:20

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1185564002, 1185564003, 1185564006, 1185564008, 1185564011

Results by EPA 625M SIM (PAH)

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
Acenaphthene	0.5	0.334	67	(48-114)
Acenaphthylene	0.5	0.345	69	(35-121)
Anthracene	0.5	0.338	68	(53-119)
Benzo(a)Anthracene	0.5	0.364	73	(59-120)
Benzo[a]pyrene	0.5	0.333	67	(53-120)
Benzo[b]Fluoranthene	0.5	0.365	73	(53-126)
Benzo[g,h,i]perylene	0.5	0.337	67	(44-128)
Benzo[k]fluoranthene	0.5	0.385	77	(54-125)
Chrysene	0.5	0.384	77	(57-120)
Dibenzo[a,h]anthracene	0.5	0.301	60	(44-131)
Fluoranthene	0.5	0.373	75	(58-120)
Fluorene	0.5	0.348	70	(50-118)
Indeno[1,2,3-c,d] pyrene	0.5	0.354	71	(48-130)
Naphthalene	0.5	0.344	69	(43-114)
Phenanthrene	0.5	0.337	67	(53-115)
Pyrene	0.5	0.394	79	(53-121)

Surrogates

2-Methylnaphthalene-d10 (surr)	0.5	71.8	72	(47-106)
Fluoranthene-d10 (surr)	0.5	75.3	75	(24-116)

Batch Information

Analytical Batch: XMS11143

Analytical Method: EPA 625M SIM (PAH)

Instrument: SVA Agilent 780/5975 GC/MS

Analyst: BMZ

Prep Batch: XXX40612

Prep Method: SW3520C

Prep Date/Time: 09/29/2018 08:38

Spike Init Wt./Vol.: 0.5 ug/L Extract Vol: 1 mL

Dupe Init Wt./Vol.: Extract Vol:

Print Date: 10/12/2018 4:44:19PM



Billable Matrix Spike Summary

Original Sample ID: 1185564002
MS Sample ID: 1185564013 BMS
MSD Sample ID: 1185564014 BMSD

Analysis Date: 10/10/2018 11:41
Analysis Date: 10/10/2018 13:23
Analysis Date: 10/10/2018 13:44
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

Results by EPA 625M SIM (PAH)

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
		Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Acenaphthene	0.00670U	0.515	.222	43 *	0.562	0.258	46 *	48-114	14.90	(< 20)
Acenaphthylene	0.00670U	0.515	.242	47	0.562	0.268	48	35-121	10.20	(< 20)
Anthracene	0.00670U	0.515	.171	33 *	0.562	0.182	32 *	53-119	6.60	(< 20)
Benzo(a)Anthracene	0.00670U	0.515	.109	21 *	0.562	0.117	21 *	59-120	7.50	(< 20)
Benzo[a]pyrene	0.00269U	0.515	.0688	13 *	0.562	0.0756	14 *	53-120	9.30	(< 20)
Benzo[b]Fluoranthene	0.00670U	0.515	.0936	18 *	0.562	0.0988	18 *	53-126	5.50	(< 20)
Benzo[g,h,i]perylene	0.0359	0.515	.0777	8 *	0.562	0.0865	9 *	44-128	10.80	(< 20)
Benzo[k]fluoranthene	0.00670U	0.515	.0695	14 *	0.562	0.0763	14 *	54-125	9.30	(< 20)
Chrysene	0.0189	0.515	.147	25 *	0.562	0.160	25 *	57-120	8.70	(< 20)
Dibenzo[a,h]anthracene	0.00269U	0.515	.0413	8 *	0.562	0.0466	8 *	44-131	12.10	(< 20)
Fluoranthene	0.0688	0.515	.226	30 *	0.562	0.235	30 *	58-120	4.00	(< 20)
Fluorene	0.00670U	0.515	.232	45 *	0.562	0.254	45 *	50-118	9.00	(< 20)
Indeno[1,2,3-c,d] pyrene	0.00670U	0.515	.0515	10 *	0.562	0.0570	10 *	48-130	10.10	(< 20)
Naphthalene	0.0165J	0.515	.262	48	0.562	0.286	48	43-114	9.00	(< 20)
Phenanthrene	0.0615	0.515	.261	39 *	0.562	0.277	38 *	53-115	5.90	(< 20)
Pyrene	0.0894	0.515	.26	33 *	0.562	0.275	33 *	53-121	5.80	(< 20)
Surrogates										
2-Methylnaphthalene-d10 (surr)		0.515	.262	51	0.562	0.292	52	47-106	10.90	
Fluoranthene-d10 (surr)		0.515	.169	33	0.562	0.178	32	24-116	5.50	

Batch Information


Analytical Batch: XMS11143
Analytical Method: EPA 625M SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 10/10/2018 1:23:00PM

Prep Batch: XXX40612
Prep Method: Liquid/Liquid Extraction for 625 SIMS
Prep Date/Time: 9/29/2018 8:38:45AM
Prep Initial Wt./Vol.: 970.00mL
Prep Extract Vol: 1.00mL

Print Date: 10/12/2018 4:44:20PM

REVIEWED *Act*

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ?????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie	1185564 
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Project: MOA Stormwater Management **Matrix:** Water **Project #:** 5078
Complete by: 2 weeks **Note:** Samples contain sodium thiosulfate for dechlorination

Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM11-04	348-1	9/28/18	1125	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	① A	
SWM12-04	1454-1		1210	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	② A	
SWM12-04 Dup	1454-1		1210	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	③ A	
SWM03-04	1224-1		1150	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	④ A	
SWM04-04	1224-2		1155	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑤ A	
SWM05-04	207-1		1240	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑥ A	
SWM06-04	314-22		1000	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑦ A	
SWM07-04	484-1		1025 ³⁰	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑧ A	
SWM08-04	86-1		1025	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑨ A	
SWM08-04 Dup	86-1		1025	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑩ A	
SWM09-04	499-1		1050	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑪ A	
SWM10-04	525-2	1055	Samp	Fecal (SM 9222D)	125-ml sterile	<10 °C	1	⑫ A		

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>AG</i>	9/28/18 1255	hand		
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
			<i>all abn</i>	9/28/18 1301

TB: 1.8 D21, 4.5 D12, 4.5 D11, 0.0 D21

1185564



Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie
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Project: **MOA Stormwater Management** Matrix: **Water** Project #: **5078**
 Complete by: **2 weeks**

Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM11-04	348-1	9/28/18	1125	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	① B	
SWM12-04	1454-1		1210	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	② B	
SWM12-04 Dup	1454-1		1210	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	③ B	
SWM03-04	1224-1		1150	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	④ B	
SWM04-04	1224-2		1155	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑤ B	
SWM05-04	207-1		1240	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑥ B	
SWM06-04	314-22		1000	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑦ B	
SWM07-04	484-1		1020	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑧ B	
SWM08-04	86-1		1025	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑨ B	
SWM08-04 Dup	86-1		1025	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑩ B	
SWM09-04	499-1		1050	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑪ B	
SWM10-04	525-2		1055	Samp	Total Hardness (SM 2340B)	250-ml HDPE	HNO3 ≤ 6 °C	1	⑫ B	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

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<i>[Signature]</i>	9/28/18 1255	hand		
Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
			<i>[Signature]</i>	9/28/18 1301

Chain of Custody Record



To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie
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Project: MOA Stormwater Management **Matrix:** Water **Project #:** 5078
Complete by: 2 weeks


Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM11-04	348-1	9/28/18	1125	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	① C	
SWM12-04	1454-1		1210	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	② C	
SWM12-04 Dup	1454-1		1210	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	③ C	
SWM03-04	1224-1		1150	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	④ C	
SWM04-04	1224-2		1155	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑤ C	
SWM05-04	207-1		1240	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑥ C	
SWM06-04	314-22		1000	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑦ C	
SWM07-04	484-1		1020	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑧ C	
SWM08-04	86-1		1025	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑨ C	
SWM08-04 Dup	86-1		1025	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑩ C	
SWM09-04	499-1		1050	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑪ C	
SWM10-04	525-2	1055	Samp	BOD (SM 5210B)	1-L HDPE	≤ 6 °C	1	⑫ C		

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
	9/28/18 1255	hand		
Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
				9/28/18 1305

Chain of Custody Record



To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie	<h1 style="margin: 0;">1185564</h1> 
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Project: MOA Stormwater Management	Matrix: Water	Project #: 5078
Complete by: 2 weeks		

Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM11-04	348-1	9/28/18	1125	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	① D	
SWM12-04	1454-1	1	1210	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	② D	
SWM12-04 Dup	1454-1		1210	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	③ D	
SWM03-04	1224-1		1150	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	④ D	
SWM04-04	1224-2		1155	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑤ D	
SWM05-04	207-1		1240	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑥ D	
SWM06-04	314-22		1000	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑦ D	
SWM07-04	484-1		1020	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑧ D	
SWM08-04	86-1		1025	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑨ D	
SWM08-04 Dup	86-1		1025	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑩ D	
SWM09-04	499-1		1050	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑪ D	
SWM10-04	525-2	1055	Samp	TSS (SM 2540D)	1-L HDPE	≤ 6 °C	1	⑫ D		

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
	9/28/18 1255	hgw		
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
				9/28/18 1301

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ?????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie
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Project: MOA Stormwater Management Complete by: 2 weeks	Matrix: Water	Project #: 5078
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Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM12-04	1454-1	9/28/18	1260	Samp/MS/MSD	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	9	② E-G ③ A-C ④ A-C	
SWM12-04 Dup	1454-1	↓	1260	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	③ E-G	
SWM05-04	207-1		1240	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑥ E-G	
SWM07-04	484-1		1020	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑧ E-G	
SWM09-04	499-1		1050	Samp	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑩ E-G	
Trip Blank	N/A		N/A	N/A	TB	TAH (EPA 602/624)	40-ml VOA	HCl, ≤6°C	3	⑮ A-C


Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
Ag	9/28/18 1255	LAWD		
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
			MCA	9/28/18 1301

1.8 D21, 4.5 D12, 4.5 D11, 0.0 D21

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ?????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie	<div style="font-size: 2em; font-weight: bold;">1185564</div> 
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Project: MOA Stormwater Management Complete by: 2 weeks	Matrix: Water	Project #: 5078
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Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM12-04	1454-1	9/28/18	1216	Samp/MS/MSD	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	6	② H-I (13) D-E (14) D-E	
SWM12-04 Dup	1454-1		1210	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	③ H-I	
SWM05-04	207-1		1240	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	⑥ H-I	
SWM07-04	484-1		1020	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	⑧ H-I	
SWM09-04	499-1		1050	Samp	TAqH (EPA 625M SIM)	1-L AG	≤ 6 °C	2	⑪ H-I	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments:

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
<i>Alena Gerlek</i>	9/28/18 1255	hand		
Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
			<i>Mark Savoie</i>	9/28/18 1301

Chain of Custody Record

To: SGS Environmental Services, Inc. 2100 West Potter Drive Anchorage, AK 99518 (907) 562-2343 (907) 561-5301 Fax Contact: Justin Nelson	SGS Quote No. ????? Bill To: HDR Alaska, Inc. 2525 C Street Anchorage, AK 99503 Contact: Alena Gerlek Alena.Gerlek@hdrinc.com (907) 644-2000	From: Kinnetic Laboratories, Inc 704 West 2nd Avenue Anchorage, AK 99501 (907) 276-6178 (907) 278-6881 Fax Contact: Mark Savoie
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Project: MOA Stormwater Management

Matrix: Water

Project #: 5078

Complete by: 2 weeks

Sample ID	Outfall ID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Bottles	Lab ID	Condition Upon Receipt
SWM11-04	348-1	9/28/18	1125	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	16 A-B	
SWM12-04	1454-1		1210	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	17 A-B	
SWM12-04 Dup	1454-1		1216	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	18 A-B	
SWM03-04	1224-1		1150	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	19 A-B	
SWM04-04	1224-2		1155	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	20 A-B	
SWM05-04	207-1		1240	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	21 A-B	
SWM06-04	314-22		1000	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	22 A-B	
SWM07-04	484-1		1020	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	23 A-B	
SWM08-04	86-1		1025	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	24 A-B	
SWM08-04 Dup	86-1		1025	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	25 A-B	
SWM09-04	499-1		1050	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	26 A-B	
SWM10-04	525-2	1055	Samp	Diss.Cu (EPA 200.8)	250-ml HDPE	≤ 6 °C	1	27 A-B		

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. Submit all data in digital formats to KLI. Email digital reports to msavoie@kinneticlabs.net. All times on this sheet are military time.

