Field Sampling Plan for Stormwater Quality Monitoring in Compliance with Permit NMR04B000 Santa Fe County

Prepared for

Santa Fe County

Prepared by

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Project Coordinator
Santa Fe County

Date

Table of Contents

List of Figures

List of Tables

List of Appendices

List of Acronyms and Abbreviations

$CaCO_3$	calcium carbonate
CFR	Code of Federal Regulations
CoCoRaHS	Community Collaborative Rain, Hail, and Snow Network
County	Santa Fe County
DBS&A	Daniel B. Stephens & Associates, Inc.
DI	deionized
DO	dissolved oxygen
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
FSP	field sampling plan
GIS	geographic information system
MDL	method detection limit
MS4	municipal separate storm sewer system
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
PCB	Polychlorinated biphenyl
PPE	personal protective equipment
QA/QC	quality assurance/quality control
QAPP	quality assurance project plan
RL	reporting limit
SOP	standard operating procedure
SWQB	Surface Water Quality Bureau [NMED]
TBD	to be determined
TMDL	total maximum daily load
USGS	U.S. Geological Survey
WWTP	wastewater treatment plant

1. Introduction

Daniel B. Stephens & Associates, Inc. (DBS&A) has prepared this field sampling plan (FSP) is to provide a detailed description of the methods used by the Santa Fe County (the County) to collect water quality samples in accordance with the Wet Weather Monitoring Plan requirements in the U.S. Environmental Protection Agency (EPA) municipal separate storm sewer system (MS4) Permit (No. NMR04B000) (the EPA MS4 Statewide Permit) (U.S. EPA, 2026), which is anticipated to be issued in early 2027. The project area is Santa Fe County in the Santa Fe Urbanized area. The project area is located in the Santa Fe River Watershed, which is a sub-basin of the larger Rio Grande Watershed (Figure 1). The Santa Fe River Watershed encompasses the Santa Fe River and all its contributing streams, arroyos, and watercourses, and covers over 180,000 acres.

This FSP was prepared in accordance with standard operating procedure (SOP) 2.1 of the New Mexico Environment Department (NMED): Field Sampling Plan Development and Execution. This FSP will serve as a guide for County staff and contractors who engage in the compliance sampling used for watershed monitoring. Adherence to this FSP will ensure collection of samples in accordance with the requirements of the EPA MS4 Statewide Permit.

This FSP references the County quality assurance project plan (QAPP), which was developed concurrently with the FSP. The QAPP describes data quality objectives and the necessary measures required to meet them. This FSP also references an SOP, which provides detailed instructions for specific tasks.

This FSP covers field activities related to the collection of compliance water quality samples. The QAPP is a broader document applicable to all stormwater quality sampling and data associated with the County's EPA MS4 Statewide Permit compliance and conforms to EPA standards under 40 CFR 136. The SOP supplements the FSP and QAPP by providing detailed procedures for conducting specific activities. Although developed for this FSP, the SOP may also be used for other County activities as appropriate.

2. Project Personnel

Table 1 details the responsibilities for this project. Each team member is responsible for implementing the assigned responsibilities. If an individual is unable to fulfill his/her duties, it is

that individual's responsibility to find assistance and/or a replacement, in coordination with appropriate supervisors.

Table 1. Personnel Roles and Responsibilities

Team Member	Position/Role	Responsibilities
County Staff	Project Coordinator	▪ Coordinates monitoring planning efforts. ▪ Coordinates and participates in the collection of chemical data. ▪ Provides monitoring results and writes appropriate portions of the MS4 annual report.
County Staff	Water quality sample collection	Collects water quality samples and delivers samples to analytical laboratory.
Contractors to County	TBD; may support water quality sample collection	Assists R&W staff with collection of water quality samples and delivers samples to analytical laboratory.

3. Project Description

3.1 Background

EPA published the EPA MS4 Statewide Permit in 2026. It is proposed to replace the 2007 NMR040000 small MS4 National Pollutant Discharge Elimination System (NPDES) permit, which expired in 2012 but was administratively continued. The EPA MS4 Statewide Permit authorizes stormwater discharges to waters of the U.S. from large and small MS4s within New Mexico.

In New Mexico, stormwater MS4 general permits are written, managed, and enforced by EPA Region 6. The NMED Surface Water Quality Bureau (SWQB) assists EPA in regulation of stormwater discharges by performing inspections on behalf of EPA and by serving as a local point of contact for providing information to operators and other agencies regarding this federal regulatory program. To facilitate oversight, reporting, and sharing of data with EPA and NMED, this FSP has been developed to conform, as applicable, to the FSP and QAPP measures used by the NMED SWQB.

3.2 Objectives

The objective of this FSP is to describe in detail the methods used to conduct wet weather water quality sampling. The EPA MS4 Statewide Permit directs permittees to develop and implement a

Wet Weather Monitoring Plan designed to meet permit objectives. The proposed Wet Weather Monitoring Plan may propose sample collection, timing, or other monitoring techniques to address constraints on sampling programs due to local geographical and climate conditions.

