
MD 70 (Rowe Boulevard) Bridge Replacement/ Rehabilitation Project

December 2007



Weems and College Creeks Final Water Quality Monitoring Report (Post-Construction Phase, Year Three)



Environmental Systems Analysis



Gannett Fleming



**WEEMS AND COLLEGE CREEKS
FINAL WATER QUALITY MONITORING REPORT FOR
(POST-CONSTRUCTION PHASE, YEAR THREE)**

**MD 70 (ROWE BOULEVARD) BRIDGE
REPLACEMENT/REHABILITATION PROJECT
ANNAPOLIS, MARYLAND**

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EXECUTIVE SUMMARY

The Maryland State Highway Administration (SHA) has completed bridge improvements on MD 70 (Rowe Boulevard) located in Annapolis, Maryland. The Weems Creek Bridge was replaced, while the College Creek Bridge was re-decked and rehabilitated. A water quality monitoring program was conducted on both creeks to document potential impacts to the waterways associated with construction. This program consisted of monthly water quality sampling of select chemical and physical parameters and environmental inspections following precipitation events. This final report represents a cumulative comparison of each monitoring period with a focus on the post-construction monitoring phase of the project, conducted from September 2006 through August 2007. Pre-construction (baseline) monitoring was conducted from October 2002 through December 2003, year one construction monitoring was conducted from June 2004 through May 2005, and year two construction monitoring was conducted from June 2005 through July 2006.

Chemical and physical monitoring of select parameters was performed monthly at six locations in Weems Creek and five locations in College Creek. The parameters sampled included water temperature, total dissolved solids, salinity, pH, dissolved oxygen, secchi depth, turbidity, total nitrogen, total phosphorus, total suspended solids, and oil and grease (baseline phase only). Impacts were determined by comparing the data from baseline to construction and post-construction monitoring, where appropriate. The results from post-construction monitoring and an overall comparison are summarized below:

- Water temperatures were slightly higher during construction monitoring; however, temperatures followed similar patterns at all monitoring stations, including those located immediately upstream and downstream of the bridges. While summer temperature highs during all monitoring periods approached the regulatory limit of 90°F, all readings were within limits. Air temperatures were higher during construction and post-construction monitoring than during baseline. Precipitation was less frequent during construction in comparison to baseline monitoring. Therefore, increases in water temperatures were probably not due to construction activities but resulted from a combination of warmer air temperatures and less frequent precipitation during construction monitoring.
- Total dissolved solids (TDS) and salinity both followed similar trends at all stations with the lowest values occurring during year-one construction phase monitoring and the highest values occurring during baseline monitoring. All values recorded during construction and post-construction monitoring were within the high range of observations recorded during baseline monitoring. Readings were within the expected ranges for brackish water.
- Levels of pH followed similar trends at all stations and values were comparable to the baseline measurements, but there was a slight increase in pH observed during post-construction. A total of forty-one measurements, collected during the post-construction monitoring phase, on Weems and College Creek were outside the regulatory limit of 6.50 and 8.50 standard units. Because slightly elevated pH levels were observed during baseline and post-construction monitoring and occurred at multiple stations, they did not appear to have been produced by construction activities. The slightly basic pH may be attributed to photosynthesis by algae and submerged aquatic vegetation.

- Lower bottom dissolved oxygen (DO) concentrations were observed during post-construction monitoring than were observed during baseline monitoring on Weems Creek and College Creek. Concentrations followed a seasonal trend of lower concentrations during the summer months and higher concentrations during winter at all monitoring stations, as expected. The majority of dissolved oxygen levels were below 5.00 mg/L from April through October during all monitoring periods and dissolved oxygen levels were generally lowest in the headwaters in both creeks. The decrease in bottom dissolved oxygen was likely due to the warming of the creeks as a result of warmer air temperatures.
- Secchi measurements in Weems Creek and College Creek indicate poor water clarity, particularly during the summer months for all monitoring periods. The water clarity was poor in the summer, presumably due to algae suspended in the water column.
- Turbidity values were relatively constant throughout construction monitoring and were similar to values collected during baseline monitoring. There was a slight increase in turbidity observed during the late spring and early summer of the post-construction monitoring period. During construction monitoring period environmental inspections, Weems Creek turbidity measurements recorded following storm events ranged from 4.00 to 119.00 NTU and College Creek turbidity measurements ranged from 5.00 to 113 NTU. Both creeks were within regulatory limits.
- Total suspended solids (TSS) concentrations collected during construction and post-construction monitoring were similar to concentrations collected during baseline. Elevated TSS readings were recorded after storm events.
- Nitrogen concentrations decreased during the construction monitoring in comparison to baseline monitoring. An increase in nitrogen concentrations was observed during post-construction. Furthermore, total nitrogen (the sum of NO₃, NO₂, and TKN) exhibited seasonal fluctuations during all monitoring periods. In general, TKN concentrations were greater during the summer months and NO₃ and NO₂ concentrations were greater during the spring. Lower NO₃ and NO₂ concentrations were observed during the height of the growing season during construction monitoring, as well as during baseline monitoring.
- Total phosphorus concentrations during construction and post-construction monitoring declined in comparison to baseline and no phosphorus was detected in both Weems and College Creeks during the second year of construction monitoring. The decline in phosphorus concentrations was likely due to less runoff as a result of fewer precipitation events during construction monitoring.
- Oil and grease concentrations were less than 5.00 mg/L during baseline monitoring in Weems and College Creek. Oil and grease were not sampled during construction or post-construction monitoring.

Water quality parameters indicate that both Weems Creek and College Creek were not affected by bridge construction activities. Both Weems and College Creeks exhibit characteristics of a eutrophic

system with nutrient concentrations decreasing during the growing season and near-anoxic bottom dissolved oxygen concentrations during the summer months, both of which are likely due to algal blooms. The slightly basic pH may also be attributed to algal respiration. In addition, water clarity was generally lower in summer also primarily due to algal blooms.

1.0 INTRODUCTION

A water quality monitoring program was administered for the MD 70 (Rowe Boulevard) Bridge Replacement/Rehabilitation Project located in Annapolis, (Figure 1). Pre-construction monitoring was conducted between October 2002 and December 2003, year-one construction phase monitoring was conducted between June 2004 and May 2005, year-two construction phase monitoring was conducted between June 2005 and July 2006, and post-construction monitoring was conducted between September 2006 and August 2007. This program consisted of monthly water quality sampling of select chemical and physical parameters and environmental inspections following precipitation events in Weems Creek and College Creek.

The purpose of these studies was to document baseline, construction, and post-construction phase water quality conditions in both Weems and College Creeks to determine any changes to water quality that might occur during and after the bridge construction. This report summarizes all of the construction monitoring results. This report focuses on the post-construction monitoring period and compares these results to all previous monitoring. The water quality monitoring requirements and frequencies are listed below:

Baseline Phase (one year)

- Monthly water quality sampling in both creeks.
- Four of the monthly sampling events conducted after a storm event with at least 0.5 inches of precipitation.

Construction Phase (two years)

- Monthly water quality sampling in both creeks.
- Four of the monthly sampling events per year conducted after a storm event with at least 0.5 inches of precipitation.
- Environmental inspections after storm events of at least 0.5 inches to document sediment inputs to both creeks from construction activities and outfalls draining the surrounding area.
- Daily sediment and erosion control inspections of the construction site(s).

Post-Construction Phase (one year)

- Monthly water quality sampling in both creeks.
- Four of the monthly sampling events conducted after a storm event with at least 0.5 inches of precipitation.

2.0 SITE DESCRIPTION

Bridges over both Weems Creek and College Creek on MD 70 (Rowe Boulevard) have been replaced and repaired, respectively. Both Weems Creek and College Creek are tidal, brackish tributaries to the Severn River and are within the lower western shore basin of the Chesapeake Bay. The Weems Creek Bridge is located approximately 600 feet southeast of the U.S. 50/MD 70 interchange (Figure 2). The new bridge is approximately 720 feet long and was constructed on four concrete piers. Surrounding land use consists of residential waterfront properties. College Creek is located approximately 1,000 feet southeast of the U.S. 50/MD 70 interchange (Figure 3). The bridge

is approximately 978 feet long and was constructed on fifteen concrete piers. Surrounding land use consisted of Saint Anne's cemeteries, St. John's College, and residential waterfront properties. A wooded buffer was present along the creek upstream and downstream of the bridge.

3.0 METHODOLOGY

The methodology used to measure the water quality parameters was derived from the *Final Quality Assurance Project Plan*, prepared by the Maryland Department of Natural Resources (DNR, 2001). This document provides details regarding the collection and analysis of chemical and physical water quality parameters for the Chesapeake Bay and its tidal tributaries.

3.1 Water Quality Stations

Six water quality monitoring stations were established on Weems Creek (Figure 2). Three stations (WC1, WC2, and WC3) were located upstream of the MD 70 bridge. Station WC1 was located near Cowhide Branch, whose drainage area includes the Annapolis Mall. Station WC2 was located near the cove at Fitzgerald Road. Station WC3 was located in the center of Weems Creek, just below the cove located at Dewey Drive. Two stations (WC4 and WC5) were located immediately above and below the bridge to monitor construction activities and one station (WC6) was situated near the mouth of the creek. The stations are only accessible by boat. Figure 2 also illustrates the location of six stormwater outfalls located along Weems Creek. Environmental inspections were conducted on these outfalls following rain events during the construction period to gauge potential sediment inputs. A total of four outfalls were identified upstream of the MD 70 bridge and two were identified downstream of the MD 70 bridge.

Five stations were established on College Creek (Figure 3). One station (CC1) was located to monitor water quality upstream of the MD 70 Bridge. Two stations (CC2 and CC3) were located immediately above and below the bridge to monitor construction activities. Station CC4 monitors a cove just above King George Street (MD 450) and station (CC5) was situated near the mouth of the creek. The stations are only accessible by boat. Along with the five water quality stations, a total of eighteen outfalls were identified along College Creek (Figure 3). Seven of these outfalls were located west of the MD 70 Bridge and eleven were located east of the bridge.

Latitudinal and longitudinal coordinates for all monitoring stations and outfall locations were obtained using the Garmin Global Positional System Map 76S unit. The monitoring station coordinates are provided in Table 1 and the outfall coordinates are provided in Table 2.

3.2 Water Quality Parameters

The following parameters were measured during low tide at each site during each monitoring event:

- Secchi disk depth;
- pH;
- Dissolved oxygen;

- Conductivity;
- Total dissolved solids;
- Salinity; and
- Instantaneous temperature.

Water clarity was measured *in-situ* at each station using a Secchi disc. The remaining parameters listed above were measured *in-situ* at each station using a YSI 556 Multi-Parameter Water Quality Probe and logger. The probe was calibrated prior to each sampling event according to the manufacturer's instructions. Surface measurements were reported for pH, conductivity, total dissolved solids, salinity, and instantaneous temperature, while bottom measurements were reported for dissolved oxygen. Surface measurements are obtained at 0.5 meters below the water surface and bottom measurements are obtained at the channel bottom depth plus 1.0 meter

The following parameters were measured or collected from the water surface upstream and downstream of the bridge at each creek for laboratory analysis (stations WC4, WC5, CC2, and CC3):

- Turbidity;
- Total suspended solids;
- Nitrogen (nitrate, nitrite, and total Kjeldahl nitrogen);
- Total phosphorus; and
- Oil and grease.

Turbidity was measured monthly at each station upstream and downstream of the Weems and College Creek bridges. It was also measured during environmental inspections that followed rain events of 0.50 inches or greater during the construction period. Turbidity was measured using a HACH 2100P Portable Turbidimeter that was calibrated prior to monitoring according to the manufacturer's specifications. It should be noted that not all storm events were sampled due to occurrence of storms on weekends and unsafe boating conditions. Fredericktowne Labs, Inc., a Maryland State Certified Water Quality Laboratory, analyzed the other parameters in accordance with the methodologies provided in Table 3.

3.3 Parameter Descriptions

3.3.1 *In-Situ Parameters*

Instantaneous Water Temperature

This is a measure of the temperature of the water at the surface. Water temperature is inversely related to the dissolved oxygen concentration. The Code of Maryland Regulations (COMAR), Title 26 Department of the Environment, Subtitle 08 Water Pollution, Chapter 02, Water Quality, 03-3 Water Quality Criteria Specific to Designated Uses, Criteria for Use I, hereafter to be referred to as "COMAR Use I Designation" specifies the maximum water temperature outside of the mixing zone may not exceed 90° Fahrenheit (°F).

Total Dissolved Solids

Total dissolved solids (TDS) is a measure of dissolved substances, including Calcium (Ca^{2+}), Sodium (Na^+), Potassium (K^+), Magnesium (Mg^{2+}), and Chloride (Cl^-). TDS concentrations are directly related to salinity. COMAR does not regulate TDS levels for Use I waterways. TDS is measured in grams per liter (g/L).

Salinity

Salinity refers to the quantity of dissolved salts in sea water, and is measured as the total amount of dissolved solids in sea water in parts per thousand (ppt) by weight. Salinity fluctuates seasonally in the Chesapeake Bay and is related to the amount of fresh water entering from bay tributaries. COMAR Use I criteria for salinity does not exist.

pH

pH is the measure of hydrogen ion activity expressing acidity, neutrality or alkalinity. Rapid fluctuation or prolonged extremes in pH can be detrimental to aquatic life. COMAR Use I Designation defines optimum pH levels as those not less than 6.5 or greater than 8.5 standard units (COMAR, 1997).

