Quality Assurance/Quality Control Manual

Municipal Separate Stormwater Sewer System

Stormwater Monitoring

March 2022

In support of

Arizona Department of Transportation
Municipal Separate Stormwater Sewer System

Permit No. AZS0000018 – 2021

ADOT | Arizona Department of Transportation

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ABBREVIATIONS

A.A.C. - Arizona Administrative Code
ADEQ - Arizona Department of Environmental Quality
ADHS - Arizona Department of Health Services
ADOT - Arizona Department of Transportation
A.R.S. - Arizona Revised Statutes
BMP - Best Management Practices
BOD - Biochemical Oxygen Demand
COC - Chain of Custody
COD - Chemical Oxygen Demand
CRM - Certified Reference Material
E. coli - Escherichia coli
EPA - United States Environmental Protection Agency
HPLC - High Performance Liquid Chromatography
LCS - Laboratory Control Sample
LOQ - Limit of Quantitation
MDL - Method Detection Limit
mg/L - Milligrams per Liter
MQO - Measurement Quality Objective
MPN - Most Probable Number
MS/MSD - Matrix Spike/Matrix Spike Duplicate
MS4 - Municipal Separate Storm Water Sewer System
NTU - Nephelometric Turbidity Units
OAW - Outstanding Arizona Waters
PAH - Polycyclic Aromatic Hydrocarbons
PQLs - Practical Quantitation Limits
QAM - Quality Assurance Manual
QAP - Quality Assurance Plan
QA/QC - Quality Assurance/Quality Control
SOP - Standard Operating Procedure
TDS - Total Dissolved Solids
TSS - Total Suspended Solids
VOC - Volatile Organic Compound
WLA - Wasteload Allocation
µg/L - Micrograms per Liter

1.0 PROJECT MANAGEMENT

1.1 INTRODUCTION

This Quality Assurance/Quality Control Manual has been prepared for the Arizona Department of Transportation (ADOT) and their contractors to assist in meeting stormwater monitoring requirements as identified within Section 5 of Arizona Pollutant Discharge Elimination System Municipal Separate Storm Sewer System Permit No. AZS0000018-2021 (Permit). This Permit is implemented under Arizona Department of Environmental Quality (ADEQ) Arizona Pollutant Discharge Elimination System (AZPDES) and authorizes ADOT to discharge stormwater to Waters of the United States in Arizona within its Municipal Separate Storm Sewer System (MS4) and select maintenance facilities.

Quality assurance (QA) is defined as methods designed to implement the data quality objectives throughout the sampling and analytical procedure. Quality control (QC) is defined as the methods to measure how effectively the quality assurance methodologies have been applied.

1.2 DATA QUALITY OBJECTIVES

The data quality objectives of this manual are to provide a standard working tool for ADOT personnel and designated contractors in determining the type, quantity and quality of data needed to reach defensible decisions or make credible estimates in meeting Permit conditions as described in Part 5 of the ADOT's MS4 Permit. This regulatory target requires data qualifiers of precision, accuracy and representativeness that governs the data quality objectives of the program.

1.2.1 Precision

Precision refers to the closeness of two or more measurements to each other. Measurements of concentration in sampled stormwater gathered by this program will be compared to Arizona surface water quality standards (A.A.C. Title 18, Chapter 11, Article 1) applicable to receiving waters of the MS4, qualitatively used to evaluate narrative standards to impaired and unique waters. The precision of numeric water quality standards varies but is the most exact of these three uses. Therefore, the precision of any data should be comparable to applicable surface water quality standards of the specific receiving waters.

1.2.2 Accuracy

Accuracy refers to the closeness of a measured value to a standard or known value. For environmental samples the true value is never known, even for a specific aliquot. Therefore, data accuracy can only be determined by intra-laboratory methods. Acceptable levels for accuracy of regulatory data where enforcement actions are possible are quite high and these have been specified by the Arizona Department of Health Services (ADHS) Office of Laboratory Licensure and Certification. All samples collected for monitoring are analyzed by a laboratory licensed by the ADHS and accuracy determined by internal programs of those labs. See Section 3.3 – Acceptance Criteria for further discussion.

1.2.3 Representativeness

Sample representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. It is dependent on the proper design of the sampling program and will be satisfied by ensuring this approved plan is followed during sampling and analysis. Stormwater sampling variability is continuous; therefore, site characterization standards suggest that the physical nature of the water sample be the best criteria for representativeness. These criteria include location relative to the source of pollution and receiving water, flow discharge and the nature of the rainstorm has specified the locations, sample timing, characteristic rainfall amounts and other qualifiers for the sampling program.

1.2.4 Level of Data Quality

The MS4 permit has assumed a level of data quality needed for compliance by requiring that ADHS certified laboratories are used. The Permit also stipulates the sampling locations, frequency, and antecedent rainfall conditions and by requiring that the data be compared to applicable surface water quality standards of the specific receiving waters and calculated pollutant loads of impaired waters. This level of data quality will be maintained during the implementation of ADOT's monitoring program.

1.3 ROLES, RESPONSIBILITIES, AND QUALIFICATIONS

The organization structure ADOT's stormwater monitoring program is provided in Appendix A and will be updated as needed. The ADOT assigned project manager (ADOT PM) is responsible for compliance with the MS4 Permit. Sampling, monitoring and interpretive support will be assigned to the ADOT Contractor, who will maintain the project database. Data and narrative interpretation will be delivered to the ADOT PM for inclusion in the MS4 Permit Annual Report.

1.4 SAMPLE PARAMETERS AND FREQUENCY

Permit section 5.2(F) identifies parameters and sampling frequency. This table is provided below as Table 1 and Table 2 to assist users of this manual in preparing sampling activities.

