Quality Assurance Project Plan for the City of Caldwell

NPDES Phase II Stormwater Permit Stormwater Monitoring Program

Prepared by:
City of Caldwell Stormwater Compliance Program
Version 1.0; June 2022

Acronyms

BMP	Best Management Practice
CFR	Code of Federal Regulations
CSWMP	City of Caldwell Stormwater Management Plan
EPA	Environmental Protection Agency
IDEQ	Idaho Department of Environmental Quality
ITD	Idaho Transportation Department, District 5
MS4	Municipal Separate Storm Sewer System
IPDES	Idaho Pollutant Discharge Elimination System
NUA	Nampa Urbanized Area
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
TSS	Total Suspended Sediment
TP	Total Phosphorus
WOTUS	Waters of the United States

PROJECT MANAGEMENT

Approval

Robb MacDonald, City Engineer
City of Caldwell

Date 9/27/22

Intent

City staff developed this Quality Assurance Project Plan with the intent to satisfy part 6.2.6 of the City of Caldwell National Pollutant Discharge Elimination System (NPDES/IPDES) stormwater permit IDS028118, effective December 1, 2020. This plan satisfies part 6.2.6 of the permit.

Compiler

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Internal Reviewers

Jeanette Ayala, Environmental Superintendent

Jake Wells, Environmental Scientist

Contents

DISTRIBUTION LIST

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PROJECT ORGANIZATION

City of Caldwell stormwater compliance staff (City) prepared this Quality Assurance Project Plan (QAPP) for the City of Caldwell National Pollutant Discharge Elimination System (NPDES) Phase II Municipal Separate Storm Sewer System (MS4) Permit. This Environmental Protection Agency (EPA) NPDES permit No. IDS0028118 became effective on December 1, 2020.

The City of Caldwell does not share this permit with other co-permittees, despite being part of the Nampa Urbanized Area (NUA). At present, the cities Nampa and Caldwell have sufficiently discreet boundaries not to share a permit. The City of Caldwell was included in the NUA to enable it to be regulated as an MS4 at an earlier date. In 2009, when EPA issued the original City of Caldwell MS4 permit, the City of Caldwell did not have sufficient population to qualify as a small MS4.

Under provisions of the federal NPDES permit, the Permittee is required to monitor water quality in stormwater runoff and waters of the United States (WOTUS) potentially affected by operation of the MS4. Staff of the City of Caldwell, or consultants retained by the City, will conduct all field data collection and sampling subsequently described in this document. Analytical Labs Inc. in Boise, Idaho will complete all laboratory analyses.

This document describes the standards and methods used to ensure consistent sampling procedures and ensure that data generated during field activities are accurate, complete, and representative of actual stormwater discharge conditions.

A team of technically qualified staff will complete all responsibilities of the City of Caldwell stormwater monitoring program. Key individuals and their primary responsibilities related to implementing this QAPP are outlined in the table below.

Table 1. Key Personnel Contact Information and Responsibilities

Name	City of Caldwell Title and Responsibilities
Robb MacDonald (208) 455-3006 rmacdonald@cityofcaldwell.org	*City Engineer* – Provides Engineering Department oversight at the administrative level.
Ashley Newbry (208) 455-4672 anewbry@cityofcaldwell.org	*Assistant City Engineer* – Water Resources & Environmental Lead; provides technical and managerial oversight of all City environmental programs and permits.
Jeanette Ayala (208) 455-4670 jayala@cityofcaldwell.org	*Environmental Superintendent* – Stormwater and Floodplain Compliance Program Supervisor; Provides technical and managerial oversight of the City's stormwater compliance program.
Jake Wells (208) 455-4587 jwells@cityofcaldwell.org	*Environmental Scientist* – Permit Documentation Lead; Provides technical oversight for sample processing. Provides QA oversight for sample handling, custody, and analytical methods.

Scientific Stormwater (IDDE, DWF) Inspector (208) 455-3006 TBD@cityofcaldwell.org	*Sampling Assistant* – May be tasked with stormwater monitoring or other simple permit responsibilities
Construction Stormwater (CGP) Inspector (208) 455-3006 TBD@cityofcaldwell.org	*Sampling Assistant* – May be tasked with stormwater monitoring or other simple permit responsibilities

PROBLEM DEFINITION, BACKGROUND AND OBJECTIVES

As part of its Idaho Pollutant Discharge Elimination System (IPDES) Municipal Separate Storm Sewer System (MS4) Permit (Permit) requirements, the City of Caldwell is required to develop and implement a stormwater monitoring program. This permit tasks the City of Caldwell with monitoring stormwater pollutant discharges to Indian Creek, Mason Creek, and the Boise River. The MS4 permit requires the City to examine temperature, E.coli, sediment, and total phosphorus loading to each of Indian Creek, Mason Creek and the Boise River. Each of these watersheds differ in type of upstream development, tributaries, and runoff control measures.

