

June 9, 2025

BGE, Inc.
245 Townpark Drive, Suite 470
Kennesaw, Cobb County, Georgia 30144

Attention: Mr. Blayne Coleman – Bcoleman@bgeinc.com

Subject: **Limited Stream Assessment**
Lake Arrowhead, Phase II, Unit 12
1434 Arrowhead Drive
Waleska, Cherokee County, Georgia
Maxis Project No.: 1-25-152A

Dear Mr. Coleman:

Maxis Engineering, LLC (Maxis) is pleased to submit this Limited Stream Assessment report for the above-referenced property (subject property). The assessment was performed in response to an email dated May 30, 2025, regarding a Cherokee County Stop Work Order. The purpose of this assessment was to evaluate stream conditions following a sediment loss associated with land disturbance activities at the subject property.

Please contact me at (770) 694-6178 if there are questions regarding the information contained in this report.

Sincerely,
Maxis Engineering, LLC



Barry D. Holbert, P.E.
Principal



Limited Stream Assessment

Proposed Residential Property

1434 Arrowhead Drive, Waleska, Cherokee County, Georgia

Maxis Project No. 1-25-152A

June 9, 2025

Limited Stream Assessment

Lake Arrowhead, Phase II, Unit 12
1434 Arrowhead Drive
Waleska, Cherokee County, Georgia
Maxis Project No.: 1-25-152A

Prepared for:

BGE, Inc.
245 Townpark Drive, Suite 470
Kennesaw, Cobb County, Georgia 30144

Prepared by:



501 Hickory Ridge Trail, Suite 110
Woodstock, GA 30188

June 9, 2025

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ATTACHMENT

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1. INTRODUCTION

Lake Arrowhead Phase II, Unit 12 construction activities, located near 1434 Lake Arrowhead Drive in Waleska, Cherokee County Georgia, experienced a “sediment loss” associated with the approved/installed erosion and sedimentation control measures. The sediment loss occurred in May 2025 and appeared to originate from temporary sediment ponds Sd3-7, Sd4C-8, and Sd3-16, which are located upgradient of the impacted stream. The impacted stream, hereinafter referred to as “Stream A,” is classified by the Georgia Environment Protection Division – Watershed Protection Branch as a minor, perennial, non-trout fishing stream which discharges into a cove of Lake Arrowhead located approximately 1,840 feet from the aforementioned temporary sediment ponds.

On Tuesday May 27, 2025, Cherokee County issued a Stop Work Order (SWO) based on a site inspection conducted during the week of May 19, 2025. One stipulation of the SWO was that the developer must consult with a professional to conduct a stream evaluation prior to cleanup, if applicable. A Site Location Map illustrated the proposed development is included as **Figure 1**.

Maxis Engineering, LLC (Maxis) was retained by BGE, Inc. (BGE) to conduct a Limited Stream Assessment of Stream A associated with the aforementioned sediment loss. Maxis conducted the assessment on June 2, 2025, by collecting in-situ field parameters at 17 stations/locations along Stream A (Stations A-1 through A-17) and an un-affected secondary side stream (Stream B), which discharges into Stream A. Maxis also collected in-situ field parameters at the outfall/mouth of Stream A (Stations C-1 through C-4) which discharges into a cove on Lake Arrowhead.

This report summarizes the sampling locations and procedures (Section 2), presents the field data in the context of the Georgia Water Quality Control Rules and Regulations, 391-3-6-.03, hereinafter referred to as “Rules” and the National Pollutant Discharge Elimination System (NPDES) storm water discharge associated with construction activity, General NPDES Permit No. GAR100001 (Section 3), and provides an overall summary of the data collected with recommendations (Section 4).

In general, the results of this Limited Stream Assessment indicate the in-situ field data collected from the subject stream are within acceptable ranges established for specific criteria for classified use [391-3-6-.03(6)]; note: any stream or stream reach that isn’t specifically listed in Rules, is classified as “fishing” regarding water use.