ADOT

Table 1. Analytical Wet Weather Monitoring Each Wet Season

Parameter	Units	Monitoring Frequency	Monitoring Type
Conventional Parameters			
Flow	--	1x/Sampling Event	--
pH	S.U.	1x/Wet Season	Discrete
Hardness	mg/L	1x/Wet Season	Flow Proportional Composite
Temperature	°C	1x/Wet Season	Discrete
Total Suspended Solids	mg/L	1x/Wet Season	Flow Proportional Composite
Microbiology			
Escherichia coli	cfu/ 100mL or MPN	1x/Wet Season	Discrete
Metals (total)			
Arsenic	µg/L	1x/Wet Season	Flow Proportional Composite
Barium	µg/L	1x/Wet Season	Flow Proportional Composite
Cadmium	µg/L	1x/Wet Season	Flow Proportional Composite
Chromium	µg/L	1x/Wet Season	Flow Proportional Composite
Copper	µg/L	1x/Wet Season	Flow Proportional Composite
Lead	µg/L	1x/Wet Season	Flow Proportional Composite
Mercury	µg/L	1x/Wet Season	Flow Proportional Composite
Selenium	µg/L	1x/Wet Season	Flow Proportional Composite
Silver	µg/L	1x/Wet Season	Flow Proportional Composite
Zinc	µg/L	1x/Wet Season	Flow Proportional Composite
Nutrients			
Nitrate plus Nitrite as N	mg/L	1x/Wet Season	Flow Proportional Composite
Ammonia as N	mg/L	1x/Wet Season	Flow Proportional Composite
Total Kjeldahl Nitrogen (TKN) as N	mg/L	1x/Wet Season	Flow Proportional Composite
Total Phosphorus	mg/L	1x/Wet Season	Flow Proportional Composite
Organic Toxic Pollutants			
Total Oil and Grease	mg/L	1x/Wet Season	Discrete
Polycyclic Aromatic Hydrocarbons (PAH)*	µg/L	1x/Wet Season	Discrete

**Parameter is not permit required/Voluntary analyses by ADOT*

Table 2. Analytical Wet Weather Characterization Monitoring Year 4

Parameter	Units	Monitoring Frequency	Monitoring Type
Metals (total)			
Antimony	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Barium	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Beryllium	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Thallium	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Volatile Organic Compounds (VOC's)			
Acrolien	µg/L	1x /wet season during year 4 of the permit term	Discrete
Acrylonitrile	µg/L	1x /wet season during year 4 of the permit term	Discrete
Benzene	µg/L	1x /wet season during year 4 of the permit term	Discrete
Carbon tetrachloride	µg/L	1x /wet season during year 4 of the permit term	Discrete
Chlorobenzene	µg/L	1x /wet season during year 4 of the permit term	Discrete
Chlorodibromomethane	µg/L	1x /wet season during year 4 of the permit term	Discrete
Chloroethane	µg/L	1x /wet season during year 4 of the permit term	Discrete
2-chloroethylvinyl ether	µg/L	1x /wet season during year 4 of the permit term	Discrete
Chloroform	µg/L	1x /wet season during year 4 of the permit term	Discrete
Dichlorobromomethane	µg/L	1x /wet season during year 4 of the permit term	Discrete

1,2-dichlorobenzene	µg/L	1x /wet season during year 4 of the permit term	Discrete
1,3-dichlorobenzene	µg/L	1x /wet season during year 4 of the permit term	Discrete
1,4-dichlorobenzene	µg/L	1x /wet season during year 4 of the permit term	Discrete
1,1-dichloroethane	µg/L	1x /wet season during year 4 of the permit term	Discrete
1,2-dichloroethane	µg/L	1x /wet season during year 4 of the permit term	Discrete
1,3-dichloropropylene	µg/L	1x /wet season during year 4 of the permit term	Discrete
Ethylbenzene	µg/L	1x /wet season during year 4 of the permit term	Discrete
Methyl bromide	µg/L	1x /wet season during year 4 of the permit term	Discrete
Methyl chloride	µg/L	1x /wet season during year 4 of the permit term	Discrete
Methylene chloride	µg/L	1x /wet season during year 4 of the permit term	Discrete
1,1,2,2-tetrachloroethane	µg/L	1x /wet season during year 4 of the permit term	Discrete
Tetrachloroethylene	µg/L	1x /wet season during year 4 of the permit term	Discrete
Toluene	µg/L	1x /wet season during year 4 of the permit term	Discrete
1,2-trans-dichloroethylene	µg/L	1x /wet season during year 4 of the permit term	Discrete
1,1,1-trichloroethane	µg/L	1x /wet season during year 4 of the permit term	Discrete
1,1,2-trichloroethane	µg/L	1x /wet season during year 4 of the permit term	Discrete

Trichloroethylene	µg/L	1x /wet season during year 4 of the permit term	Discrete
Trimethylbenzene	µg/L	1x /wet season during year 4 of the permit term	Discrete
Vinyl chloride	µg/L	1x /wet season during year 4 of the permit term	Discrete
Xylene	µg/L	1x /wet season during year 4 of the permit term	Discrete
Semi-VOC's – Acid Extractables			
2-chlorophenol	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
2,4-dichlorophenol	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
2,4-dimethylphenol	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
4,6-dinitro-o-cresol	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
2,4-dinitrophenol	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
2-nitrophenol	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
4-nitrophenol	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
p-chloro-m-cresol	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Pentachlorophenol	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Phenol	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
2,4,6-trichlorophenol	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Semi-VOC's – Base/ Neutrals			
Acenaphthene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite

Acenaphthylene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Anthracene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Benz(a)anthracene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Benzo(a)pyrene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Benzo(b)fluoranthene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Benzo(g,h,i)perylene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Benzo(k)fluoranthene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Chrysene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Dibenzo(a,h)anthracene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
3,3’-dichlorobenzidine	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Diethyl phthalate	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Dimethyl phthalate	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Di-n-butyl phthalate	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
2,4-dinitrotoluene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
2,6-dinitrotoluene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Di-n-octyl phthalate	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite

1,2-diphenylhydrazine (as azobenzene)	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Fluoranthene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Fluorene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Hexachlorobenzene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Hexachlorobutadiene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Hexachlorocyclopentadiene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Hexachloroethane	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Indeno(1,2,3-cd)pyrene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Isophorone	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Naphthalene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Nitrobenzene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
N-nitrosodimethylamine	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
N-nitrosodi-n-propylamine	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
N-nitrosodiphenylamine	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Phenanthrene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Pyrene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite

1,2,4-trichlorobenzene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
PCB / Pesticides			
Aldrin	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Alpha-BHC	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Beta-BHC	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Gamma-BHC	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Delta-BHC	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Chlordane	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
4,4’-DDT	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
4,4’-DDE	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
4,4’-DDD	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Dieldrin	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Alpha-endosulfan	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Beta-endosulfan	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Endosulfan sulfate	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Endrin	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Endrin aldehyde	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Heptachlor	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite

Heptachlor epoxide	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
PCB-1242	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
PCB-1254	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
PCB-1221	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
PCB-1232	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
PCB-1248	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
PCB-1260	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
PCB-1016	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite
Toxaphene	µg/L	1x /wet season during year 4 of the permit term	Flow Proportional Composite

1.5 REGULATORY LIMITS

Analytical results will be compared to their applicable Arizona numeric water quality standards for surface water (A.A.C. Title 18, Chapter 11, Article 1) applicable to the MS4 receiving waters. Current surface water quality standards are available at the following link:

https://apps.azsos.gov/public_services/Title_18/18-11.pdf

2.0 SAMPLE COLLECTION PROCEDURES

2.1 SAMPLING EQUIPMENT

Monitoring equipment will be gathered ahead of time because opportunities to sample during rainfall events often come with little advanced notice. Stormwater monitoring generally requires the following equipment:

- Field forms
- Waterproof pens
- Permanent markers
- Powder-free nitrile gloves
- Clear glass jar for visual examinations
- Sample containers
- Sample preservatives
- Sample container labels

- Chain of Custody (COC) forms
- COC seals
- Ice chest(s)
- Ice
- Foul-weather gear

A MS4 Stormwater Sampling Equipment List is provided in Appendix B to assist sampling technicians in preparing for field activities.