- *Indian Creek TMDL*. In 2015, DEQ established a TMDL on "Indian Creek – Sugar Ave to Boise River" for bacteria (e-coli) and sediment, and the entire lower Boise River basin was listed for phosphorus. Though no TMDL exists, this reach is also considered impaired for temperature.
- *Mason Creek TMDL*. In 2015, DEQ established a TMDL on Mason Creek for bacteria (e-coli) and sediment, and the entire lower Boise River basin was listed for phosphorus. Though no TMDL exists, this reach is also considered impaired for temperature and chlorpyrifos. (Chlorpyrifos is an organophosphate insecticide, acaricide and miticide are used to control foliage and soil-borne insect pests.)
- *Boise River TMDL*. Boise River received a TMDL for bacteria (fecal coliform) and sediment in 2000. By 2015, a TMDL for total phosphorus was added. The "Boise River – Middleton to Indian Creek" is also known to be impaired for temperature.

Monitoring stormwater quality will enable the City of Caldwell stormwater compliance staff to develop meaningful and timely evaluations of the effectiveness of permit-required activities.

The objectives of the monitoring program include the following:

- Quantify existing conditions of water quality over time with respect to stormwater runoff to WOTUS,
- Provide credible, defensible scientific information that will help the City meet NPDES permit regulations, and
- Assess suitability of standards and compliance with water quality objectives that support beneficial uses.

This Quality Assurance Project Plan (QAPP) intends to describe regular monitoring activities of the City of Caldwell stormwater monitoring program, as required by the Permit. This QAPP does not describe procedures for dry weather outfall screening that is required by the Permit.

PROJECT DESCRIPTION AND DOCUMENTATION

The City of Caldwell will conduct stormwater monitoring as described in detail in the City of Caldwell Stormwater Monitoring Plan (City of Caldwell, 2022). Information about the number of samples, sampling locations, and sampling procedures can be found in the monitoring plan.

Project data will be compiled, edited, saved electronically, and made available on the stormwater page of the City's website. Any information not posted is also readily available to the public via a public records request. Caldwell stormwater compliance staff are responsible for conducting a regular review and update of the QAPP, and staff will post updated versions to the website.

Table 2. Summary of document and handling procedures for CSWMP.

Description	**Backup**	**Retention Period**
Field Notes	Saved in files on server	5 years
Chain of Custody Forms	Kept with laboratory results	5 years
Laboratory Reports	Saved in files on server	5 years

DATA QUALITY OBJECTIVES AND CRITERIA

The CSMP seeks to produce scientifically defensible data that meet monitoring objectives. This involves establishing and meeting goals for precision, accuracy, representativeness, completeness, comparability, bias, and sensitivity.

Precision – Precision is a measure of agreement among individual measurements of the same property under identical or substantially similar conditions. Replicate samples (typically duplicates) shall be collected for all constituents at an annual rate of at least 5% of the total number of samples collected.

Accuracy – Accuracy is a measure of agreement between an analytical measurement and a reference of a known value. Field blanks shall be collected at an annual rate of at least 5% of the total number of samples collected.

Representativeness – The measure of the degree to which data accurately and precisely represent constituent variations at a sampling point is its representativeness. Water flowing past a given location on land is constantly changing in response to a suite of environmental factors. Sampling strategies, equipment, and schedules will be designed to maximize representativeness where possible and applicable.

Completeness – The quantity of valid data available for use compared to the amount of potential data constitutes a measure of completeness. In an ambient water quality monitoring program, 90% completeness is a reasonable goal.

Comparability – Comparability is a measure of the confidence with which one data set or method can be compared to another. Standard methods and sampling techniques will be used to assess comparability (APHA, 2017; Shelton, 1994).

Bias - Inherent in any sampling program are potential sampling biases or prejudices. A goal of this QAPP is to describe guidelines and procedures that will eliminate or minimize the amount of sampling bias introduced into the PSMP.

Sensitivity – Sensitivity is the capability of a method or instrument to discriminate between measurement responses representing different levels of a variable of interest.

SPECIAL TRAINING REQUIREMENTS AND SAFETY

Field technicians are trained using standard operating procedures as well as hands-on training with field sampling equipment. Proper field and laboratory safety procedures are followed with respect to chemicals (e.g., preservatives), and safety equipment (e.g., protective footwear). Prior to conducting field work the field technicians will conduct a safety briefing covering the safety rules below and to bring awareness to any site specific hazards such as uneven terrain, wildlife, pedestrians or traffic etc. Appropriate traffic control measures vary per site but are in place as needed. The City will maintain all of its own records.