Special Instructions/Comments: Dissolved Copper must be Filtered & Preserved at Lab

Sampled and Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
<i>Ah</i>	9/28/18 1255	hand		
Relinquished By:	Date/Time:	Transporter:	Received By:	Date/Time:
			<i>allahn</i>	9/28/18 1301



e-Sample Receipt Form

SGS Workorder #:

1185564



1 1 8 5 5 6 4

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements	YES	Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N/A	ABSENT
COC accompanied samples?	YES	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	YES	Cooler ID: 1 @ 1.8 °C Therm. ID: D12
	YES	Cooler ID: 2 @ 4.5 °C Therm. ID: D12
	YES	Cooler ID: 3 @ 4.5 °C Therm. ID: D11
	YES	Cooler ID: 4 @ 0.0 °C Therm. ID: D21
	N/A	Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	YES	
If samples received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	YES	
Do samples match COC ** (i.e., sample IDs, dates/times collected)?	YES	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	YES	
Were proper containers (type/mass/volume/preservative***) used?	YES	N/A ***Exemption permitted for metals (e.g. 200.8/6020A).
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	NO	All VOA vials and trip blank were in the same cooler except for VOA vials for samples 6, 8, and 11.
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	YES	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	
Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.		
Additional notes (if applicable):		



Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1185564001-A	Na2S2O3 for Chlorine Redu	OK	1185564008-H	No Preservative Required	OK
1185564001-B	HNO3 to pH < 2	OK	1185564008-I	No Preservative Required	OK
1185564001-C	No Preservative Required	OK	1185564009-A	Na2S2O3 for Chlorine Redu	OK
1185564001-D	No Preservative Required	OK	1185564009-B	HNO3 to pH < 2	OK
1185564002-A	Na2S2O3 for Chlorine Redu	OK	1185564009-C	No Preservative Required	OK
1185564002-B	HNO3 to pH < 2	OK	1185564009-D	No Preservative Required	OK
1185564002-C	No Preservative Required	OK	1185564010-A	Na2S2O3 for Chlorine Redu	OK
1185564002-D	No Preservative Required	OK	1185564010-B	HNO3 to pH < 2	OK
1185564002-E	HCL to pH < 2	OK	1185564010-C	No Preservative Required	OK
1185564002-F	HCL to pH < 2	OK	1185564010-D	No Preservative Required	OK
1185564002-G	HCL to pH < 2	OK	1185564011-A	Na2S2O3 for Chlorine Redu	OK
1185564002-H	No Preservative Required	OK	1185564011-B	HNO3 to pH < 2	OK
1185564002-I	No Preservative Required	OK	1185564011-C	No Preservative Required	OK
1185564003-A	Na2S2O3 for Chlorine Redu	OK	1185564011-D	No Preservative Required	OK
1185564003-B	HNO3 to pH < 2	OK	1185564011-E	HCL to pH < 2	OK
1185564003-C	No Preservative Required	OK	1185564011-F	HCL to pH < 2	OK
1185564003-D	No Preservative Required	OK	1185564011-G	HCL to pH < 2	OK
1185564003-E	HCL to pH < 2	OK	1185564011-H	No Preservative Required	OK
1185564003-F	HCL to pH < 2	OK	1185564011-I	No Preservative Required	OK
1185564003-G	HCL to pH < 2	OK	1185564012-A	Na2S2O3 for Chlorine Redu	OK
1185564003-H	No Preservative Required	OK	1185564012-B	HNO3 to pH < 2	OK
1185564003-I	No Preservative Required	OK	1185564012-C	No Preservative Required	OK
1185564004-A	Na2S2O3 for Chlorine Redu	OK	1185564012-D	No Preservative Required	OK
1185564004-B	HNO3 to pH < 2	OK	1185564013-A	HCL to pH < 2	OK
1185564004-C	No Preservative Required	OK	1185564013-B	HCL to pH < 2	OK
1185564004-D	No Preservative Required	OK	1185564013-C	HCL to pH < 2	OK
1185564005-A	Na2S2O3 for Chlorine Redu	OK	1185564013-D	No Preservative Required	OK
1185564005-B	HNO3 to pH < 2	OK	1185564013-E	No Preservative Required	OK
1185564005-C	No Preservative Required	OK	1185564014-A	HCL to pH < 2	OK
1185564005-D	No Preservative Required	OK	1185564014-B	HCL to pH < 2	OK
1185564006-A	Na2S2O3 for Chlorine Redu	OK	1185564014-C	HCL to pH < 2	OK
1185564006-B	HNO3 to pH < 2	OK	1185564014-D	No Preservative Required	OK
1185564006-C	No Preservative Required	OK	1185564014-E	No Preservative Required	OK
1185564006-D	No Preservative Required	OK	1185564015-A	HCL to pH < 2	OK
1185564006-E	HCL to pH < 2	OK	1185564015-B	HCL to pH < 2	OK
1185564006-F	HCL to pH < 2	OK	1185564015-C	HCL to pH < 2	OK
1185564006-G	HCL to pH < 2	OK	1185564016-A	No Preservative Required	OK
1185564006-H	No Preservative Required	OK	1185564016-B	HNO3 to pH < 2	OK
1185564006-I	No Preservative Required	OK	1185564017-A	No Preservative Required	OK
1185564007-A	Na2S2O3 for Chlorine Redu	OK	1185564017-B	HNO3 to pH < 2	OK
1185564007-B	HNO3 to pH < 2	OK	1185564018-A	No Preservative Required	OK
1185564007-C	No Preservative Required	OK	1185564018-B	HNO3 to pH < 2	OK
1185564007-D	No Preservative Required	OK	1185564019-A	No Preservative Required	OK
1185564008-A	Na2S2O3 for Chlorine Redu	OK	1185564019-B	HNO3 to pH < 2	OK
1185564008-B	HNO3 to pH < 2	OK	1185564020-A	No Preservative Required	OK
1185564008-C	No Preservative Required	OK	1185564020-B	HNO3 to pH < 2	OK
1185564008-D	No Preservative Required	OK	1185564021-A	No Preservative Required	OK
1185564008-E	HCL to pH < 2	OK	1185564021-B	HNO3 to pH < 2	OK
1185564008-F	HCL to pH < 2	OK	1185564022-A	No Preservative Required	OK
1185564008-G	HCL to pH < 2	OK	1185564022-B	HNO3 to pH < 2	OK

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1185564023-A	No Preservative Required	OK			
1185564023-B	HNO3 to pH < 2	OK			
1185564024-A	No Preservative Required	OK			
1185564024-B	HNO3 to pH < 2	OK			
1185564025-A	No Preservative Required	OK			
1185564025-B	HNO3 to pH < 2	OK			
1185564026-A	No Preservative Required	OK			
1185564026-B	HNO3 to pH < 2	OK			
1185564027-A	No Preservative Required	OK			
1185564027-B	HNO3 to pH < 2	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

BU - The container was received with headspace greater than 6mm.

DM - The container was received damaged.

FR - The container was received frozen and not usable for Bacteria or BOD analyses.

IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

Appendix C
Field & Laboratory Data Validation

Field & Laboratory Data Validation

Data review focused on the following quality control (QC) parameters and their overall effects on the data:

- Physical parameter replicate comparisons
- Sample handling and holding time compliance
- Field replicate comparison for conventional and organic constituents
- Comparisons of laboratory controls (e.g., matrix spike/matrix spike duplicates).

1. Physical Parameter Comparisons

Precipitation

Precipitation was measured at four project locations within the Anchorage basin using tipping bucket rain gauges. Daily rainfall data from the PANC weather station at the AIA were used to supplement the four project rain gauges.

The study plan specifies that storm events must meet the following criteria: a storm event must be ≥ 0.1 inch of rain in 24 hours (hr) and be preceded by 24 hr of dry weather (< 0.1 inch of rain). These criteria were applied on a 24-hr storm basis rather than a calendar basis since storms often commence in late evening the day before sampling. All four storm events met the criteria of exhibiting ≥ 0.1 inch of rain in 24 hr. Total rainfall as measured at PANC and the four tipping bucket stations in the monitoring area during each monitored event ranged from a low of 0.22 inches at PANC during the third event to 0.67 inches at Lynwood during the second event. In all storm events, sampling was completed within 24 hours from the start of a storm. In all sampling events, precipitation recorded at all four project gauges during the preceding 24-hr period was < 0.1 inches. Based on these data, all four storms that were sampled were considered to have met storm event criteria.

Flow Measurements

Flow velocities were measured using an acoustic Doppler flow meter at most stations. Although not required by the QAP, duplicative flow measurements were taken at SWM08 during all four sampling events and at SWM12 during events 1 and 3. Relative percent differences (RPDs) between flow velocities ranged from 0 to 6.7, indicating good agreement between measurements (Table 1). This parameter was duplicated at a rate of 17% during 2018.

Table 1. Field Duplicate Relative Percent Difference for Doppler Flow Measurements

Storm Event Date	SWM08	SWM12
11-Jul-2018	0	6.7
25-Jul-2018	0	*
22-Sept-2018	2.2	3.6
28-Sept-2018	3.2	*

* Denotes measurement was not collected.

At station SWM07, the volumetric method was utilized to determine flow during each of the four sampling events, where repeated bucket fill-time measurements were made and the average measurement was used to calculate the flow velocity. No measurement quality objectives for this method were provided in the project QAP, as the parameter is essentially self-correcting as it includes repeated measurements. However, the coefficient of variation (CV), a percentage representing the standard deviation divided by the mean of a population, was calculated to determine variability of this measurement. Bucket measurements showed low CVs of $\leq 10\%$ (Table 2), indicating good consistency between measurements.

Table 2. Coefficients of Variation for Volume/Time Flow Measurements

Storm Event Date	SWM07
11-Jul-2018	5%
25-Jul-2018	9%
22-Sept-2018	2%
28-Sept-2018	10%

2. Sample Handling and Holding Time Compliance

For most analyses, samples were taken directly from the stormwater flow into laboratory-cleaned sample bottles; for TAH samples, small “VOA” vials containing preservative were typically filled from the PAH sample bottles. For every storm event, all samples were appropriately labeled and the chains of custody completed as prescribed in the QAP. For all storm events, samples were maintained in the coolers at less than 6 °C or delivered to the laboratory at ambient temperatures within a few hours of sampling, which meets EPA’s sampling preservation and holding requirements for temperature. Sample custody was maintained; samples were hand delivered directly to the laboratory by the sampling crew within hours of sample collection. The holding times specified in the QAP (MOA 2016) were met for all parameters, except for six fecal coliform samples that were run within 2 hours of its short holding time of 8 hr. It was unclear from the laboratory report as to the reason that these samples exceeded holding time as all samples were received by the laboratory within 4 hours of sampling. These samples were flagged in the report for this deviation, but were considered acceptable based on a number of bacterial holding time studies that indicate no significant effect of extending holding times on sample results (Buchon et al. 2015, Salvakumar et al. 2004, etc.).