2.2 SAMPLE LOCATIONS

2.2.1 Maintenance Facilities Monitoring Locations

ADOT will conduct stormwater monitoring at selected maintenance facilities, including, but not limited to:

- Nogales Maintenance Yard - 1340 N. Hohokam Drive, Nogales (31° 21’ 22.97’’ N; 110° 55’ 38.96’’ W)
- Superior Maintenance Yard - 951 Main Street, Superior (33° 17’ 14.14” N; 111° 06’ 40.31” W)
- Superior Storage and Fuel Yard - 952 Main Street, Superior (33° 17’ 17.12” N; 111° 06’ 43.49” W)

Maintenance Facility Sampling Parameters

ADOT will collect a minimum of one sample per facility from each representative outfall between June 1 and October 31 (summer season) and one sample between November 1 and May 31 (winter season). Samples will be collected utilizing in-ground passive collection bottles installed within protective mounting tubes and retrieved after a storm event.

Maintenance Facility Field Measurements

Field measurements at each maintenance location will consist of the following:

- pH
- Temperature
- Residual chlorine (Nogales Yard only)

Testing equipment will be calibrated prior to measurements and documented on a Field Bench Sheet as provided in Appendix C as per Section 6.1, Item 3 in the Permit. Additionally, field measurements will be recorded in the site location logbook. The completed Field Bench Sheet shall be submitted to ADOT for records retention.

2.2.2 Wet Weather (MS4) Monitoring Locations

ADOT will conduct stormwater monitoring at the following five established MS4 locations:

- Flagstaff 2 MS4 - S. Beulah Blvd. along north side of street between I-40 overpass and south bound I-17 exit ramp (35°10'20.23"N; 111°39'56.18"W)
- Nogales MS4 - Morley Road at Intersection of State Route 82 (31° 21’ 02.12”N; 110° 55’ 24.52”W)

- Phoenix MS4 - East of State Route 101 on north bank of Skunk Creek (33° 37’ 19.86”N; 112° 14’ 21.65”W)
- Sedona MS4 - Below western abutment of State Route 179 bridge over Oak Creek (34° 51’43.95’N; 111° 45’ 42.72”W)
- Tucson MS4 - West of Interstate 10 north of Grant Road within ADOT Yard (32° 15’ 17.21”N; 110° 59’ 49.43”W)

A map showing the MS4 sampling locations is provided in Appendix D.

MS4 Sampling Parameters

ADOT will collect stormwater samples from the first representative storm event of each wet season (June 1- October 31 and November 1- May 31) and subsequent representative storm events as necessary to collect at least one stormwater sample for each wet season from each outfall or monitoring location. Sampling will be conducted over the first 3 hours of the discharge or for the entire discharge period, if the discharge lasts less than 3 hours. Sampling efforts should include the “first flush” (first 30 minutes of stormwater discharge) whenever possible. A representative storm event is defined in the ADOT Permit as a storm event of greater than 0.1 inches of rainfall and that occurs at least 72 hours after the previously measurable (greater than 0.1 inch of rainfall) storm event.

MS4 Field Measurements

Field measurements at each MS4 location will consist of the following:

- pH
- Temperature
- Flow

Testing equipment will be calibrated prior to measurements and documented on a Field Bench Sheet as provided in Appendix C as per Section 6.1, Item 3 in the Permit. Additionally, field measurements will be recorded in the site location logbook.

MS4 Grab Samples

A minimum of one grab sample will be collected from a discharge resulting from a measurable storm event at each MS4 location and analyzed for the following:

- *Escherichia coli* (*E. coli*)
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Residual chlorine (Nogales MS4 only)

Grab sampling information for *E. coli* and PAHs will be recorded on the COC. Information for residual chlorine (Nogales MS4 only) will be recorded in the site location logbook.

MS4 Flow-Weighted Composite Samples

Flow-weighted composite samples will be collected at each MS4 location utilizing an ISCO automated stormwater sampler. Sampling will be conducted over the first three hours of the discharge or for the entire discharge period if the discharge is less than three hours. A list of analyses required for flow-weighted sampling is provided in Table 1 and 2 (see page 3 of this document).

2.3 QUALITY ASSURANCE/QUALITY CONTROL SAMPLING

The Quality Assurance/Quality Control (QA/QC) program ensures that samples collected are of the highest quality and the laboratory analyzing the samples is producing reliable results. In order to be certified by ADHS, an analytical laboratory is required to have a Quality Assurance Plan (QAP) or Quality Assurance Manual (QAM) that contains a set of QA/QC procedures covering all aspects of laboratory operations. The contracted laboratory will be required to provide a copy of its QAP and maintained on file by ADOT or their contractor.

Contamination can be introduced to a sample at any point during equipment preparation, sample collection, transport, or analysis steps and is referred to as sample bias. Standardized procedures for field and laboratory activities minimize the likelihood of contamination of samples or sample bias. Different types of blank samples can be used to determine if contamination has been introduced during any of the steps. The different types of blanks are described in the remainder of this section.

Section 4 of this document outlines required correction procedures in the event of surface water quality standard exceedance.

Trip Blanks

A trip blank sample shall be analyzed every fifth sampling event to estimate sample bias in volatile organic compound (VOC) analyses and analyzed for VOCs during every sampling event. Trip blank samples will be provided by the laboratory and will remain with the sample containers throughout the sampling and shipping process.

Equipment Blanks

Equipment blanks shall be collected by pouring analyte-free water over the decontaminated field equipment before collecting samples from a site. One equipment blank sample will be collected during seasonal maintenance activity (winter and summer). The equipment blank will be submitted to the laboratory and analyzed for the same parameters as the site sample(s).