3.3 Sample Frequency

Per the EPA MS4 Statewide Permit, sampling must be conducted at a minimum of eight events per sampling location during the permit term, with at least four events in the wet season and two events in the dry season. Seasonal monitoring periods are as follows:

- Wet Season: July 1 to October 31
- Dry Season: November 1 to June 30

Monitoring methodology for both seasons will consist of collecting a minimum of four grab samples spaced at a minimum interval of 15 minutes each. Individual grab samples for each sampling location will be preserved and combined into a single composite sample in the field.

4. Monitoring Locations

The project area is Santa Fe County in the Santa Fe Urbanized area located in the Santa Fe River Watershed, which is a sub-basin of the larger Rio Grande Watershed (Figure 1).

Monitoring locations have been identified and are proposed to meet the EPA MS4 Statewide Permit requirements as identified in Part III.A. The EPA MS4 Statewide Permit requires that monitoring locations be sufficient to assess the effects of stormwater discharges on receiving waters. The monitoring locations are typically located on the waterbodies that flow into the MS4 jurisdictional area (upstream) and where the river flows out of the MS4 jurisdictional area (downstream). However, within the County's MS4 jurisdiction, upstream monitoring locations consist primarily of ephemeral channels that are dry for much of the year and only convey flow during precipitation events. As a result, collection of pre-storm or baseline samples is infeasible, as no standing or baseflow conditions exist prior to storm events.

In the City's northwest (NW) area, the County proposes to collect samples from the Santa Fe River at the South Meadows Road Bridge to assess stormwater discharges from the County's upstream MS4 jurisdiction into the Santa Fe River. For upstream and receiving-water characterization, the County will rely on complementary monitoring conducted by the City of

Santa Fe. For the Community College District area and La Cienega area, downstream samples will be collected from Cienega Creek upstream of its confluence with the Santa Fe River.

As required in the draft EPA MS4 Statewide Permit, in response to monitoring results, the County proposes a contingency monitoring approach whereby additional monitoring data may be collected within the MS4 or at other appropriate locations if results indicate that MS4 discharges may be contributing to exceedances of applicable water quality standards. Proposed contingency monitoring locations include Cienega Creek and Arroyo Hondo at NM-14 road crossings, and at the confluence of Arroyo Hondo and Arroyo de los Chamisos. Table 2 and Figure 1 also show County's MS4 monitoring locations.

Table 2. Monitoring Locations

Sample Location No.	Sample Location	Sample ID	Coordinates (WGS 1984)	
			Longitude	Latitude
Downstream				
1	Santa Fe River at South Meadows Road	SFR_MEADOWS	-106.040849°	35.648188°
2	La Cienega	LACIENGA	TBD	TBD
Contingency				
3	Arroyo Hondo - East	HONDOEAST	-106.049455°	35.590209°
4	Arroyo Hondo - West	HONDOWEST	-106.089285°	35.590265°
5	Cienega Creek	CIENGACREEK	-106.053498°	35.583503°
6	Arroyo Del Los Chamisos	CHAMISOS	-106.090152°	35.593334°

5. Sampling Plan

Sample collection will be generally be consistent with the procedures described in the EPA MS4 Statewide Permit. NMED SOPs were modified and adapted specifically for the monitoring activities, but the NMED methods and procedures were maintained to the extent possible. A sampling SOP is provided in Appendix A.

5.1 Qualifying Event Determination

Per Part III of the EPA MS4 Statewide Permit, wet weather monitoring shall be conducted only during storm events with predicted or measured rainfall greater than 0.25 inch, provided that an antecedent dry period of at least 48 hours has occurred following any rain event exceeding 0.1 inch.

Due to the nature of rainfall in the watershed, the County is proposing that a qualifying event be defined as a 0.25-inch or greater storm anywhere in the watershed that creates a discharge to the Santa Fe River. Additionally, no antecedent dry period will be required to ensure that a sufficient number of qualifying events are available for sampling.

To determine whether or not a qualifying storm event has occurred, the County may use a variety of different data sources for representative locations within the watershed to identify the qualifying storm event. Sources for determining a qualifying storm event may include the Community Collaborative Rain, Hail, and Snow Network (CoCoRahs), wundermap.com data, calibrated National Weather Service radar, and/or U.S. Geological Survey (USGS) weather data based on rainfall measurements taken within the watershed.

5.2 Sample Collection

Per the EPA MS4 Statewide Permit Part III, A.2 General Wet Weather Monitoring Requirements, samples at each MS4 monitoring location shall be collected during each portion of the monitoring location's discharge hydrograph (i.e., first flush, rising limb, peak, and falling limb) after a discernible increase in flow at the tributary inlet. The typical storm event in Santa Fe is high-intensity and short in duration, making it challenging to obtain the needed samples from each portion of the hydrograph.

The County proposes to collect flow-weighted composite samples using aliquot collection. An aliquot is a discrete, representative subsample of surface water collected at a specific point in time and combined with other subsamples to form a composite sample. A minimum of three aliquots per hour, separated by at least 15 minutes, shall be collected. Where more than three aliquots per hour are collected, comparable intervals between aliquots shall be maintained (e.g., six aliquots per hour, spread over at least 7-minute intervals). The aliquots will be collected during any point in the discharge event hydrograph. The modification is necessary to capture discharge from flash storms indicative of the watershed. These storms produce sudden short-lived discharge that may be missed with the required hydrograph portioning. Sample collection procedures are provided in Appendix A.

5.3 Sample Equipment

Field sampling activities will be conducted using the equipment and methods described in the SOP for sample collection (Appendix A).