3. Comparisons of Field Replicate Analyses

Conventional Parameters

Replicates of parameters analyzed in the field were taken as a measure of field variability/precision, where precision was calculated as either an RPD (for dissolved oxygen {DO}) or the difference between measurements (for pH, turbidity, temperature, and conductivity) as defined in the QAP. However, it should be noted that the precision values listed in the QAP for field instruments pertain to the precision of the instrument and are not realistic goals for natural variability of stormwater field measurements. In a high stormwater outflow situation, samples collected only a few minutes apart would be expected to show considerable variability based on the fact that different water masses are being discharged, even though samples are being

collected only minutes apart. As such, comparison of field duplicate results here, though compared to the QAP-provided precision standards, are more indicative of field variability than actual instrument precision.

Each sampling event included collection of field replicates at two stations. Field analyses included measurement of the conventional parameters of DO, pH, temperature, turbidity, and specific conductivity. Replicates were taken at a rate of 20% for these parameters, exceeding the 15% prescribed for all parameters in the QAP, and twice each sampling day, exceeding the once/day requirement in the study plan. Table 3 provides the calculated field variability/precision for conventional parameters measured in the field.

Table 3. Precision and Variability of Field Parameters

Parameter	QAP Standard	11-Jul-2018		25-Jul-2018		22-Sep-2018		28-Sep-2018	
		SWM07	SWM12	SWM08	SWM12	SWM08	SWM12	SWM08	SWM12
DO	10% RPD	4.62	0.32	0.20	0.11	0.10	0.31	2.85	1.68
pH	±0.2 units	0.04	0	0.01	0	0.01	0.06	0.09	0.03
Turbidity	±1 NTU	3	1	0.2	0.3	0.2	0.6	0.4	13
Temperature	±0.4 °C	0.02	0.01	0	0.06	0	0	0	0
Conductivity	±1 µS/cm	2	0	3	12	3	4	9	1

Values in **bold** and **red** exceeded the measurement quality objective specified in the QAP.

DO, pH, and temperature met the precision goals during all sampling events. Turbidity and conductivity frequently did not meet the precision limits due to the variability of the discharge. Failure to meet the precision sensitivities prescribed in the QAP likely reflect the heterogeneous nature of stormwater flow rather than sampling anomalies. Although not specified in the outfall monitoring plan, conductivity was monitored to provide additional information to the field crew.

Replicate samples for the conventional parameters (TSS, BOD, and fecal coliform) were taken as field duplicates at SWM08 and SWM12 and analyzed by the laboratory as a measure of field variability/precision. Replicates were taken at a rate of 20%, exceeding the 15% prescribed for all parameters in the QAP and the once/day requirement in the study plan. Field variability was less than the QAP RPD limits in all but one case (Table 4). The RPD for field replicates of fecal coliform for SWM12-02 was 118%, with a QAP limit of 60%. Again, failure to meet the precision sensitivities prescribed in the QAP likely reflect the heterogeneous nature of stormwater flow rather than sampling anomalies. Calculated RPDs for TSS met the standards prescribed in the QAP. RPDs for BOD were also calculated, but no limits were provided in the project QAP for this parameter, although all RPDs were ≤10%.

Table 4. Field Duplicate Results for Conventional Parameters

Parameter	QAP Precision (RPD)	11-Jul-2018		25-Jul-2018		22-Sep-2018		28-Sep-2018	
		SWM08	SWM12	SWM08	SWM12	SWM08	SWM12	SWM08	SWM12
TSS	25	5	0	7	11	4	0	1	1
BOD	NA	8	9	0	7	1	2	1	10
Fecal Coliform	60	46	4	41	118	10	5	1	13

Values in **bold** and **red** exceeded the precision measurement quality objective specified in the QAP.

Dissolved Copper and Hardness

Field replicates of dissolved copper and hardness were taken at SWM08 and SWM12. Replicates were taken at a rate of 20%, exceeding the 15% prescribed for all parameters in the QAP and the once/day requirement in the study plan. RPD results are presented in Table 5 and show variability below 20% for both parameters and all events with the exceptions of 79% RPD for copper at SWM08-03 and SWM12-03 and 38% at SWM08-04, reflecting a high degree of field variability at those outfalls.

Table 5. Field Duplicate Results for Dissolved Copper and Hardness as CaCO₃

Parameter	QAP Precision (RPD)	11-Jul-2018		25-Jul-2018		22-Sep-2018		28-Sep-2018	
		SWM08	SWM12	SWM08	SWM12	SWM08	SWM12	SWM08	SWM12
Dissolved Copper	20	1	2	18	10	79	79	38	7
Hardness	20	2	0	0	0	0	2	1	1

Values in **bold** and **red** exceeded the precision measurement quality objective specified in the QAP.

Organic Parameters

Field replicates for the TAH (BETX) and PAH constituents were obtained at SWM12 during each of the four storm events. This represents a replication rate of 25%, which exceeds the 15% prescribed in the QAP and meets the once/day requirement of the study plan.

The field precision RPDs for TAH and PAH constituents are presented in Table 6. TAH concentrations were all below detection limits (ND) and RPDs were not calculated. Most individual PAH analytes were below the detection limits. Those with values detected showed RPD precisions ranging from about 1–23%, all within the QAP specified limit of 30%.

4. Comparisons of Laboratory Controls

Verification analyses for laboratory parameters were conducted by SGS North America, Inc., the laboratory performing the analyses. SGS is certified by the EPA and the Alaska Drinking Water Program and has an approved QA/QC program. Analytical methods and testing procedures were in adherence with the QAP, standard methods, and EPA-approved protocols and guidelines.

Conventional Parameters

Laboratory method blanks were performed for the three conventional parameters BOD, TSS, and fecal coliform. None of the method blanks had any detections. The laboratory control sample and sample duplicate (LCS/LCSD) for the conventional parameters for all storm events were within the laboratory control limits.

Table 6. Field Duplicate Results for TAH and PAH

Parameter	QAP Precision (RPD)	11-Jul-2018	25-Jul-2018	22-Sep-2018	28-Sep-2018
		SWM12	SWM12	SWM12	SWM12
TAH (BETX)					
Benzene	20	---	---	---	---
Chlorobenzene	20	---	---	---	---
1,2-Dichlorobenzene	20	---	---	---	---
1,3-Dichlorobenzene	20	---	---	---	---
1,4-Dichlorobenzene	20	---	---	---	---
Ethylbenzene	20	---	---	---	---
Toluene	20	---	---	---	---
o-Xylene	20	---	---	---	---
p & m-Xylenes	20	---	---	---	---
PAH					
Acenaphthene	30	---	---	---	---
Acenaphthylene	30	---	---	---	---
Anthracene	30	---	---	---	---
Benzo(a)anthracene	30	---	---	---	---
Benzo(a)pyrene	30	---	---	---	---
Benzo(b)fluoranthene	30	---	---	---	---
Benzo(g,h,i,l)perylene	30	---	---	---	16
Benzo(k)fluoranthene	30	---	---	---	---
Chrysene	30	---	---	---	13
Dibenzo(a,h)anthracene	30	---	---	---	---
Fluoranthene	30	23	5	---	2
Fluorene	30	---	---	---	---
Indeno(1,2,3-cd)pyrene	30	---	---	---	---
Naphthalene	30	---	---	---	2
Phenanthrene	30	10	1	---	1
Pyrene	30	20	18	---	5

Values in **bold** and **red** exceeded the precision measurement quality objective specified in the QAP. “---” non-detect so no RPDs could be calculated.

The two TSS laboratory duplicates for the second event were reported with RPDs of 5.6% and 16.5%, above the 5% laboratory RPD limit. Both are below the 25% QAP limit for TSS.

Dissolved Copper and Hardness

Hardness is computed from magnesium and calcium so the QC for those compounds relate to the quality of the hardness results. All metals and hardness data were within QC limits this year.

Organic Parameters

Trip blanks were collected for the TAH analyses to ascertain whether the handling of the samples introduced contaminants. The trip blank for the third sample was not analyzed by the lab after they reported bubbles > 6 mm in the sample containers. These trip blanks are prepared and provided by the laboratory in a sealed cardboard box with each sample kit, so the field crew was not aware of any bubble issue at the time of sampling. Trip blanks for the other three storm events showed no evidence of contamination. Also, since all TAH constituents were undetected, the missing trip blank did not affect the overall interpretation of the data.

The Laboratory and Method Blanks for organics (both TAH and PAH) were all reported as non-detect.

LCS/LCSDs were run, as were Matrix Spikes and Spike Duplicates (MS/MSD), to confirm the accuracy and precision of the analysis of the organic parameters. Spike recoveries confirm accuracy and the RPD confirms precision. Matrix Spikes confirm the ability to see the target analyte in the sample. The MS/MSD results are presented for the organic analysis in Table 7.

All spike recoveries and their RPDs were within acceptable range for the TAH.

For PAH, the analysis of the samples from all four storm events showed that many of the PAH analytes in the matrix spikes were recovered at levels that fell below both the QAP and laboratory control limits. However, the LCS spike recoveries were in range for those parameters, indicating a potential matrix interference with these results. Data values were evaluated by looking at those results where the recoveries were found to be 20 points outside the lower laboratory limit or exhibiting an RPD >30. Further, the sample results associated with those analytes were examined in detail as low recoveries coupled with low or non-detect results are an indication that the laboratory is unable to recover the analyte in the matrix. These results were re-qualified with a “J-“ or a “UJ-“ (if not detected) to indicate that sample results may exhibit a low bias based on poor spike recoveries ascribed to probable matrix interference, although initial qualification of batch sample data was not performed by the laboratory based on their best professional judgement, since LCS recoveries were within range.

The recovery of PAH compounds during the extraction and analysis process was represented by the surrogates 2-Methylnaphthalene-d10 and Fluoranthene-d10, the latter of which was recovered in range for all samples. Most 2-Methylnaphthalene-d10 surrogate recoveries were reported within laboratory control limits, the exception to this was three samples: SWM12-03 Dup, SWM05-03, and SWM12-04. They were recovered below the laboratory control limit of 47% but within 5% of the target. For the third sampling event, both SWM12-03 Dup and SWM05-03 were re-extracted (outside of holding time) and results were found to be comparable, so no qualification was applied by the laboratory. This re-extraction and re-analysis was not performed for the fourth storm event's sample (SWM12-04). This excursion was not considered to affect overall data quality; as these samples had already been re-qualified as possibly biased low due to the matrix interference. As the PAHs were already qualified for MS/MSD recovery issues, the excursion for the surrogate 2-Methylnaphthalene was dismissed without any further qualifications to the data.

In qualifying the PAH data it is important to note that the PAH constituents are hydrophobic and are likely to sorb or otherwise associate with particles in the stormwater. Thus, where the quality of the stormwater is highly variable with respect to particulates, PAH constituent exceedances of precision and accuracy limits may be expected. In addition, it should be noted that the MS/MSD analyses for PAH were based on separate field replicates that were obtained for this purpose. Therefore, RPD differences in the analyses may be the result of field variability and not necessarily due to any issues with the laboratory analysis.