Matrix Spikes and Matrix Spike Duplicates

Matrix spikes and matrix spike duplicates (MS/MSD) are collected at the same location as the original samples and the laboratory adds (spikes) the sample with a known concentration of analyte to a sample. The samples are then analyzed to determine the concentration of the sample plus the spike. Deviation from 100 percent in the spike recoveries indicates matrix interference. One MS/MSD will be collected for every ten VOC.

Method Blanks

A method blank is used to determine if any contamination is being introduced by laboratory reagents or glassware. For each batch of samples, method blanks will be run by the laboratory

and the results of the method blank analysis reported with the sample results as percent recovery. Method blanks are conducted by the laboratory and no action on the part of the field sampling personnel is required.

Laboratory Duplicates
A laboratory duplicate is a sample that is split into two aliquot samples and then analyzed separately to determine the reproducibility of the laboratory analytical methods. Results of the laboratory duplicate analysis is reported with the sample results. At least one laboratory duplicate sample should be collected once a year from the five MS4 sampling locations. Laboratory duplicates are conducted by the laboratory and no action on the part of the field sampling personnel is required.

2.4 PRESERVATIVES AND HOLDING TIMES

Water sample preservation procedure is based on the particular type of analysis methodology.

- Bottle sets are typically shipped from the contract laboratory with preservatives contained in the bottle but may include separately-contained preservative vials for special circumstances.
- The type of preservative used for the analysis to be performed is typically identified by a colored dot or sticker on the pre-preserved bottle, which may also include a written notation of the added preservative.
- Sample bottles should be shipped for each sampling event on a per event/request basis.
- Bottles shall be new and contain the pre-measured amount of the preservative, except as noted above.
- Any pre-preserved bottle that is discolored around the cap, lost its preservative label, or appears to lack sufficient preservative shall be discarded.
- A crucial requirement for sample preservation is to extract the sample within established hold times for the specific analysis.

A list of analysis methods, bottle requirements, preservatives and hold times for the required analysis is listed in Table 3 and 4 and in accordance with EPA SW-846 requirements.

Table 3. Preservatives and Holding Times

Analysis	Method	Preservative	Container	Volume Required	Hold Time
Hardness	6010B	Nitric Acid	Plastic 250 mL - Wide	250 mL	28 Days
Total Suspended Solids (TSS)	2540D	None	Plastic 500 mL - Wide-unpreserved	200 mL	7 Days
Escherichia coli (E. coli)	9221F	None	Bacti Bottle 125 mL - Idexx	125 mL	8 Hours
Mercury (CVAA)	245.1 CWA	Nitric Acid	Plastic 500 mL - Wide	100 mL	28 Days
Metals (ICP)	200.7 CWA	Nitric Acid	Plastic 500 mL - Wide	100 mL	180 Days
Metals (ICP/MS)	200.8 CWA LL	Nitric Acid	Plastic 500 mL - Wide	100 mL	180 Days
Nitrate plus Nitrite as N	353.2	Sulfuric Acid	Plastic 250 mL - Wide	250 mL	28 Days
Ammonia as N	350.1	Sulfuric Acid	Plastic 250 mL - Wide	250 mL	28 Days
Total Kjeldahl Nitrogen (TKN) as N	351.2	Sulfuric Acid	Plastic 250 mL - Wide	250 mL	28 Days
Total Phosphorus	365.4	Sulfuric Acid	Plastic 250 mL - Wide	250 mL	28 Days
Total Oil and Grease	1664A	Hydrochloric Acid	Glass/Clear - Wide	1 L	180 Days
Metals (ICP)	200.7 CWA	Nitric Acid	Plastic 500 mL - Wide	100 mL	180 Days
Metals (ICP/MS)	200.8 CWA LL	Nitric Acid	Plastic 500 mL - Wide	100 mL	180 Days
PAH	8310	None	1 Liter Amber - Wide	2000 mL	7 Days
VOC's	8260B	HCL	40 ml Amber- VOA	40 mL	14 Days
Semi-VOC's - Acid Extractables	8270C	None	40 ml Amber- VOA	40 mL	7 Days
Semi-VOC's - Base/Neutrals	8270C	None	40 ml Amber- VOA	40mL	7 Days
PCB / Pesticides	8082	None	1 Liter Amber - Wide	1 L	7 Days

2.5 SAMPLE NOMENCLATURE

A consistent system for naming samples ensures that sample data are readily identifiable as to time and location and avoids confusion when samples are collected regularly at the same location over a long period of time. All samples should be named according to the following two-part labeling system:

Part 1 - Location Code

FLAG2 – Flagstaff2 MS4
NOGMS4 - Nogales MS4
PHX - Phoenix MS4
SED - Sedona MS4
TUC - Tucson MS4

NOGYARD - Nogales Maintenance Yard
SUPYARD - Superior Maintenance Yard
SUPFUEL - Superior Storage and Fuel Yard

Part 2 - Date Code
Include the date in the following format: YYMMDD. An example sample from the Phoenix MS4 sampling location collected on November 26, 2021 would be labeled:

PHX211126

An example of a completed COC is provided in Appendix E of this document.

Laboratory Selection
Laboratories selected for analyses of stormwater samples may include any ADHS certified laboratory. Currently, the following labs have been providing service to ADOT for stormwater analyses:

- Pace Analytical
- Turner Laboratories, Inc.
- Xenco Laboratories

The sampling technician will also document field measurements and observations in the Stormwater Sampling Data Form provided in Appendix F or within the site logbook. Completed Stormwater Sampling Data Forms shall be submitted to ADOT for records retention.

3.0 APPROVED ANALYTICAL METHODS

3.1 ANALYTICAL METHODS

The recommended analytical methods, limits of quantification (LOQs) and method detection limits (MDLs) for specific analytes are provided in Table 4 below and are in accordance with EPA SW-846 requirements.

The analytical method will be specified on the COC form. In addition to these requirements, the Permit requires the selected analytical method to have a LOQ less than the applicable numeric surface water quality standard. If all methods have LOQs higher than applicable numeric surface water quality criteria, ADOT must use the approved analytical method with the lowest LOQ. The laboratory contracted for ADOT stormwater sample analysis must also use a standard calibration where the lowest standard point is equal to or less than the LOQ. This will be verified through review of laboratory data in comparison of the LOQ to surface water quality standards.