Dissolved Oxygen

Dissolved oxygen (DO) is a measure of soluble oxygen concentrations in the water. DO concentrations are important to the metabolic and respiratory functions of aquatic life. Gas solubility generally decreases as water temperatures increase. This can result in lower DO concentrations during summer months. Additionally, DO concentrations are influenced by aquatic flora, aquatic respiration, and organic decomposition. Generally, the concentration of DO is greatest near the water surface and lowest near the bottom. COMAR Use I designation specifies that DO concentrations may not be less than 5.0 milligrams per liter (mg/L) at any time.

Secchi Depth

Secchi depth is a measure of water clarity. A Secchi disc is lowered on the shady side of the boat and the depth at which the disc is no longer visible is recorded in meters. A low Secchi number indicates poor water clarity, which inhibits photosynthesis, creating negative impacts on bay grasses and aquatic organisms.

Turbidity

Turbidity is a measure of the degree of which water scatters light. Scattering increases as suspended particle matter (organic and inorganic) increases, thereby reducing the depth sunlight can penetrate and inhibiting photosynthesis. COMAR Use I designation states that turbidity measurements may not exceed levels detrimental to aquatic life. Turbidity measurements in surface water resulting from

any discharge may not exceed 150 nephelometric turbidity units (NTUs) at any time or have a monthly average greater than 50 NTUs.

3.3.2 *Laboratory-Measured Parameters*

Nitrogen

Three forms of nitrogen were sampled for this study: total Kjeldahl nitrogen (ammonia nitrogen and organic nitrogen), nitrite (NO_2), and nitrate (NO_3). Nitrogen is essential for aquatic plants and certain algae species; however, excess nitrogen in waterways contributes to prolific algal growths that create detrimental impacts on submerged aquatic vegetation (SAV), aquatic life, and recreational pursuits. The rapid growth, death, and decay of plankton and aquatic vegetation can stress aquatic life by reducing DO concentrations in the water column. Sources of nitrogen include sewage treatment plant effluent, agriculture, atmospheric deposition, runoff from urban areas and construction sites, and industrial effluent.

Total Phosphorus

Total phosphorus is a measure of the dissolved inorganic, dissolved organic, particulate inorganic, and particulate organic forms of phosphorus. Phosphorus is commonly present in non-agricultural soils at low levels; however, high concentrations of phosphorus are found in runoff from urban areas due to the use of fertilizers. Phosphate, the most common form of phosphorus, stimulates the growth of plankton and aquatic plants.

Total Suspended Solids

Total suspended solids (TSS) is a measure of the organic and inorganic particulate matter in water. TSS can harm aquatic life when suspended in the water column or when settled along the bottom of the creek. TSS can reduce the growth rate, decrease disease resistance, and prevent successful development of aquatic life. In addition, TSS can modify the natural movements and migration of fish and reduce the abundance of available food.

Oil and Grease

Oil and grease comprise a large range of pollutants, which can be harmful to aquatic life. Oil and grease create a long-term sub-lethal effect on aquatic life by disrupting the physiological processes of feeding, breathing, and reproduction. Pollution by these constituents does not necessarily lead to the immediate death of aquatic life, however, disruption of processes can occur with petroleum concentrations as low as 10 mg/L.

3.4 Quality Assurance and Quality Control

Quality Assurance and Quality Control (QA/QC) samples were collected for parameters analyzed by Fredericktowne Labs. Duplicate samples were collected for TSS, nitrogen, total phosphorus, at two stations in each creek during the baseline, construction, and post-construction monitoring periods.

Duplicate samples collected during the baseline phase were also analyzed for oil and grease. Fredericktowne Labs also performs duplicate and blank sample testing for their internal QA/QC program.

4.0 RESULTS AND DISCUSSION

This section provides results of the water quality monitoring. An overview of the precipitation for the monitoring period is provided along with specific results for each of the creeks, as well as QA/QC information.

4.1 Precipitation and Air Temperature Data

Monthly precipitation and mean air temperature data, provided by the National Weather Service (NWS) at Baltimore-Washington International (BWI) Airport, was compared to the Maryland Department of the Environment (MDE) 30-year monthly precipitation averages for Anne Arundel County to determine temporal fluctuations in precipitation between the baseline, construction, and post-construction monitoring phases (Table 4). Based upon these data, precipitation was below normal during one month of the baseline monitoring period in April 2003. Throughout the first and second year of construction monitoring, precipitation was below normal during ten months, including August, October, and December of 2004; May, August, September, and November of 2005; and March, May, and July of 2006. During the post-construction monitoring period, precipitation was below normal during six months which included August 2006, December 2006, February 2007, May 2007, June 2007, and August 2007. According to data collected at BWI, the mean air temperatures were approximately 5° F warmer during construction than during baseline and post-construction monitoring.

Monthly water quality sampling and rain event environmental inspections were conducted during both the baseline and construction monitoring periods. Due to drought conditions, storm event sampling was conducted once during the post construction monitoring period (August 2007). During the baseline monitoring period, monthly water quality samples were collected following rain events during October 2002, July 2003, October 2003, and December 2003. For construction monitoring, monthly water quality samples were collected following rain events during August 2004, December 2004, March 2005, July 2005, October 2005, and June 2006 (Table 4). The environmental inspections were performed on twenty-three occasions during construction monitoring following precipitation events of 0.50 inches or greater. The amount of precipitation preceding these sampling events is documented in Table 5 along with corresponding turbidity readings.

4.2 Weems Creek Results

Post-Construction Weems Creek sampling results were compared to baseline and year-one and year-two construction monitoring results in order to determine any potential impacts from construction.

Water quality sampling in Weems Creek was conducted in accordance with the methodologies presented in Section 3. General observations from the monitoring period were noted. Photographs taken during the post-construction period of the monitoring stations are provided in Appendix A. Surface total dissolved solids, salinity, and pH data were not recorded for Stations WC-1, WC-2,

WC-3, and WC-6 during June 2007 because the sampling probe malfunctioned. Total suspended solids, NO₂/NO₃, total Kjeldahl nitrogen, and total phosphorus were not recorded during August 2007 due to elevated temperatures which occurred during shipping. These elevated temperature readings precluded the analyses of the samples.

The water quality data for all stations on Weems Creek appeared to exhibit similar trends during baseline, both construction monitoring periods, and post-construction monitoring (Tables 6 through 11, and Figures 4 through 9 and 16 through 19). Surface water temperatures during post-construction monitoring ranged from a low of 43.8 °F in March 2007 to a high of 85.8°F in August 2007 (Figure 4). These temperatures are comparable to baseline, which ranged from 41.7°F to 83.1°F and construction conditions which ranged from 38.4 °F to 85.8 °F. While the summer temperature highs approached the regulatory limit of 90.0°F, all readings were within regulatory limits. Although water temperature measurements collected during construction and post-construction were warmer, the increase was due to higher air temperatures and likely not due to construction activities.

Total dissolved solids and salinity both followed similar trends at all stations during post-construction monitoring. TDS and salinity measurements displayed a seasonal fluctuation with the highest levels recorded during the fall and winter months of 2006 and the lowest measurements recorded in the late spring and early summer of 2007 (Figure 5). Post-construction measurements ranged from 12.86 g/L in October 2006 to 6.68 g/L in May 2007. TDS and salinity are closely related measurements and the trends were very similar (Figure 6). Post-construction salinity ranged from 5.10 to 11.84 parts per thousand (ppt). For comparison, baseline TDS ranged from 6.08 to 15.14 g/L and salinity ranged from 5.27 to 14.11 ppt. TDS and salinities during baseline monitoring were slightly higher than were observed during subsequent year-one, year-two, and post-construction monitoring; overall these periods resembled conditions observed during the baseline monitoring and they were within the expected ranges for brackish water.

Measurements recorded during post-construction monitoring indicated a slightly basic pH throughout the monitoring period with regulatory exceedances occurring during the spring months (Figure 7). Measurements ranged from approximately 6.46 (WC-1, 10/06) to 9.89 (WC-6, 04/07) standard units. Values of pH observed during post-construction were similar to baseline, year-one, and year-two construction values, which ranged from 6.33 to 10.05 standard units. The extremes of the range do not comply with regulatory limits. Because slightly elevated pH levels were observed during baseline and post-construction monitoring and these occurrences were observed at multiple stations, the noncompliant measurements observed during construction year-one and two were not likely attributable to construction activities.

Baseline, year-one, year-two, and post-construction monitoring bottom dissolved oxygen concentrations followed a seasonal trend of lower concentrations during the summer months and higher concentrations during winter (Figure 8). Post-construction monitoring concentrations ranged from 0.13 mg/L in August to approximately 17.00 mg/L in April. The DO concentration was below the regulatory limit of 5.00 mg/L in September 2006 at stations WC-1 and WC-2 and from June through the end of the post-construction period in August at all stations. Some of the dissolved oxygen concentrations observed during post-construction monitoring were lower than those observed during baseline, year-one, and year-two monitoring. Based upon this, the decrease in bottom

dissolved oxygen does not appear to be linked to construction activities, but was likely due to eutrophication brought on by higher air temperatures during the summer of 2007.

Secchi depth readings observed during post-construction monitoring appeared to fluctuate in response to seasonal variation in water quality. The greatest depth observed was 2.50 m (WC-6 in March 2007) and the lowest depth was 0.30 m (WC-1 in August 2007) (Figure 9). These measurements exceeded measurements recorded during any of the other monitoring periods. Baseline depths ranged from 0.5 to 2.0 meters, but overall Secchi depths ranged primarily between 0.5 and 1.5 m for baseline through year-two construction monitoring. Water clarity was poorest in the spring, presumably due to algal growth in the water column. Because this general trend was observed at all monitoring stations throughout all monitoring periods, it does not appear to correspond to construction activities.

Turbidity values were relatively constant throughout the entire monitoring period (Figure 16). Post-construction monitoring values ranged from 1.03 to 14.30 NTU, while baseline values ranged from 1.99 to 21.00 NTU and year-one and year-two construction values ranged between 1.88 and 29.60 NTU. During construction monitoring, turbidity measurements were recorded following storm events of 0.50 inches or greater. Higher turbidities were documented in the headwaters, upstream of the construction activities. All readings collected in Weems Creek were within regulatory limits (below 150 NTU).

Total suspended solids values collected during post-construction monitoring ranged from 2.00 to 19.00 mg/L and were similar to baseline values, which ranged from 2.10 to 22.00 mg/L (Figure 17). The majority of the values were between 5.00 and 10.00 mg/L throughout the year.

Post construction nutrient levels within Weems Creek were compared with baseline, year-one and year-two results. Total Nitrogen ($\text{NO}_3 + \text{NO}_2 + \text{TKN}$) concentrations ranged from 0.00 to 3.80 mg/L during post-construction monitoring (Figure 18). Baseline total nitrogen concentrations ranged from less than 0.10 to 3.90 mg/L. In general, TKN concentrations were greater during the summer months and NO_3 and NO_2 concentrations were greater during the spring. Lower NO_3 and NO_2 concentrations were observed during the height of the growing season during construction, as well as baseline monitoring. During year-two construction, total phosphorus concentrations were detected during one sampling period at a level of 0.20 mg/L at stations WC-4 and WC-5 in June 2007 (Figure 19). These values, as well as values observed during construction, were lower than those observed during baseline monitoring. Baseline total phosphorus concentrations ranged from less than 0.10 to 1.40 mg/L.

Oil and grease concentrations were less than 5.00 mg/L during baseline monitoring. Construction and post-construction monitoring sampling was not required and was performed on an 'as needed' basis.

4.3 College Creek Results

Post-construction College Creek sampling results were compared to baseline, year-one, and year-two construction monitoring results in order to determine any potential impacts from construction.

Water quality sampling in College Creek was conducted in accordance with the methodologies presented in Section 3. General observations from the monitoring period were noted. Photographs of the monitoring stations during post construction monitoring are provided in Appendix A. Surface total dissolved solids, salinity, and pH data were not recorded for Stations CC-1, CC-2, CC-3, CC-4, and CC-5 during June 2007 because the sampling probe malfunctioned. Total suspended solids, NO₂/NO₃, total Kjeldahl nitrogen, and total phosphorus were not recorded during August 2007 due to elevated temperatures which occurred during shipping. These elevated temperature readings precluded the analyses of the samples.

The water quality data for all stations on College Creek appeared to exhibit similar trends during baseline, both construction monitoring periods, and post-construction monitoring (Tables 12 through 16 and Figures 10 through 19). During post-construction, water temperatures ranged from a low of 43.8°F in March 2007 to 84.6 °F August 2007 (Figure 10). These temperatures are comparable to baseline and construction monitoring measurements. All measurements were within regulatory limits.

Total dissolved solids and salinity both followed similar trends at all stations during post-construction monitoring (Figure 11). Measurements during post-construction ranged from 7.18 g/L in May 2007 to 13.37 g/L in October 2006. TDS and salinity are closely related measurements and the trends were very similar (Figure 12). Salinity measured during post-construction ranged from 5.50 to 12.35 ppt. For comparison, baseline TDS measurements ranged from 6.15 to 14.38 g/L and salinity ranged from 5.32 to 13.31 ppt. TDS and salinity measurements observed during construction and post-construction monitoring were comparable to baseline conditions and were within the expected ranges for brackish waters.

Measurements of pH were slightly higher during post-construction monitoring in comparison to baseline and both construction monitoring periods. Measurements indicated a slightly basic pH during all monitoring periods with the highest pH readings observed during the post-construction monitoring period (Figure 13). Post-construction measurements ranged from approximately 7.47 to 9.66 standard units, while baseline measurements ranged from 6.20 to 8.82 standard units. It does not appear that these values were attributed to bridge construction because the highest readings were observed following completion of bridge construction and these readings were only slightly elevated from a similar trend that was observed throughout all monitoring periods, including baseline monitoring.

