Addendum #1 to Quality Assurance Project Plan:

Icicle Creek Alluvial Water Storage Project Monitoring

Environmental Assessment Program

Washington State Department of Ecology

Central Regional Office

Olympia, Washington

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This Quality Assurance Project Plan Addendum is on the Department of Ecology's website at https://apps.ecology.wa.gov/publications/SummaryPages/2612025.html This is an addition to an original Quality Assurance Project Plan (QAPP). It is not a correction (errata) to the original plan.

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Data for this project will be available on Ecology's Environmental Information Management (EIM) website at EIM Database.[1] Search Study ID WROCR-2123-00025.

Original Quality Assurance Project Plan:

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[1] https://www.ecology.wa.gov/Research-Data/Data-resources/Environmental-Information-Management-database

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Quality Assurance Project Plan

Icicle Creek Alluvial Water Storage Project Monitoring

by Chelan County Natural Resource Department
October 2026

QAPP Approval Signatures

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Note: The numbered headings in this document correspond to the headings in the original QAPP. Only relevant sections are included here; therefore, some numbered headings may be missing.

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2.0 Abstract

Updated to remove seven study site locations and observational data of stream discharge. Monitoring is not necessary at seven study sites because they are not being pursued for restoration designs. Monitoring will occur at the remaining two study sites that are in project development for restoration designs. Stream discharge measurements are infeasible due to stream conditions at the study sites. Observations of surface water and groundwater elevations already meet the goals of the study.

This Quality Assurance Project Plan (QAPP) will cover monitoring associated with the AWS component of this grant (WROCR-2527-ChCoNR-00068), which includes two sites within the Icicle watershed. Monitoring will include observational data collection of channel bed elevations, groundwater and surface water elevations, and water temperature.

3.0 Background

Updated to remove seven study site locations and observational data of stream discharge. Monitoring is not necessary at seven study sites because they are not being pursued for restoration designs. Monitoring will occur at the remaining two study sites that are in project development for restoration designs. Stream discharge measurements are infeasible due to stream conditions at the study sites. Measuring stream discharge would be unsafe except at the lowest base flows, due to large substrate and high water depth and velocity. At higher flows, the sites are often inaccessible due to snow on the road. As a result, a true stage-discharge rating curve is infeasible for these study sites. Observations of surface water and groundwater elevations already meet the goals of the study. Surface water and groundwater elevation observations facilitate characterizing hydrologic conditions and detecting changes through time, which are components of the first two project goals.

3.1 Introduction and problem statement

Updated to remove the monitoring of 'Surface Water Discharge'.

3.2 Study area and surroundings

This study will collect data on two Alluvial Water Storage (AWS) project sites along the Icicle Creek mainstem (Table 1).

Table 1. Project site details.

Site Name	Approximate Reach Length (miles)	Approximate River Mile (RM)
Doctor Creek	0.56	RM 15.5
Cashmere Mountain	0.31	RM 10

3.2.3 Parameters of interest and potential sources

Updated to remove the parameter of interest for 'surface water discharge'.

4.0 Project Description

Updated to remove observational data of stream discharge and related quality objectives.

4.2 Project objectives

Updated to remove the objective for ‘discharge’. Observations of surface water and groundwater elevations already meet the goals of the study. Surface water and groundwater elevation observations facilitate characterizing hydrologic conditions and detecting changes through time, which are components of the first two project goals. The comparison of surface water and groundwater elevations through time will allow characterizing streamflow impacts on groundwater.

4.3 Information needed and sources

Updated to remove new data collection of ‘manual discharge measurements’.

5.0 Organization and Schedule

Updated to reflect continued monitoring through 2027 field season.

To accommodate monitoring beyond 2027, a new QAPP will be developed after the expiration of the existing QAPP in 2028.

5.4 Proposed project schedule

Table 2. Proposed schedule for completing field and laboratory work, data entry into EIM, and reports.

WORK TYPE	DUE DATE	LEAD STAFF
Field and laboratory work		
Equipment Installation	Fall 2023 – Spring 2024	Matt Holland
Field Visits	Bi-Annual (Spring-Fall)	Matt Holland
Field work completed	October 2027	Matt Holland
Data analysis completed	January 2028	Matt Holland
Environmental Information System (EIM) database		
EIM data loaded	January 2028	Matt Holland
EIM data entry review	January 2028	Bryan Maloney
EIM complete	February 2028	Matt Holland
Final report		
Draft due to supervisor	October 2027	Matt Holland
Draft due to client/peer reviewer	November 2027	Matt Holland
Draft due to external reviewer(s)	November 2027	Matt Holland
Final (all reviews done) due to publications coordinator	December 2027	Matt Holland
Final report due on web	December 2027	Matt Holland

6.0 Quality Objectives

Updated to remove observational data of stream discharge and associated quality objectives. Stream discharge measurements are infeasible due to stream conditions at the study sites. Measuring stream discharge would be unsafe except at the lowest base flows, due to large substrate and high water depth and velocity. At higher flows, the sites are often inaccessible due to snow on the road. As a result, a true stage-discharge rating curve is infeasible for these study sites. Observations of surface water and groundwater elevations already meet the goals of the study. Surface water and groundwater elevation observations facilitate characterizing hydrologic conditions and detecting changes through time, which are components of the first two project goals. The comparison of surface water and groundwater elevations through time will allow characterizing streamflow impacts on groundwater. There will not be a rated discharge relationship to compare to groundwater elevations. However, surface water elevations, which correspond to discharge, will be measured and can be compared to groundwater elevations.

6.2 Measurement quality objectives

Updated to remove the ‘streamflow gaging’ measurement quality objective. Updated to remove the ‘stream discharge’ parameter.

7.0 Study Design

Updated to remove seven study site locations and observational data of stream discharge. Monitoring is not necessary at seven study sites because they are not being pursued for restoration designs. Monitoring will occur at the remaining two study sites that are in project development for restoration designs. Stream discharge measurements are infeasible due to stream conditions at the study sites. Measuring stream discharge would be unsafe except at the lowest base flows, due to large substrate and high water depth and velocity. At higher flows, the sites are often inaccessible due to snow on the road. Observations of surface water and groundwater elevations already meet the goals of the study. Surface water and groundwater elevation observations facilitate characterizing hydrologic conditions and detecting changes through time, which are components of the first two project goals. The comparison of surface water and groundwater elevations through time will allow characterizing streamflow impacts on groundwater. There will not be a rated discharge relationship to compare to groundwater elevations. However, surface water elevations, which correspond to discharge, will be measured and can be compared to groundwater elevations.

7.2 Field data collection

Updated to remove sites 1, 2, 3, 4, 6, 7, and 9. Sites 5 and 8 are now named ‘Doctor Creek’ and ‘Cashmere Mountain’, respectively.

7.2.2 Field parameters and laboratory analytes to be measured

Updated to remove the field parameter for ‘streamflow gaging’.

8.0 Field Procedures

Updated to observational data of stream discharge. Stream discharge measurements are infeasible due to stream conditions at the study sites. Observations of surface water and groundwater elevations already meet the goals of the study.

8.2 Measurement and sampling procedures

Updated to remove ‘streamflow gaging’.