Table 4. Analytical Methods Years 1-5

Analyte	Method	LOQ	MDL	Units
Hardness	SM 2340B	3.3	0.07	mg/L
Total Dissolved Solids	SM 2540C	20.0	20	mg/L
Escherichia Coli (E. coli)	SM 9221F	1.8	1.8	MPN/100 mL
Arsenic	200.8 LL	0.5	0.247	µg/L
Barium	200.8 LL	0.5	0.259	µg/L
Cadmium	200.8 LL	0.5	0.0231	µg/L
Chromium	200.8 LL	0.5	0.433	µg/L
Copper	200.8 LL	0.5	0.332	µg/L
Lead	200.8 LL	0.5	0.220	µg/L
Mercury	245.1	0.0002	0.00007	mg/L
Selenium	200.8 LL	0.5	0.0743	µg/L
Silver	200.8 LL	0.1	0.0121	µg/L
Zinc	200.8 LL	12.5	3.12	µg/L
Acenaphthene	8310	40.3	1.8	µg/L
Acenaphthylene	8310	45.1	2.3	µg/L
Anthracene	8310	28.7	0.66	µg/L
Benzo(a)anthracene	8310	4.0	0.013	µg/L
Benzo(a)pyrene	8310	4.0	0.023	µg/L
Benzo(b)fluoranthene	8310	3.1	0.018	µg/L
Benzo(ghi)perylene	8310	2.3	0.076	µg/L
Benzo(k)fluoranthene	8310	2.5	0.017	µg/L
Chrysene	8310	4.2	0.15	µg/L
Dibenzo(a,h)anthracene	8310	2.0	0.030	µg/L

Fluoranthene	8310	3.0	0.21	µg/L
Fluorene	8310	43.0	0.21	µg/L
Indeno(1,2,3-cd)pyrene	8310	3.0	0.043	µg/L
Naphthalene	8310	40.7	1.8	µg/L
Phenanthrene	8310	37.7	0.64	µg/L
Pyrene	8310	3.4	0.27	µg/L
Nitrate plus Nitrite as N	300.0	0.1	0.05	mg/L
Ammonia as N	350.1	0.25	0.12	mg/L
Total Kjeldahl Nitrogen (TKN) as N	351.2	0.25	0.14	mg/L
Total Phosphorus	365.4	0.10	0.04	mg/L
Total Oil and Grease	1664A	0.25	0.12	mg/L

Table 5. Analytical Methods Year 4

Analyte	Method	LOQ	MDL	Units
Volatile Organic Compounds (VOC's)				
Acrolien	8260B	0.05	0.00254	mg/L
Acrylonitrile	8260B	0.01	0.00067	mg/L
Benzene	8260B	0.001	0.00009	mg/L
Carbon tetrachloride	8260B	0.001	0.00013	mg/L
Chlorobenzene	8260B	0.001	0.00012	mg/L
Chlorodibromomethane	8260B	0.001	0.00014	mg/L
Chloroethane	8260B	0.005	0.00019	mg/L
2-chloroethylvinyl ether	8260B	0.001	0.00011	mg/L
Chloroform	8260B	0.005	0.00011	mg/L
Dichlorobromomethane	8260B	0.001	0.00012	mg/L
1,2-dichlorobenzene	8260B	0.001	0.00011	mg/L
1,3-dichlorobenzene	8260B	0.001	0.00011	mg/L
1,4-dichlorobenzene	8260B	0.001	0.00012	mg/L
1,1-dichloroethane	8260B	0.001	0.0001	mg/L
1,2-dichloroethane	8260B	0.001	0.00019	mg/L
1,3-dichloropropylene	8260B	0.3001	0.00015	mg/L
Ethylbenzene	8260B	0.001	0.00014	mg/L
Methyl bromide	8260B	0.005	0.00043	mg/L
Methyl chloride	8260B	0.005	0.00043	mg/L
Methylene chloride	8260B	0.005	0.00043	mg/L
1,1,2,2-tetrachloroethane	8260B	0.001	0.00013	mg/L
Tetrachloroethylene	8260B	0.001	0.0030	mg/L
Toluene	8260B	0.001	0.00028	mg/L
1,2-trans-dichloroethylene	8260B	0.001	0.00012	mg/L
1,1,1-trichloroethane	8260B	0.001	0.00015	mg/L
1,1,2-trichloroethane	8260B	0.001	0.00015	mg/L
Trichloroethylene	8260B	0.001	0.00019	mg/L
Trimethylbenzene	8260B	0.001	0.00016	mg/L
Vinyl chloride	8260B	0.001	0.00023	mg/L

Xylene	8260B	0.003	0.00017	mg/L
Semi VOC's – Acid Extractables				
2-chlorophenol	8270C	0.01	0.00013	mg/L
2,4-dichlorophenol	8270C	0.01	0.0001	mg/L
2,4-dimethylphenol	8270C	0.01	0.00006	mg/L
4,6-dinitro-o-cresol	8270C	0.01	0.00112	mg/L
2,4-dinitrophenol	8270C	0.01	0.00593	mg/L
2-nitrophenol	8270C	0.01	0.00012	mg/L
4-nitrophenol	8270C	0.01	0.00014	mg/L
p-chloro-m-cresol	8270C	0.01	0.00013	mg/L
Pentachlorophenol	8270C	0.01	0.00031	mg/L
Phenol	8270C	0.01	0.00433	mg/L
2,4,6-trichlorophenol	8270C	0.01	0.0001	mg/L
Semi-VOC's – Base/ Neutrals				
Acenaphthene	8270C	0.01	0.000089	mg/L
Acenaphthylene	8270C	0.01	0.000092	mg/L
Anthracene	8270C	0.01	0.00008	mg/L
Benz(a)anthracene	8270C	0.01	0.0002	mg/L
Benzo(a)pyrene	8270C	0.01	0.00038	mg/L
Benzo(b)fluoranthene	8270C	0.01	0.00013	mg/L
Benzo(g,h,i)perylene	8270C	0.01	0.00012	mg/L
Benzo(k)fluoranthene	8270C	0.01	0.00012	mg/L
Chrysene	8270C	0.01	0.00013	mg/L
Dibenzo(a,h)anthracene	8270C	0.01	0.00008	mg/L
3,3'-dichlorobenzidine	8270C	0.01	0.00021	mg/L
Diethyl phthalate	8270C	0.01	0.00029	mg/L
Dimethyl phthalate	8270C	0.01	0.00026	mg/L
Di-n-butyl phthalate	8270C	0.01	0.00045	mg/L
2,4-dinitrotoluene	8270C	0.01	0.000098	mg/L
2,6-dinitrotoluene	8270C	0.01	0.00025	mg/L
Di-n-octyl phthalate	8270C	0.01	0.00093	mg/L
1,2-diphenylhydrazine	8270C	0.01	0.00084	mg/L
Fluoranthene	8270C	0.01	0.0001	mg/L
Fluorene	8270C	0.01	0.000084	mg/L
Hexachlorobenzene	8270C	0.01	0.000076	mg/L
Hexachlorobutadiene	8270C	0.01	0.000006	mg/L
Hexachlorocyclopentadiene	8270C	0.01	0.00013	mg/L
Hexachloroethane	8270C	0.01	0.00013	mg/L
Indeno(1,2,3-cd)pyrene	8270C	0.01	0.00028	mg/L
Isophorone	8270C	0.01	0.00014	mg/L
Naphthalene	8270C	0.01	0.00026	mg/L
Nitrobenzene	8270C	0.01	0.0003	mg/L
N-nitrosodimethylamine	8270C	0.01	0.00026	mg/L
N-nitrosodi-n-propylamine	8270C	0.01	0.001	mg/L
N-nitrosodiphenylamine	8270C	0.01	0.00237	mg/L
Phenanthrene	8270C	0.01	0.00011	mg/L