Water quality measurements will be collected for dissolved oxygen (DO), pH, conductivity, and temperature with a calibrated water quality meter. These parameters will be analyzed for in the field within 15 minutes of sample collection if possible and recorded on the field sheets. The meter calibration will occur in the office before field mobilization and the calibration will be recorded on a calibration sheet.

A dedicated plastic sampling bucket equipped with a handle and rope will be used to collect aliquots. Pre-cleaned sample bottles, both preserved and unpreserved as required by analytical parameters, will be filled directly from the composite bucket following the procedures outlined in the SOP.

Each field team will be equipped with nitrile gloves and a calibrated multiparameter meter capable of measuring temperature, pH, conductivity, and dissolved oxygen. Deionized (DI) water, phosphate-free detergent, and rinse bottles will be used for cleaning and decontamination of sampling equipment between sites to prevent cross-contamination. All samples will be stored immediately in insulated coolers containing ice to maintain a temperature of approximately 4°C until delivery to the analytical laboratory.

Further details regarding sampling procedures, decontamination methods, and quality assurance/quality control (QA/QC) requirements are provided in the referenced SOP and the project-specific QAPP.

5.4 Analytical Methods

Analytical methods used under this FSP shall conform to 40 CFR Part 136, as specified in the EPA MS4 Statewide Permit, or to other methods approved by EPA for the analysis of wastewater and surface water. Table 3 provides the MS4 compliance analytical program and includes a list of analytical methods that meet the requirements of 40 CFR Part 136. Analytical data generated using these methods shall achieve method detection limits (MDLs), reporting limits (RLs), accuracy, and precision sufficient to support evaluation of applicable New Mexico water quality standards (20.6.4 NMAC), total maximum daily load (TMDL) requirements, and pollutant-specific monitoring obligations established under the EPA MS4 Statewide Permit.

Table 3. MS4 Compliance Analytical Program

#	Pollutant Parameter	Analytical Method (40 CFR 136)	Sample Container Size and Type	Recommended Holding Time
1	Dissolved oxygen (DO) [a]	Standard method (SM) 4500/Field		Immediately/in situ
2	pH [a]	EPA 150.2/SM 4500/Field		Immediately/in situ
3	Temperature	Field measurement (thermistor)	None - field sample	Immediately/in situ
4	Total suspended solids (TSS) [a]	EPA 160.2/SM 2540	500-mL HDPE	7 days at 4 °C
5	Total dissolved solids (TDS)	EPA 160.1	500-mL HDPE	7 days at 4 °C
6	Chemical oxygen demand (COD)	EPA 410.4/SM 5220	250-mL HDPE	28 days (acidified, cool)
7	Biochemical oxygen demand, 5-day (BOD_5)	SM 4500-B	300-mL glass	48 hours at 4 °C
8	Oil and grease	EPA 1664A/SM 5520	1-L glass	28 days (pH <2, cool)
9	E. coli, enumerated [a]	EPA 1103.2/1603.1/1604/SM 9221	100-mL HDPE	6 hours (on ice, 4 °C)
10	Total Kjeldahl nitrogen (TKN) [a]	EPA 351.2/SM 4500-NH_3	250-mL glass or HDPE	28 days (acidified, cool)
11	Nitrate + nitrite (as N) [a]	EPA 353.2/EPA 300.0 SM 4500-NO_3/SM 4110	250-mL HDPE	48 hours (unfiltered)/28 days (filtered, cool)
12	Dissolved phosphorus [a]	EPA 365.1/EPA 2007/SM 4500-P	250-mL HDPE	28 days (cool, filtered)
13	Total phosphorus [a]	EPA 365.1/SM4500-P	250-mL HDPE	28 days (cool, acidified)
14	Total ammonia + organic nitrogen [a]	EPA 350.1/351.1/SM 4500-NH_3	250-mL HDPE	28 days (cool, acidified)
15	Aluminum, total recoverable [b]	EPA 200.7/200.8 (ICP-AES/ICP-MS)	250-mL HDPE	6 months (acidified, 4 °C)
16	Hardness (as $CaCo_3$) [b]	EPA 130.1/ SM 2340C	250-mL HDPE	6 months (on ice, 4 °C)

[a] 303(d) pollutants/total maximum daily load (TMDL) constituents stated in final 2026-2028 State of NM Clean Water Act Section 303(d)/305(b) integrated report; methods and minimum quantification levels (MQLs) must be those approved under 40 CFR 136 and specified in the NPDES permit.

[b] Aluminum is an impaired parameter in the Santa Fe River urban reach, but under the draft MS4 permit it is a "secondary/conditional monitoring parameter," not a primary required TMDL-driven analyte like E. coli, nutrients, or TSS. Because aluminum toxicity to aquatic life is strongly influenced by water hardness, hardness measurements are included to support interpretation of aluminum results and application of hardness-dependent water quality criteria used by NMED.

Holding time is maximum recommended time from sample collection to start of analysis or preservation method as per method guidance or State monitoring plan.

Pollutant parameters U.S. Environmental Protection Agency (EPA) Region 6 MQLs for reporting and compliance are provided in the Permit.