2. SAMPLING LOCATIONS AND COLLECTION METHODS

The sampling locations and collection methodologies are presented in this section. Prior to this assessment, the last recorded rain event (0.29 inch) occurred on May 29, 2025, based on the nearest USGS rain gauging station. No rainfall occurred during the stream assessment activities conducted on June 2, 2025.

On June 2, 2025, Maxis reviewed the proposed subdivision and approved grading plans and determined the sediment loss point of impact (POI) appeared to originate directly downgradient of temporary sediment ponds Sd3-7 and Sd4C-8. A third possible location for sediment discharge was identified during the field reconnaissance, which was located downgradient of temporary sediment pond Sd3-16. Sediment associated with the loss appeared to flow east, southeast along Stream A until reaching a cove in Lake Arrowhead.

Based on a channel width between approximately three (3) and eight (8) feet, Maxis assessed approximately 1,840 feet of the subject stream by dividing it up into 17 sampling stations/locations (Stations A-1 through A-17), which were located down gradient of the POI. Sampling stations/locations were spaced between 40 and 100 feet apart. Additionally, Maxis assessed the unaffected, side stream (Station B-1) located down gradient from Station A-4. Maxis adjusted the actual sampling location at each station to ensure sufficient surface water level (minimum of 8 inches) was present at the point of data collection. Each sampling station was flagged to ensure the same point could be located and monitored in the future, if necessary. A Site Map showing Stream A, Stream B and the corresponding stations is included as **Figure 2**.

Maxis also assessed the mouth of Stream A, which discharges into a cove of Lake Arrowhead; field parameters were collected before and after the turbidity curtain that was installed in the cove. Two (2) sampling stations (Stations C-1 and C-2) were located before the turbidity curtain, and two (2) sampling stations (Stations C-3 and C-4) were located after the turbidity curtain. A Site Map showing the cove within Lake Arrowhead and associated stations is included as **Figure 2**.

Maxis collected in-situ field parameters on June 2, 2025, using a Horiba U52, multiparameter water quality monitor, calibrated by Pine Environmental. The field parameters collected were temperature, pH, turbidity and dissolved oxygen.

Maxis began downstream, collecting data at each station prior to moving to the next upgradient station to ensure the natural water conditions were not disturbed. The Horiba probe was positioned/submerged in the stream at the designated sampling point and allowed approximately 10 to 20 seconds to stabilize before the aforementioned parameters were recorded. Additionally, Maxis visually observed if fish and/or amphibians

were present in the vicinity of each station during the field assessment. In-situ field data collected during this assessment is summarized on **Table 1**. Photographs of the stream stations and lake evaluated during this assessment are attached.

At the request of the Cherokee County, sediment core samples were to be collected within the cove of Lake Arrowhead. On June 2, 2025, Maxis attempted to collect several sediment core samples within the affected cove by manually pushing a 2-inch diameter plastic sleeve into the sediment/debris.

3. SUMMARY OF FIELD DATA AND COMPARISON TO STREAM CRITERIA

As discussed, water quality parameters were collected from 17 stations/locations along Stream A during this assessment. The weather was sunny, and the outside temperature was approximately 24°C during data collection. The following is a summary of the data collected from Stream A during the limited assessment completed on June 2, 2025:

Temperature

Water temperature ranged between 17.21°C and 21.84°C during data collection. The average temperature was 20.16°C. According to the Rules (319-3-6.03), water temperature shall not exceed 32.2°C. Additionally, the Rules state at no time shall the water temperature of the receiving water be increased by -15°C above the intake temperature. Based on parameters collected during this assessment, water temperatures did not exceed the above criteria, and the temperature measurements from the unaffected stream (Stream B) were similar to those measured in Stream A.

pH

Water pH ranged between 5.82 and 6.83 SUs during data collection. The average pH was 6.22. According to the Rules (319-3-6.03), a pH range of 6.0 to 8.5 is specified for streams classified for “fishing” use. Based on parameters collected during this assessment, pH did not exceed the above criteria, and the pH measurements from the unaffected stream (Stream B) were slightly lower than the pH measured in Stream A. The lower pH levels maybe contributed to various factors including organic matter build-up (leaves) and water stagnation.