Table 7. Laboratory Precision and Accuracy for TAH and PAH

Parameter	QAP Standard		11-Jul-2018		25-Jul-2018		22-Sep-2018		28-Sep-2018	
	Precision	Accuracy	Precision	Accuracy	Precision	Accuracy	Precision	Accuracy	Precision	Accuracy
	RPD	% Rec	RPD	% Rec	RPD	% Rec	RPD	% Rec	RPD	% Rec
TAH										
Benzene	20	80-120	0.79	101/100	1.7	107/105	0.32	103/103	0.28	95.3/95.1
Chlorobenzene	20	80-120	0.14	97.8/97.7	2.2	105/102	0.06	105/105	0.68	93.5/92.9
1,2-Dichlorobenzene	20	80-120	0.03	105/105	0.66	107/106	0.76	110/109	0.68	98.6/97.9
1,3-Dichlorobenzene	20	80-120	0.85	107/106	0.06	108/108	2	112/110	1.2	101/99.7
1,4-Dichlorobenzene	20	80-120	0.41	107/106	0.68	108/107	0.27	110/110	1.1	100/99.1
Ethylbenzene	20	80-120	1.2	106/105	4.6	110/105	0.68	107/107	0.17	95.9/95.8
Toluene	20	77-120	0.71	98.4/99.1	2.2	103/101	0.19	103/103	0.7	94.4/95
o-Xylene	20	80-120	0.84	103/102	2.9	110/107	0.13	105/105	0.35	94.3/94
p & m-Xylenes	20	80-120	0.7	106/105	2.7	112/109	0.61	107/106	0.28	94/94.3
PAH										
Acenaphthene	30	53-110	2.2	48.4/47.4	25.4	64.3/ 50.1	0.34	46.2/46.2	14.9	43.1/45.9
Acenaphthylene	30	53-105	2.4	48.3/47.4	24.1	61/ 48.1	0.19	42.9/43.1	10.2	47/47.8
Anthracene	30	59-110	4.8	30.7/30.9	24.6	50.2/39.4	4.2	43.1/41.6	6.6	33.1/32.4
Benzo(a)anthracene	30	64-110	1.5	11.1/10.5	37.6	21.7/14.9	1.8	24.7/24.4	7.5	21.1/20.8
Benzo(a)pyrene	30	58-110	8.2	7.3/6.5	42.4	12.8/8.4	0.64	13.8/13.8	9.3	13.4/13.5
Benzo(b)fluoranthene	30	57-120	2.5	8.8/8.3	46.6	14.3/8.9	2.00	15.7/15.5	5.5	18.2/17.6
Benzo(g,h,i)perylene	30	48-123	5.3	7.7/7	40.9	8.8/5.9	0.62	8.7/8.7	10.8	8.1/9
Benzo(k)fluoranthene	30	58-124	12.4	8.4/7.1	38.6	13.6/9.2	4.1	15.1/14.6	9.3	13.5/13.6
Chrysene	30	63-110	1.6	16.6/16.2	35.7	25.9/18.2	3.4	27.3/26.5	8.7	24.8/25.2
Dibenzo(a,h)anthracene	30	53-125	11.3	6.2/5.3	42.2	9.4/6.1	0.57	9.2/9.2	12.1	8/8.3
Fluoranthene	30	59-115	1.5	21.4/20.9	29.1	43.2/31.7	1.1	36.1/35.9	4.00	30.4/29.6
Fluorene	30	56-110	2.3	43.5/42.7	23.5	59/ 46.8	0.5	44.7/44.8	9.00	44.9/45.1
Indeno(1,2,3-cd)pyrene	30	51-125	7.4	6/5.4	40.7	9/6	1.2	8.9/9.1	10.1	10/10.2
Naphthalene	30	45-100	0.33	50.1/48.2	24.9	59.7/46.7	1.8	40.1/41	9.00	47.6/48
Phenanthrene	30	58-115	3.3	32.1/32	26	50.8/38.8	1.4	43.4/43	5.9	38.8/38.4
Pyrene	30	62-128	1.5	21.1/19.8	30.4	42.3/30.3	2.5	37/36.3	5.8	33/33

Values in **bold** and **red** did not meet the measurement quality objectives in the QAP.

5. Completeness

Calculated completeness for field sample collection, field measurement, and laboratory results all well exceeded the project goal of 90%. All (100%) of the intended samples were collected for laboratory analysis. Valid field analytical measurements (DO, pH, temperature, turbidity, and conductivity) were recorded 100% of the time; no water quality data points were dismissed. Laboratory data were determined to be 100% complete, with no laboratory results deemed unacceptable or un-usable.

6. Conclusions

A careful review of the results confirmed that the dataset for this project is acceptable and can be used to meet project goals as defined in the study plan. Sampling process and completeness criteria were all met. Holding times for six fecal samples were slightly exceeded for the second storm event, but overall quality of that data was not considered to have been affected. Field duplication results for some parameters fell outside QAP-specified levels where expected, which is consistent with the fact that these “duplicates” are actually replicates that indicate field variability rather than a measurement of precision. Low percent recoveries were seen in some PAH analytes in both the MS and MSDs during all four storm events, resulting in these analytes being re-qualified as potentially biased low due to potential matrix interference inherent in the stormwater samples. Poor recoveries seen for one PAH surrogate (2-Methylnaphthalene) in three samples was dismissed without further qualification as the PAHs were already qualified for MS/MSD recovery issues. Despite the minor QC issues identified in this report, overall evaluation of the analytical QA/QC data indicates that the project data are, for the most part, within established performance criteria and can be used for characterization of stormwater for this project.

7. References

- Bushon, R.N., A.M. Brady, and B.D. Lindsey. 2015. Holding-time and Method Comparisons for the Analysis of Fecal-Indicator Bacteria in Groundwater. *Environmental Monitoring and Assessment*. Vol. 187(11):672.
- MOA 2016. Monitoring, Evaluation, and Quality Assurance Plan, APDES Permit No. AKS-052558. Prepared for Alaska Department of Environmental Conservation, Division of Water. Prepared by HDR Alaska, Inc. and Municipality of Anchorage.
- Selvakumar, A., M. Borst, M. Boner, and P. Mallon. 2004. Effects of Sample Holding Time on Concentrations of Microorganisms in Water Samples. *Water Environment Research*. Vol. 76(1): 67-72.

Appendix D

Field Logs

**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

Storm #1

STATION ID: SWM 03 DATE: 7/11/18 SAMPLE TIME: 1500

OUTFALL/NODE ID: 1224-1 PHYSICAL LOCATION: Old Seward / Sylvan N.

OUTFALL FLOW MEASUREMENTS

Flow Method (circle)		Bucket		Flow Meter		
Flow Meter	Flow Speed (ft/s): <u>1.22</u>	Water Depth (in): <u>2</u>		Pipe Diam (in): <u>36</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						

IN SITU WATER QUALITY MEASUREMENTS

INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>12.09</u>	<u>131</u>	<u>8.96</u>	<u>83.6</u>	<u>7.62</u>	<u>19.0</u>
FIELD REPLICATE						

DISCRETE WATER QUALITY SAMPLES

SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM 03-01</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
<u>SWM ___-01 Dup</u>						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>bl</u>

STANDARD OBSERVATIONS

PARAMETER	TYPE/SOURCE	EXTENT - COMMENTS
ODOR	<u>None</u>	
COLOR	<u>None</u>	
CLARITY	<u>clear</u>	
FLOATABLES	<u>None</u>	
DEPOSITS or STAINS		
SHEEN		
SURFACE SCUM		
DEBRIS		

WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:

Field Crew: Gary Hawley & Kacy (HDR)
 Storm # 1
 Photos: Yes No

**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>04</u>		DATE: <u>7/11/18</u>		SAMPLE TIME: <u>1503</u>		
OUTFALL/NODE ID: <u>1224-2</u>		PHYSICAL LOCATION: <u>Old Seward / Sylvan St.</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket		(<u>Flow Meter</u>)		
Flow Meter	Flow Speed (ft/s): <u>0.12</u>	Water Depth (in): <u>3.3/4</u>	Pipe Diam (in): <u>18</u>			
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>13.93</u>	<u>256</u>	<u>7.03</u>	<u>68.2</u>	<u>7.46</u>	<u>21.5</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM__-01	✓	✓	✓			✓✓
SWM__-01 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:					Samplers' Initials: <u>GL</u>	
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR	None					
COLOR	clear					
CLARITY	clear					
FLOATABLES	NONE					
DEPOSITS or STAINS	NONE					
SHEEN	None					
SURFACE SCUM	↓					
DEBRIS	↓					
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>Depth not accurate, ponded</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>05</u>		DATE: <u>7/11/18</u>		SAMPLE TIME: <u>1350</u>		
OUTFALL/NODE ID: <u>207-1</u>		PHYSICAL LOCATION: <u>Save School</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket <u>Flow Meter</u>				
Flow Meter	Flow Speed (ft/s): <u>1.20</u>	Water Depth (in): <u>0.25</u>		Pipe Diam (in): <u>24</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>13.12</u>	<u>132</u>	<u>9.71</u>	<u>93.2</u>	<u>7.85</u>	<u>46.4</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>05</u> -01	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SWM <u> </u> -01 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>GL</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR	None					
COLOR	orange/brown					
CLARITY	low					
FLOATABLES	None					
DEPOSITS or STAINS	None					
SHEEN	None		oil droplets in creek, none in sample			
SURFACE SCUM	↓					
DEBRIS	↓					
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. [Signature]

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: <u>SWM 06</u>		DATE: <u>7/11/18</u>		SAMPLE TIME: <u>13:25</u>		
OUTFALL/NODE ID: <u>314-22</u>		PHYSICAL LOCATION: <u>End of maplewood</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket		Flow Meter		
Flow Meter	Flow Speed (ft/s): <u>0.3</u>	Water Depth (in): <u><0.5</u>		Pipe Diam (in): <u>26</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>14.36</u>	<u>83</u>	<u>8.15</u>	<u>80.1</u>	<u>7.06</u>	<u>23.3</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM 06-01</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
<u>SWM ___-01 Dup</u>						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>GL</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR	<u>Musty</u>					
COLOR	<u>None</u>					
CLARITY	<u>clear</u>					
FLOATABLES	<u>None</u>					
DEPOSITS or STAINS						
SHEEN						
SURFACE SCUM						
DEBRIS	<u>trash in ditch</u>					
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>Flow - low, mouth is eroded, hard to get clean sample</u>						
<u>Velocity + flow are estimates</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. Ann

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**


STATION ID: SWM <u>07</u>		DATE: <u>7/11/18</u>		SAMPLE TIME: <u>12:50 PM</u>		
OUTFALL/NODE ID:		PHYSICAL LOCATION: <u>Seward Hwy N.</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle) <u>Bucket</u> <u>Flow Meter</u> - both						
Flow Meter	Flow Speed (ft/s): <u>0.5</u>	Water Depth (in): <u>0.75</u>		Pipe Diam (in): <u>24</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: <u>1-gal</u> 5-gal	<u>6.13</u>	<u>6.46</u>	<u>6.76</u>	<u>6.82</u>	<u>26.17</u>	
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>13.12</u>	<u>103</u>	<u>9.31</u>	<u>88.7</u>	<u>7.52</u>	<u>241</u>
FIELD REPLICATE	<u>13.10</u>	<u>105</u>	<u>8.89</u>	<u>86.0</u>	<u>7.56</u>	<u>238</u>
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>07</u> -01	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SWM <u> </u> -01 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>GL</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR	<u>Fuel smell</u>					
COLOR	<u>Brownish</u>					
CLARITY	<u>low clarity</u>					
FLOATABLES	<u>NONE</u>					
DEPOSITS or STAINS						
SHEEN						
SURFACE SCUM						
DEBRIS						
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. [Signature]