Baseline, year-one, year-two, and post-construction monitoring bottom dissolved oxygen concentrations followed a seasonal trend of lower concentrations during the summer months and higher concentrations during winter (Figure 14). During post-construction monitoring, the lowest dissolved oxygen levels were observed between June and August 2007 and the highest readings were observed in April of 2007. Post-construction concentrations ranged from 0.60 mg/L at CC3 in August 2007 to 15.40 mg/L in April of 2007 again at CC3. Baseline concentrations ranged from 1.94 to 17.49 mg/L. In general, bottom dissolved oxygen concentrations followed a seasonal trend that was observed during all monitoring periods. Data were observed to be below regulatory limits during every monitoring period at stations located above and below the construction site so it does

not appear that construction activities caused decreased dissolved oxygen concentration in College Creek.

Secchi disk measurements during the post-construction monitoring period ranged from 0.5 to 2.4 meters and a few measurements were slightly deeper than baseline, which ranged from 0.6 to 2.2 meters (Figure 15). Water clarity appeared to increase slightly during post-construction, but generally followed the seasonal trend observed during the previous monitoring periods. Diminished water clarity observed during periods of monitoring were presumably due to algal growth in the water column and spring runoff.

Turbidity values were relatively constant throughout all monitoring periods (Figure 16). Post-construction values ranged from 2.10 to 11.20 NTU, while baseline values ranged from 2.00 to 13.20 NTU. All readings collected during monthly water quality monitoring were within regulatory limits.

In contrast, turbidity values collected during the environmental inspections conducted during the construction monitoring period ranged from 4.00 to 113 NTU. These higher readings occurred in the headwaters of the study areas upstream of construction and were not likely due to construction activities associated with this project.

Total suspended solids values were similar for baseline, construction, and post-construction monitoring and do not appear to be impacted by construction activities associated with the MD 70 bridges (Figure 17). The highest reading was observed during baseline monitoring. Baseline concentrations ranged from 1.70 to 23.00 mg/L and year-two construction concentration ranged from 4.00 to 11.00 mg/L. Post-construction monitoring concentrations ranged from 2.00 to 15.00 mg/L. In general, TSS concentrations followed a seasonal trend that was observed during all monitoring periods. It appears that TSS concentrations increased during spring and early summer corresponding to an increase in algal growth in College Creek.

Post construction nutrient levels within College Creek were compared with baseline, year-one and year-two results. Total Nitrogen ($\text{NO}_3 + \text{NO}_2 + \text{TKN}$) concentrations ranged from 0.00 to 1.80 mg/L during post-construction monitoring (Figure 18). Total nitrogen ($\text{NO}_3 + \text{NO}_2 + \text{TKN}$) concentrations collected during year-one and year-two construction monitoring were similar, ranging from 0.00 to 1.50 mg/L (Figure 18). For comparison, baseline concentrations ranged from 0.60 mg/L to 1.80 mg/L. Nutrient levels within College Creek appeared to decrease slightly when compared to baseline monitoring, but generally followed the same trend throughout all monitoring periods on College Creek.

During post-construction, total phosphorus was detected on two occasions with concentrations of 0.30 and 0.10 mg/L. Baseline total phosphorus concentrations ranged from less than 0.10 mg/L to 0.80 mg/L (Figure 19). Higher nutrient concentrations were observed during the height of the growing season during baseline monitoring than during any other monitoring period.

Oil and grease concentrations were less than 5.0 mg/L during baseline monitoring. Construction and post construction monitoring sampling was not required and was performed on an 'as needed' basis.

4.4 Seasonal Mean Water Quality Data Analysis

Tables 17 and 18A and 18B illustrate a comparison of seasonal mean water quality data collected during the baseline, year-one, year-two, and post-construction monitoring periods. Table 17 compares laboratory-measured seasonal mean data for Weems and College Creek. Table 18A compares in-situ mean seasonal data for Weems Creek, and Table 18B compares in-situ mean seasonal data for College Creek.

When comparing seasonal means for laboratory-measured parameters (Table 17), it appears that generally there was a consistent trend throughout all monitoring periods. There was a slight increase in mean turbidity and a slight decrease in suspended solids during year-one. Mean values for total nitrogen actually appear to decrease during construction when compared to baseline and post-construction mean values. Total phosphorus mean values remained relatively unchanged in both Weems and College Creek during all monitoring periods. There was an overall increase in in-situ mean temperature, TDS, and Salinity for both creeks for all seasons from baseline through the post-construction monitoring period (Table 18A and 18B). In Weems and College Creek, the mean dissolved oxygen, pH, and water clarity values appeared to decrease during year-two construction monitoring when compared to all other monitoring periods, but overall there was a slight increase in mean values with the highest values occurring during post-construction.

4.5 QA/QC Evaluation

Four pairs of duplicate samples were collected for this project during baseline, year-one construction, and year-two construction monitoring and two sets of duplicate samples were collected during post-construction (Table 17). In general, the duplicate pairs collected during year-two construction monitoring were in agreement for the two College Creek stations. The two stations on Weems Creek exceeded the 20 percent relative percent difference (RPD) threshold for comparing duplicate pairs (DNR, 2001) for nitrate and nitrite only. An 85.7% RPD was observed at WC4 and a 100.0% RPD was observed at WC5 for nitrate and nitrite. Only one measurement exceeded the threshold during post-construction monitoring. A 31.6% RPD was observed at CC2 for TKN during May of 2007. These values are considered less precise than the other sample results. Tables 18 and 19 illustrate a comparison of mean data collected during the baseline, first and second year of construction, and post-construction monitoring.

5.0 CONCLUSIONS

Water quality data collected before, during, and after construction indicate that Weems Creek and College Creek were not affected by bridge construction activities. Similar water quality trends were observed during the baseline, both years of construction, and post-construction monitoring periods. Higher water temperatures and lower dissolved oxygen, nutrient, and TSS concentrations observed during construction monitoring were likely a result of warmer air temperatures and less frequent precipitation when compared with baseline monitoring. Similar or increased values for several parameters were documented during post-construction which further illustrates that bridge construction did not affect water quality. Both Weems and College Creeks exhibit characteristics of a eutrophic system with nutrient concentrations decreasing during the growing season and near-anoxic bottom dissolved oxygen concentrations during the summer months. The slightly basic pH

may be attributed to algal respiration. In addition, water clarity was generally lower in summer due to algal growth in the water column.

6.0 LITERATURE CITED

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National Weather Service (NWS), 2005. Monthly Precipitation and Mean Air Temperature Data Collected and BWI. Internet. Available at <http://www.erh.noaa.gov/lwx/climate.htm>.

TABLES

Table 1
Monitoring Station Coordinates
Weems and College Creeks Final Water Quality Monitoring Report
(Post-Construction Phase Year Three)

	Station	Latitude	Longitude
Weems Creek	WC1	N 38° 59' 22.9"	W 076° 31' 06.1"
	WC2	N 38° 59' 28.6"	W 076° 30' 55.5"
	WC3	N 38° 59' 25.8"	W 076° 30' 47.0"
	WC4	N 38° 59' 26.7"	W 076° 30' 35.3"
	WC5	N 38° 59' 29.6"	W 076° 30' 32.0"
	WC6	N 38° 59' 46.0"	W 076° 30' 17.4"
College Creek	CC1	N 38° 58' 52.5"	W 076° 29' 57.9"
	CC2	N 38° 58' 58.2"	W 076° 29' 52.0"
	CC3	N 38° 58' 59.8"	W 076° 29' 47.3"
	CC4	N 38° 59' 05.5"	W 076° 29' 44.8"
	CC5	N 38° 59' 07.6"	W 076° 29' 37.3"

Note: °, ', " - degrees, minutes, seconds

Table 2
Outfall Coordinates
Weems and College Creeks Final Water Quality Monitoring Report
(Post-Construction Phase Year Three)

	Station	Latitude	Longitude
Weems Creek	WCON#1	N38°, 59.492'	W76°, 30.632'
	WCON#2	N38°, 59.576'	W76°, 30.525'
	WCON#3	N38°, 59.535'	W76°, 30.705'
	WCOS#1	N38°, 59.380'	W76°, 30.564'
	WCOS#2	N38°, 59.439'	W76°, 30.507'
	WCOS#3	N38°, 59.553'	W76°, 30.434'
College Creek	CCON#1	N38°, 59.024'	W76°, 29.895'
	CCON#2	N38°, 59.041'	W76°, 29.877'
	CCON#3	N38°, 59.140'	W76°, 29.913'
	CCON#4	N38°, 59.126'	W76°, 29.768'
	CCON#5	N38°, 59.136'	W76°, 29.724'
	CCON#6	N38°, 59.128'	W76°, 29.781'
	CCON#7	N38°, 59.152'	W76°, 29.691'
	CCON#8	N38°, 59.164'	W76°, 29.674'
	CCON#9	N38°, 59.176'	W76°, 29.655'
	CCON#10	N38°, 59.190'	W76°, 29.637'
	CCOS#1	N38°, 58.840'	W76°, 30.018'
	CCOS#2	N38°, 58.848'	W76°, 29.995'
	CCOS#3	N38°, 58.909'	W76°, 29.906'
	CCOS#4	N38°, 58.935'	W76°, 29.778'
	CCOS#5	N38°, 58.938'	W76°, 29.762'
	CCOS#6	N38°, 58.989'	W76°, 29.759'
	CCOS#7	N38°, 59.101'	W76°, 29.601'
	CCOS#8	N38°, 59.024'	W76°, 29.695'

Note: °, . ' - degrees, minutes

Table 3
EPA Methodologies and Detection Limits for Grab Water Samples
Weems and College Creeks Final Water Quality Monitoring Report
(Post-Construction Phase Year Three)

Parameter	EPA Method Number	Detection Limit (mg/L)
Total Suspended Solids	160.2	0.1
Nitrite Nitrogen	353.2	0.1
Nitrate Nitrogen	353.2	0.1
Total Kjeldahl Nitrogen	351.3	0.1
Total Phosphorus	365.2	0.1
Oil and Grease	1664	5.0

Note: mg/L- milligrams per liter

Table 4
Monthly Precipitation and Temperature Data
Weems and College Creeks Final Water Quality Monitoring Report (Post-Construction Phase Year Three)

Phase	Date	Mean Air Temperature * (°F)	BWI Monthly Precipitation * (inches)	MDE Normal Monthly Precipitation ** (inches)	Difference (inches)	Rain Event Sampling Date and Rainfall Totals (inches)
Baseline	October-02	38.0	6.01	3.2	2.81	10/29-10/30, 1.07
	November-02	41.0	3.78	3.3	0.48	
	March-03	44.0	4.17	4	0.17	
	April-03	60.0	2.40	3.2	-0.80	
	May-03	58.0	6.81	4	2.81	
	June-03	78.0	6.96	3.5	3.46	
	July-03	74.0	5.56	3.8	1.76	7/24, 1.67
	August-03	72.0	4.61	4.1	0.51	
	September-03	55.0	7.47	3.5	3.97	
	October-03	51.0	5.82	3.2	2.62	10/27-10/30, 4.21
	November-03	54.0	4.86	3.3	1.56	
	December-03	40.0	4.71	3.5	1.21	12/17, 0.78
Year One Construction	June-04	66.0	4.17	3.5	0.67	
	July-04	79.0	8.69	3.8	4.89	8/1, 0.64
	August-04	76.0	2.71	4.1	-1.39	
	September-04	70.0	3.94	3.5	0.44	
	October-04	54.0	1.44	3.2	-1.76	
	November-04	48.0	5.02	3.3	1.72	
	December-04	50.0	2.93	3.5	-0.57	12/7, 0.41
	March-05	50.0	5.13	4	1.13	3/28, 1.83
	April-05	55.0	3.81	3.2	0.61	
	May-05	62.0	2.64	4	-1.36	
	June-05	74.0	3.74	3.5	0.24	
	July-05	80.0	8.77	3.8	4.97	7/25, 0.71
Year Two Construction	August-05	79.0	3.71	4.1	-0.39	
	September-05	74.0	0.67	3.5	-2.83	10/24-10/25, 1.03
	October-05	60.0	9.23	3.2	6.03	
	November-05	50.0	2.12	3.3	-1.18	
	December-05	36.0	3.90	3.5	0.4	
	March-06	45.0	0.18	4	-3.82	
	April-06	57.0	3.28	3.2	0.08	
	May-06	64.0	0.18	4	-3.82	
	June-06	72.0	7.32	3.5	3.82	6/12, 0.31
	July-06	79.0	1.86	3.8	-1.94	
	August-06	79.0	1.45	3.9	-2.45	
	September-06	66.0	7.56	3.7	3.86	
Year Three Post-Construction	October-06	55.0	5.75	3.1	2.65	
	November-06	50.0	6.25	3.4	2.85	
	December-06	43.0	1.88	3.2	-1.32	
	January-07	39.0	2.48	3.0	-0.52	
	February-07	29.0	2.04	2.9	-0.86	
	March-07	45.0	4.17	3.7	0.47	
	April-07	52.0	5.00	3.3	1.70	
	May-07	66.0	0.94	4.2	-3.26	
	June-07	74.0	2.20	3.8	-1.60	
	July-07	77.0	3.31	3.8	-0.49	
	August-07	78.0	3.08	3.9	-0.82	8/5-8/6, 1.10

Note: *http://www.wunderground.com/US/MD/Bwi_Airport.html

**http://www.mde.state.md.us/Programs/WaterPrograms/Water_Conservation/Previous_Conditions/normalprecip_new.asp

Table 5
Precipitation and Turbidity Data for Storm Events During Construction
Weems and College Creeks Final Water Quality Monitoring Report (Post-Construction Phase Year Three)