Safety rules for the field:

- Monitor with at least one partner if possible. Always let someone else know where you are, when you intend to return, and what to do if you do not come back at the anticipated time.
- Make certain that each member of a sampling group knows the location of the nearest medical center so that you can locate the center or direct emergency personnel as needed.
- Have a first aid kit handy. Know any important medical conditions of team members (e.g., heart conditions or allergic reactions to bee stings).
- Listen to weather reports. Never go sampling if severe weather (lightening, wind advisory, impassible snow, flash flood warning, or a similarly unsafe weather advisory) is predicted or if a storm occurs while at the site.
- If there is lightning in the area, stay out of contact with the water, avoid contact with bridges and stay away from tall trees. It is usually best to wait out a thunderstorm in your vehicle.
- Never cross private property without the permission of the landowner.
- Do not wade alone. Rocky-bottom streams can be very slippery and can contain deep pools; muddy-bottom streams might also prove treacherous in areas where mud, silt, or sand has accumulated in sinkholes. If you must cross the stream, your partner(s) should wait on dry land and be ready to assist you if you fall.
- Do not attempt to wade across waterways that are swift and above the knee in depth without taking proper precautions. Personal flotation devices shall be worn when wading in water deeper than two feet or at any time when there is a risk of drowning. When engaged wading activities, the team should have a throw bag and be trained in its use.
- After sampling, wash your hands with soap.

- Wear high visibility clothing when working along roads.

When using chemicals:

- Know your equipment, sampling instructions, and procedures before going out into the field. Prepare labels and clean equipment before you get started.
- Avoid contact between chemical reagents and skin, eyes, nose, and mouth. Never use your fingers to stopper a sample bottle (e.g., when you are shaking a solution). Safety glasses or safety goggles should be worn when performing any chemical test or handling preservatives.
- Know chemical cleanup and disposal procedures. Wipe up all spills when they occur. Return all unused chemicals to your program coordinator for safe disposal. Close all containers tightly after use. Do not switch caps.
- A copy of the MSDS binder is kept in the work vehicle for reference.

DATA GENERATION AND ACQUISITION

SAMPLING DESIGN

Detailed maps and information about stormwater monitoring sites, including location, type, sample parameters, sample frequency, etc. can be found in the City of Caldwell's stormwater monitoring plan (City of Caldwell, 2022).

Grab samples - Grab samples will be collected for E.coli, total suspended sediment, temperature, total nitrogen, and total phosphorus. Sample containers are provided by Analytical Laboratories Inc (ALI). Samples will be collected from storm drains. Some locations necessitate use of a swing sampler with an extension rod to collect runoff directly into sample bottles. All samples are handled and preserved on ice per laboratory recommendations and following standard water quality sampling procedures (APHA, 2017).

Discharge Volume - The City of Caldwell will use its Davis Weatherlink Stations to log the intensity of local storm events. Stormwater compliance staff maintain three City-owned weather stations.

- Treasure Valley Executive Airport at Caldwell (formerly Caldwell Industrial Airport) at (43.647580, -116.637334)
- Caldwell Street Department Shop at (43.679296, -116.681130)
- Caldwell Fire Station #2 at (43.632815, -116.689883)

Each rain gauge measures the hourly and cumulative storm rain depth and intensity ("rain rate") at the gage location every 15 minutes. We can estimate tributary area and use rainfall intensity to quantify the volume of water discharged to an outfall.

One method of calculating volume discharged:

*[runoff coefficient] * [cumulative rain depth] * [tributary area] = total runoff volume*

A second method of calculating volume discharged (Manning's Equation):

$$V = (k_n / n)\, R_h^{2/3}\, S^{1/2}$$

V = velocity
k_n = constant, 1.486 for English or 1.0 for SI
n = Manning's roughness coefficient
R_h = hydraulic radius
S = slope of pipe

Then, one would need to multiply V * A, where A = the cross sectional area of flow.

For the purposes of this document, Manning's equation would require additional work to utilize. Note that one would need to survey the pipe(s) to determine slope. Also, because volumetric flow rate may not be relatively constant throughout the storm, there are additional complexities associated with measurement of the hydraulic radius. We propose use of the first calculation method whenever possible.

SAMPLE HANDLING AND CUSTODY

The site name, date and time of collection, and analyses requested are used as a sample identifier. Immediately following collection, water samples are preserved as necessary to limit chemical, biological, and physical reactions that may alter monitoring parameters. Personal protective equipment (e.g., goggles and gloves) is worn when working with acids to reduce the risk of contamination and for safety reasons. Glass containers are placed in padded sleeves to prevent breakage. All samples are placed on ice in a cooler to maintain sample temperature between 0°C and 4°C for transport back to the laboratory.

Pertinent data (e.g., station identification, date, time, analyses requested, sample preparation) are entered on Chain of Custody forms. A sample Chain of Custody form is provided in Appendix B. Chain of custody procedures are intended to ensure that sample integrity is maintained during all phases of sample handling and analysis, and that these procedures are documented with an accurate written record. Technically qualified City of Caldwell Engineering Department staff shall complete the Chain of Custody forms associated with each sampling event.