Analytical parameters included in this FSP are selected to explicitly address the identified causes of impairment [Clean Water Act Section 303(d) pollutants] and associated TMDL constituents for the Santa Fe River, including E. coli, nutrients (total nitrogen and total phosphorus), and aluminum, which represent the primary pollutants of concern for stormwater discharges from the MS4.

Samples collected for aluminum analysis shall be accompanied by laboratory measurements of hardness (reported as calcium carbonate [$CaCO_3$]) and pH to enable determination of applicable aquatic life criteria in accordance with 20.6.4 NMAC, which specifies hardness- and pH-dependent standards for aluminum. Aluminum shall be evaluated as a secondary sediment-associated pollutant of concern, given its strong correlation with suspended sediments in urban stormwater runoff.

Polychlorinated biphenyls (PCBs) are identified as a human health–based impairment in the Santa Fe River upstream of the County MS4 area. PCBs will not be a part of the County Wet Weather Monitoring Plan, as this impairment is upstream of the County MS4 area. In addition, because PCB impairments are primarily assessed through fish tissue and bioaccumulation pathways rather than water column concentrations, routine stormwater monitoring for PCBs is not typically effective for MS4 compliance evaluation. PCB monitoring, if conducted by the County in the future, shall be implemented through targeted investigations, special studies, or source identification efforts where potential urban sources are suspected, and shall be consistent with applicable MS4 Permit requirements and any relevant TMDL provisions.

5.5 Sample Handling, Packaging, and Custody

Table 2 of the sampling SOP (Appendix A) summarizes the containers, sample preservatives, and holding times for various analyses. All water samples will be collected in new sample containers. Sampling containers will not be rinsed with distilled or sample water before collecting the sample. All sampling containers should be obtained from the accredited analytical laboratory to which the samples are being submitted for analysis. Pre-acidified containers should be stored in secondary containment, such as coolers with the lid propped open, to minimize vapor buildup. Pre-acidified containers should not be opened in a closed area or near the face. When filling sample containers, they should not be overfilled, as this may lead to loss of preservative.

Self-adhering labels will be used for all sample bottles. All sample containers will be labeled with the sample site, sample name, date, and initials of sampling personnel. Sample name will

be the outfall location name as provided in Table 2 and the sample date noted as YYYY-MM-DD (e.g., SFR-MEADOWS-2027-06-03).

After collection, sample bottles will be placed in coolers with ice. Samplers will ensure that all samples required to be kept cool are surrounded and in contact with enough ice to cool to approximately 4°C. Samplers will ensure that sample bottles are not allowed to freeze during cooling, as freezing may compromise sample integrity. Samplers will ensure that all glass sampling containers are placed in bubble-wrap sleeves to protect from breaking. Bubble-wrap may insulate samples from cooling, and it may be necessary to place additional ice in coolers. Samplers will check that samples are adequately labeled and that container lids are secure.

A formal chain of custody is required for all samples collected. The chain of custody is intended to document and ensure the integrity of samples. Samples collected shall follow the chain of custody procedures provided by the contracted analytical laboratory.

5.6 Documentation

This FSP deals with the field activities associated with the collection of stormwater quality samples for wet weather monitoring under the EPA MS4 Statewide Permit. Project documents include this FSP, calibration records, field notes, validation and verification records, sample collection data, records of analytical data in hard copy or electronic form, and QC records. Documents will be maintained in accordance with the requirements of the associated QAPP.

Project documentation will include narrative descriptions of progress throughout the life of the project relating to planning and implementation efforts, including deviations from the original plan and issues that arise along with any associated corrective actions. These will be summarized, as applicable, in MS4 annual reports to EPA.

5.6.1 Field Data

Field activities will be documented in field notes, field sheets, and compiled in Microsoft Excel spreadsheets. An example field sheet is included in Appendix A.

Best practices for field notes include the following:

- Each day's notes should begin at the top of a page.
- At the top of each page, include the following:
  - A header that identifies the project name and location

- The date
- The name and initials of the person taking notes

- The first entry of the day should identify the location, names of field personnel, visitors, contractors, etc., and the purpose of the activities (e.g., equipment inspection, data retrieval, sampling, etc.).
- Each important observation should start with the time.
- The person taking notes should sign and date each page.
- A diagonal line should be drawn across the bottom of each day's entry, then signed and dated.
- Field notes will not be recopied. Field notes are notes taken in the field.

5.6.2 Analytical Data

Analytical data will be obtained from the analytical service provider in the form of an electronic data deliverable (EDD) in Excel spreadsheet format, when possible, in addition to the required hard copy analytical data package. All data maintained by the County will be managed (in either hard copy or electronic formats, depending on how the data were received from the laboratory) by the Project Coordinator or his/her designee using the appropriate data management tools as specified in the QAPP. These tools consist of databases, geographic information systems (GIS), spreadsheets, and statistical and word processing computer software. Monitoring results may be reported in MS4 annual reports to assess and track the program's progress to improve and focus MS4 programs.

6. Field Sampling and Laboratory Submission Procedures

The sample collection process involves coordinating the logistics of obtaining samples and ensuring their timely delivery to the designated laboratory within the required holding time limits for each analytical parameter—particularly E. coli. To streamline and expedite this process, the County proposes the sample collection procedures outlined in this section.

6.1 Delivery of Sample Bottles

If it is confirmed that a qualifying storm event has occurred, the preserved sample bottles shall be delivered to a laboratory for analysis in accordance with the specified holding time and preservation requirements.