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: <u>SWM 08</u>		DATE: <u>7/11/18</u>		SAMPLE TIME: <u>13:04</u>		
OUTFALL/NODE ID: <u>86-1</u>		PHYSICAL LOCATION: <u>New Seward (Black Sabbath)</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket <u>Flow Meter</u> <u>dup. 3.62</u>				
Flow Meter	Flow Speed (ft/s): <u>3.62</u>	Water Depth (in): <u>3.0</u>		Pipe Diam (in): <u>42</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>13.07</u>	<u>86</u>	<u>9.73</u>	<u>92.6</u>	<u>7.34</u>	<u>66.4</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM 08 -01</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
<u>SWM 08 -01 Dup</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>GL</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR	<u>diesel smell</u>					
COLOR	<u>yellowish</u>					
CLARITY	<u>clear</u>					
FLOATABLES	<u>NONE</u>					
DEPOSITS or STAINS						
SHEEN						
SURFACE SCUM						
DEBRIS						
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. [Signature]

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>01-01</u>		DATE: <u>7/14/18</u>		SAMPLE TIME: <u>12:05 PM</u>		
OUTFALL/NODE ID: <u>499-1</u>		PHYSICAL LOCATION: <u>North Bend Boeke</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket <u>Flow Meter</u>				
Flow Meter	Flow Speed (ft/s): <u>0.35</u>	Water Depth (in): <u>0.5"</u>		Pipe Diam (in): <u>24</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Rate (gal/s)	
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #		YSI 556 MULTIPROBE: KLI #1939		HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>13.06</u>	<u>128</u>	<u>9.41</u>	<u>89.5</u>	<u>7.29</u>	<u>40.5</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS ✓	TAqH	TAH	Dissolved Cu Hardness
SWM <u>01</u> -01	✓	✓	✓	✓	✓	✓
SWM <u> </u> -01 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>GL</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR	<u>None</u>					
COLOR	<u>pretty clean</u>					
CLARITY	<u>clear</u>					
FLOATABLES	<u>NA</u>					
DEPOSITS or STAINS	<u>None</u>					
SHEEN	<u>None</u>					
SURFACE SCUM	<u>NO</u>					
DEBRIS	<u>NO</u>					
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
Photos: <input checked="" type="radio"/> Yes <input type="radio"/> No						

Reviewed By: M. [Signature]

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>10-01</u>		DATE: <u>7/14/18</u>		SAMPLE TIME: <u>12:30PM</u>		
OUTFALL/NODE ID: <u>525-2</u>		PHYSICAL LOCATION: <u>South Chester at Ben Boeke</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket <u>Flow Meter</u>				
Flow Meter	Flow Speed (ft/s): <u>2.7</u>	Water Depth (in): <u>1.0</u>		Pipe Diam (in): <u>24</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #		YSI 556 MULTIPROBE: KLI #1939		HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>9.91</u>	<u>306</u>	<u>10.74</u>	<u>95</u>	<u>7.16</u>	<u>19.2</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM 10-01</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
<u>SWM ___-01 Dup</u>						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:					Samplers' Initials: <u>GL</u>	
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR	<u>NONE</u>					
COLOR	<u>NONE</u>					
CLARITY	<u>clear</u>					
FLOATABLES	<u>NO</u>					
DEPOSITS or STAINS	<u>iron bacteria stain</u>					
SHEEN	<u>NO</u>					
SURFACE SCUM	<u>NO</u>					
DEBRIS	<u>NO</u>					
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: Man [Signature]

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>11</u>		DATE: <u>7/11/18</u>		SAMPLE TIME: <u>15:24</u>		
OUTFALL/NODE ID: <u>348-1</u>		PHYSICAL LOCATION: <u>John + Botanical</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket		<u>Flow Meter</u>		
Flow Meter	Flow Speed (ft/s): <u>0.04</u>	Water Depth (in): <u>1.5</u>		Pipe Diam (in): <u>36</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #		YSI 556 MULTIPROBE: KLI #1939		HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>12.48</u>	<u>138</u>	<u>8.40</u>	<u>80.5</u>	<u>7.48</u>	<u>24.6</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM 11-01</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
<u>SWM ___-01 Dup</u>						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>GL</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR	<u>NONE</u>					
COLOR	<u>NONE</u>					
CLARITY	<u>clear</u>					
FLOATABLES	<u>NONE</u>					
DEPOSITS or STAINS						
SHEEN						
SURFACE SCUM						
DEBRIS						
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. [Signature]

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>12</u>		DATE: <u>7/11/18</u>		SAMPLE TIME: <u>1420</u>		
OUTFALL/NODE ID: <u>1454-1</u>		PHYSICAL LOCATION: <u>Lynwood outfall</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket		<u>Flow Meter</u> <u>1.66</u> <u>dope</u>		
Flow Meter	Flow Speed (ft/s): <u>1.84</u>	Water Depth (in): <u>1.25</u>		Pipe Diam (in): <u>24</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>12.21</u>	<u>250</u>	<u>9.27</u>	<u>86.6</u>	<u>7.40</u>	<u>238</u>
FIELD REPLICATE	<u>12.22</u>	<u>250</u>	<u>9.24</u>	<u>86.2</u>	<u>7.40</u>	<u>237</u>
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>12</u> -01	✓	✓	✓	<u>1,2</u> ✓	<u>1,2,3,4,5,6</u> ✓	✓
SWM <u>12</u> -01 Dup	✓	✓	✓	✓	✓	✓
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:				Samplers' Initials: <u>GL</u>		
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR	<u>None</u>					
COLOR	<u>light brown</u>					
CLARITY	<u>Clear</u>					
FLOATABLES	<u>None</u>					
DEPOSITS or STAINS	↓					
SHEEN						
SURFACE SCUM						
DEBRIS						
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>cloudy</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. [Signature]

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

Storm # 2

STATION ID: <u>SWM 03</u>		DATE: <u>7/25/18</u>	SAMPLE TIME: <u>1310</u>			
OUTFALL/NODE ID: <u>1224-1</u>		PHYSICAL LOCATION: <u>Old Sewer / Sylvan N.</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket	Flow Meter			
Flow Meter	Flow Speed (ft/s): <u>1.39</u>	Water Depth (in): <u>2.1</u>	Pipe Diam (in): <u>36</u>			
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: <u>1-gal</u> <u>5-gal</u>						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>13.52</u>	<u>82</u>	<u>9.49</u>	<u>91.0</u>	<u>7.33</u>	<u>13.1</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM 03 -02</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
<u>SWM ___ -02 Dup</u>						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>MS</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR			<u>None</u>			
COLOR			<u>None</u>			
CLARITY			<u>Clear</u>			
FLOATABLES			<u>None</u>			
DEPOSITS or STAINS			<u>None</u>			
SHEEN			<u>None</u>			
SURFACE SCUM			<u>None</u>			
DEBRIS			<u>None</u>			
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>Field Crew Storm #2: Mark Savoie + Kacy (HDR)</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: Mark Savoie

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>04</u>		DATE: <u>7/25/18</u>	SAMPLE TIME: <u>1315</u>			
OUTFALL/NODE ID: <u>1224-2</u>		PHYSICAL LOCATION: <u>Old Seward / Sylvan S.</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket	Flow Meter			
Flow Meter	Flow Speed (ft/s): <u>0.16</u>		Water Depth (in): <u>1.7</u>		Pipe Diam (in): <u>18</u>	
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>14.57</u>	<u>291</u>	<u>8.24</u>	<u>81.0</u>	<u>7.47</u>	<u>10.7</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM 04-02</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
<u>SWM ___-02 Dup</u>						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:				Samplers' Initials: <u>MS</u>		
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR			None			
COLOR			Tea colored			
CLARITY			Clear			
FLOATABLES			None			
DEPOSITS or STAINS			None			
SHEEN			None			
SURFACE SCUM			None			
DEBRIS			None			
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>Flowing very slowly, down stream rocks are impeding flow, water depth good</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. [Signature]

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>25</u>		DATE: <u>7/25/18</u>		SAMPLE TIME: <u>1415</u>									
OUTFALL/NODE ID: <u>207-1</u>		PHYSICAL LOCATION: <u>E. 56th @ SAUC School</u>											
OUTFALL FLOW MEASUREMENTS													
Flow Method (circle)		Bucket		Flow Meter									
Flow Meter		Flow Speed (ft/s): <u>0.97</u>		Water Depth (in): <u>0.6</u>									
Pipe Diam (in): <u>24</u>													
Bucket Measurements		Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)						
Bucket: 1-gal 5-gal													
IN SITU WATER QUALITY MEASUREMENTS													
INSTRUMENT/SERIAL #		YSI 556 MULTIPROBE: KLI #1939		HACH 2100P/Q TURBIDIMETER: KLI #0833									
TEMP (°C)		SpCond (µS/cm)		DO (mg/L)		DO (% Sat)		pH		TURB (ntu)			
MEASUREMENT		<u>13.64</u>		<u>173</u>		<u>9.10</u>		<u>87.6</u>		<u>7.24</u>		<u>27.6</u>	
FIELD REPLICATE													
DISCRETE WATER QUALITY SAMPLES													
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)												
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness							
<u>SWM 05-02</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							
<u>SWM ___-02 Dup</u>													
MS/MSD SAMPLES													
FIELD QC (Trip/Equip)													
Description of QC Samples:						Samplers' Initials: <u>MS</u>							
STANDARD OBSERVATIONS													
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS										
ODOR			<u>None</u>										
COLOR			<u>Light tea colored</u>										
CLARITY			<u>-</u>										
FLOATABLES			<u>None</u>										
DEPOSITS or STAINS			<u>None</u>										
SHEEN			<u>Some oil like sheen in pond</u>										
SURFACE SCUM			<u>None</u>										
DEBRIS			<u>None</u>										
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:													
<u>90i water coming out of 207-1, trickle out of 2nd (to the right) pipe</u>													
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No													

Reviewed By: M. June

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>06</u>		DATE: <u>7/25/18</u>		SAMPLE TIME: <u>10:45</u>		
OUTFALL/NODE ID: <u>314-22</u>		PHYSICAL LOCATION: <u>Maplewood</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket		<u>Flow Meter</u>		
Flow Meter	Flow Speed (ft/s): <u>0.62</u>	Water Depth (in): <u>0.2</u>		Pipe Diam (in): <u>26</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Rate (gal/s)	
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>14.43</u>	<u>69</u>	<u>9.50</u>	<u>92.9</u>	<u>7.42</u>	<u>16.9</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM06-02</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
<u>SWM___-02 Dup</u>						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>MS</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR			<u>None</u>			
COLOR			<u>None</u>			
CLARITY			<u>Clear</u>			
FLOATABLES			<u>None</u>			
DEPOSITS or STAINS			<u>None</u>			
SHEEN			<u>None</u>			
SURFACE SCUM			<u>None</u>			
DEBRIS			<u>None</u>			
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>Pipe corroded, water flowing out of bottom, Flow estimated</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. Down