ANALYTICAL METHODS

Constituents to be determined for stormwater samples are listed in Table 3. The laboratory equipment, regulatory citations and instruments needed for the procedures identified in Table 3, as well as corrective action if failures occur, are provided in the Analytical Labs Inc. QA Plan and/or professional laboratory grade SOP's upon request. ALI is located at 1804 N 33rd Street in Boise, Idaho 83703.

Table 3. Laboratory Analyses of Water Quality Samples.

Parameter	Method	Detection Limit mg/L (except where noted)	Sample Volume (oz) & Preservative (If needed)	Sample Holding Time (days)	Laboratory
TKN	SM 4500 N	0.05	16[a]; H_2SO_4	28	ALI
Nitrogen, nitrate + nitrite	EPA 353.2	0.05	16[a]; H_2SO_4	28	ALI
Phosphorus, total	EPA 365.4	0.05	8	2	ALI
Solids, total suspended	USGS I-3765	2	32	7	ALI
Escherichia coli	SM 9221	1 colony	8; $Na_2S_2O_3$	0.333	ALI

- All sample containers are cooled to 4°C.
- An additional preservative is used where indicated (i.e. H_2SO_4 to pH<2).
- Preservation and holding times are taken from 40 CFR Ch. 1 Section 136.3.
- Volume is adjusted for suspended sediment sample to allow filtration of the entire sample.

QUALITY CONTROL

Field QC consists of routine calibration checks of continuous monitoring equipment as well as regular collection of field QC samples, which consist of blanks and duplicates.

- **Grab samples** - A *field blank* is a sample that is prepared in the field using deionized water and appropriate preservatives. The field blank is carried in the same cooler and delivered to the laboratory with the field samples simultaneously to check the cleanliness of the field conditions at the time of sampling. A *duplicate* serves as a second aliquot sample that is collected at the same time and in the same manner as the first aliquot. Duplicate samples shall be labeled with unique identifiers that are not indicative of collection location; however, it is imperative that information clearly defining these samples shall be recorded in field notes. Following analyses of duplicates, each duplicate's results shall be noted and labeled with the actual location and time of sampling in the data set. The duplicate sample provides information about the repeatability of the sampling and analysis. One field blank sample and one duplicate sample should be prepared/collected during each sampling event.

Laboratory QC samples are prepared and analyzed at the laboratories to assess analytical precision, accuracy, and representativeness. These laboratory QC measures include method blanks, laboratory control samples (also called blank spikes), matrix spikes, matrix spike duplicates, and laboratory duplicate samples. The method blanks provide information on the degree of contamination of field samples that may occur in the laboratory during sample preparation and analysis. Blank spikes and laboratory duplicate analyses enable the laboratory to determine the accuracy and precision of the analytical system. Analysis of matrix spike and matrix spike duplicates are standard laboratory practices for determining the suitability of an analytical method for a particular environmental sample matrix. Laboratory control and duplicate samples are generally analyzed at a frequency of ten percent of the total samples submitted for analysis. (City of Caldwell anticipates that ALI will utilize laboratory QC practices to handle and analyze samples.)

EXCEEDANCE OF A QUALITY CONTROL LIMIT

Field – If a sampling device, outfall, or control mechanism is found to be damaged or dysfunctional, such condition shall be logged on in the sampling reports and records associated with the sampling event. Sampling staff may speculate whether and how the adverse condition may influence the sample results, if necessary. Staff should recommend remedial actions, where feasible. After noting existing conditions, sampling staff should request a work order task to be completed by Caldwell Street Department for cleaning or repair of the site.

Lab – Implementation of the laboratory component of the QC program is the responsibility of each laboratory. QC reports and data provided by the laboratories will be reviewed for compliance with data quality objectives. If control limits are exceeded, an inquiry will be initiated to determine the source of the problem.

INSTRUMENT INSPECTION AND MAINTENANCE

Weather Station – Stormwater compliance staff shall download datalogger data from each of the three stations on Monday and Friday each week, and any date following a measurable storm event (> 0.10" of precipitation). Often, a quick review of the data will indicate the presence of errors or site maintenance on the weather stations. If errors exist, staff shall reset the logger and attempt to re-download. If errors persist, staff must visit the station in the field to perform cleaning of the exterior unit, and replace the batteries in both outdoor and indoor units. Staff must allow at least 24 hours to pass; the system will reboot itself. In the event that all these activities do not enable one or more stations to reconnect to the City's network, staff shall contact Caldwell IT department to determine whether any IP addresses have recently been updated. Regardless of the results of the semi-weekly data download, staff shall perform an onsite condition inspection on the outdoor monitoring units each quarter.

Sampling Sites – Each of the sampling sites require regular maintenance to facilitate accurate and reliable sample results.