Turbidity

Water turbidity ranged between 16.9 and 102 NTUs during data collection. The average turbidity was 61.1. According to the General NPDES Permit No. GAR100001, discharge from the site shall not result in the turbidity level greater than 75 NTU at stormwater monitoring outfall locations. Based on parameters collected during this assessment, turbidity did not exceed the above criteria.

Dissolved Oxygen

Dissolved oxygen (DO) ranged between 5.47 and 9.25 milligrams per liter (mg/L) during data collection. The average DO was 7.33. According to the Rules (319-3-6.03), an average DO concentration of 5.0 mg/L, and no less than 4.0 mg/L, is recommended at all times for waters supporting warm water (non-trout) species of fish. Based on parameters collected during this assessment, DO met the criteria referenced in the Rules (319-3-6.03).

Sediment Cores

Maxis attempted to collect several sediment core samples in the cove near the turbidity curtain, however, due to organic matter including leaf litter and wood debris, core samples and the associated thickness of the sediment could not be successfully obtained.

Sediment build-up was observed along the interior section of the turbidity curtain. The turbidity curtain appeared to be successful in temporarily isolating/containing the sediment loss to within the interior of the cove.

4. SUMMARY / RECOMMENDATIONS

Maxis performed a Limited Stream Assessment on June 2, 2025, in response to a sediment loss in May 2025, at Lake Arrowhead Phase II, Unit 12 construction activities and the associated Cherokee County SWO issued on May 27, 2025.

Maxis collected in-situ parameters from 17 stations/locations (Stations A-1 through A-17) along Stream A, one (1) unaffected adjacent stream (Station B-1), and four (4) stations/locations (Stations C-1 through C-4) before and after turbidity curtain at the mouth of Stream A within a cove of Lake Arrowhead. Based on data collected in the field during this assessment, water quality parameters of the stream were within the applicable ranges specified by Georgia Rules, 391-3-6-.03(6) and General NPDES Permit No. GAR100001.

The turbidity curtain appeared to be effective temporarily isolating/containing the sediment loss to the cove. There was no discernable indication that the sediment loss to Stream A would have long-term, detrimental effects on the waterbody and associated ecosystem. Residual silt/sediment will be resolved through the stream's natural self-purification process and collected at the turbidity curtain.

Maxis recommends inspecting and demucking of the aforementioned sediment ponds, if necessary, and removing sediment build-up in the cove associated with the turbidity curtain. Additionally, areas of concentrated stormwater flow as evidence of erosion rills and/or gulleys should be addressed with additional best management practices (BMPs), including but not limited to additional mulch/seed/check dams, etc... to stabilize these areas.

A more thorough stream evaluation (Tier 1 through Tier 4) can be conducted, however, based on the findings of this assessment, additional investigation is not recommended at this time.

5. REFERENCES

BGE, June 10, 2024. *“Construction Documents for Lake Arrowhead Phase II, Unit 12”*

State of Georgia, 2013. 31-3-6-.03 *“Water Use Classifications and Water Quality Standards.”* Amended: F. October 2, 2013; eff. October 22, 2013.

State of Georgia, Environmental Protection Division, 2018. *“Authorization To Discharge Under The NPDES Storm Water Discharge Associated With Construction Activity For Stand Alone Construction Projects.”* General NPDES Permit No. GAR100001, signed May 16, 2018; eff. August 1, 2018.

North Carolina Division of Water Quality, 2010. *“Methodology for Identification of Intermittent and Perennial Streams and Their Origins.”* Version 4.11, eff. September 1, 2010.

United States Environmental Protection Agency, Office of Water, May 2013. *“Nation Rivers and Streams Assessment 2013/14 – Field Operations Manual Wadeable.”* EPA 841-B-12-009b, Version 1.0.