6.2 Post-Sampling Procedures

Following each sampling event, the County will produce a summary of the event, including the methodology used to determine the timing of the hydrograph at the downstream sampling location and an assessment of the effectiveness of the methodology employed. This assessment shall be used to refine, as necessary, the approach for timing hydrographs, addressing multiple discharges occurring at different times, and determining the most accurate method to quantify the impact of stormwater on the receiving waters.

An evaluation of sampling performance shall be included with each MS4 annual report to assess whether the selected sampling locations and the frequency of sampling during the reporting year were sufficient to characterize the response of receiving waters to wet weather discharges. Additionally, recommendations for future wet weather sampling programs shall be provided in the MS4 annual report to inform potential adjustments to sampling locations, frequency, or methodologies.

7. Exceedance Response Procedures

In the event of an analytical exceedance, the County shall review all available meteorological, hydrological, and stream gage data to correlate rainfall event characteristics (including intensity, duration, and timing) with sampling event data. This evaluation shall be used to identify the most probable source area(s) and discharge location(s) contributing to the exceedance within the watershed.

Based on this evaluation, the County shall implement appropriate next steps, which may include consideration of contingency monitoring locations, refinement of sampling strategies, and planning for targeted monitoring during the next storm event to further isolate and confirm contributing source areas.

8. Health and Safety Considerations

Stormwater sampling activities often occur during or following precipitation events; field personnel may encounter hazardous conditions, particularly when working in or near flowing water. Therefore, strict adherence to health, safety, and environmental protection procedures is required to ensure personnel safety.

All sampling activities shall be conducted in accordance with established safety and environmental protocols. During storm events, potential hazards may include high or rapidly changing water levels, strong currents, slippery or unstable banks, and proximity to vehicular traffic. Personnel shall maintain situational awareness at all times and shall not enter flowing water or unstable areas where safety cannot be assured. Appropriate personal protective equipment (PPE)—including high-visibility outerwear, gloves, waterproof boots or waders, and other site-specific safety gear—shall be worn at all times.

Access to sampling sites shall occur only in compliance with applicable access permits, right-of-entry agreements, and site restrictions.

If extreme flow conditions or other unsafe circumstances are present, sampling shall be postponed or suspended. Field staff shall coordinate with local emergency services or public safety personnel prior to conducting any sampling under hazardous flow conditions to ensure that all necessary precautions are taken.

9. Training and Competency

All personnel involved in sampling activities shall receive appropriate training prior to conducting fieldwork. Training shall include, at a minimum, instruction in site-specific safety procedures, hazard recognition and mitigation, proper use of PPE, and emergency response protocols. Personnel shall also be familiar with safe practices for working in and around water, including the risks associated with high flows, unstable banks, and rapidly changing stream conditions. Only individuals who have demonstrated competency in sampling techniques, equipment handling, and safety procedures shall be authorized to perform field sampling tasks. Refresher training shall be conducted periodically, or as needed, to ensure continued compliance with safety standards and maintenance of technical proficiency.

References

New Mexico Environment Department (NMED). Use attainability analysis: Santa Fe River from Nichols Reservoir to the Outfall of the Santa Fe Wastewater Treatment Facility. November 2012. Available at <https://www.env.nm.gov/wp-content/uploads/sites/25/2018/11/17-UAA_SantaFeRiver.pdf>.

NMED. 2024. 2026-2028 State of New Mexico Clean Water Act §303(d)/§305(b) integrated report. May 13,2024. Available at <https://www.env.nm.gov/surface-water-quality/303d-305b/>.

NMED Surface Water Quality Bureau (SWQB). 2023. Standard operating procedures for sample collection and handling. Most recent versions of SOPs accessed June 2026 at <https://www.env.nm.gov/surface-water-quality/sop/>.

U.S. Environmental Protection Agency (U.S. EPA). 2026. DRAFT New Mexico municipal separate storm sewer system permit. NPDES Permit No. NMR04B000.