Table 4. Recommended Maintenance at Sampling Sites

Outfall ID	Site Name	Latitude, Longitude	Maintenance Required
IND-0545D	12th Ave at Indian Creek Outfall	43.663084, -116.683243	Trim thorny vegetation around outfall, inside Indian Creek channel by sampling staff; Regular vactor-cleaning of sand-and-grease trap upstream of outfall by Caldwell Street Department
NOB-0214B	Noble Drain at Tamsworth Way Storm Pond Outfall	43.661335, -116.617651	Landscape maintenance of stormwater storage & infiltration pond by HOA
SOL-0165A	Solomon Drain at Skyway Street Pond Outfall	43.655451, -116.629855	Landscape maintenance of stormwater storage & infiltration pond by HOA
BOI-0007A	SDMH Upstream of BOI-0007A Outfall	43.669898, -116.678370	Regular jet cleaning of tributary catch basins and pipes by Caldwell Street Department

DATA VALIDATION AND USABILITY

VERIFICATION AND VALIDATION METHODS

Data must be verified and validated prior to publication.

Verification is the process of evaluating the completeness, correctness, and conformance/compliance of a specific data set against the method, procedural, or contractual requirements (EPA, 2002).

Validation is an analyte-specific and sample-specific process that extends the evaluation of data beyond method, procedural, or contractual compliance (i.e., data verification) to determine the analytical quality of a specific data set (EPA, 2002).

All data collected and analyzed in the CSMP will be reviewed to check for errors in transcription, calculation, or input to spreadsheets. All data will be saved electronically. Data will be subject to the following general validation procedures:

Grab Sample Data

- Confirm that results of all method blanks and spikes fall within the limits set by the indicated laboratories.
- Review results from analytical laboratories, including chain of custody forms, for completeness.
- Conduct graphical review of the data.
- Investigate possible causes of data that appear to be anomalous or outside of expected ranges (e.g., laboratory or database entries, atypical conditions at the time of sampling, etc.).
- Note modifications to the data in comment fields.
- Confirm analytical methodologies are compliant with current minimum detection levels as stated in part 6.2.7 of the Permit. Use an alternative accepted method where needed.

Weather Station Monitoring Data

- Data are downloaded on a regular basis and trend charts are maintained.
- Data and time ranges considered anomalous are noted including the reasons why.
- Data are considered anomalous when:
    - Sensors have obstructions or operational requirements which are not met, and therefore the equipment is reporting incorrect data,
    - Data spikes are observed during the downloading or during field calibration, and
    - Instruments are known to be out of calibration.
- Data are not removed from the primary data set. Data that are not acceptable, including data that are noted as anomalous, are rejected from inclusion in the final data set.
- A careful graphical review of the data is performed.
- All modifications and limitations of the data are noted.

Project staff will be responsible for conducting data verification procedures to ensure that published data are accurate, complete, and scientifically reasonable. Missing or suspect data will be explained or identified by data qualifiers given in the database.

ASSESSMENT AND RESPONSE ACTIONS

Assessment activities are critical to the successful implementation of the quality assurance program. The CSMP QAPP will be reviewed annually by the QA Manager for assessment of compliance with the outlined protocols and procedures. To aid in this review, when sampling problems arise, personnel shall seek advice from their immediate supervisor for guidance. Problems are documented and communicated to the QA Manager.

If the annual review identifies any needed corrective actions, they will be discussed by City staff. Corrective actions will depend on the type and severity of the finding. The City shall be responsible for verifying that this corrective action has been accomplished.

REFERENCES

APHA 2017. "Standard Methods for Examination of Water and Wastewater." 23rd ED., American Public Health Association, Washington D.C.

City of Caldwell. 2020. Stormwater Monitoring Plan for the City of Caldwell NPDES Phase II Stormwater Permit.

Idaho Department of Environmental Quality 1999. Lower Boise River TMDL: Subbasin Assessment, Total Maximum Daily Loads.

Idaho Department of Environmental Quality. 2015. Lower Boise River TMDL: 2015 Sediment and Bacteria Addendum.

Idaho Department of Environmental Quality. 2015. Lower Boise River TMDL: 2015 Total Phosphorus Addendum.

Lurry, D.L. and Kolbe, C.M. (2000) Interagency field manual for the collection of water-quality data. U.S. Geological Survey. Open-File Report 00-213.

Shelton, L.R. 1994. Field Guide for Collecting and Processing Stream-Water Samples for the National Water-Quality Assessment Program. U.S Geological Survey Open-File Report 94-455. Sacramento, California.

U.S. Environmental Protection Agency (EPA). 2001. U.S. EPA Requirements for Quality Assurance Project Plans. EPA QA/R-5. EPA/240/B-01/003. March.

U.S. Environmental Protection Agency (EPA). 2002. U.S. EPA Guidance on Environmental Data Verification and Data Validation.