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: <u>SWM 07</u>		DATE: <u>7/25/18</u>		SAMPLE TIME: <u>11:10</u>		
OUTFALL/NODE ID: <u>484-1</u>		PHYSICAL LOCATION: <u>Seward Hwy - N</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle) <u>Bucket</u> Flow Meter						
Flow Meter	Flow Speed (ft/s): <u>—</u>	Water Depth (in): <u>—</u>		Pipe Diam (in): <u>24</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: <u>1-gal</u> 5-gal	<u>58</u>	<u>61</u>	<u>64</u>	<u>71</u>	<u>254</u>	
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>13.85</u>	<u>69</u>	<u>9.06</u>	<u>87.1</u>	<u>7.10</u>	<u>84.8</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM 07-02</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<u>SWM ___-02 Dup</u>						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>MS</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR			<u>None</u>			
COLOR			<u>Gray</u>			
CLARITY			<u>N/A</u>			
FLOATABLES			<u>None</u>			
DEPOSITS or STAINS			<u>None</u>			
SHEEN			<u>None</u>			
SURFACE SCUM			<u>None</u>			
DEBRIS			<u>None</u>			
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>Overcast - rain has stopped</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. [Signature]

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: <u>SWM 08</u>		DATE: <u>7/25/18</u>		SAMPLE TIME: <u>11:15</u>		
OUTFALL/NODE ID: <u>86-1</u>		PHYSICAL LOCATION: <u>Seward Hwy - Block 26</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket <u>Flow Meter</u> <u>DUP - 2.16</u>				
Flow Meter	Flow Speed (ft/s): <u>2.20</u>	Water Depth (in): <u>2.2</u>		Pipe Diam (in): <u>42</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>13.26</u>	<u>119</u>	<u>9.82</u>	<u>93.7</u>	<u>7.15</u>	<u>36.1</u>
FIELD REPLICATE	<u>13.26</u>	<u>122</u>	<u>9.80</u>	<u>93.6</u>	<u>7.14</u>	<u>36.3</u>
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM 08-02</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
<u>SWM 08-02 Dup</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:					Samplers' Initials: <u>MS</u>	
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR			<u>Light hydrocarbon smell</u>			
COLOR			<u>Tan</u>			
CLARITY			<u>N/A</u>			
FLOATABLES			<u>None</u>			
DEPOSITS or STAINS			<u>None</u>			
SHEEN			<u>None</u>			
SURFACE SCUM			<u>None</u>			
DEBRIS			<u>None</u>			
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>Overcast - rain has stopped</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>09</u>		DATE: <u>7/25/18</u>		SAMPLE TIME: <u>11:50</u>		
OUTFALL/NODE ID: <u>499-1</u>		PHYSICAL LOCATION:				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket <u>Flow Meter</u> <u>N. Ben Boeke</u>				
Flow Meter	Flow Speed (ft/s): <u>0.26</u>	Water Depth (in): <u>2.1</u>		Pipe Diam (in): <u>24</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>12.85</u>	<u>266</u>	<u>10.05</u>	<u>94.9</u>	<u>7.40</u>	<u>12.1</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>09</u> -02	✓	✓	✓	✓	✓	✓✓
SWM <u> </u> -02 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>MS</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR			<u>None</u>			
COLOR			<u>None</u>			
CLARITY			<u>Clear</u>			
FLOATABLES			<u>None</u>			
DEPOSITS or STAINS			<u>None</u>			
SHEEN			<u>None</u>			
SURFACE SCUM			<u>None</u>			
DEBRIS			<u>None</u>			
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. [Signature]

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>10</u>		DATE: <u>7/25/18</u>	SAMPLE TIME: <u>12:00</u>			
OUTFALL/NODE ID: <u>525-2</u>		PHYSICAL LOCATION: <u>Ben Bucke S. bank</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket	Flow Meter			
Flow Meter	Flow Speed (ft/s): <u>2.54</u>	Water Depth (in): <u>1.5</u>	Pipe Diam (in): <u>24</u>			
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>10.58</u>	<u>380</u>	<u>11.17</u>	<u>104</u>	<u>7.18</u>	<u>8.19</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>10</u> -02	✓	✓	✓			✓✓
SWM <u> </u> -02 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:					Samplers' Initials: <u>MS</u>	
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR			<u>None</u>			
COLOR			<u>None</u>			
CLARITY			<u>Very clear</u>			
FLOATABLES			<u>None</u>			
DEPOSITS or STAINS			<u>Rust film on plate</u>			
SHEEN			<u>None</u>			
SURFACE SCUM			<u>None</u>			
DEBRIS			<u>None</u>			
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. Anna

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>11</u>		DATE: <u>7/25/18</u>	SAMPLE TIME: <u>1240</u>			
OUTFALL/NODE ID: <u>348-1</u>		PHYSICAL LOCATION: <u>Johns Rd. + Botanical</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket	Flow Meter			
Flow Meter	Flow Speed (ft/s): <u>0.07</u>	Water Depth (in): <u>2.3</u>	Pipe Diam (in): <u>36</u>			
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>13.61</u>	<u>143</u>	<u>8.61</u>	<u>82.6</u>	<u>6.82</u>	<u>23.5</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>11</u> -02	✓	✓	✓			✓✓
SWM <u> </u> -02 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>MS</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR			<u>None</u>			
COLOR			<u>Tea colored</u>			
CLARITY			<u>Clear</u>			
FLOATABLES			<u>None</u>			
DEPOSITS or STAINS			<u>None</u>			
SHEEN			<u>None</u>			
SURFACE SCUM			<u>None</u>			
DEBRIS			<u>None</u>			
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
Photos: <input checked="" type="radio"/> Yes <input type="radio"/> No						

Reviewed By: Man

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>12</u>		DATE: <u>7/25/18</u>		SAMPLE TIME: <u>1340</u>		
OUTFALL/NODE ID: <u>1454-1</u>		PHYSICAL LOCATION: <u>Lynnwood Pond</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket		Flow Meter		
Flow Meter	Flow Speed (ft/s): <u>2.30</u>		Water Depth (in): <u>1.4</u>		Pipe Diam (in): <u>24</u>	
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>13.00</u>	<u>252</u>	<u>9.47</u>	<u>89.8</u>	<u>7.42</u>	<u>59.4</u>
FIELD REPLICATE	<u>12.94</u>	<u>264</u>	<u>9.48</u>	<u>89.8</u>	<u>7.42</u>	<u>59.7</u>
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>12-02</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SWM <u>12-02 Dup</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>MS</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR			None			
COLOR			Light Tea color			
CLARITY			—			
FLOATABLES			None			
DEPOSITS or STAINS			None			
SHEEN			None			
SURFACE SCUM			None			
DEBRIS			Trash downstream			
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>YSI Readings Dup taken ~10 min after initial measurements</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Storm#3

MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG

STATION ID: SWM 03 DATE: 9/22/18 SAMPLE TIME: 1200

OUTFALL/NODE ID: 1224-2 PHYSICAL LOCATION: Old Seward/Sy/van N

OUTFALL FLOW MEASUREMENTS

Flow Method (circle)	Bucket	<u>Flow Meter</u>	<u>1.5" WS</u>			
Flow Meter	Flow Speed (ft/s): <u>1.48</u>	Water Depth (in): <u>1 3/8"</u>	Pipe Diam (in): <u>36</u>			
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						

IN SITU WATER QUALITY MEASUREMENTS

INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>9.77</u>	<u>169</u>	<u>8.26</u>	<u>73.0</u>	<u>7.55</u>	<u>3.14</u>
FIELD REPLICATE						

DISCRETE WATER QUALITY SAMPLES

SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>03</u> -03	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
SWM <u> </u> -03 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>BL</u>

STANDARD OBSERVATIONS

PARAMETER	TYPE/SOURCE	EXTENT - COMMENTS
ODOR	<u>none</u>	
COLOR	<u>none</u>	
CLARITY	<u>none</u>	
FLOATABLES	<u>none</u>	
DEPOSITS or STAINS	<u>none</u>	
SHEEN	<u>none</u>	
SURFACE SCUM	<u>none</u>	
DEBRIS	<u>none</u>	

WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:

Field Crew Storm#3: Cary Lawley + Lynn Spenser

Photos: Yes No

Reviewed By: [Signature]

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>04</u>		DATE: <u>9/22/18</u>		SAMPLE TIME: <u>1210</u>		
OUTFALL/NODE ID: <u>1224-2</u>		PHYSICAL LOCATION: <u>Old Sevard / sylvan S</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket		<u>Flow Meter</u>		
Flow Meter	Flow Speed (ft/s): <u>0.4</u>	Water Depth (in): <u>0.5"</u>		Pipe Diam (in): <u>18</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Rate (gal/s)	
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>12.59</u>	<u>304</u>	<u>7.39</u>	<u>69.4</u>	<u>7.46</u>	<u>5181</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM04-03</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
<u>SWM__-03 Dup</u>						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:					Samplers' Initials: <u>HS/BL</u>	
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR	<u>none</u>					
COLOR	<u>little</u>					
CLARITY	<u>clear</u>					
FLOATABLES	<u>none</u>					
DEPOSITS or STAINS	<u>none</u>					
SHEEN	<u>none</u>					
SURFACE SCUM	<u>none</u>					
DEBRIS	<u>none</u>					
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: [Signature]

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>05</u>		DATE: <u>9/22/18</u>		SAMPLE TIME: <u>1305</u>		
OUTFALL/NODE ID: <u>207-1</u>		PHYSICAL LOCATION: <u>E. 56th @ Save School</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket		Flow Meter		
Flow Meter	Flow Speed (ft/s): <u>0.58</u>	Water Depth (in): <u>11/4</u>		Pipe Diam (in): <u>24</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Rate (gal/s)	
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>11.71</u>	<u>49</u>	<u>9.98</u>	<u>92.4</u>	<u>7.52</u>	<u>6.52</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>05</u> -03	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SWM <u> </u> -03 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>GL</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE	EXTENT - COMMENTS				
ODOR	<u>none</u>					
COLOR	<u>tea</u>					
CLARITY	<u>cloudy - slight</u>					
FLOATABLES	<u>none</u>					
DEPOSITS or STAINS	<u>none</u>					
SHEEN	<u>none</u>					
SURFACE SCUM	<u>none</u>					
DEBRIS	<u>none</u>					
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
Photos: Yes No						

Reviewed By: M. Moran

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>06</u>		DATE: <u>9/22/18</u>		SAMPLE TIME: <u>9:52</u>		
OUTFALL/NODE ID: <u>314-22</u>		PHYSICAL LOCATION: <u>damaged / maple wood</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket		Flow Meter		
				<u>'12" depth</u>		
Flow Meter	Flow Speed (ft/s): <u>0.65</u>	Water Depth (in): <u>1/2</u>		Pipe Diam (in): <u>26</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Rate (gal/s)	
Bucket: 1-gal 5-gal	<u>0.65 (12)</u>					
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #		YSI 556 MULTIPROBE: KLI #1939		HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	
MEASUREMENT	<u>10.72</u>	<u>93</u>	<u>87.8</u>	<u>9.7</u>	<u>6.86</u>	
FIELD REPLICATE			<u>9.7</u>	<u>87.8</u>	<u>HS</u>	
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>06</u> -03	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>NO</u>	<u>NO</u>	<input checked="" type="checkbox"/>
SWM <u> </u> -03 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>HS</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE	EXTENT - COMMENTS				
ODOR	<u>- musty</u>	the culvert is broken 6" back from rim - water flowing under culvert - samples & EQ taken just above rim - water flowing well.				
COLOR	<u>clear</u>					
CLARITY	<u>clear</u>					
FLOATABLES	<u>none</u>					
DEPOSITS or STAINS	<u>none</u>					
SHEEN	<u>none</u>					
SURFACE SCUM	<u>none</u>					
DEBRIS						
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>leaves &</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>07</u>	DATE: <u>9/24/18</u>	SAMPLE TIME: <u>1010</u>
OUTFALL/NODE ID: <u>484-1</u>	PHYSICAL LOCATION: <u>New Seward Ni</u>	