Date	Precipitation (inches)	Storm Duration (Days)	Turbidity Range Observed (NTU)		Comments	
			Weem's Creek	College Creek	Weem's Creek	College Creek
9/16/2004	0.74	1	46 - 75	7 - 14	Highest values observed in Headwaters	Highest values observed in Headwaters
9/29/2004	3.21	2	68 - 82	14 - > 1000	Values similar throughout. 79 NTU documented at WCOS-1	Highest values observed at CCOS-4
9/30/2004	0.88	1	20 - 43	24 - 946	Highest values observed near Headwaters	Highest values observed at CCOS-4 and CCOS-8
10/14/2004	0.77	1	12 - 41	19 - 50	Highest values observed near Headwaters	Highest values observed near Headwaters
12/8/2004	0.50	1	4 - 17	5 - 9	Highest values observed upstream of Bridge	Notable low values
3/24/2005	2.41	1	51 - 101	78 - 175	Highest values observed around Bridge	Highest values recorded near St. John College Bulkhead wall
3/29/2005	1.81	1	14 - 71	14 - 128	Highest values observed upstream of Bridge	Highest values recorded near Headwaters
6/7/2005	1.64	2	26 - 29	17 - 56	Highest values observed upstream of Bridge	Highest values recorded near Headwaters
7/6/2005	1.08	2	17 - 22	10 - 36	Highest values observed near Headwaters	Highest values recorded in cove adjacent to Sewage Treatment Plant
7/14/2005	1.55	2	9 - 25	9 - 113	Highest values observed near Headwaters	Highest values observed near Headwaters
7/28/2005	0.71	1	6 - 14	8 - 16	Highest values observed near Headwaters	Highest values observed near Headwaters
8/10/2005	3.40	3	11 - 13	12 - 19	Highest values observed near Headwaters	Highest values observed near Headwaters
8/17/2005	1.75	2	38 - 73	15 - 48	Highest values observed in cove near Porter Drive	Highest values observed near Headwaters
10/26/2005	0.49	1	4 - 7	4 - 8	Highest values observed near Headwaters	Highest values observed near Headwaters
11/17/2005	0.62	1	6 - 15	6 - 10	Highest values observed near Headwaters	Highest values observed near Headwaters
12/16/2005	1.78	2	10 - 20	8 - 28	Highest values observed both upstream and downstream of Bridge	Highest values observed near CCOS-8
4/24/2006	1.36	3	7 - 9	5 - 10	Highest values observed upstream of Bridge	Highest values observed near Headwaters
5/12/2006	1.22	1	20 - 26	12 - 16	Highest values observed upstream of Bridge	Highest values observed downstream of Bridge
6/2/2006	0.78	2	14 - 24	8 - 13	Highest values observed near Headwaters	Highest values observed near Headwaters
6/20/2006	1.11	2	17 - 119	9 - 15	Highest values observed near WCOS-1	Highest values observed near CCOS-8
6/27/2006	10.46	5	21 - 27	N/A	Highest values observed in cove near Fitzgerald Road	Unable to complete sampling because of intense rainfall
6/28/2006	10.77	6	46 - 61	35 - 45	Highest values observed downstream of Bridge	Highest values observed near Headwaters
8/8/2006	0.54	1	6 - 16	7 - 11	Highest values observed near Headwaters	Highest values observed near Headwaters

Note: No storm event sampling was conducted during the post-construction phase monitoring period.

Table 6
Weems Creek Station WC1 Water Quality Data
Weems and College Creeks Final Water Quality Monitoring Report (Post-Construction Phase Year Three)

Phase	Date	Surface Temperature (°F)	Surface TDS (g/L)	Surface Salinity (ppt)	Bottom Dissolved Oxygen (mg/L)	Surface pH	Secchi Depth (m)
Baseline Monitoring	10/30/2002	53.08	11.15	10.12	8.59	7.83	0.80
	11/21/2002	53.80	15.14	14.11	12.30	7.97	0.65
	3/19/2003	52.38	10.02	9.02	8.79	8.32	1.00
	4/28/2003	59.05	6.62	5.78	5.68	8.04	0.85
	5/14/2003	62.68	7.17	6.29	6.11	7.68	0.95
	6/25/2003	77.70	6.28	5.42	6.63	8.79	0.60
	7/24/2003	81.92	8.00	7.02	4.82	7.63	0.80
	8/25/2003	81.20	6.08	5.27	4.12	8.54	0.60
	9/30/2003	69.64	9.06	8.08	5.85	7.73	0.80
	10/30/2003	62.32	10.02	9.03	4.83	7.43	1.70
Year One Construction	11/24/2003	53.80	15.14	14.11	13.39	7.97	0.65
	12/17/2003	42.63	6.59	5.70	13.13	7.92	1.40
	6/21/2004	76.82	6.03	5.19	0.88	6.37	0.60
	8/3/2004	83.86	8.17	7.17	5.89	7.92	0.80
	8/25/2004	80.39	8.60	7.60	4.96	8.26	0.70
	9/22/2004	71.21	6.26	5.43	10.09	8.59	0.90
	10/26/2004	61.15	7.63	6.72	2.81	6.83	0.70
	11/16/2004	53.85	9.31	8.38	7.02	7.70	1.30
	12/8/2004	48.26	6.74	5.82	13.00	7.60	1.80
	3/30/2005	52.19	5.43	4.67	8.45	7.52	0.40
Year Two Construction	4/10/2005	58.48	4.07	3.43	7.08	7.64	0.60
	5/10/2005	64.35	6.30	5.48	7.08	8.01	0.70
	6/21/2005	76.87	9.15	8.17	0.90	7.32	0.70
	7/26/2005	85.66	10.01	8.92	0.44	6.96	0.70
	8/23/2005	82.43	11.20	10.10	5.06	7.33	0.90
	9/14/2005	80.59	12.36	11.25	4.98	7.81	0.90
	10/26/2005	60.97	13.40	12.37	7.91	6.33	1.10
	11/15/2005	56.75	12.67	11.64	16.10	8.24	0.90
	12/20/2005	*	*	*	*	*	*
	3/22/2006	46.87	9.14	8.13	7.72	7.36	0.70
Year Three Post-Construction	4/25/2006	65.60	10.26	9.25	8.76	8.35	0.70
	5/31/2006	77.12	12.13	11.01	4.13	7.61	0.60
	6/13/2006	72.97	12.53	11.47	3.02	7.41	0.60
	7/11/2006	80.95	6.19	5.33	2.68	7.70	0.60
	9/26/2006	71.17	10.30	9.29	4.91	7.65	0.90
	10/24/2006	56.81	12.17	11.14	6.17	6.46	1.00
	11/14/2006	55.15	10.12	9.12	9.11	8.27	1.60
	12/5/2006	46.03	9.13	8.11	11.55	8.14	1.80
	3/14/2007	46.04	9.12	8.11	13.52	9.17	1.90
	4/24/2007	60.02	7.73	6.83	16.43	9.75	1.10
Year Three Post-Construction	5/15/2007	67.06	6.91	5.30	7.08	8.45	0.70
	6/12/2007	78.70	**	**	0.93	**	0.50
	7/16/2007	80.82	11.00	9.90	0.69	7.15	0.70
	8/7/2007	85.05	11.36	10.24	0.13	7.12	0.30

Notes:
Highlighted cells exceed COMAR standards for Use I waters.
Turbidity, surface total suspended solids, surface nitrogen, surface total Kjeldahl nitrogen, total phosphorus, and oil and grease sampling was not conducted at this location.
°F- degrees Fahrenheit
TDS- total dissolved solids
g/L- grams per liter
ppt- parts per thousand
mg/L- milligrams per liter
m- meters
*-Data not collected for this parameter due to frozen condition of stream.
**-Data not collected for this parameter because probe malfunctioned.

Table 7
Weems Creek Station WC2 Water Quality Data
Weems and College Creeks Final Water Quality Monitoring Report
(Post-Construction Phase Year Three)

Phase	Date	Surface Temperature (°F)	Surface TDS (g/L)	Surface Salinity (ppt)	Bottom Dissolved Oxygen (mg/L)	Surface pH	Secchi Depth (m)
Baseline Monitoring	10/30/2002	51.31	12.68	11.69	7.88	8.24	1.00
	11/21/2002	52.01	14.48	13.51	14.42	8.17	0.95
	3/19/2003	49.93	10.51	9.48	10.28	8.44	1.25
	4/28/2003	57.55	6.73	5.88	4.05	8.09	0.95
	5/14/2003	62.40	7.18	6.31	5.92	7.75	1.00
	6/25/2003	77.43	6.24	5.40	1.29	8.69	0.70
	7/24/2003	81.84	7.93	6.94	1.27	7.82	1.00
	8/25/2003	81.54	6.14	5.27	2.13	8.50	0.60
	9/30/2003	71.24	9.36	8.37	1.82	8.14	0.90
	10/30/2003	62.01	10.22	9.23	2.18	7.53	1.10
	11/24/2003	52.01	14.48	13.51	14.42	8.17	0.95
	12/17/2003	42.47	6.91	5.99	11.61	8.01	1.50
Year One Construction	6/21/2004	77.23	6.40	5.53	3.00	7.02	0.90
	8/3/2004	83.26	8.75	7.72	1.80	8.07	0.90
	8/25/2004	80.34	8.71	7.70	3.44	8.25	0.70
	9/22/2004	71.63	6.15	5.32	10.94	8.81	0.90
	10/26/2004	59.94	7.33	6.46	3.35	7.01	1.30
	11/16/2004	53.16	8.93	7.95	7.74	7.69	1.30
	12/8/2004	48.02	6.31	5.44	12.62	7.73	0.60
	3/30/2005	51.88	5.46	4.70	8.95	7.39	0.40
	4/10/2005	64.06	3.84	3.23	8.91	7.68	0.70
	5/10/2005	63.71	6.42	5.59	8.70	8.01	1.00
	6/21/2005	77.55	85.32	7.54	3.51	7.70	0.90
	7/26/2005	85.47	10.04	8.94	2.20	7.20	0.90
Year Two Construction	8/23/2005	82.86	11.39	10.28	5.82	7.39	1.00
	9/14/2005	80.38	12.42	11.31	1.11	7.75	0.90
	10/26/2005	59.33	12.94	11.92	8.27	6.85	1.20
	11/15/2005	57.31	12.42	11.39	16.85	8.32	0.90
	12/20/2005	*	*	*	*	*	*
	3/22/2006	47.13	9.22	8.20	8.61	7.51	0.70
	4/25/2006	64.67	10.30	9.33	9.70	8.46	0.80
	5/31/2006	78.77	12.26	11.16	2.64	8.14	1.10
	6/13/2006	72.60	12.41	11.35	2.52	7.57	0.60
	7/11/2006	81.10	6.36	5.48	3.18	7.90	0.70
	9/26/2006	72.46	10.55	9.50	4.32	7.73	0.90
	10/24/2006	59.39	12.63	11.61	6.47	7.64	1.10
Year Three Post-Construction	11/14/2006	55.23	10.24	9.24	9.03	8.26	1.70
	12/5/2006	46.69	9.16	8.15	7.50	8.41	1.50
	3/14/2007	46.00	9.05	8.04	13.47	9.02	2.40
	4/24/2007	59.91	7.70	6.80	16.46	9.65	1.10
	5/15/2007	67.28	6.99	5.30	5.94	8.79	0.70
	6/12/2007	78.24	**	**	1.76	**	0.50
	7/16/2007	80.85	11.26	10.44	1.69	7.23	1.00
	8/7/2007	85.81	11.08	9.96	0.70	8.52	0.60

Notes:
Highlighted cells exceed COMAR standards for Use I waters.
Turbidity, surface total suspended solids, surface nitrogen, surface total Kjeldahl nitrogen, total phosphorus, and oil and grease sampling was not conducted at this location.
°F- degrees Fahrenheit
TDS- total dissolved solids
g/L- grams per liter
ppt- parts per thousand
mg/L- milligrams per liter
*-Data not collected for this parameter due to frozen condition of stream.
**-Data not collected for this parameter because probe malfunctioned.