APPENDIX A – LOWER BOISE RIVER SUBBASIN TMDL

For full code, visit: **https://www.deq.idaho.gov/water-quality/surface-water/total-maximum-daily-loads/boise-river-lower-subbasin/**

Sediment & Bacteria

- The effluent contains an *E. coli* concentration less than 126 cfu/100 mL (30-day geometric mean)
- The effluent contains a suspended sediment concentration less than 17.5 mg/L (4-month average)

Total Phosphorus

This TMDL addendum focuses on two primary targets:

1. **May 1–September 30 TP Concentration**: TP concentrations (and TP load equivalents[1]) ≤ 0.07 mg/L in the lower Boise River near Parma to achieve the 2004 SR-HC TMDL TP target (Table B)

2. **Mean Monthly Benthic Chlorophyll-*a***: TP concentrations (and TP load equivalents) correlated with a mean monthly benthic chlorophyll *a* (periphyton) level ≤ 150 mg/m^2 within the two §303(d)-listed (impaired) AUs on the main stem lower Boise River— ID17050114SW005_06b (Middleton to Indian Creek) and ID17050114SW001_06 (Indian Creek to the mouth)
   a. With different TP allocations to achieve the mean monthly periphyton target for the seasons:
      - May 1–September 30 (Table B)
      - October 1–April 30 (Table C)

APPENDIX B – CHAIN OF CUSTODY FORM

CLIENT CODE:

CHAIN OF CUSTODY RECORD

CLIENT INFORMATION:		PROJECT INFORMATION:	ANALYTICAL LABS, INC. 1804 N. 33rd Street • Boise, ID 83703 (208) 342-5515 • Fax: (208) 342-5591 • 1-800-574-5773 Website www.analyticallaboratories.com E-mail: ali@analyticallaboratories.com
Project Manager:		Project Name:	
Company:		PWS Number:	
Address:		Purchase Order Number:	TESTS REQUESTED
		Required Due Date:	
Phone:	Fax:	E-mail Address:	
Sampled by: *(Please print)*		Transported by: *(Please print)*	

Lab ID	Date Sampled	Time Sampled	Sample Description (Source)	Sample Matrix										Remarks:

Invoice to: *(If different than above address)*	Special Instructions:

ALLOCATIONS OF RISK. Analytical Laboratories, Inc. will perform preparation and testing services, obtain findings and prepare reports in accordance with Good Laboratory Practices (GLP). If, for any reason, Analytical Laboratories, Inc. errors in the conduct of a test or procedure, their liability shall be limited to the cost of the test or procedure completed in error. Under no circumstances will Analytical Laboratories, Inc. be liable for any other cost associated with obtaining a sample or use of data.

Note: Samples are discarded 21 days after results are reported. Hazardous samples will be returned to client or disposed of at client expense.

Relinquished By: *(Signature)*	Print Name:	Company:	Date:	Time:
Received By: *(Signature)*	Print Name:	Company:	Date:	Time:
Relinquished By: *(Signature)*	Print Name:	Company:	Date:	Time:
Received By: *(Signature)*	Print Name:	Company:	Date:	Time:
SAMPLE RECEIPT Total # of Containers:	Chains of Custody Seals Y / N / NA	Intact: Y / N / NA Temperature Received:	Condition:	

REV 2/1W12 WHITE STAYS WITH SAMPLE(S) YELLOW LAB PINK SAMPLER

APPENDIX C – TECHNICAL RESOURCES FOR WEATHERLINK STATIONS

Worldwide Weather Station Map (Live): https://www.weatherlink.com/map

Davis Weather Station Troubleshooting Resources: https://support.davisinstruments.com/

Davis Supplies: https://www.davisinstruments.com/

APPENDIX D – SAMPLING CRITERIA

In order for a storm event to qualify for sampling is must meet the following criteria:

- Must have a 50% chance or greater of happening within a 24 hour period.
- Precipitation forecast predicts 0.10 inch or greater of rainfall amount.
- Must not have rained a measureable event in the previous 72 hrs.

Note: Lab must be able to receive sample within 8 hours of collection (same business day). Storm events between 2:00 PM Saturday and 12:00 AM on Sunday would exceed hold times and are not eligible. (Assumes 1 hour of sampling and 1 hour of drive time to lab.) The lab is closed for Holidays.

- Samples must be collected within the first 2 hours of the start of rain event.
- If site is not discharging at the time of sampling, continue to the next site and return to the previous site to check for any discharge. Until the 2 hour limit expires then note in the report "no discharge."
- Label each sampling bottle with the following information: site, time, lab test requested.
- After the sites have been sampled, the samples must be kept cold using gel ice and taken to Analytical Labs Inc. located at 1804 N. 33"' Street, Boise, Id 83703 within an 8 hour period.