Figure

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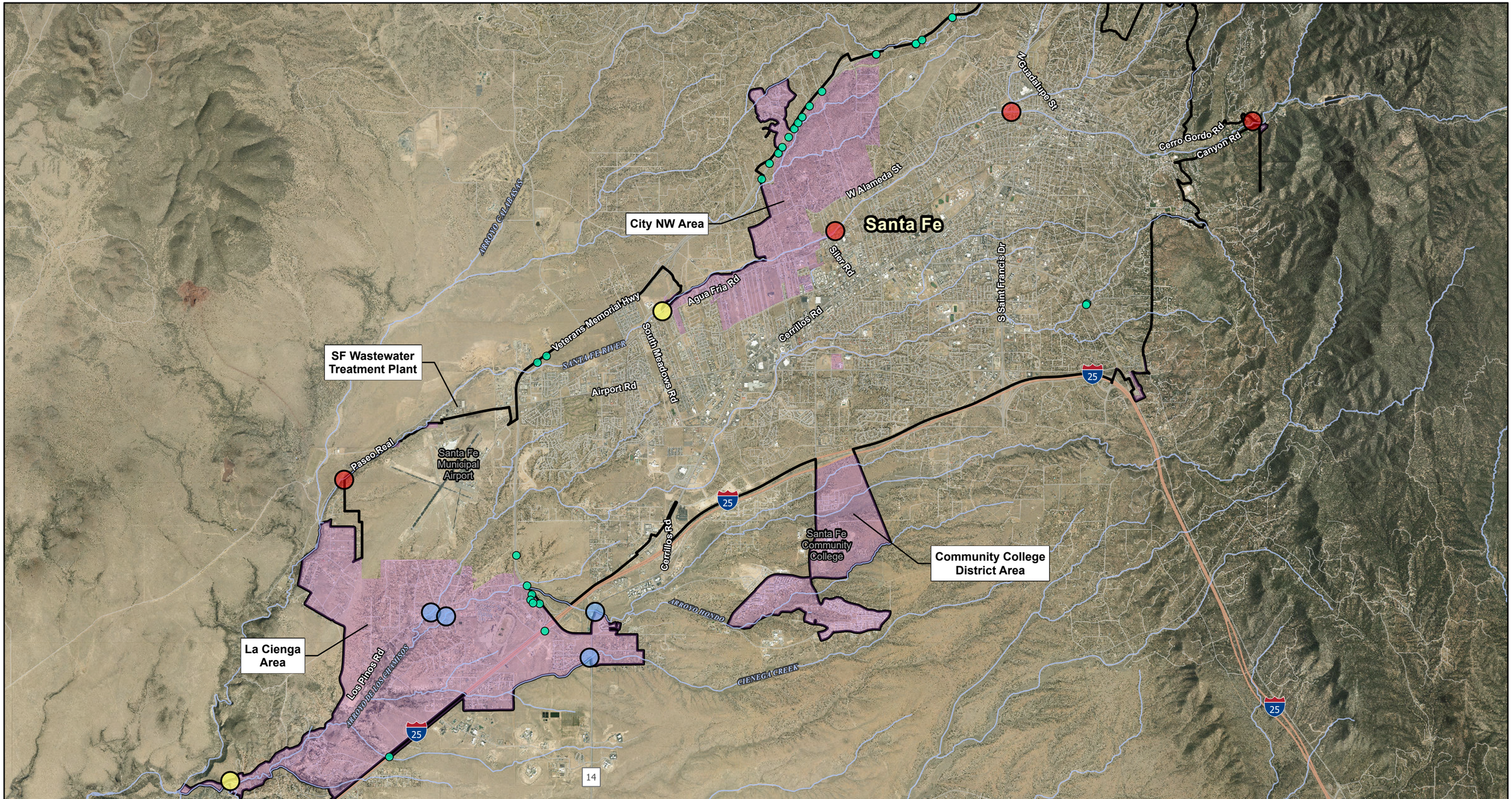

SANTA FE COUNTY

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- Santa Fe County MS4 Jurisdiction
- 2021 Census Urbanized Area
- Stream
- NMDOT MS4 Stormwater Outfall Location
- Potential City of Santa Fe Monitoring Location
- Potential Santa Fe County - NMDOT Joint Monitoring Location
- Potential Contingency Location for Santa Fe County - NMDOT Joint Monitoring

N

0 0.63 1.25 2.5 Miles

1 in = 1.25 mi

Santa Fe County Stormwater Monitoring Program Recommendations

Figure 1
Proposed Wet Weather Monitoring Locations

P:\20230082\WRARCGIS\Maps\20230082_SantaFeCountyMS4_Map\20230082_SantaFeCountyMS4_Map.aprx
Author: mcrooks

May 2026

Appendix A

Standard Operating Procedure

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Standard Operating Procedure
Stream Water Sample Collection Using a Bucket

1. Purpose and Scope

This standard operating procedure (SOP) describes the method for collecting surface water samples from a stream using a bucket. The SOP applies to general water quality, metals, nutrients, and bacteria sampling programs. If per- and polyfluoroalkyl substances (PFAS) are included in the sampling program, this SOP must be revised to incorporate additional procedures and contamination control measures to ensure proper sample collection and data integrity.

This SOP was developed in accordance with established federal and state guidance documents to ensure consistency with recognized field methods and data quality standards.

2. Responsibilities

Field sampling must be conducted by trained personnel familiar with the project's quality assurance project plan (QAPP) and any applicable monitoring permits or protocols. Team members are responsible for following this SOP, maintaining clean sampling conditions, and ensuring the integrity of collected samples.

3. Equipment and Materials

3.1 Equipment Requisition and Preparation

Prior to any water sampling event, the designated water sampler shall ensure that all required equipment and supplies are properly requisitioned, organized, and available for use. A complete list of equipment and materials is provided in Table 1. Field personnel are responsible for verifying that all items are clean, functional, and appropriate for the intended sampling activities.

3.2 Sampling Equipment

Equipment is listed in Table 1. Field personnel shall use a clean plastic or stainless-steel bucket dedicated exclusively to surface water sampling. The bucket shall be equipped with a sturdy handle or rope to allow safe and controlled lowering into, and retrieval from, the waterbody. Buckets shall be clearly labeled and stored to prevent contamination between sampling events.

3.3 Equipment Calibration and Testing

All field equipment, with the exception of rental instruments, shall be inspected, calibrated, and tested prior to deployment. Calibration shall be conducted in accordance with the manufacturer's recommended procedures using clean, fresh calibration standards or reagents. All calibration and testing activities shall be documented in the field logbook or calibration record prior to sampling.