Table 8
Weems Creek Station WC3 Water Quality Data
Weems and College Creeks Final Water Quality Monitoring Report
(Post-Construction Phase Year Three)

Phase	Date	Surface Temperature (°F)	Surface TDS (g/L)	Surface Salinity (ppt)	Bottom Dissolved Oxygen (mg/L)	Surface pH	Secchi Depth (m)
Baseline Monitoring	10/30/2002	51.36	12.48	11.43	8.23	8.42	1.40
	11/21/2002	51.75	14.77	13.73	17.73	8.33	1.15
	3/19/2003	48.65	10.51	9.47	11.22	8.48	1.25
	4/28/2003	57.69	6.72	5.87	2.56	7.99	0.95
	5/14/2003	62.29	7.21	6.33	4.44	7.53	1.00
	6/25/2003	76.61	6.41	5.54	1.93	8.63	0.70
	7/24/2003	81.34	8.01	7.03	1.80	7.67	1.00
	8/25/2003	82.55	6.23	5.36	2.34	8.67	0.60
Year One Construction	9/30/2003	71.74	9.47	8.47	5.27	8.06	0.80
	10/30/2003	61.14	10.26	9.27	4.83	7.61	1.50
	11/24/2003	51.75	14.77	13.73	17.73	8.33	1.15
	12/17/2003	42.51	6.90	5.98	12.36	7.94	1.70
	6/21/2004	77.45	6.44	5.57	2.95	7.26	0.80
	8/3/2004	82.73	9.04	8.00	2.28	8.04	0.80
	8/25/2004	80.14	8.77	7.76	5.40	8.22	0.90
	9/22/2004	71.89	6.01	5.21	9.03	8.85	0.80
Year Two Construction	10/26/2004	58.80	7.03	6.22	4.22	7.29	1.30
	11/16/2004	52.09	9.03	8.08	7.56	7.66	1.30
	12/8/2004	48.45	6.61	5.74	12.28	7.76	0.90
	3/30/2005	49.50	7.13	6.22	9.16	7.31	0.40
	4/10/2005	61.42	4.02	3.39	8.67	7.67	0.60
	5/10/2005	62.66	6.74	5.64	8.34	7.83	1.00
	6/21/2005	77.37	8.49	7.50	3.72	7.91	1.00
	7/26/2005	85.87	9.96	8.87	1.81	7.58	0.90
Year Three Post-Construction	8/23/2005	83.07	11.49	10.37	2.18	7.46	1.20
	9/14/2005	80.33	12.42	11.32	0.96	7.76	0.90
	10/26/2005	61.54	13.62	12.60	8.70	7.03	1.30
	11/15/2005	56.77	12.73	11.70	15.73	8.30	1.00
	12/20/2005	*	*	*	*	*	*
	3/22/2006	46.40	9.18	8.16	9.29	8.14	0.80
	4/25/2006	64.32	10.32	9.30	7.71	8.42	0.80
	5/31/2006	78.54	12.33	11.24	5.63	8.07	1.00
Year Three Post-Construction	6/13/2006	72.83	12.38	11.27	4.14	7.57	0.70
	7/11/2006	80.87	6.56	5.63	1.67	7.89	0.70
	9/26/2006	72.06	10.56	9.53	5.16	7.84	1.00
	10/24/2006	59.43	12.67	11.64	6.93	7.75	1.20
	11/14/2006	55.58	9.93	8.94	9.86	8.32	1.70
	12/5/2006	45.73	9.10	8.08	10.82	8.46	1.80
	3/14/2007	46.33	8.92	7.91	12.92	8.95	2.40
	4/24/2007	60.56	7.69	6.80	17.00	9.67	1.30
Year Three Post-Construction	5/15/2007	67.10	6.72	5.10	5.63	8.93	0.70
	6/12/2007	78.45	**	**	0.50	**	0.50
	7/16/2007	80.81	11.39	10.29	1.58	7.28	1.00
	8/7/2007	85.02	11.19	10.07	1.19	8.12	1.10

Notes:
 Highlighted cells exceed COMAR standards for Use I waters.
 Turbidity, surface total suspended solids, surface nitrogen, surface total Kjeldahl nitrogen, total phosphorus, and oil and grease sampling was not conducted at this location.
 °F- degrees Fahrenheit
 TDS- total dissolved solids
 g/L- grams per liter
 ppt- parts per thousand
 mg/L- milligrams per liter
 m- meters
 *-Data not collected for this parameter due to frozen condition of stream.
 **-Data not collected for this parameter because probe malfunctioned.

Table 9
Weems Creek Station WC4 Water Quality Data
Weems and College Creeks Final Water Quality Monitoring Report (Post-Construction Phase Year Three)

Phase	Date	Surface Temperature (°F)	Surface TDS (g/L)	Surface Salinity (ppt)	Bottom Dissolved Oxygen (mg/L)	Surface pH	Secchi Depth (m)	Surface Turbidity (NTU)	Surface TSS (mg/L)	Surface NO ₂ + NO ₃ (mg/L)	Surface TKN (mg/L)	Surface Total Phosphorus (mg/L)	Surface Oil & Grease (mg/L)
Baseline Monitoring	10/30/2002	54.23	13.65	12.61	8.08	8.47	1.75	4.41	7.00	<0.10	1.10	0.10	<5.00
	11/21/2002	51.87	14.94	13.88	15.62	8.37	1.25	4.11	17.00	0.20	0.60	0.20	<5.00
	3/19/2003	48.01	10.50	9.44	11.02	8.50	1.60	4.31	2.80	0.80	<0.10	<0.10	<5.00
	4/28/2003	58.11	6.80	5.95	2.92	8.11	1.10	4.62	6.00	0.50	0.50	<0.10	<5.00
	5/14/2003	62.91	7.21	6.33	4.98	7.75	0.75	4.69	4.00	0.30	1.70	1.40	<5.00
	6/25/2003	77.36	6.31	5.45	3.27	8.62	0.80	7.30	7.00	1.10	<0.10	<0.10	<5.00
	7/24/2003	81.40	8.02	7.04	3.72	7.87	1.00	5.91	6.00	<0.1	<0.10	<0.10	<5.00
	8/25/2003	82.23	6.26	5.39	4.16	8.67	0.50	21.00	22.00	<0.2	<0.10	<0.10	<5.00
	9/30/2003	72.41	9.45	8.47	4.72	8.39	0.80	6.54	8.00	<0.3	0.70	<0.10	<5.00
	10/30/2003	60.56	10.26	9.26	9.24	7.59	1.20	9.26	6.00	0.30	0.30	<0.10	<5.00
Year One Construction	11/24/2003	51.87	14.94	13.88	17.35	8.29	1.25	4.11	6.00	0.10	1.60	<0.10	<5.00
	12/17/2003	42.73	7.06	6.14	12.01	7.93	1.75	3.76	4.00	0.30	1.20	<0.10	<5.00
	6/21/2004	77.70	6.49	5.62	3.82	7.66	0.80	8.10	7.00	<0.10	0.80	0.00	<5.00
	8/3/2004	82.56	9.14	8.11	1.60	8.08	1.00	7.69	5.00	<0.10	0.60	0.00	n/a
	8/25/2004	80.03	8.87	7.85	3.87	8.20	0.90	6.68	7.00	<0.10	0.40	0.10	n/a
	9/22/2004	71.66	6.09	5.26	5.17	8.74	0.70	8.50	10.00	0.50	<0.10	0.10	n/a
	10/26/2004	60.48	7.83	6.92	4.30	7.34	0.70	6.61	4.00	0.10	<0.10	0.00	n/a
	11/16/2004	52.70	9.42	8.54	6.53	7.60	1.10	8.93	*	*	*	*	*
	12/8/2004	48.41	7.11	5.77	12.36	7.69	0.70	10.30	*	*	*	*	*
	3/30/2005	47.44	7.96	7.01	8.46	7.30	0.60	29.60	12.00	0.50	0.30	0.00	n/a
Year Two Construction	4/10/2005	61.41	3.96	3.34	9.46	7.68	0.70	9.26	9.00	0.50	<0.10	0.00	n/a
	5/10/2005	61.48	6.63	5.79	6.63	7.80	1.10	4.31	5.00	0.40	<0.10	0.00	n/a
	6/21/2005	77.49	8.67	7.67	2.68	7.94	1.20	6.63	6.00	<0.10	0.10	0.00	n/a
	7/26/2005	84.54	9.09	8.04	1.73	7.71	0.90	6.18	7.00	<0.10	<0.10	0.00	n/a
	8/23/2005	82.47	11.52	10.40	3.59	7.42	1.20	4.29	4.00	<0.10	0.10	0.00	n/a
	9/14/2005	80.10	12.50	11.40	2.27	7.71	0.90	5.93	6.00	<0.10	0.30	0.00	n/a
	10/26/2005	59.16	13.00	11.98	59.16	7.10	1.10	6.45	5.00	0.20	0.20	0.00	n/a
	11/15/2005	56.84	12.69	11.66	12.47	8.44	1.00	5.91	15.00	<0.10	<1.00	0.00	n/a
	12/20/2005	38.71	9.68	8.54	12.17	7.28	1.30	10.50	8.00	0.30	0.30	0.00	n/a
	3/22/2006	45.96	9.08	8.06	9.76	7.63	1.00	7.05	8.00	<0.10	0.20	0.00	n/a
Year Three Post-Construction	4/25/2006	64.54	10.16	9.17	7.22	8.59	0.70	5.21	7.00	<0.10	0.60	0.00	n/a
	5/31/2006	77.48	12.49	11.41	3.20	8.20	1.00	2.27	5.00	<0.10	0.50	0.00	n/a
	6/13/2006	72.24	12.08	11.05	3.71	7.83	0.80	5.53	8.00	<0.10	0.60	0.00	n/a
	7/11/2006	81.07	6.35	5.47	1.09	8.42	0.70	4.66	8.00	0.20	0.80	0.00	n/a
	9/26/2006	72.85	10.61	9.58	6.04	7.99	1.00	5.07	6.00	<0.10	0.30	0.00	n/a
	10/24/2006	59.58	12.71	11.69	7.30	7.81	1.30	4.96	5.00	<0.10	0.30	0.00	n/a
	11/14/2006	55.67	9.65	8.67	9.31	8.31	1.50	2.75	4.00	0.20	0.60	0.00	n/a
	12/5/2006	46.73	9.15	8.14	11.17	8.55	1.80	3.67	4.00	<0.10	<0.10	0.00	n/a
	3/14/2007	44.05	9.07	8.03	13.03	9.01	2.30	2.60	2.00	0.60	0.30	0.00	n/a
	4/24/2007	60.91	7.66	6.76	16.83	9.67	1.30	4.00	5.00	0.40	2.00	0.00	n/a
Year Three Post-Construction	5/15/2007	67.34	6.68	5.10	7.21	9.15	0.60	14.30	19.00	0.20	0.60	0.00	n/a
	6/12/2007	78.67	**	**	1.07	**	0.60	14.10	13.00	<0.10	1.10	0.20	n/a
	7/16/2007	80.95	11.32	10.23	1.71	7.41	1.00	3.40	4.00	3.20	0.60	0.00	n/a
Year Three Post-Construction	8/7/2007	85.48	11.14	10.01	1.79	8.13	1.40	3.80	*	*	*	*	n/a

Notes:
Highlighted cells exceed COMAR standards for Use 1 waters.
°F- degrees Fahrenheit
TDS- total dissolved solids
g/L- grams per liter
ppt- parts per thousand
mg/L- milligrams per liter
m- meters
NTU- nephelometric turbidity units
TSS- total suspended solids
NO₂ + NO₃- nitrite and nitrate
TKN- Total Kjeldahl Nitrogen
*-Samples were not analyzed due to elevated temperature reading at the laboratory.
**-Data not collected for this parameter because probe malfunctioned.

Table 10
Weems Creek Station WC5 Water Quality Data
Weems and College Creeks Final Water Quality Monitoring Report (Post-Construction Phase Year Three)

Phase	Date	Surface Temperature (°F)	Surface TDS (g/L)	Surface Salinity (ppt)	Bottom Dissolved Oxygen (mg/L)	Surface pH	Secchi Depth (m)	Surface Turbidity (NTU)	Surface TSS (mg/L)	Surface NO ₃ + NO ₂ (mg/L)	Surface TKN (mg/L)	Surface Total Phosphorus (mg/L)	Surface Oil & Grease (mg/L)
Baseline Monitoring	10/30/2002	54.38	13.72	12.69	9.04	8.46	1.75	2.93	7.00	<0.10	1.10	0.60	<5.00
	11/21/2002	50.40	14.33	13.26	16.58	8.45	1.25	3.18	9.00	0.2	0.60	0.20	<5.00
	3/19/2003	47.51	10.46	9.41	9.36	8.50	1.55	1.99	2.10	0.8	<0.10	<0.10	<5.00
	4/28/2003	57.33	6.90	6.04	3.50	8.14	1.05	4.33	5.00	0.5	0.80	<0.10	<5.00
	5/14/2003	63.00	7.21	6.33	3.77	7.79	0.95	5.44	5.00	0.3	1.10	<0.10	<5.00
	6/25/2003	77.55	6.18	5.33	4.21	8.62	0.70	6.85	8.00	1.4	0.20	<0.10	<5.00
	7/24/2003	81.45	8.05	7.06	4.82	7.85	1.00	4.85	5.00	<0.10	<0.10	<0.10	<5.00
	8/25/2003	83.08	6.28	5.39	4.23	8.31	0.60	20.00	17.00	<0.10	3.90	<0.10	<5.00
	9/30/2003	71.86	9.47	8.47	3.72	8.39	0.90	5.83	6.00	<0.10	0.60	<0.10	<5.00
	10/30/2003	60.58	10.24	9.25	4.63	7.85	1.10	7.90	6.00	0.3	0.40	<0.10	<5.00
Year One Construction	11/24/2003	50.40	14.33	13.26	16.58	8.45	1.25	3.18	5.00	0.1	1.30	<0.10	<5.00
	12/17/2003	42.16	7.04	6.07	11.51	7.80	1.60	3.88	4.00	0.4	0.70	<0.10	<5.00
	6/21/2004	77.64	6.52	5.64	4.23	7.74	0.80	9.15	6.00	<0.10	0.60	0.00	<5.00
	8/3/2004	82.04	9.36	8.31	1.99	7.71	1.80	6.10	4.00	<0.10	0.90	0.00	n/a
	8/25/2004	80.17	8.87	7.86	5.03	8.30	0.90	7.21	7.00	<0.10	0.80	0.00	n/a
	9/22/2004	71.46	5.61	4.78	4.98	8.59	0.70	8.71	9.00	0.60	0.50	0.00	n/a
	10/26/2004	60.63	8.18	7.25	4.60	7.35	0.80	4.11	11.00	0.10	0.30	0.00	n/a
	11/16/2004	52.30	9.52	8.53	7.71	7.61	1.30	5.62	*	*	*	*	*
	12/8/2004	48.66	6.68	5.81	11.56	7.70	1.00	10.30	*	*	*	*	*
	3/30/2005	47.84	7.98	7.03	8.70	7.54	0.60	25.40	15.00	0.40	<0.10	0.00	n/a
Year Two Construction	4/10/2005	60.33	4.03	3.39	10.04	7.74	0.70	8.78	9.00	0.90	<0.10	0.00	n/a
	5/10/2005	61.18	6.62	5.77	7.98	7.88	1.10	3.88	5.00	0.30	<0.10	0.00	n/a
	6/21/2005	76.57	8.77	7.78	2.32	8.01	1.10	5.08	5.00	<0.10	0.10	0.00	n/a
	7/26/2005	85.35	9.40	8.32	3.47	7.91	0.90	6.05	8.00	<0.10	0.60	0.00	n/a
	8/23/2005	83.11	11.55	10.43	4.34	7.51	1.20	4.31	3.00	<0.10	0.30	0.00	n/a
	9/14/2005	79.83	12.66	11.56	2.70	7.63	0.90	6.30	7.00	<0.10	0.60	0.00	n/a
	10/26/2005	58.72	13.08	12.05	8.75	7.20	1.10	5.60	4.00	0.20	0.20	0.00	n/a
	11/15/2005	56.49	12.78	11.75	12.88	8.39	1.00	5.65	12.00	<0.10	<1.0	0.00	n/a
	12/20/2005	38.47	9.72	8.58	11.84	7.62	1.30	6.35	6.00	0.30	0.30	0.00	n/a
	3/22/2006	46.27	9.18	8.16	9.70	7.67	1.00	6.44	9.00	<0.10	0.10	0.00	n/a
Year Three Post-Construction	4/25/2006	63.45	10.49	9.49	5.71	8.34	0.70	6.39	8.00	<0.10	0.70	0.00	n/a
	5/31/2006	77.61	12.50	11.42	5.11	8.12	1.00	1.88	5.00	<0.10	0.30	0.00	n/a
	6/13/2006	72.69	12.23	11.19	4.23	7.59	0.70	5.91	9.00	<0.10	0.30	0.00	n/a
	7/11/2006	80.91	6.51	5.63	1.70	8.17	0.70	2.91	8.00	0.10	0.80	0.00	n/a
	9/26/2006	72.95	10.65	9.61	5.74	8.06	0.90	5.14	6.00	<0.10	0.10	0.00	n/a
	10/24/2006	60.13	12.80	11.79	6.89	7.84	1.30	4.65	6.00	<0.10	0.30	0.00	n/a
	11/14/2006	55.36	10.01	9.02	9.35	8.33	1.70	1.03	4.00	0.20	0.70	0.00	n/a
	12/5/2006	46.83	9.14	8.13	11.13	8.58	1.60	4.91	8.00	<0.10	0.30	0.00	n/a
	3/14/2007	44.49	9.05	8.03	11.55	8.99	2.40	2.60	2.00	0.60	0.30	0.00	n/a
	4/24/2007	60.35	7.68	6.77	16.62	9.61	1.30	3.80	6.00	0.40	1.70	0.00	n/a
Year Three Post-Construction	5/15/2007	67.09	6.76	5.20	6.14	9.07	0.60	13.33	19.00	0.20	0.60	0.00	n/a
	6/12/2007	78.85	**	**	1.27	**	0.60	9.80	16.00	<0.10	0.80	0.20	n/a
	7/16/2007	80.73	11.40	10.32	1.24	7.36	1.00	4.20	5.00	3.20	0.00	0.00	n/a
	8/7/2007	84.17	11.59	10.47	1.63	7.71	1.40	3.60	*	*	*	*	n/a