OUTFALL FLOW MEASUREMENTS

Flow Method (circle) <u>Bucket</u> Flow Meter						
Flow Meter	Flow Speed (ft/s): <u>—</u>	Water Depth (in): <u>1/10"</u>	Pipe Diam (in): <u>24"</u>			
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 4 gal <u>5 gal</u>	<u>11/25</u>	<u>11/24</u>	<u>11/24</u>	<u>11/23.9</u>	<u>97</u>	

IN SITU WATER QUALITY MEASUREMENTS

INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>11.39</u>	<u>56</u>	<u>9.35</u>	<u>85.8</u>	<u>7.26</u>	<u>31.1</u>
FIELD REPLICATE						

DISCRETE WATER QUALITY SAMPLES

SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>07-03</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SWM <u> </u> -03 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials:

STANDARD OBSERVATIONS

PARAMETER	TYPE/SOURCE	EXTENT - COMMENTS
ODOR	<u>none</u>	
COLOR	<u>clear</u>	
CLARITY	<u>slightly cloudy</u>	
FLOATABLES	<u>none</u>	
DEPOSITS or STAINS	<u>none</u>	
SHEEN	<u>none</u>	
SURFACE SCUM	<u>none</u>	
DEBRIS	<u>sticks, leaves</u>	

WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:

- rain stopped, very low flow

Photos: Yes No

Reviewed By: Man Sam

Date: 10/22/18

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16 liter
JAF

**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

RS

STATION ID: SWM <u>08</u>	DATE: <u>9/22/18</u>	SAMPLE TIME: <u>9:25 10:25</u>
OUTFALL/NODE ID: <u>86-1</u>	PHYSICAL LOCATION: <u>New Sewer 42" / Black Sabbath</u>	

OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)	Bucket	<u>Flow Meter</u>	<u>2.17 dup</u>			
Flow Meter	Flow Speed (ft/s): <u>2.10</u>	Water Depth (in): <u>13/4"</u>	Pipe Diam (in): <u>42</u>			
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						

IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>10.82</u>	<u>136</u>	<u>9.59</u>	<u>86.7</u>	<u>7.03</u>	<u>9.94</u>
FIELD REPLICATE	<u>11.82</u>	<u>139</u>	<u>9.58</u>	<u>86.6</u>	<u>7.04</u>	<u>9.74</u>

DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>08</u> -03	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>No</u>	<u>No</u>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
SWM <u>08</u> -03 Dup	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:				Samplers' Initials:		

STANDARD OBSERVATIONS		
PARAMETER	TYPE/SOURCE	EXTENT - COMMENTS
ODOR	<u>Hydrocarbon</u>	<u>diesel odor - strong</u>
COLOR	<u>slight tea</u>	
CLARITY	<u>cloudy</u>	
FLOATABLES	<u>none</u>	
DEPOSITS or STAINS	<u>none</u>	
SHEEN	<u>none</u>	
SURFACE SCUM	<u>none</u>	
DEBRIS	<u>leave sticks</u>	

WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:	
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>09</u>		DATE: <u>9/22/18</u>		SAMPLE TIME: <u>1050</u>									
OUTFALL/NODE ID: <u>499-1</u>		PHYSICAL LOCATION: <u>CHS (small) / Boeke N.</u>											
OUTFALL FLOW MEASUREMENTS													
Flow Method (circle)		Bucket		<u>Flow Meter</u>									
Flow Meter		Flow Speed (ft/s): <u>0.10</u>		Water Depth (in): <u>3/4"</u>									
Pipe Diam (in): <u>24</u>													
Bucket Measurements		Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)						
Bucket: 1-gal 5-gal													
IN SITU WATER QUALITY MEASUREMENTS													
INSTRUMENT/SERIAL #		YSI 556 MULTIPROBE: KLI #1939		HACH 2100P/Q TURBIDIMETER: KLI #0833									
TEMP (°C)		SpCond (µS/cm)		DO (mg/L)		DO (% Sat)		pH		TURB (ntu)			
MEASUREMENT		<u>11.77</u>		<u>212</u>		<u>8.96</u>		<u>83.1</u>		<u>7.28</u>		<u>6.38</u>	
FIELD REPLICATE													
DISCRETE WATER QUALITY SAMPLES													
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)						Dissolved Cu Hardness						
	FECAL	BOD	TSS	TAqH	TAH								
SWM <u>09-03</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
SWM <u> </u> -03 Dup													
MS/MSD SAMPLES													
FIELD QC (Trip/Equip)													
Description of QC Samples:										Samplers' Initials: <u>GL</u>			
STANDARD OBSERVATIONS													
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS										
ODOR	<u>none</u>												
COLOR	<u>clear</u>												
CLARITY	<u>none</u>												
FLOATABLES	<u>none</u>												
DEPOSITS or STAINS	<u>none</u>												
SHEEN	<u>none</u>												
SURFACE SCUM	<u>none</u>												
DEBRIS	<u>none</u>												
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:													
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No													

Reviewed By: M. [Signature]

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>10</u>		DATE: <u>9/22/18</u>		SAMPLE TIME: <u>1100</u>		
OUTFALL/NODE ID: <u>525-2</u>		PHYSICAL LOCATION: <u>CHS / Boeke S. Bank</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket		Flow Meter		
Flow Meter	Flow Speed (ft/s): <u>2.22</u>	Water Depth (in): <u>1"</u>		Pipe Diam (in): <u>24</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Rate (gal/s)	
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>10.77</u>	<u>382</u>	<u>10.33</u>	<u>93.6</u>	<u>7.12</u>	<u>7.95</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>10</u> -03	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
SWM <u> </u> -03 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>GL</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR	<u>none</u>					
COLOR	<u>light tea</u>					
CLARITY	<u>clear</u>					
FLOATABLES	<u>clear none</u>					
DEPOSITS or STAINS	<u>none</u>					
SHEEN	<u>none</u>					
SURFACE SCUM	<u>none</u>					
DEBRIS	<u>none</u>					
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. Moore

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>11</u>		DATE: <u>9/22/18</u>	SAMPLE TIME: <u>1140</u>			
OUTFALL/NODE ID: <u>348-1</u>		PHYSICAL LOCATION: <u>Furrow / Labins Rd / Botman</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket	<u>Flow Meter</u>			
Flow Meter	Flow Speed (ft/s): <u>0.07</u>	Water Depth (in): <u>2 1/4'</u>	Pipe Diam (in): <u>36</u>			
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>11.33</u>	<u>132</u>	<u>9.81</u>	<u>94.0</u>	<u>7.4</u>	<u>25.6</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>11</u> -03	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
SWM <u> </u> -03 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:					Samplers' Initials: <u>GL</u>	
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR	<u>none - musty</u>					
COLOR	<u>light grey</u>					
CLARITY	<u>cloudy</u>					
FLOATABLES	<u>none</u>					
DEPOSITS or STAINS	<u>none</u>					
SHEEN	<u>none</u>					
SURFACE SCUM	<u>none</u>					
DEBRIS	<u>none</u>		<u>- some leaves-sticks</u>			
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. Anon

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>12</u>		DATE: <u>9/22/18</u>		SAMPLE TIME: <u>1230</u>		
OUTFALL/NODE ID: <u>1454-1</u>		PHYSICAL LOCATION: <u>CAM / Lynnwood Pond</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket <u>1.94</u>		Flow Meter <u>7/8" Dup</u>		
Flow Meter	Flow Speed (ft/s): <u>2.05</u>	Water Depth (in): <u>7/8"</u>		Pipe Diam (in): <u>30</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>10.61</u>	<u>285</u>	<u>9.81</u>	<u>90.1</u>	<u>7.40</u>	<u>15.7</u>
FIELD REPLICATE	<u>10.61</u>	<u>289</u>	<u>9.78</u>	<u>90.3</u>	<u>7.34</u>	<u>15.1</u>
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM/2-03</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<u>SWM/2-03 Dup</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>LR</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE	EXTENT - COMMENTS				
ODOR	<u>none</u>					
COLOR	<u>light tea</u>					
CLARITY	<u>none - some cloudiness</u>					
FLOATABLES	<u>none</u>					
DEPOSITS or STAINS	<u>none</u>					
SHEEN	<u>none</u>					
SURFACE SCUM	<u>none</u>					
DEBRIS	<u>none</u>					
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. Anon

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

Storm #4

STATION ID: <u>SWM 03</u>	DATE: <u>9/28/18</u>	SAMPLE TIME: <u>1150</u>
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OUTFALL/NODE ID: <u>1224-1</u>	PHYSICAL LOCATION: <u>Old Seward / SYLVAN N.</u>
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OUTFALL FLOW MEASUREMENTS

Flow Method (circle)		Bucket	<u>Flow Meter</u>			
Flow Meter	Flow Speed (ft/s): <u>1.38</u>	Water Depth (in): <u>2.0</u>	Pipe Diam (in): <u>36</u>			
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						

IN SITU WATER QUALITY MEASUREMENTS

INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>9.68</u>	<u>109</u>	<u>10.81</u>	<u>96.0</u>	<u>7.45</u>	<u>19.5</u>
FIELD REPLICATE						

DISCRETE WATER QUALITY SAMPLES

SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM 03-04</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
<u>SWM ___-04 Dup</u>						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>GL</u>

STANDARD OBSERVATIONS

PARAMETER	TYPE/SOURCE	EXTENT - COMMENTS
ODOR	<u>None</u>	
COLOR	<u>None</u>	
CLARITY	<u>clear</u>	
FLOATABLES	<u>None</u>	
DEPOSITS or STAINS		
SHEEN		
SURFACE SCUM		
DEBRIS	<input checked="" type="checkbox"/>	

WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:

leaves ↓ Field Crew Storm #4: Gary Lowley + Kacy (HDR)

Photos: Yes No

**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>04</u>		DATE: <u>9/28/18</u>	SAMPLE TIME: <u>1155</u>			
OUTFALL/NODE ID: <u>1224-2</u>		PHYSICAL LOCATION: <u>Old Seward / Sylvan S</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket	Flow Meter			
Flow Meter	Flow Speed (ft/s): <u>0.16</u>	Water Depth (in): <u>4</u>	Pipe Diam (in): <u>18</u>			
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>11.19</u>	<u>100</u>	<u>10.13</u>	<u>92.3</u>	<u>7.35</u>	<u>17.7</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					Dissolved Cu Hardness
	FECAL	BOD	TSS	TAqH	TAH	
SWM <u>04</u> -04	✓	✓	✓			✓✓
SWM <u> </u> -04 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:					Samplers' Initials: <u>GL</u>	
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE	EXTENT - COMMENTS				
ODOR	<u>None</u>					
COLOR	<u>None</u>					
CLARITY	<u>Clear</u>					
FLOATABLES	<u>None</u>					
DEPOSITS or STAINS						
SHEEN						
SURFACE SCUM						
DEBRIS	↓					
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>leaves ↓</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. Brown

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: <u>SWM 05</u>		DATE: <u>9/28/18</u>	SAMPLE TIME: <u>1240</u>			
OUTFALL/NODE ID: <u>207-1</u>		PHYSICAL LOCATION: <u>E. 56th @ S Ave School</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket	<u>Flow Meter</u>			
Flow Meter	Flow Speed (ft/s): <u>1.67</u>	Water Depth (in): <u>1.25</u>	Pipe Diam (in): <u>24</u>			
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Rate (gal/s)	
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>11.08</u>	<u>73</u>	<u>11.44</u>	<u>106</u>	<u>7.24</u>	<u>80.0</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM 05-04</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
<u>SWM -04 Dup</u>						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>GL</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR	None					
COLOR	None					
CLARITY	Turbid					
FLOATABLES	None					
DEPOSITS or STAINS	None					
SHEEN	None					
SURFACE SCUM	A little in pond					
DEBRIS	None					
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>Holding pond also has a lot of suspended sediment</u>						
<u>leaves ↓</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. Jansen