Pyrene	8270C	0.01	0.00011	mg/L
1,2,4-trichlorobenzene	8270C	0.01	0.00007	mg/L
PCB / Pesticides				
Aldrin	8082	0.001	0.0000500	mg/L
Alpha-BHC	8082	0.001	0.0000500	mg/L
Beta-BHC	8082	0.001	0.0000500	mg/L
Gamma-BHC	8082	0.001	0.0000500	mg/L
Delta-BHC	8082	0.001	0.0000500	mg/L
Chlordane	8082	0.001	0.00500	mg/L
4,4'-DDT	8082	0.001	0.0000500	mg/L
4,4'-DDE	8082	0.001	0.0000500	mg/L
4,4'-DDD	8082	0.001	0.0000500	mg/L
Dieldrin	8082	0.001	0.0000500	mg/L
Alpha-endosulfan	8082	0.001	0.0000500	mg/L
Beta-endosulfan	8082	0.001	0.0000500	mg/L
Endosulfan sulfate	8082	0.001	0.0000500	mg/L
Endrin	8082	0.001	0.0000500	mg/L
Endrin aldehyde	8082	0.001	0.0000500	mg/L
Heptachlor	8082	0.001	0.0000500	mg/L
Heptachlor epoxide	8082	0.001	0.0000500	mg/L
PCB-1242	8082	0.001	0.0000500	mg/L
PCB-1254	8082	0.001	0.0000500	mg/L
PCB-1221	8082	0.001	0.0000500	mg/L
PCB-1232	8082	0.001	0.0000500	mg/L
PCB-1248	8082	0.001	0.0000500	mg/L
PCB-1260	8082	0.001	0.0000500	mg/L
PCB-1016	8082	0.001	0.0000500	mg/L
Toxaphene	8082	0.001	0.000500	mg/L

3.2 QUALITY CONTROL RESULTS

The subcontracted laboratory will provide the standard Level II data package with the analytical results. This will provide the QA/QC data necessary to evaluate the laboratory results. The standard Level 2 data package with reports include all of the elements of a Level 1 report (the sample analytical results) and also include surrogates and batch QC results. This allows for review of the reliability of the sample data provided. The laboratory shall be submitted to ADOT for records retention.

3.3 ACCEPTANCE CRITERIA

The process of acceptance criteria for laboratory data is important to ensure quality and reliability of the sample results. This process will be conducted by ADOT and/or their designated contractor and may include one or more of the following elements:

- Percent recovery of the laboratory control sample
- Percent recovery of the matrix spike
- Percent difference of the matrix spike duplicate

- Laboratory duplicates and field duplicates
- Replicate analyses

If the sample doesn't completely comply with the criteria, it must be rejected and new sample collected and analyzed.

4.0 CORRECTIVE ACTION

Corrective action is required in response to administrative or technical failures. Any corrective action required will be implemented and documented accordingly. Once the corrective action is identified, ADOT personnel or their designated contractor will initiate activities and provide appropriate documentation of actions taken. A copy of the corrective action will be maintained with this QAM and kept on file for a minimum of five years past the date of the expired permit. The contractor shall document the corrective action in a technical memorandum and submit it to ADOT for records retention.

4.1 Laboratory Corrective Action

Failures in laboratory measurement systems include, but are not limited to: instrument malfunction, calibration failure, sample container breakage, contamination, and QC sample failure. If the failure can be corrected, the analyst documents the issue and resolution in the laboratory records and completes the analyses. If the failure is not resolved, it is conveyed to the respective supervisor who will determine if the analytical failure compromised associated results. The nature and disposition of the problem must be documented in the data report sent to the ADOT Project Manager.

4.2 Field Corrective Action

The field technician team is responsible for responding to failures in their sampling and field measurement systems. These failures may include equipment or technical failures as presented below:

- *Equipment Failures* - If monitoring equipment fails, personnel are to record the issue accordingly. Failing equipment must be replaced or repaired prior to subsequent sampling events.
- *Technical Failures* - Technical failures may include dropped or broken sample containers during collection due to site conditions (rain, low visibility, slick surfaces, etc.). If such an event occurs the sampling technician will document the occurrence in the site logbook.

It is the combined responsibility of all members of the field sampling team to determine if requirements of the specific sampling method have been met. The field sampling team will also determine if additional sampling is required and analyses is required.

5.0 DATA REVIEW

The initial data review is conducted by the laboratory to verify holding times, proper COC procedures, preservation, sample data, QC sample data, and laboratory QC data. Any deviations from the requirements are noted by the laboratory and reported with the analytical results.

5.1 REVIEW PROCESS

The laboratory will provide a standard Level II data package and standard turnaround time for analytical results. Standard turnaround times for laboratory data of two to three weeks for electronic data are generally satisfactory for stormwater samples. Receiving the electronic data more quickly allows an early data review to identify any problems that may be corrected through re-extraction or re-analysis of leftover sample still at the laboratory (unless notified to do otherwise, the laboratory only keeps leftover samples for 30 days). The data package should be delivered as electronic.