Notes:
Highlighted cells exceed COMAR standards for Use I waters.
°F- degrees Fahrenheit
TDS- total dissolved solids
g/L- grams per liter
ppt- parts per thousand
mg/L- milligrams per liter
m- meters
NTU- nephelometric turbidity units
TSS- total suspended solids
NO₃ + NO₂- nitrite and nitrate
TKN- Total Kjeldahl Nitrogen
*-Samples were not analyzed due to elevated temperature reading at the laboratory.
**-Data not collected for this parameter because probe malfunctioned.

Table 11
Weems Creek Station WC6 Water Quality Data
Weems and College Creeks Final Water Quality Monitoring Report
(Post-Construction Phase Year Three)

Phase	Date	Surface Temperature (°F)	Surface TDS (g/L)	Surface Salinity (ppt)	Bottom Dissolved Oxygen (mg/L)	Surface pH	Secchi Depth (m)
Baseline Monitoring	10/30/2002	54.30	13.55	12.50	8.76	8.42	1.75
	11/21/2002	50.40	14.42	13.35	15.01	8.42	1.10
	3/19/2003	45.23	10.14	9.07	10.77	8.40	1.65
	4/28/2003	58.10	6.92	6.06	2.82	8.06	1.25
	5/14/2003	63.43	7.31	6.43	4.34	8.04	0.85
	6/25/2003	77.01	6.55	5.67	3.70	10.05	0.70
	7/24/2003	80.97	8.17	7.18	3.25	8.04	1.00
	8/25/2003	82.27	6.55	5.65	4.09	8.66	0.70
	9/30/2003	72.04	9.57	8.56	7.90	8.47	1.00
	10/30/2003	60.27	9.93	8.95	8.52	7.85	1.10
Year One Construction	11/24/2003	50.40	14.42	13.35	15.01	8.42	1.10
	12/17/2003	41.71	7.31	6.35	11.66	7.81	2.00
	6/21/2004	77.51	6.72	5.83	3.82	7.64	0.90
	8/3/2004	81.91	9.23	8.20	3.41	7.94	0.80
	8/25/2004	80.22	9.00	7.98	5.55	8.45	0.90
	9/22/2004	70.55	4.62	3.91	5.92	8.61	1.00
	10/26/2004	59.93	7.76	6.85	5.34	7.59	1.30
	11/16/2004	52.52	9.71	8.71	9.23	7.72	1.70
	12/8/2004	48.64	6.66	5.79	11.75	7.49	1.10
	3/30/2005	46.82	8.82	7.83	9.22	7.42	0.60
Year Two Construction	4/10/2005	59.89	4.34	3.68	10.21	7.80	0.80
	5/10/2005	61.78	6.76	5.92	8.49	7.79	1.30
	6/21/2005	77.47	9.32	8.30	4.30	7.58	1.20
	7/26/2005	85.21	10.14	9.04	4.42	8.16	1.10
	8/23/2005	82.80	11.67	10.56	7.48	7.67	1.20
	9/14/2005	80.22	12.72	11.62	4.02	7.89	0.90
	10/26/2005	60.04	13.63	12.64	9.13	7.30	1.30
	11/15/2005	56.79	12.91	11.88	12.25	8.18	1.00
	12/20/2005	38.61	9.99	8.83	12.64	7.72	1.20
	3/22/2006	46.05	9.33	8.31	11.06	7.86	1.00
Year Three Post-Construction	4/25/2006	63.46	10.88	9.87	8.60	8.22	0.90
	5/31/2006	75.65	12.86	11.78	6.82	8.24	1.40
	6/13/2006	72.58	12.57	11.52	3.83	8.00	0.90
	7/11/2006	80.63	7.82	5.82	4.04	8.27	0.80
	9/26/2006	72.44	10.79	9.76	8.08	8.25	1.40
	10/24/2006	59.78	12.86	11.84	8.58	8.00	1.40
	11/14/2006	55.41	10.64	9.64	9.49	8.46	1.70
	12/5/2006	49.02	9.51	8.50	10.63	8.83	1.50
	3/14/2007	43.89	8.86	7.83	12.62	9.07	2.50
	4/24/2007	58.99	7.50	6.61	15.81	9.89	1.30
Year Three Post-Construction	5/15/2007	66.77	7.10	5.40	6.92	8.89	0.60
	6/12/2007	77.88	*	*	1.50	*	0.60
	7/16/2007	80.53	11.67	10.57	1.78	7.69	1.00
8/7/2007		84.92	11.36	10.22	3.87	8.44	1.40

Notes: Highlighted cells exceed COMAR standards for Use 1 waters.

Turbidity, surface total suspended solids, surface nitrogen, surface total Kjeldahl nitrogen, total phosphorus, and oil and grease sampling was not conducted at this location.

°F- degrees Fahrenheit

TDS- total dissolved solids

g/L- grams per liter

ppt- parts per thousand

mg/L- milligrams per liter

m- meters

*-Data not collected for this parameter because probe malfunctioned.

Table 12
College Creek Station CCI Water Quality Data
Weems and College Creeks Final Water Quality Monitoring Report
(Post-Construction Phase Year Three)

Phase	Date	Surface Temperature (°F)	Surface TDS (g/L)	Surface Salinity (ppt)	Bottom Dissolved Oxygen (mg/L)	Surface pH	Secchi Depth (m)
Baseline Monitoring	10/30/2002	51.29	10.53	9.40	8.83	8.50	0.75
	11/21/2002	49.75	14.39	13.31	17.40	8.00	1.25
	3/19/2003	49.56	9.63	8.62	9.06	7.38	1.50
	4/28/2003	58.01	7.01	6.14	6.41	7.50	1.55
	5/14/2003	61.92	7.65	6.57	5.79	6.20	1.45
	6/25/2003	76.27	6.15	5.31	4.36	8.82	0.80
	7/24/2003	79.69	8.26	7.27	1.94	7.42	1.30
	8/25/2003	80.66	6.30	5.42	3.00	7.93	0.60
	9/30/2003	70.29	10.13	9.12	4.96	7.82	1.20
	10/30/2003	59.03	10.33	9.34	4.77	7.39	1.70
Year One Construction	11/24/2003	49.75	14.39	13.31	17.40	8.00	1.25
	12/17/2003	41.92	6.93	6.01	12.79	7.78	1.60
	6/21/2004	77.43	7.14	6.23	1.38	7.69	0.70
	8/3/2004	82.25	9.26	8.23	1.45	5.91	0.80
	8/25/2004	80.54	8.77	7.76	2.27	6.87	0.90
	9/22/2004	71.85	4.66	4.01	11.35	8.72	0.70
	10/26/2004	59.70	7.79	6.89	4.99	7.51	1.30
	11/16/2004	51.28	9.97	8.96	8.29	7.60	1.70
	12/8/2004	47.59	6.38	5.52	12.76	6.35	1.30
	3/30/2005	48.28	8.21	7.26	9.27	7.33	0.90
Year Two Construction	4/10/2005	59.95	3.97	3.40	10.99	8.04	0.70
	5/10/2005	61.10	6.98	6.12	8.37	7.64	1.00
	6/21/2005	76.58	8.97	7.98	2.87	6.34	1.10
	7/20/2005	85.51	9.81	8.72	6.88	7.54	0.70
	8/23/2005	82.11	11.71	10.60	1.63	7.67	0.80
	9/14/2005	80.37	12.96	11.85	1.14	7.65	0.70
	10/26/2005	60.48	14.06	13.05	9.10	7.37	1.20
	11/15/2005	56.87	12.61	11.58	16.28	6.59	1.00
	12/20/2005	*	*	*	*	*	*
	3/22/2006	46.66	9.59	8.55	9.86	7.75	1.60
Year Three Post-Construction	4/25/2006	63.69	10.96	9.96	10.29	7.91	1.30
	5/31/2006	77.04	12.59	11.51	3.40	7.71	0.60
	6/13/2006	71.80	12.46	11.41	1.36	7.54	0.70
	7/11/2006	80.24	6.83	5.89	2.81	7.60	0.80
	9/26/2006	70.54	10.87	9.85	5.33	7.59	0.90
	10/24/2006	58.67	13.26	12.23	6.81	7.47	1.30
	11/14/2006	55.11	10.71	9.70	8.66	7.92	2.40
	12/5/2006	48.65	9.57	8.55	11.30	8.60	1.20
	3/14/2007	44.19	8.26	7.27	14.13	8.39	1.90
	4/24/2007	60.25	7.74	6.84	14.29	9.44	1.30
Year Three Post-Construction	5/15/2007	66.16	7.28	5.60	6.08	8.59	1.00
	6/12/2007	78.80	**	**	3.46	**	0.60
	7/16/2007	80.47	11.77	10.67	1.29	7.51	0.80
	8/7/2007	83.72	11.50	10.39	2.99	7.55	1.00

Notes:
Highlighted cells exceed COMAR standards for Use I waters.
Turbidity, surface total suspended solids, surface nitrogen, surface total Kjeldahl nitrogen, total phosphorus, and oil and grease sampling was not conducted at this location.
°F- degrees Fahrenheit
TDS- total dissolved solids
g/L- grams per liter
ppt- parts per thousand
mg/L- milligrams per liter
m- meters
*-Data not collected for this parameter due to frozen condition of stream.
**-Data not collected for this parameter because probe malfunctioned.