United States Environmental Protection Agency, Office of Water, April 2009. *“Nation Rivers and Streams Assessment – Field Operations Manual.”* EPA 841-B-07-009, Version 1.0.

United States Department of Agriculture, National Resources Conservation Service, December 1998. *“Stream Visual Assessment Protocol.”* National Water and Climate Center - Technical Note 99-1.

FIGURES



Scale

NOTES:

BASE MAP CREATED FROM SURVEY PROVIDED BY CHEROKEE COUNTY GIS AND ARCGIS.



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SITE LOCATION MAP

Lake Arrowhead, Phase II Unite 12
1434 Lake Arrowhead Drive
Waleska, Cherokee County, Georgia

PIN No.: 22-0231-0028

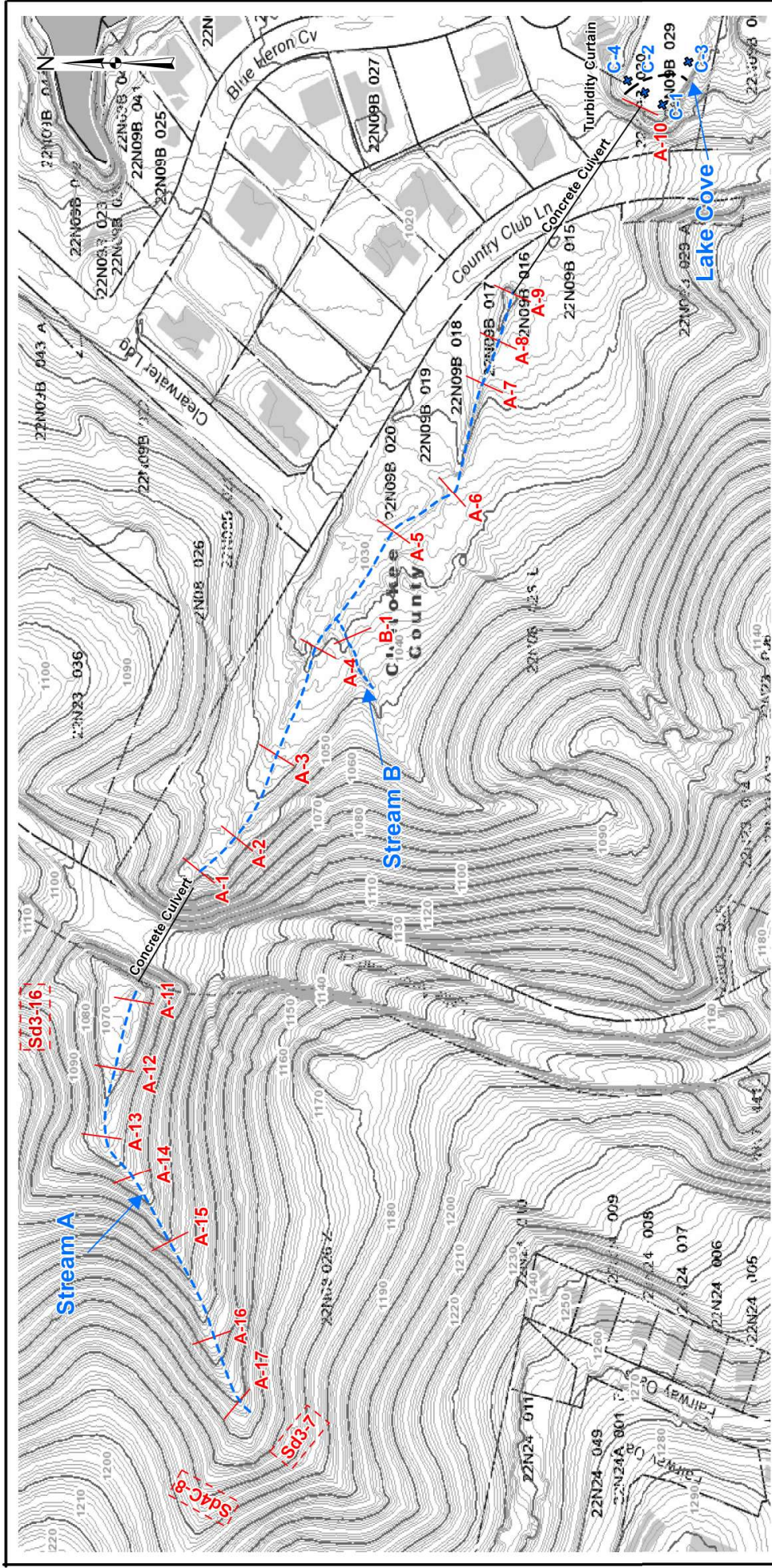
DRAWN BY: DAF

CHK'D BY: BH

JOB NO: 1-25-152A

DATE: 06/03/25

FIGURE NO: 1



NOTES:
BASE MAP CREATED FROM SURVEY PROVIDED BY CHEROKEE COUNTY GIS AND ARCGIS.

Legend
Stream Sample Location
Cove Sample Location
Temporary Sediment Basin
Sd3-16





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SITE MAP
Lake Arrowhead, Phase II Unit 12
1434 Lake Arrowhead Drive
Waleska, Cherokee County, Georgia

PIN No.: 22-0231-0028
JOB NO: 1-25-152A

DRAWN BY: DAF
DATE: 06/03/25

CHK'D BY: BH
FIGURE NO: 2



TABLES

LIMITED STREAM ASSESSMENT
 Lake Arrowhead, Phase II Unit 12
 1434 Lake Arrowhead Drive
 Waleska, Cherokee County, Georgia
 Maxis Project No.: 1-25-152A

Table 1
 In-situ Field Parameter Measurements

Stream Station	Date Sampled	Readings ⁽¹⁾				Fish/amphibians Present (yes/no) ⁽²⁾