3.4 Decontamination Procedures

Proper decontamination of sampling equipment is essential to prevent cross-contamination between sampling locations and to ensure the integrity of analytical results. All equipment that comes into direct contact with the sample (e.g., buckets, bottles, tubing, or other collection devices) shall be cleaned and rinsed according to the procedures below.

3.4.1 General Equipment Decontamination

1. Initial Rinse: Rinse the equipment thoroughly with site water to remove sediment and debris.
2. Detergent Wash: Wash all contact surfaces with a non-phosphate, laboratory-grade detergent solution (e.g., Alconox®) using a clean brush or sponge.
3. Tap Water Rinse: Rinse thoroughly with tap water to remove all detergent residue.
4. Deionized (DI) Water Rinse: Rinse the equipment with DI or distilled water to eliminate any remaining contaminants.

3.4.2 Field Decontamination Between Sampling Sites

- Between sampling locations, repeat Steps 1–4 in Section 3.4.1 using field supplies (e.g., DI water and detergent solution) to minimize cross-contamination.

- Allow equipment to air dry in a clean, protected area or cover with clean aluminum foil or plastic sheeting if immediate reuse is necessary.

3.4.3 PFAS Considerations

If sampling for PFAS is anticipated, specialized decontamination procedures must be implemented. PFAS sampling requires strict avoidance of fluoropolymer-containing materials (e.g., Teflon®) and specific cleaning methods to prevent trace contamination. A separate PFAS-specific SOP or addendum shall be developed and followed for such sampling events.

3.5 Sample Containers

Table 2 summarizes the appropriate sample containers, preservatives, and holding times for the analytical parameters included in this program. All water samples shall be collected in new, unused containers supplied by the accredited analytical laboratory designated for analysis.

Do not rinse sample containers with distilled water, site water, or any other liquid prior to sample collection. Containers provided by the laboratory are pre-cleaned and, when applicable, pre-preserved to meet analytical requirements.

Pre-acidified sample containers shall be stored in secondary containment (e.g., coolers or plastic bins) with lids propped open to minimize vapor buildup. These containers should never be opened in an enclosed space or near the sampler's face.

When filling sample containers, avoid overfilling, as this may result in the loss or dilution of preservatives. Ensure that caps are securely tightened after filling, and that each container is properly labeled in accordance with the chain-of-custody and labeling procedures.

4. Safety Precautions

Before sampling, the field team should assess the site for hazards such as swift water, unstable banks, or contamination. Personnel must wear appropriate personal protective equipment, including gloves, waterproof boots, and a personal flotation device when working near deep or moving water. No one should enter the stream if conditions appear unsafe; in such cases, the sample should be collected from the bank using the bucket and rope.

5. Sampling Procedures

5.1 Site Preparation

Upon arrival at the sampling location, the sampler should approach the stream from downstream to avoid disturbing sediments. The date, time, site identification, weather, and water appearance should be recorded on the field documentation. Flow conditions and any visible discharges or disturbances should also be noted.

5.2 Equipment Decontamination

Before the first use of the day, the bucket should be rinsed three times with DI water. Between different sampling sites, the bucket must be washed with a phosphate-free detergent, rinsed with DI water, and allowed to air dry. The sampler should avoid touching the inside of the bucket or the mouths of sample bottles to prevent contamination.

5.3 Sample Collection

To collect the aliquot sample, the bucket is lowered on a rope into the flow facing upstream and submerged to approximately mid-depth. Care should be taken to avoid surface scum and bottom sediments. Avoid contaminating the sample with debris from the rope and bridge, or other sampling platform. For each aliquot, use the first bucketful of water to rinse the bucket. Use the second and third buckets of water to collect the sample.

Grab samples should be collected by collecting four separate sub-samples (aliquots), spaced 15 minutes apart, on any part of the hydrograph (first flush, rising limb, peak flow, falling limb). To composite the sample, the four aliquots are combined into a clean container and mixed. The sample is then decanted into sample containers obtained from the analytical laboratory.

Ensure that no air is entrapped in the sample vials to be analyzed for VOCs. Collect the sample by holding the vial at an angle so that aeration is minimized. Avoid touching the lip of the vial or the Teflon liner. If the sample cannot be collected directly from the water source, use a clean stainless steel cup. Direct the water stream against the inside surface of the vial. Allow a convex meniscus to form across the mouth of the filled vial. Carefully cap the vial, and then invert and tap the vial to ensure that no entrapped air is present. If entrapped air is present, recollect the sample.

Pre-preserved bottles must not be rinsed before filling. Each bottle should be filled to the required volume, capped securely, and labeled immediately with the site ID, date, time, sampler initials, and requested analyses.

5.4 Field Measurements

Immediately after collection, the sampler should measure field parameters such as temperature, pH, conductivity, chlorine, and dissolved oxygen using properly calibrated instruments. Fill a clean beaker or other appropriate container with surface water for field parameter measurement. The time of calibration, calibration standards, and instrument readings should all be documented on the field sheet.

5.5 Quality Control

The QAPP should be reviewed prior to any water sampling event. The QAPP addresses the data quality objectives, analytical methodologies, specific quality assurance (QA) and quality control (QC) activities, and laboratory requirements designed to achieve the data quality goals of the project.