Table 13
College Creek Station CC2 Water Quality Data
Weems and College Creeks Final Water Quality Monitoring Report (Post-Construction Phase Year Three)

Phase	Date	Surface Temperature (°F)	Surface TDS (g/L)	Surface Salinity (ppt)	Bottom Dissolved Oxygen (mg/L)	Surface pH	Secchi Depth (m)	Surface Turbidity (NTU)	Surface TSS (mg/L)	Surface NO ₂ + NO ₃ (mg/L)	Surface TKN (mg/L)	Surface Total Phosphorus (mg/L)	Surface Oil & Grease (mg/L)
Baseline Monitoring	10/30/2002	50.51	10.40	9.34	9.16	8.54	0.90	13.20	9.00	0.30	1.00	0.80	<5.00
	11/21/2002	49.71	14.28	13.20	17.47	8.27	1.25	7.01	11.00	0.30	0.80	0.80	<5.00
	3/19/2003	48.17	9.85	8.82	9.34	8.27	1.85	2.77	2.50	0.90	0.30	<0.10	<5.00
	4/28/2003	58.18	6.99	6.13	6.83	7.77	1.60	3.91	4.00	0.60	<0.10	<0.10	<5.00
	5/14/2003	62.22	7.47	6.58	5.69	7.85	1.50	2.97	3.00	<0.10	0.70	<0.10	<5.00
	6/25/2003	76.90	6.44	5.57	4.41	8.48	0.70	8.16	8.00	1.40	<0.10	<0.10	<5.00
	7/24/2003	80.19	8.22	7.24	2.40	7.48	1.10	6.12	4.00	<0.10	1.40	<0.10	<5.00
	8/25/2003	81.02	6.31	5.43	3.49	8.33	0.70	7.57	5.00	<0.10	0.90	<0.10	<5.00
	9/30/2003	70.28	10.23	9.21	4.93	7.76	1.10	6.27	6.00	<0.10	0.80	0.20	<5.00
	10/30/2003	60.16	10.45	9.45	4.99	7.53	0.60	3.86	6.00	0.60	0.80	<0.10	<5.00
Year One Construction	11/24/2003	49.71	14.28	13.20	17.47	8.27	1.25	7.01	6.00	0.60	0.80	<0.10	<5.00
	12/17/2003	41.60	6.94	5.99	11.72	7.57	1.00	3.35	3.00	0.50	0.60	<0.10	<5.00
	6/21/2004	71.70	7.27	6.35	2.72	7.79	0.80	7.30	6.00	<0.10	0.80	0.00	<5.00
	8/3/2004	81.82	9.04	8.00	2.43	6.84	1.00	5.30	6.00	<0.10	1.10	0.00	n/a
	8/25/2004	80.72	8.91	7.89	4.48	7.78	1.00	5.82	7.00	<0.10	0.60	0.10	n/a
	9/22/2004	71.14	4.29	3.62	9.68	8.70	1.10	5.24	6.00	0.70	0.50	0.00	n/a
	10/26/2004	58.12	7.59	6.69	4.30	7.52	1.50	2.58	3.00	<0.10	0.10	0.00	n/a
	11/16/2004	51.98	10.01	9.01	8.00	7.58	1.80	3.43	*	*	*	*	n/a
	12/8/2004	47.96	6.31	5.47	12.47	7.00	0.90	11.50	*	*	*	*	n/a
	3/30/2005	47.17	8.53	7.55	9.13	7.37	1.10	8.45	7.00	0.50	1.00	0.00	n/a
Year Two Construction	4/10/2005	59.73	4.00	3.36	9.80	7.89	0.60	9.13	16.00	0.60	0.20	0.00	n/a
	5/10/2005	63.13	6.84	5.99	7.99	7.85	1.10	5.99	6.00	0.50	<0.10	0.00	n/a
	6/21/2005	75.19	9.36	8.35	3.71	6.68	1.10	5.10	6.00	<0.10	0.40	0.00	n/a
	7/20/2005	86.06	10.00	8.91	7.13	7.76	1.00	5.05	7.00	<0.10	0.70	0.00	n/a
	8/23/2005	82.31	11.86	10.74	2.32	7.51	0.90	5.59	7.00	<0.10	0.70	0.00	n/a
	9/14/2005	80.26	13.06	11.95	2.56	7.64	0.90	7.79	9.00	<0.10	0.60	0.00	n/a
	10/26/2005	60.09	13.95	12.95	9.20	7.49	1.20	4.44	4.00	0.20	0.20	0.00	n/a
	11/15/2005	56.41	12.6	11.56	15.15	7.57	1.00	5.68	11.00	<0.10	<0.10	0.00	n/a
	12/20/2005	**	**	**	**	**	**	**	**	**	**	**	n/a
	3/22/2006	46.37	9.679	8.64	10.30	7.81	1.60	5.00	5.00	<0.10	0.40	0.00	n/a
Year Three Post-Construction	4/25/2006	63.5	10.94	9.94	8.72	7.96	1.30	3.37	4.00	<0.10	0.40	0.00	n/a
	5/31/2006	77.9	12.66	11.57	6.09	8.01	0.90	3.21	5.00	<0.10	0.40	0.00	n/a
	6/13/2006	72.91	12.54	11.48	3.94	8.07	0.70	4.95	11.00	0.20	0.60	0.00	n/a
	7/11/2006	79.73	6.715	5.82	1.90	7.53	0.80	2.85	7.00	0.20	0.60	0.00	n/a
	9/26/2006	70.83	11	9.97	5.28	7.65	1.50	4.15	4.00	<0.10	0.30	0.00	n/a
	10/24/2006	58.45	13.34	12.32	7.42	7.71	1.50	4.81	5.00	0.30	<0.10	0.00	n/a
	11/14/2006	55.3	10.55	9.54	9.02	7.97	1.90	3.41	3.00	0.30	0.80	0.00	n/a
	12/5/2006	48.05	9.569	8.55	12.15	8.63	1.50	4.87	3.00	0.20	<0.10	0.00	n/a
	3/14/2007	43.89	8.245	7.25	13.77	8.83	2.20	2.30	2.00	0.70	0.80	0.00	n/a
	4/24/2007	60.14	7.625	6.73	15.35	8.57	1.30	4.90	5.00	0.40	1.10	0.00	n/a
Notes:	5/15/2007	66.27	7.28	5.6	5.18	8.59	0.80	8.90	12.00	0.20	0.10	0.00	n/a
	6/12/2007	78.7	***	***	1.38	***	0.70	8.60	6.00	0.20	0.30	0.00	n/a
	7/16/2007	80.41	11.78	10.68	1.44	7.57	0.80	7.10	5.00	<0.10	1.10	0.00	n/a
	8/7/2007	83.95	11.76	10.63	1.2	7.7	1.10	4.30	*	*	*	*	n/a

Highlighted cells exceed COMAR standards for Use I waters.

°F- degrees Fahrenheit

TDS- total dissolved solids

g/L- grams per liter

ppt- parts per thousand

mg/L- milligrams per liter

m- meters

NTU- nephelometric turbidity units

TSS- total suspended solids

NO₂ + NO₃- nitrite and nitrate

TKN- Total Kjeldahl Nitrogen

NS- not sampled

*-Samples were not analyzed due to elevated temperature reading at the laboratory.

**Data not collected for this parameter due to frozen condition of stream.

***Data not collected for this parameter because probe malfunctioned.

Table 14
College Creek Station CC3 Water Quality Data
Weems and College Creeks Final Water Quality Monitoring Report (Post-Construction Phase Year Three)

Phase	Date	Surface Temperature (°F)	Surface TDS (g/L)	Surface Salinity (ppt)	Bottom Dissolved Oxygen (mg/L)	Surface pH	Secchi Depth (m)	Surface Turbidity (NTU)	Surface TSS (mg/L)	Surface NO ₃ + NO ₂ (mg/L)	Surface TKN (mg/L)	Surface Total Phosphorus (mg/L)	Surface Oil & Grease (mg/L)
Baseline Monitoring	10/30/2002	51.89	11.20	10.16	9.28	8.56	0.90	9.64	12.0	0.40	1.40	0.80	<5.00
	11/21/2002	50.02	14.34	13.27	17.49	8.35	1.50	4.46	23.0	0.30	0.80	0.60	<5.00
	3/19/2003	47.61	9.79	8.77	10.78	8.33	1.75	2.00	1.7	0.90	<0.10	<0.10	<5.00
	4/28/2003	57.56	7.05	6.18	4.07	7.97	1.50	3.88	3.0	0.60	0.50	<0.10	<5.00
	5/14/2003	62.03	7.41	6.52	3.52	7.71	1.50	3.83	3.0	0.40	0.40	<0.10	<5.00
	6/25/2003	77.25	6.15	5.32	4.14	8.32	0.70	8.67	8.0	0.80	<0.10	<0.10	<5.00
	7/24/2003	80.17	8.30	7.31	2.94	7.52	1.20	4.61	4.0	<0.10	1.10	<0.10	<5.00
	8/25/2003	81.32	6.44	5.56	4.09	8.33	0.60	10.90	12.0	<0.10	0.90	<0.10	<5.00
	9/30/2003	70.81	10.22	9.20	5.06	7.76	0.90	8.25	8.0	<0.10	0.60	<0.10	<5.00
	10/30/2003	60.07	10.47	9.47	7.01	7.57	1.60	3.45	5.0	0.30	0.60	<0.10	<5.00
Year One Construction	11/24/2003	50.02	14.34	13.27	17.49	8.35	1.50	4.46	6.0	1.00	0.80	<0.10	<5.00
	12/17/2003	40.47	6.92	5.97	11.63	7.71	1.20	3.72	4.0	0.50	0.40	<0.10	<5.00
	6/21/2004	77.77	7.29	6.36	2.87	8.08	1.00	7.30	5.00	<0.10	0.80	0.00	<5.00
	8/3/2004	81.56	8.93	7.90	1.82	6.96	1.20	3.67	4.00	<0.10	0.90	0.00	n/a
	8/25/2004	80.51	8.92	7.90	4.70	7.91	1.00	5.32	6.00	<0.10	0.90	0.00	n/a
	9/22/2004	70.94	3.98	3.34	9.31	8.54	1.10	5.20	6.00	0.70	0.40	0.00	n/a
	10/26/2004	58.53	7.65	6.75	3.77	7.59	1.50	2.74	4.00	<0.10	<0.10	0.00	n/a
	11/16/2004	51.59	9.96	8.95	8.03	7.61	2.10	2.63	*	*	*	*	*
	12/8/2004	48.09	6.35	5.50	12.88	7.32	1.00	8.70	*	*	*	*	*
	3/30/2005	48.49	8.25	7.32	8.86	7.38	1.00	10.40	8.00	0.50	0.90	0.00	n/a
Year Two Construction	4/10/2005	60.17	4.01	3.38	10.70	7.80	0.70	8.70	9.00	0.60	<0.10	0.00	n/a
	5/10/2005	61.21	7.05	6.17	8.08	7.73	1.20	6.11	6.00	0.50	<0.10	0.00	n/a
	6/21/2005	75.78	9.27	8.26	3.53	7.10	1.20	5.11	5.00	<0.10	0.60	0.00	n/a
	7/20/2005	85.63	10.00	8.91	2.90	7.81	1.00	3.75	5.00	<0.10	0.50	0.00	n/a
	8/23/2005	82.41	11.89	10.78	3.39	7.45	0.90	7.23	7.00	<0.10	0.30	0.00	n/a
	9/14/2005	80.10	13.08	11.97	3.25	7.64	0.90	10.01	10.00		0.60	0.00	n/a
	10/26/2005	60.12	13.97	12.94	9.19	7.53	1.20	4.06	4.00	0.20	0.20	0.00	n/a
	11/15/2005	56.42	12.63	11.59	15.56	7.93	1.00	5.09	11.00	<0.10	<0.10	0.00	n/a
	12/20/2005	**	**	**	**	**	**	**	**	**	**	**	n/a
	3/22/2006	46.24	9.60	8.57	10.23	7.62	1.60	3.87	4.00	<0.10	0.10	0.00	n/a
Year Three Post-Construction	4/25/2006	63.04	10.99	9.98	9.44	7.96	1.30	2.89	5.00	<0.10	0.30	0.00	n/a
	5/31/2006	76.49	12.71	11.62	7.01	8.02	0.90	2.88	5.00	<0.10	<0.10	0.00	n/a
	6/13/2006	72.59	12.47	11.42	6.20	7.92	0.70	8.35	8.00	<0.10	0.60	0.00	n/a
	7/11/2006	79.93	6.55	5.65	2.62	7.54	0.80	1.89	7.00	0.10	0.60	0.00	n/a
	9/26/2006	71.02	11.01	9.98	6.30	7.73	1.40	7.43	4.00	<0.10	0.30	0.00	n/a
	10/24/2006	58.39	13.30	12.28	7.12	7.66	1.50	4.02	5.00	<0.10	<0.10	0.00	n/a
	11/14/2006	55.21	10.49	9.49	9.11	8.00	1.90	2.96	3.00	0.30	0.60	0.00	n/a
	12/5/2006	49.11	9.57	8.56	11.76	8.53	0.50	3.27	6.00	0.20	<0.10	0.00	n/a
	3/14/2007	44.25	8.15	7.17	13.04	8.99	2.20	2.10	6.00	0.70	0.60	0.30	n/a
	4/24/2007	59.06	7.37	6.63	15.40	9.64	1.30	3.40	5.00	0.40	1.40	0.00	n/a
Year Three Post-Construction	5/15/2007	66.34	7.25	5.60	6.55	8.61	0.80	11.20	15.00	0.20	0.30	0.00	n/a
	6/12/2007	78.77	***	***	2.30	***	0.70	9.30	9.00	<0.10	0.80	0.10	n/a
	7/16/2007	80.41	11.79	10.69	1.88	7.47	0.80	6.70	5.00	<0.10	0.80	0.00	n/a
	8/7/2007	84.19	11.77	10.64	0.60	8.10	1.10	4.00	*	*	*	*	n/a

Notes: Highlighted cells exceed COMAR standards for Use I waters.

°F- degrees Fahrenheit

TDS- total dissolved solids

g/L- grams per liter

ppt- parts per thousand

mg/L- milligrams per liter

m- meters

NTU- nephelometric turbidity units

TSS- total suspended solids

NO₃ + NO₂- nitrite and nitrate

TKN- Total Kjeldahl Nitrogen

NS- not sampled

*-Samples were not analyzed due to elevated temperature reading at the laboratory.