The data package will include a narrative identifying any problems, corrections, anomalies, and conclusions, as well as completed COC documentation. The standard Level II data package will include:

- Sample extraction and analysis dates
- Results of method blanks
- Summary of analytical accuracy (matrix spike, duplicate compound recoveries, and lab control samples)
- Summary of analytical precision (comparison of laboratory control samples, matrix duplicate, and matrix spike duplicate results)
- Summary of organic method performance (surrogate spike compound recoveries)
- Practical Quantitation Limits (PQLs) and MDLs

The field sampling sheets and analytical data package will be reviewed for unacceptable procedures in the field or laboratory. Analytical data will be reviewed as soon as it is received from the laboratory.

5.2 REPORTING RESULTS

The Permit requires sampling results from the field sampling data forms and the laboratory to be included in the Annual Report. This reporting is the responsibility of the ADOT Water Resources Group.

5.3 RESOLVING DATA QUALITY ISSUES

A Data Quality Assurance Worksheet as provided in Appendix G will be completed upon receipt of laboratory reports to assist in validity of the data. The purpose of this review is not to reject that data, but rather assist in improving the data collection process. In general, given the time constraints involved in stormwater sampling, exceeded hold times on analyses for E. coli and fecal coliform will not automatically trigger resampling. These data will be flagged as necessary

for reporting purposes. The completed worksheet shall be submitted to ADOT for records retention.

5.4 DATA USE LIMITATIONS

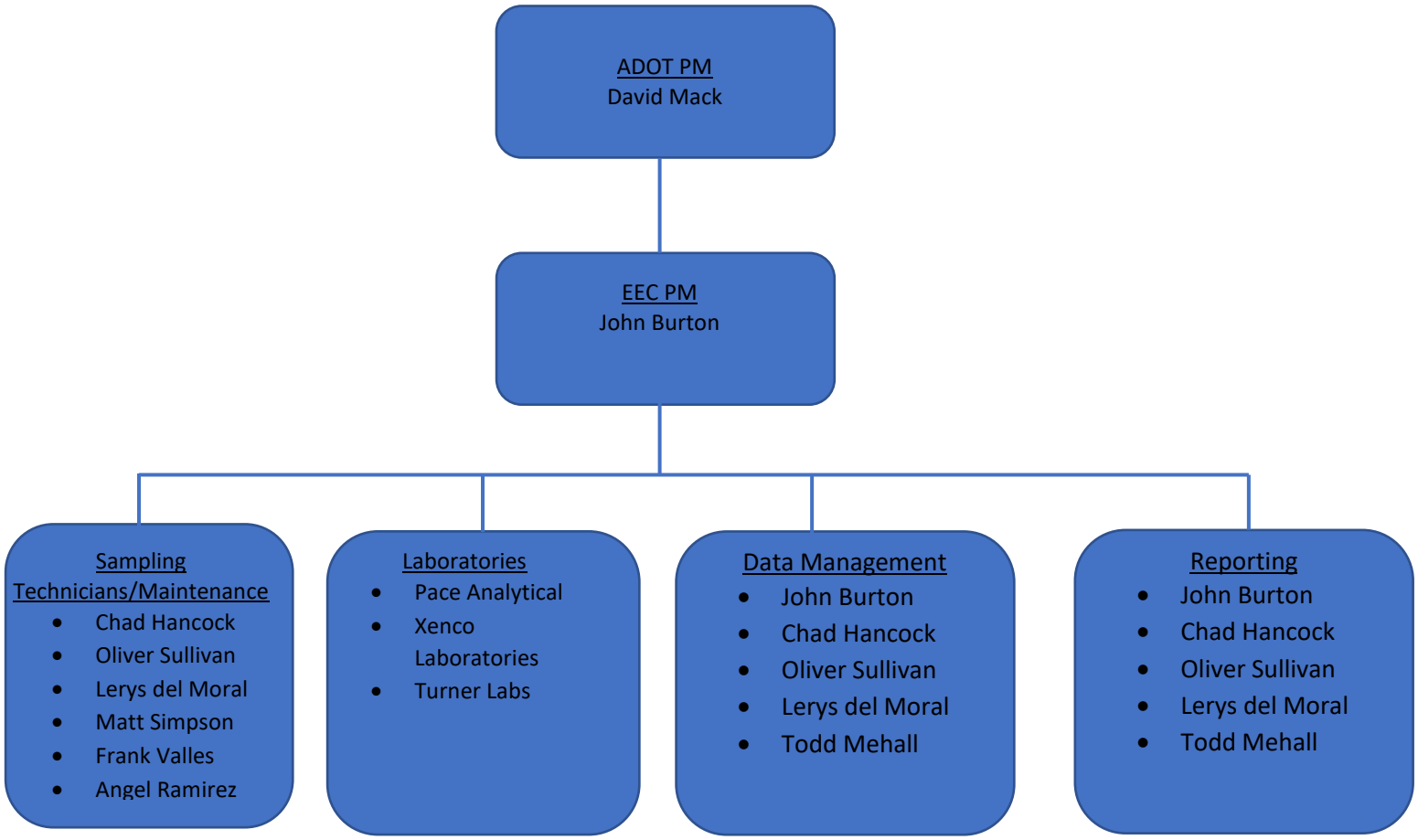
Data use limitations may also be identified in the Data Quality Assurance Worksheet as provided in Appendix G. Data that do not meet the measurement performance criteria specified in this QAM will be identified and the impact on the project quality objectives documented. Specific actions for data that do not meet the measurement performance criteria depend on the use of the data and may require additional samples be collected or the use of the data restricted. Determination of the overall data quality for a specific sampling event program will be conducted upon receipt of final laboratory report.

5.5 DATA RETENTION

Data will be retained by ADOT for a period of 5 year past the expired/termination date of the permit.

Appendix A: Project Organization Chart

Project Organization Chart



Appendix B: MS4 Stormwater Sampling Equipment List

MS4 Stormwater Sampling Equipment List
(all equipment may not be required)

Documentation

____field log book or
____laminated field book
____camera(if required)
____GPS (if required)

Sample Collection

____disp. bailers____>qty.
____disp. filters____>qty.
____disp. gloves
____pH/temp/SC/E_h meter
____peristaltic pump
____geo-pump tubing
_____calibration standards
_ 200' garden hose
_ 350' rope for bailing
____electric wire pigtails
____controller for ready-flow II
____QED Pump controller
____QED compressor
____solinist
____long solinist
_ 1/4" poly tubing
____discharge hose
____4 water pales & lids
____decon tube for pump
____Hand Radios
____Keck

Access/Maintenance

____tool box
_ 3/8" socket set
____shovel
____decon soap
____sponges
____deionized water
____loppers
____machete
____bow saw
____J-plugs