Date: 10/27/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>06</u>		DATE: <u>9/28/18</u>	SAMPLE TIME: <u>10:00</u>			
OUTFALL/NODE ID: <u>314-22</u>		PHYSICAL LOCATION: <u>Maplewood</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket	Flow Meter			
Flow Meter	Flow Speed (ft/s): <u>0.5</u>	Water Depth (in): <u>1/4"</u>	Pipe Diam (in): <u>26</u>			
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939		HACH 2100P/Q TURBIDIMETER: KLI #0833			
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>9.83</u>	<u>93</u>	<u>11.30</u>	<u>101</u>	<u>6.71</u>	<u>11.2</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>06</u> -04	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
SWM <u> </u> -04 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:					Samplers' Initials: <u>GL</u>	
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE	EXTENT - COMMENTS				
ODOR	<u>None</u>					
COLOR	<u>Tan</u>					
CLARITY	<u>Clear</u>					
FLOATABLES	<u>None</u>					
DEPOSITS or STAINS	<u>None</u>					
SHEEN	<u>None</u>					
SURFACE SCUM	<u>None</u>					
DEBRIS	<u>None</u>					
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>Good laminar flow. 80% coming out of pipe + not through holes.</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: M. Brown

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

3

STATION ID: <u>SWM 07</u>	DATE: <u>9/28/18</u>	SAMPLE TIME: <u>1020</u>
OUTFALL/NODE ID: <u>484-1</u>	PHYSICAL LOCATION: <u>New Sewer N.</u>	

OUTFALL FLOW MEASUREMENTS

Flow Method (circle) <u>Bucket</u> <u>Flow Meter</u> <u>both</u>						
Flow Meter	Flow Speed (ft/s): <u>0.95</u>	Water Depth (in): <u>1"</u>	Pipe Diam (in): <u>24</u>			
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: <u>1-gal</u> 5-gal	<u>3.30</u>	<u>2.69</u>	<u>2.75</u>	<u>2.72</u>	<u>10.46</u>	<u>—</u>

IN SITU WATER QUALITY MEASUREMENTS

INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>10.57</u>	<u>66</u>	<u>11.49</u>	<u>105.2</u>	<u>7.28</u>	<u>241</u>
FIELD REPLICATE						

DISCRETE WATER QUALITY SAMPLES

SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM 07-04</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<u>SWM ___-04 Dup</u>						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>GL</u>

STANDARD OBSERVATIONS

PARAMETER	TYPE/SOURCE	EXTENT - COMMENTS
ODOR	<u>Hydrocarbon - strong smell</u>	
COLOR	<u>turbid</u>	
CLARITY	<u>Turbid</u>	
FLOATABLES	<u>None</u>	
DEPOSITS or STAINS		
SHEEN		
SURFACE SCUM		
DEBRIS		

WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:

--

Photos: Yes No

Reviewed By: M. [Signature]

Date: 10/22/18

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**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

B, D

STATION ID: SWM <u>08</u>		DATE: <u>9/28/18</u>	SAMPLE TIME: <u>1025</u>			
OUTFALL/NODE ID: <u>36-1</u>		PHYSICAL LOCATION: <u>N. Sewall 42", Black Sabb.</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket <u>Flow Meter</u> <i>depth = 3.62</i>				
Flow Meter	Flow Speed (ft/s): <u>3.80</u>	Water Depth (in): <u>25</u>		Pipe Diam (in): <u>42</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>10.13</u>	<u>71</u>	<u>1.95</u>	<u>108</u>	<u>7.08</u>	<u>59.4</u>
FIELD REPLICATE	<u>10.13</u>	<u>80</u>	<u>12.10</u>	<u>104.5</u>	<u>6.99</u>	<u>59.0</u>
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>08</u> -04	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
SWM <u>08</u> -04 Dup	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:					Samplers' Initials: <u>GL</u>	
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE		EXTENT - COMMENTS			
ODOR	<u>STRONG Hydrocarbons odor</u>					
COLOR	<u>NONE</u>					
CLARITY	<u>tea color</u>					
FLOATABLES	<u>None</u>					
DEPOSITS or STAINS						
SHEEN						
SURFACE SCUM						
DEBRIS	<u>down stream</u>					
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>Leaves ↓</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: <u>SWM 09</u>	DATE: <u>9/28/18</u>	SAMPLE TIME: <u>1050</u>
OUTFALL/NODE ID: <u>494</u>	PHYSICAL LOCATION: <u>Boeke N.</u>	

OUTFALL FLOW MEASUREMENTS

Flow Method (circle)	Bucket	Flow Meter			
Flow Meter	Flow Speed (ft/s): <u>0.32</u>	Water Depth (in): <u>2"</u>	Pipe Diam (in): <u>24</u>		
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Rate (gal/s)
Bucket: 1-gal 5-gal					

IN SITU WATER QUALITY MEASUREMENTS

INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>11.09</u>	<u>152</u>	<u>10.40</u>	<u>94.5</u>	<u>7.25</u>	<u>34.5</u>
FIELD REPLICATE						

DISCRETE WATER QUALITY SAMPLES

SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM 09-04</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<u>SWM ___-04 Dup</u>						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>GL</u>

STANDARD OBSERVATIONS

PARAMETER	TYPE/SOURCE	EXTENT - COMMENTS
ODOR		<u>NONE</u>
COLOR		<u>NONE</u>
CLARITY		<u>clear</u>
FLOATABLES		<u>No</u>
DEPOSITS or STAINS		<u>No</u>
SHEEN		<u>No</u>
SURFACE SCUM		<u>No</u>
DEBRIS		<u>leaves, trash below</u>

WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:

leaves ↓ - difficult to get full 1 liter containers because of ponding w/in pipe, no drop for 2-3 feet - flow below impeded by leaves, cleared to sample.

Photos: Yes No

MOA Stormwater Management Program

WATER QUALITY STORM SAMPLING FIELD LOG

STATION ID: <u>SWM 10</u>	DATE: <u>9/28/18</u>	SAMPLE TIME: <u>1055</u>
OUTFALL/NODE ID: <u>525-2</u>	PHYSICAL LOCATION: <u>Boeke S.</u>	

OUTFALL FLOW MEASUREMENTS

Flow Method (circle) <u>Flow Meter</u>	Bucket	<u>Flow Meter</u>	Water Depth (in): <u>2.25</u>	Pipe Diam (in): <u>24</u>
Flow Meter	Flow Speed (ft/s): <u>3.82</u>	Time 1 (s)	Time 2 (s)	Time 3 (s)
Bucket Measurements	Time 4 (s)	Total Time	Rate (gal/s)	
Bucket: 1-gal 5-gal				

IN SITU WATER QUALITY MEASUREMENTS

INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939	HACH 2100P/Q TURBIDIMETER: KLI #0833				
MEASUREMENT	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
FIELD REPLICATE	<u>10.21</u>	<u>233</u>	<u>11.81</u>	<u>107.6</u>	<u>7.00</u>	<u>46.2</u>

DISCRETE WATER QUALITY SAMPLES

SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
<u>SWM 10 -04</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
<u>SWM -04 Dup</u>						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>GL</u>

STANDARD OBSERVATIONS

PARAMETER	TYPE/SOURCE	EXTENT - COMMENTS
ODOR	<u>None</u>	
COLOR	<u>Brown</u>	
CLARITY	<u>None</u>	
FLOATABLES		
DEPOSITS or STAINS		
SHEEN		
SURFACE SCUM		
DEBRIS		

WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:

leaves ↓

Photos: Yes No

**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>11</u>		DATE: <u>9/29/18</u>	SAMPLE TIME: <u>1125</u>			
OUTFALL/NODE ID: <u>348-</u>		PHYSICAL LOCATION: <u>Johns Rd/Botanical</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket	Flow Meter			
Flow Meter	Flow Speed (ft/s): <u>0.27</u>	Water Depth (in): <u>5</u>	Pipe Diam (in): <u>36</u>			
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Total Time	Rate (gal/s)
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>10.76</u>	<u>54</u>	<u>11.69</u>	<u>104.1</u>	<u>7.47</u>	<u>344</u>
FIELD REPLICATE						
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>11</u> -04	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
SWM <u> </u> -04 Dup						
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:				Samplers' Initials: <u>GL</u>		
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE	EXTENT - COMMENTS				
ODOR	<u>None</u>					
COLOR	<u>Chocolate Milk color</u>					
CLARITY	<u>Super turbid</u>					
FLOATABLES	<u>None</u>					
DEPOSITS or STAINS						
SHEEN						
SURFACE SCUM						
DEBRIS						
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>leaves ↓, Rocks blocking tree depth. could be deeper.</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

**MOA Stormwater Management Program
WATER QUALITY STORM SAMPLING FIELD LOG**

STATION ID: SWM <u>12</u>		DATE: <u>9/28/18</u>	SAMPLE TIME: <u>1210</u>			
OUTFALL/NODE ID: <u>1454-1</u>		PHYSICAL LOCATION: <u>Lynnwood Pond</u>				
OUTFALL FLOW MEASUREMENTS						
Flow Method (circle)		Bucket	Flow Meter <u>dupe 3.77</u>			
Flow Meter	Flow Speed (ft/s): <u>3.81</u>	Water Depth (in): <u>2.25</u>	Pipe Diam (in): <u>24</u>			
Bucket Measurements	Time 1 (s)	Time 2 (s)	Time 3 (s)	Time 4 (s)	Rate (gal/s)	
Bucket: 1-gal 5-gal						
IN SITU WATER QUALITY MEASUREMENTS						
INSTRUMENT/SERIAL #	YSI 556 MULTIPROBE: KLI #1939			HACH 2100P/Q TURBIDIMETER: KLI #0833		
	TEMP (°C)	SpCond (µS/cm)	DO (mg/L)	DO (% Sat)	pH	TURB (ntu)
MEASUREMENT	<u>10.17</u>	<u>123</u>	<u>11.38</u>	<u>102.0</u>	<u>7.30</u>	<u>358</u>
FIELD REPLICATE	<u>10.17</u>	<u>122</u>	<u>11.19</u>	<u>99.8</u>	<u>7.27</u>	<u>345</u>
DISCRETE WATER QUALITY SAMPLES						
SAMPLE NUMBER	SAMPLES COLLECTED (CHECK BOX)					
	FECAL	BOD	TSS	TAqH	TAH	Dissolved Cu Hardness
SWM <u>12</u> -04	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SWM <u>12</u> -04 Dup	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MS/MSD SAMPLES						
FIELD QC (Trip/Equip)						
Description of QC Samples:						Samplers' Initials: <u>GL</u>
STANDARD OBSERVATIONS						
PARAMETER	TYPE/SOURCE	EXTENT - COMMENTS				
ODOR	<u>Musty from pipe</u>					
COLOR	<u>Brown</u>					
CLARITY	<u>Turbid</u>					
FLOATABLES	<u>None</u>					
DEPOSITS or STAINS	↓					
SHEEN						
SURFACE SCUM						
DEBRIS						
WEATHER - VEGETATION - OTHER UNUSUAL CONDITIONS - COMMENTS:						
<u>Holding pond also contains lots of suspended sediments.</u>						
<u>leaves ↓</u>						
Photos: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Reviewed By: Mar [Signature]

Date: 10/22/18

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