APPENDIX E – GRAB SAMPLE DATA FORM

Grab Sample Data Form

Site Name: _____

Personnel: _____ **Date/Time On-Site:** _____

Site Description: _____

72-HR Antecedent Dry Period Met? (circle one) **YES / NO**

Velocity: _____ ft. /s **Temperature:** _____C

Grab Information				
	Sample ID	Date	Time	Labeled?
Total Suspended Solids (TSS)				☐
Total Kjeldahl Nitrogen (TKN) *preserve w/ H_2SO_4				☐
E.Coli				☐
Total Phosphorus (TP)				☐

Grab Information – Field QC Samples				
Source site:	Sample ID	Date	Time	Labeled?
Field Duplicate - E.Coli				☐
Field Blank – E.Coli				☐

*Time on bottle for QC Samples is 1200 for lab processing

Comments:

Time Off- Site:

APPENDIX F – WEATHER COMMUNICATION FORM

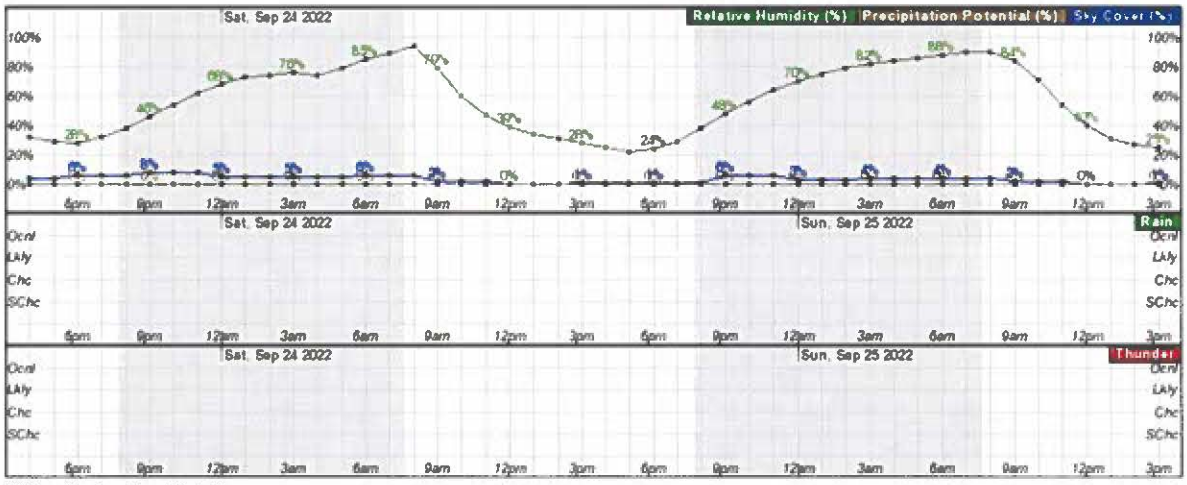
Weather Communication Form

Personnel:	Date/Time:
Targeted Stormwater Event in next 36 Hrs?	NO
Past 72-Hr Precipitation	0.21"
Date/time of expected event	
% chance /Expected amount of precipitation	
Air Quality Index	
Reasoning for Not Sampling: ☐ Antecedent Dry Period not met ☐ No Personnel ☐ Holiday ☐ other:	Forecasted Precipitation type: ☐ Light rain/Drizzle ☐ Rain ☐ Thunder Showers ☐ Snow

SITES TARGETED

Outfall ID	Site Name	Yes	NO	Comments
IND-0545D	12th Ave at Indian Creek Outfall		X	
NOB-0214B	Noble Drain at Tamsworth Way Storm Pond Outfall		X	
SOL-0165A	Solomon Drain at Skyway Street Pond Outfall		X	
BOI-0007A	SDMH Upstream of BOI-0007A Outfall		X	

NWS Forecast



Friday, September 23 at 10pm
Temperature: 60 °F Dewpoint: 44 °F Heat Index: N/A Surface Wind: SE 0mph
Sky Cover (%): 8% Precipitation Potential (%): 0% Relative Humidity (%): 54%
Rain: <10% Thunder: <10%

APPENDIX G – STANDARD OPERATING PROCEDURE: GRAB SAMPLING PROTOCOL

City of Caldwell Stormwater Compliance
Standard Operating Procedure
Wet Weather Grab Sampling

Applicability
This SOP applies to the collection of water grab samples for water chemistry analysis from storm drain structures such as outfalls, pipes, manholes, and receiving water bodies.

Purpose
This SOP's purpose is to provide standardized methods for collecting water quality grab samples from aforementioned sources.

Definition
A grab sample is a sample collected for the purpose of analysis of a water quality at a specific time and location.

Wet Weather Sampling Supplies
- Sampling containers/bottles from Analytical Laboratories, Inc. or other lab performing analysis.
- Disposable Gloves
- Swing Sampling Rod (for manhole sampling or hard to reach outfalls)
- Manhole Puller (to open manhole lid)
- Cooler with Ice
- Permanent Maker
- Chain of Custody Sheets
- Sampling Field Forms
- Pen

Guidelines
Water grab samples collected from the same site are to be collected within 15 minutes of each other.