To ensure data quality, field duplicates should be collected and equipment blanks should be prepared using DI water to check for potential contamination. All quality control samples must be clearly identified in the field records and on the chain-of-custody form.

5.6 Sample Handling and Preservation

After collection, samples should be stored in a cooler. Ensure that all samples required to be kept cool are surrounded and in contact with enough ice to cool to approximately 4°C. Ensure that sample bottles are not allowed to freeze during cooling, as freezing may compromise sample integrity. Make sure that all glass sampling containers are placed in bubble-wrap sleeves to protect from breaking. Bubble wrap may insulate samples from cooling and it may be necessary to place additional ice in coolers. Check to see that samples are adequately labeled and that container lids are secure.

If required, samples that are sensitive to light, such as nutrient samples, should be protected from sunlight. All samples must be transported to the analytical laboratory within the designated holding times. The chain-of-custody form must be completed, signed, and secured within the cooler.

5.7 Post-Sampling Decontamination

At the end of sampling or between sites, the bucket and all sampling tools should be washed with detergent and rinsed thoroughly with DI water. Equipment should then be air dried and stored in clean plastic bags to prevent contamination.

6. Documentation

All field observations, measurements, and deviations from this procedure must be recorded in the field notebook or data sheet. Chain-of-custody forms should be completed for every batch of samples, and any field issues or corrective actions must be documented. An example field sampling data sheet is provided as Attachment 1.

References

New Mexico Environment Department (NMED) Surface Water Quality Bureau (SWQB). 2019. *Standard operating procedures for surface water sampling*.

NMED. 2021. *Quality assurance guidance for surface water monitoring programs*.

U.S. Environmental Protection Agency (EPA). 2023. *National field manual for the collection of water-quality data*. Techniques of Water-Resources Investigations, Book 9.

U.S. EPA. 2026. New Mexico Municipal Separate Storm Sewer System (MS4) Permit. NPDES Permit No. NMR04B000.

U.S. Geological Survey (USGS). 2018. *Field manual for the collection of surface water samples*.

Tables

Table 1. Sampling Equipment

Category	Item/Description	Purpose	Example/Specification
Sampling Containers	Pre-cleaned sample bottles (plastic, glass, etc.)	Collect and preserve surface water samples	As specified by analytical laboratory
Sampling Device	Clean plastic or stainless-steel sample collection bucket	Used to collect surface water aliquots from the stream	Dedicated to sampling only
Sample Collection	Clean 5-gallon plastic or stainless-steel sample composite bucket	Used to composite surface water from collected aliquots	Dedicated to composite only
Field Meters	Multi-parameter water quality meter (pH, DO, conductivity, temperature),	Measure in-situ field parameters	Calibrated per manufacturer's instructions
Calibration Supplies	Calibration standards and reagents	Used for meter calibration prior to sampling	pH buffers, conductivity standards, etc.
Field QA/QC Supplies	Field blanks, equipment blanks, deionized water	Quality control verification of sampling procedures	As specified in QAPP
Personal Protective Equipment (PPE)	Gloves, safety glasses, waders, life vest	Protect personnel and ensure safe sampling	Appropriate for site conditions
Labeling and Documentation	Waterproof labels, markers, field logbook	Proper labeling and field recordkeeping	Permanent ink, indelible labels
Decontamination Supplies	Laboratory-grade detergent, DI water, rinse bottles	Clean and rinse equipment between samples	Alconox® or equivalent
Miscellaneous Supplies	Cooler with ice or ice packs, chain-of-custody forms	Maintain sample integrity during transport	As required

Table 2. Sample Handling

Sample Type	Sample Container	Processing, Preservation, and Storage	Maximum Holding Time
Inorganics			
TSS/TDS/ions/alkalinity	1-quart polyethylene cubitainer or 250-mL HDPE bottle if sample is only for TSS/TDS	On ice, approximately 6°C	7 days if TSS included in analysis; otherwise 14 days.
Total nutrients	1-quart polyethylene cubitainer	2.0 mL concentrated sulfuric acid, on ice, approximately 6°C	28 days
Microbiological Tests			
Coliform: total, fecal, and E. coli	100-mL low density polyethylene vessel	0.0008% $Na_2S_2O_3$, on ice, approximately 10°C	6 hours
Metals			
Total metals	1-quart polyethylene cubitainer	5.0 mL concentrated nitric acid	28 days
Total recoverable aluminum	1-quart polyethylene cubitainer	Filter (10 µm) within 15 min of sample collection; 5.0 mL concentrated nitric acid.	6 months
Dissolved metals/hardness	1-quart polyethylene cubitainer	Filter (0.45 µm) within 15 min; 5.0 mL concentrated nitric acid	28 days if mercury included in analysis; otherwise 6 months

Attachment 1

Field Sheet

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Samplers_____

Sampling Data Sheet

Site Identification:

Sample Date and Time:
Sample Identification:

QC Samples: Duplicate / None
QC samples require a DIFFERENT sample time than the environmental sample. QC Sample Time: QC Sample ID:

Collection Point: **Collection Equipment:**

Total Sample Volume: Collection Time Start: End:

Water Quality Meter ID:
Calibration Date:

Field Parameters

Time	Temp (°C)	pH	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	ORP (mV)	Volume (Gallons)
Composite							