		pH (SU)	Temperature (°C)	DO (mg/L)	Turbidity (NTU)	
A-1	06/02/25	6.83	20.76	9.25	60.8	no
A-2		5.92	19.68	6.85	58.9	no
A-3		6.09	19.45	7.96	66.5	no
A-4		5.92	19.58	8.94	86.1	yes
A-5		5.97	19.78	7.24	79.4	yes
A-6		5.82	19.81	6.55	85.6	yes
A-7		5.85	19.51	8.14	33.6	yes
A-8		5.83	17.21	8.66	39.0	yes
A-9		5.83	18.72	8.67	102.0	yes
A-10		6.18	21.79	8.84	30.9	no
A-11		6.49	20.42	6.56	47.0	no
A-12		6.43	20.70	6.24	63.6	no
A-13		6.60	20.49	6.46	72.0	no
A-14		6.58	20.42	6.07	48.1	no
A-15		6.64	20.92	6.27	48.7	no
A-16		6.69	21.67	6.46	16.9	no
A-17		6.01	21.84	5.47	100.0	no
Daily Average Stream A		6.22	20.16	7.33	61.1	--
Criteria ⁽³⁾		6.0-8.5	<32.2	>4.0	75.0	--
B-1	06/02/25	5.25	18.79	4.27	0.8	no
Daily Average Stream B		5.25	18.79	4.27	0.8	--
Criteria ⁽³⁾		6.0-8.5	<32.2	>4.0	75.0	--
C-1	06/02/25	5.99	21.50	7.70	99.3	no
C-2		6.11	24.70	6.96	212.0	no
Daily Average @ Cove Pre-Curtain		6.05	23.10	7.33	155.7	--
Criteria ⁽³⁾		6.0-8.5	<32.2	>4.0	75.0	--
C-3	06/02/25	6.62	26.13	8.80	6.8	yes
C-4		7.21	27.39	6.90	6.5	yes
Daily Average @ Cove Post-Curtain		6.92	26.76	7.85	6.7	--
Criteria ⁽³⁾		6.0-8.5	<32.2	>4.0	75.0	--

Notes:

Stations A-1 through A-17 were located on Stream A upgradient of Lake Arrowhead. Stations C-1 through C-4 were located downgradient of Stream A at the mouth in a cove of Lake Arrowhead. Station B-1 was an unaffected side stream (Stream B) south of Station A-4. Ambient air temperature was approximately 24° C at the time field parameters were recorded.