Depending on the accessibility of the sampling location, samples are collected via hand grab or with a swing sampling rod. The sample collector wears all appropriate personal protective equipment and at minimum disposable gloves. The inside of the container is not to be contaminated with hands, sediment, or used to transfer other samples.

If using a swing sampler the sterile sample container is cinched to the rod prior to opening the manhole to prevent a lost/fallen container.

Avoid scraping the bottom of the manhole as this may cause excess sediments to take up in the sample.

Procedure

1. With gloved hands the sterile sampling container is positioned with the open mouth facing the direction of the flow. The container lid is kept in a clean spot or held without dirtying it.
2. The mouth of the container is placed in the stream of flow or submerged about 2-4" in the direction of the flow. Avoid scraping the bottom of the manhole as this may cause excess sediments to take up in the sample.
3. The container volume should be just under full and leave a small amount of airspace for mixing.

If the sample location is inaccessible a swing sampling rod may be used.

Swing Sampling Rod
The sterile sample container is cinched to the rod prior to opening the manhole to prevent a lost/fallen container.

Container Handling
A sterile sample container is to collect grab samples in flowing streams, dip the sample container (sterile, unrinsed) to a depth of about 4 in. with the open end facing upstream. Push the mouth of the container upstream at this depth until the container is nearly full. The mouth of the container should be kept upstream of the sample collector, sampling apparatus, and any disturbed sediments. Leave enough airspace (5 to 10 mL) in the top of the sample container to help mix the sample when it is shaken just before filtration. Immediately chill samples in an ice chest or refrigerator at 1 to 4°C. Below, review specific requirements for each parameter.

E. coli
Be sure to grab at least two samples from the same location, taking care not to disturb sediments. Begin analyses as quickly as possible, preferably within 1 hour but not more than 6 hours after sample collection, to minimize changes in indicator bacteria density (Lurry and Kolbe, 2000).

Suspended Solids
If the sample is very turbid, < 250 mL should be poured into the SSC sample bottle. For relatively clear samples, the SSC sample bottle should be filled with approximately 900 ml.

Total Phosphorus
Bottles and caps are triple rinsed with sample water. Then collect the sample leaving some head space so samples can be frozen. Immediately preserve with sulfuric acid.

Transferring samples to the Laboratory
After collection into containers, samples are placed into coolers containing wet ice or gel ice packs and transported to the Analytical Labs Inc in Boise, ID. A sufficient quantity of wet ice is to be used to lower the water samples to approximately 4°C; more ice will be required in summer than winter.

In the headroom of the laboratory, samples are removed from coolers and sorted, with information entered on Chain of Custody forms. Samples to be analyzed at Analytical Labs Inc are checked in to the laboratory using the appropriate Chain of Custody form. Any samples sent to Analytical Labs Inc. must be dropped off within eight hours of the time of collection.

APPENDIX H – STANDARD OPERATING PROCEDURE: THERMOMETER MANUAL

City of Caldwell Stormwater Compliance
Standard Operating Procedure
Thermometer Measurements

Manufacturer's Information

The Taylor 3519FDA 3 3/16" digital pocket probe thermometer gives a clear digital readouts in both Fahrenheit and Celsius temperatures on its 1/2" display screen. It also has a resolution of 0.1 degree Fahrenheit, meaning that it is able to detect incredibly small increments of measure. With a temperature range between -40 and 450 degrees Fahrenheit and an accuracy of +/- 2 degrees. This thermometer has a 3 3/16" long stem.

It's also water-resistant. It is also treated with Safe-T-Guard antimicrobial protection against bacteria growth. This thermometer also offers a number of other convenient features, including auto-shut off to conserve battery life and a hold button to lock the temperature on the screen. It also comes with a protective sleeve that can attach to the back for use as an extender.

An LR44 battery is included to get you started right away. This thermometer provides instantaneous readings.

Procedure

1. The sampling person is to position themselves in a stable position with safe access to the sampling flow of water.
2. While wearing nitrile disposable gloves dip the sensor tip directly into the sampling water source. Wait for the display temperature reading to stabilize.
3. If unable to directly dip thermometer into water source, fill a clean glass jar with sample water and take measurement that way- avoid using plastic containers as they may alter readings.
4. Clean sensor tip between samples and replace battery every year or when power levels are low.
5. Thermometer will be checked and inspected prior to all wet weather events for proper use, battery life and working condition.

Quality Control & Calibration

- Duplicate readings are taken when measuring temperature to ensure precise readings.
- Calibration of the thermometer is done quarterly.

1. To calibrate, fill a glass halfway with ice and add water to top. Stir and wait 3 minutes.
2. Insert thermometer in center of glass, careful not to touch sides. Measurement should read 32°F or 0°C If difference is greater than 1°C between two readings taken 2 minutes apart the thermometer is to be replaced.