Sample Shipping

____shipping tape/dispenser
____coolers 1_ >qty.
____custody seals
____shipping labels

Health and Safety

____first aid kit
____fire extinguisher
____local phone book
____mobile phone
____shade umbrella
____water igloo container
____truck flags

Personal Gear

____hard hat
____respirator
____coveralls
____rain gear
____hard toed boots
____safety glasses
____personal cooler

MS4 Stormwater Sampling Equipment List
(all equipment may not be required)

Documentation

____field log book or
____laminated field book
____camera(if required)
____GPS (if required)

Sample Collection

____disp. bailers____>qty.
____disp. filters____>qty.
____disp. gloves
____pH/temp/SC/E_h meter
____peristaltic pump
____geo-pump tubing
_____calibration standards
_ 200' garden hose
_ 350' rope for bailing
____electric wire pigtails
____controller for ready-flow II
____QED Pump controller
____QED compressor
____solinist
____long solinist
_ 1/4" poly tubing
____discharge hose
____4 water pales & lids
____decon tube for pump
____Hand Radios
____Keck

Access/Maintenance

____tool box
_ 3/8" socket set
____shovel
____decon soap
____sponges
____deionized water
____loppers
____machete
____bow saw
____J-plugs

Sample Shipping

____shipping tape/dispenser
____coolers 1_ >qty.
____custody seals
____shipping labels

Health and Safety

____first aid kit
____fire extinguisher
____local phone book
____mobile phone
____shade umbrella
____water igloo container
____truck flags

Personal Gear

____hard hat
____respirator
____coveralls
____rain gear
____hard toed boots
____safety glasses
____personal cooler

Appendix C: Field Bench Sheet

ADOT

FIELD BENCH SHEET
pH and Chlorine Meter Calibration

Date:_____Time:_____ Site:_____

Tech Name:_____

Probe "pH" Cal:	**pH**	**Temp.**	**Comments**
Buffer 4	_____	_____	_____
Buffer 7	_____	_____	_____

Observations:

Does probe need replacing? Y/N

If yes describe action taken:

Other:

_____
_____
_____

Chlorine Meter Calibration (Nogales sampling only):

Calibration Point 1: Reading Deionized Water _____

Calibration Point 2: Reading with Reagent _____

Appendix D: ADOT MS4 Sampling Locations

ADOT MS4 Sampling Locations

Appendix E: Example Chain-of-Custody Form

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-standard-terms.pdf

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

For Example Use Only

ALL BOLD OUTLINED AREAS are for LAB USE ONLY

Company: EEC

Address: 7740 N. 16th St., Phoenix, AZ 85020

Billing Information: ap@eeccorp.com

Report To: John Burton

Email To: jburton@eeccorp.com

Copy To: Oliver Sullivan

Site Collection Info/Address: Phoenix MS4

Customer Project Name/Number: ADOT Stormwater

State: / County/City: Time Zone Collected: [ ]PT [ ]MT [ ]CT [ ]ET

Phone: 602-248-7702
Email: jburton@eeccorp.com

Site/Facility ID #: ADOT

Compliance Monitoring? [ ] Yes [X] No

Collected By (print): Print

Purchase Order # :
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature): Sign

Turnaround Date Required:

Immediately Packed on Ice: [ ] Yes [ ] No

Sample Disposal:
[ ] Dispose as appropriate
[ ] Return
[ ] Archive: _____
[ ] Hold: _____

Rush: (Expedite Charges Apply)
[ ] Same Day [ ] Next Day
[ ] 2 Day [ ] 3 Day
[ ] 4 Day [X] 5 Day

Field Filtered (if applicable): [ ] Yes [ ] No

Analysis: _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Container Preservative Type **

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Lab Project Manager:

Analyses

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Container Type: Plastic (P) or Glass (G)	AGICP, ASICP, BICP, CDI 250ml HDPE-HNO3	COLILERT Microbiological	NH3, NO2NO3, PT, TKN, 250 ml HDPE-H2SO4	OGHEX 1L-Clr-WT-HCL	PAHSIMLVI 40ml Amb-No Pres-WT	TSS 1L-HDPE No Pres
PHX211126	SW	Complete	Complete	Complete	Complete	Complete				X	X	X	X	X	X

Lab Profile/Line:

```
Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N NA
Custody Signatures Present   Y N NA
Collector Signature Present  Y N NA
Bottles Intact               Y N NA
Correct Bottles              Y N NA
Sufficient Volume            Y N NA
Samples Received on Ice      Y N NA
VOA - Headspace Acceptable   Y N NA
USDA Regulated Soils         Y N NA
Samples in Holding Time      Y N NA
Residual Chlorine Present    Y N NA
Cl Strips: _____
Sample pH Acceptable         Y N NA
pH Strips: _____
Sulfide Present              Y N NA
Lead Acetate Strips: _____

LAB USE ONLY:
Lab Sample # / Comments:
```

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours) : Y N N/A

Lab Tracking #:

Samples received via: FEDEX UPS Client Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: _____
Cooler 1 Temp Upon Receipt: __oC
Cooler 1 Therm Corr. Factor:___oC
Cooler 1 Corrected Temp: _____oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Signature	Date and Time	Lab to complete	Lab to complete
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: _____
of: _____

Appendix F: Stormwater Sampling Data Form

MS4 Stormwater Sampling

Sample ID: _____ Sample Date: _____

Sampler Name(s): _____ Time (24 hr time): _____

Sampling Event (circle): Summer / Winter

Site Parameter	Reading	Comments
Flow (gpm)		
pH (SU)		
Temperature (0C)		

*Note: Site parameter readings are not required for Yard Sites

CURRENT WEATHER:

General Conditions _____

Temperature (F^0) _____

Sample Technician Name: _____

Appendix G: Data Quality Assurance Worksheet

ADOT

Data Quality Assurance Worksheet

Monitoring Site: _____

Sample Date: _____ Sample Time: _____

Sample Type (Circle): Grab Flow-Proportional Duplicate Split

Analytical Laboratory: _____

		YES (√)	NO (√)	REMARKS
All Samples	Did the laboratory analyze all parameters requested on the chain of custody?			
	Were the samples analyzed with the analytical methods specified in the monitoring plan?			
	Were all holding times met by both the monitoring personnel and the laboratory?			
	Were the reported values at or below the reporting limits specified in the monitoring plan?			

		YES (√)	NO (√)	REMARKS
QC Samples	For duplicate samples: Does sample duplicate precision meet the specified criteria?			
	For split samples: Does sample duplicate precision meet the criteria specified in the monitoring plan?			
	If not, did the laboratories use the same analytical methods?			