(1) Field Parameters were collected using a Horiba U52.

(2) "Fish Present" indicates fish and/or aquatic life was observed within eye-sight while at the specific station. "No Fish Present" indicates no fish or aquatic life were observed with the naked eye.

(3) Criteria were taken from the following: Georgia Water Quality Control Rules and Regulations, 391-3-6-.03 and the National Pollutant Discharge Elimination System (NPDES) storm water discharge associated with construction activity, General NPDES Permit No. GAR100001.

SU = Standard Unit

NTU = Nephelometric Turbidity Unit

C = Celsius

DO = Dissolved Oxygen

mg/L = Milligrams per Liter



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Upstream of Station A-1



Upstream of Station A-2



Upstream of Station A-3



Upstream of Station A-4



Downstream of Station B-1



Upstream of Station A-5



Upstream of Station A-6



Upstream of Station A-7



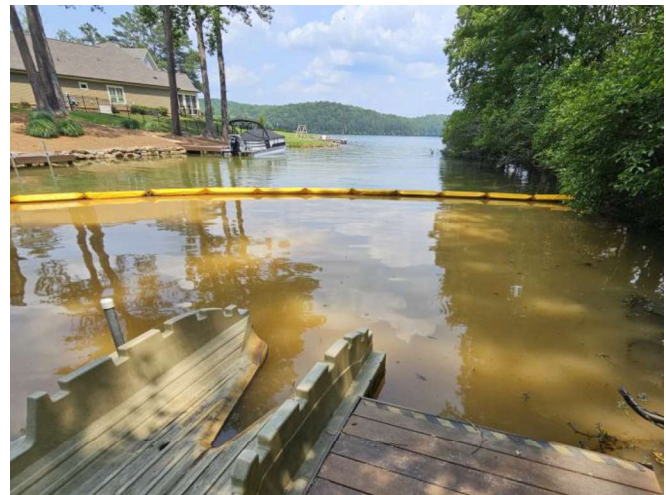
Upstream of Station A-8



Upstream of Station A-9



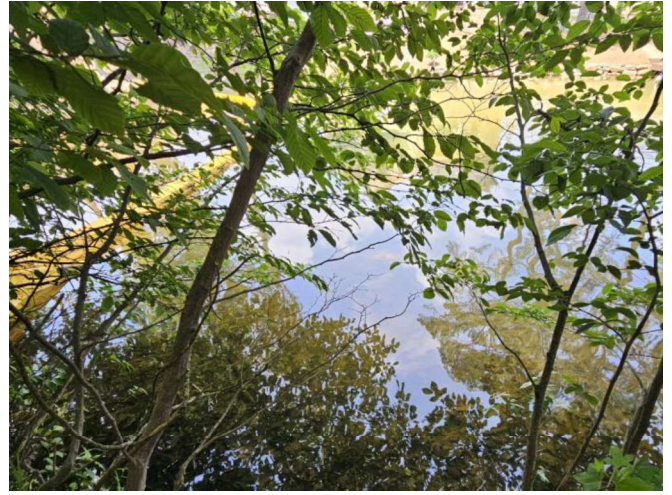
Upstream of Station A-10



Lake Station C-1



Lake Station C-2



Lake Station C-3



Lake Station C-4



Downstream of Station A-11



Upstream of Station A-12



Upstream of Station A-13



Upstream of Station A-14



Upstream of Station A-15



Upstream of Station A-16



Upstream of Station A-17



Upstream of Station A-17



Sediment Basin SD3-7



Sediment Basin SD3-7 looking down stream



Sediment Basin SD4C-8



Rock dam at SD4C-8



SD1-S looking southeast towards SD3-7



Outfall ST-6



Sediment Basin SD3-16