**Data not collected for this parameter due to frozen condition of stream.

***Data not collected for this parameter because probe malfunctioned.

Table 15
College Creek Station CC4 Water Quality Data
Weems and College Creeks Final Water Quality Monitoring Report
(Post-Construction Phase Year Three)

Phase	Date	Surface Temperature (°F)	Surface TDS (g/L)	Surface Salinity (ppt)	Bottom Dissolved Oxygen (mg/L)	Surface pH	Secchi Depth (m)
Baseline Monitoring	10/30/2002	52.47	12.74	11.09	9.52	8.57	1.30
	11/21/2002	50.25	14.38	13.31	15.79	8.38	1.40
	3/19/2003	46.62	9.73	8.69	10.23	8.40	1.65
	4/28/2003	57.51	7.06	6.19	4.22	7.63	1.25
	5/14/2003	62.02	7.78	6.87	4.20	7.63	1.80
	6/25/2003	77.39	6.36	5.50	4.78	8.74	0.80
	7/24/2003	80.26	8.34	7.35	3.02	7.52	1.10
	8/25/2003	81.22	6.49	5.60	4.09	8.24	0.80
	9/30/2003	71.21	10.27	9.25	5.55	7.81	0.90
	10/30/2003	59.79	10.35	9.36	6.51	7.71	1.60
Year One Construction	11/24/2003	50.25	14.38	13.31	15.79	8.38	1.40
	12/17/2003	41.62	7.04	6.10	10.98	7.75	2.20
	6/21/2004	78.78	7.35	6.42	2.73	8.24	0.90
	8/3/2004	81.84	9.09	8.05	3.49	7.33	1.00
	8/25/2004	80.35	8.96	7.94	6.11	8.07	1.10
	9/22/2004	70.66	3.86	3.24	8.99	8.54	1.10
	10/26/2004	58.53	7.65	6.75	5.65	7.67	1.50
	11/16/2004	51.33	9.93	8.92	9.20	7.63	2.10
	12/8/2004	48.62	6.39	5.54	12.86	7.49	1.00
	3/30/2005	49.06	7.96	7.02	9.59	7.38	1.00
Year Two Construction	4/10/2005	58.82	4.23	3.57	9.76	7.81	0.70
	5/10/2005	64.17	3.85	5.99	8.35	7.82	1.10
	6/21/2005	75.76	9.36	8.35	4.11	7.41	1.20
	7/20/2005	85.83	10.11	9.01	3.21	8.16	1.10
	8/23/2005	82.26	11.94	10.83	5.10	7.57	1.00
	9/14/2005	80.12	13.03	11.92	3.61	7.77	0.90
	10/26/2005	60.27	14.06	13.05	9.56	7.58	1.20
	11/15/2005	56.39	12.69	11.65	14.79	8.09	1.00
	12/20/2005	*	*	*	*	*	*
	3/22/2006	46.17	9.72	8.68	10.76	7.83	1.50
Year Three Post-Construction	4/25/2006	64.53	10.87	9.87	9.34	8.12	1.10
	5/31/2006	77.79	12.84	11.76	8.31	8.28	1.10
	6/13/2006	72.90	12.66	11.60	5.04	7.94	0.90
	7/11/2006	80.49	7.05	6.13	3.88	7.75	0.80
	9/26/2006	71.33	11.05	10.01	6.40	7.89	1.40
	10/24/2006	53.74	13.37	12.35	7.92	7.88	1.50
	11/14/2006	55.24	10.62	9.61	8.82	8.08	1.70
	12/5/2006	48.02	9.59	8.57	11.65	8.61	1.50
	3/14/2007	43.84	8.28	7.28	12.99	9.01	2.20
	4/24/2007	58.55	7.44	6.57	14.89	9.66	1.30
Year Three Post-Construction	5/15/2007	66.89	7.24	5.50	6.70	9.06	0.80
	6/12/2007	78.74	**	**	3.08	**	0.80
	7/16/2007	81.19	11.81	10.71	1.87	7.77	0.80
	8/7/2007	84.61	11.88	10.75	3.44	8.00	1.10

Notes:
Highlighted cells exceed COMAR standards for Use I waters.
Turbidity, surface total suspended solids, surface nitrogen, surface total Kjeldahl nitrogen, total phosphorus, and oil and grease sampling was not conducted at this location.
°F- degrees Fahrenheit
TDS- total dissolved solids
g/L- grams per liter
ppt- parts per thousand
mg/L- milligrams per liter
m- meters
*-Data not collected for this parameter due to frozen condition of stream.
**-Data not collected for this parameter because probe malfunctioned.

Table 16
College Creek Station CC5 Water Quality Data
Weems and College Creeks Final Water Quality Monitoring Report (Post-Construction Phase Year Three)

Phase	Date	Surface Temperature (°F)	Surface TDS (g/L)	Surface Salinity (ppt)	Bottom Dissolved Oxygen (mg/L)	Surface pH	Secchi Depth (m)
Baseline Monitoring	10/30/2002	53.29	12.27	11.23	9.46	8.60	1.55
	11/21/2002	50.68	14.27	13.20	17.05	8.38	1.25
	3/19/2003	46.40	9.74	8.70	11.45	8.46	2.00
	4/28/2003	57.05	7.11	6.24	3.29	7.67	1.25
	5/14/2003	61.90	7.64	6.73	5.40	7.80	0.85
	6/25/2003	76.56	6.44	5.58	4.03	8.64	0.80
	7/24/2003	80.33	8.33	7.34	2.94	7.65	1.60
	8/25/2003	81.32	6.46	5.58	4.45	8.35	0.80
	9/30/2003	71.38	10.29	9.27	5.85	8.00	0.80
	10/30/2003	59.40	10.41	9.41	6.97	7.77	1.60
Year One Construction	11/24/2003	50.68	14.27	13.20	17.05	8.38	1.25
	12/17/2003	41.45	7.00	6.07	12.04	7.73	1.70
	6/21/2004	77.61	7.37	6.48	4.05	7.99	1.10
	8/3/2004	81.29	9.07	8.04	3.51	7.58	0.70
	8/25/2004	80.06	8.98	7.96	5.54	8.16	1.20
	9/22/2004	71.04	4.00	3.35	8.75	8.52	1.00
	10/26/2004	58.49	7.63	6.73	5.60	7.82	1.60
	11/16/2004	51.44	9.92	8.91	8.68	7.65	2.30
	12/8/2004	48.41	6.31	5.46	12.28	7.54	1.00
	3/30/2005	47.51	8.65	7.65	9.64	7.47	1.00
Year Two Construction	4/10/2005	61.57	4.02	3.38	9.18	8.05	0.70
	5/10/2005	64.20	6.88	6.01	9.02	7.89	1.10
	6/21/2005	76.34	9.35	8.33	3.56	7.55	1.20
	7/20/2005	86.21	10.07	8.97	3.37	8.04	1.20
	8/23/2005	82.35	11.95	10.84	6.35	7.69	1.30
	9/14/2005	79.94	13.06	11.96	4.51	7.80	0.90
	10/26/2005	59.97	13.99	12.97	9.19	7.63	1.20
	11/15/2005	56.45	12.72	11.69	12.78	8.18	1.00
	12/20/2005	39.58	9.82	8.68	12.63	7.76	1.60
	3/22/2006	45.91	9.72	8.68	11.04	7.80	1.50
Year Three Post-Construction	4/25/2006	64.20	10.87	9.87	9.04	8.15	1.30
	5/31/2006	77.41	12.86	11.77	6.97	8.29	1.10
	6/13/2006	72.50	12.58	11.52	3.41	7.87	0.90
	7/11/2006	80.60	6.55	5.64	3.33	8.02	0.80
	9/26/2006	71.35	11.08	10.05	6.53	7.92	1.40
	10/24/2006	58.82	13.37	12.34	8.05	7.88	1.50
	11/14/2006	55.43	10.17	9.16	9.07	8.15	1.50
	12/5/2006	47.71	9.54	8.52	11.97	8.63	1.50
	3/14/2007	43.89	8.36	7.57	12.93	9.04	2.20
	4/24/2007	59.82	7.50	6.61	15.29	9.62	1.30
Year Three Post-Construction	5/15/2007	67.33	7.18	5.50	7.38	9.04	0.80
	6/12/2007	78.67	*	*	3.01	*	0.70
	7/16/2007	80.61	11.85	10.75	2.14	7.58	0.80
	8/7/2007	84.05	11.55	10.43	1.95	8.34	1.10

Notes: Highlighted cells exceed COMAR standards for Use I waters.
Turbidity, surface total suspended solids, surface nitrogen, surface total Kjeldahl nitrogen, total phosphorus, and oil and grease sampling was not conducted at this location.
°F- degrees Fahrenheit
TDS- total dissolved solids
g/L- grams per liter
ppt- parts per thousand
mg/L- milligrams per liter
m- meters
*-Data not collected for this parameter because probe malfunctioned.

Table 17
Mean Water Quality Data for Laboratory Measured Parameters
Weems and College Creeks Final Water Quality Monitoring Report (Post-Construction Phase Year Three)

Season	Station	Mean Surface Turbidity (NTU)					Mean Surface TSS (mg/L)					Mean Surface TN (mg/L)					Mean Surface TP (mg/L)					Mean Surface Oil & Grease (mg/L)				
		Baseline	Year-One	Year-Two	Post-Construction	Baseline	Year-One	Year-Two	Post-Construction	Baseline	Year-One	Year-Two	Post-Construction	Baseline	Year-One	Year-Two	Post-Construction	Baseline	Year-One	Year-Two	Post-Construction	Baseline	Year-One	Year-Two	Post-Construction	
Fall	WC4	5.69	8.01	6.10	5.87	8.80	7.00	8.67	6.89	0.98	0.30	0.23	1.16	0.10	0.05	0.00	0.02	<5.00	n/a	n/a	<5.00	n/a	n/a	n/a	n/a	
	WC4	4.54	14.39	4.84	6.97	4.27	8.67	6.67	8.67	1.27	0.57	0.43	1.37	0.47	0.00	0.00	0.00	<5.00	n/a	n/a	<5.00	n/a	n/a	n/a		
	WC4	11.40	7.49	5.46	7.10	11.67	6.33	6.60	8.50	0.37	0.60	0.36	2.45	0.00	0.03	0.00	0.10	<5.00	n/a	n/a	<5.00	n/a	n/a	n/a		
	WC4	3.76	10.30	10.50	3.67	4.00	*	8.00	4.00	1.50	*	0.60	0.00	0.00	0.00	*	0.00	0.00	<5.00	n/a	n/a	<5.00	n/a	n/a		
Fall	WC5	4.60	6.15	5.85	5.31	6.60	10.00	7.67	8.00	0.92	0.75	0.33	1.11	0.16	0.00	0.00	0.02	<5.00	n/a	n/a	<5.00	n/a	n/a	n/a		
	WC5	3.92	12.69	4.90	6.58	4.03	9.67	7.33	9.00	1.17	0.53	0.37	1.27	0.00	0.00	0.00	0.00	<5.00	n/a	n/a	<5.00	n/a	n/a	n/a		
	WC5	10.57	7.49	4.85	5.87	10.00	5.67	6.60	10.50	1.83	0.77	0.44	2.30	0.00	0.00	0.00	0.10	<5.00	n/a	n/a	<5.00	n/a	n/a	n/a		
	WC5	3.88	10.30	6.35	4.91	4.00	*	6.00	8.00	1.10	*	0.60	0.30	0.00	0.00	*	0.00	0.00	<5.00	n/a	n/a	<5.00	n/a	n/a		
Fall	CC2	7.47	3.75	5.97	5.33	7.60	4.50	8.00	5.00	1.20	0.65	0.33	0.76	0.36	0.00	0.00	0.00	<5.00	n/a	n/a	<5.00	n/a	n/a	n/a		
	CC2	3.22	7.86	3.86	5.37	3.17	9.67	4.67	6.33	0.83	0.87	0.40	1.10	0.00	0.00	0.00	0.00	<5.00	n/a	n/a	<5.00	n/a	n/a	n/a		
	CC2	7.28	6.14	4.71	6.67	5.67	6.33	7.60	5.50	1.23	0.83	0.68	0.80	0.00	0.03	0.00	0.00	<5.00	n/a	n/a	<5.00	n/a	n/a	n/a		
	CC2	3.35	11.50	*	4.87	3.00	*	*	3.00	1.10	*	*	0.20	0.00	0.00	*	0.00	0.00	<5.00	n/a	n/a	<5.00	n/a	n/a		
Fall	CC3	6.05	3.52	6.39	5.33	10.80	5.00	8.33	5.00	1.24	0.55	0.33	0.76	0.28	0.00	0.00	0.00	<5.00	n/a	n/a	<5.00	n/a	n/a	n/a		
	CC3	3.24	8.40	3.21	5.37	2.57	7.67	4.67	6.33	0.93	0.83	0.13	1.10	0.00	0.00	0.00	0.00	<5.00	n/a	n/a	<5.00	n/a	n/a	n/a		
	CC3	8.06	5.43	5.27	6.67	8.00	5.00	6.40	5.50	0.93	0.87	0.54	0.80	0.00	0.00	0.00	0.00	<5.00	n/a	n/a	<5.00	n/a	n/a	n/a		
	CC3	3.72	8.70	*	4.87	4.00	*	*	3.00	0.90	*	*	0.20	0.00	0.00	*	0.00	0.00	<5.00	n/a	n/a	<5.00	n/a	n/a		

NOTE: Winter means are based on one value for both baseline and construction

* - Data not collected for this parameter due to frozen condition of station.

Table 18A
Weems Creek Mean Water Quality Data for In-situ Parameters
Weems and College Creeks Final Water Quality Monitoring Report (Post-Construction Phase Year Three)

Season	Station	Mean Surface Temperature (°F)					Mean Surface TDS g/L					Mean Surface Salinity (ppt)					Mean Bottom Dissolved Oxygen (mg/L)					Mean Surface pH					Mean Secchi (m)				
		Baseline	Year-One	Year-Two	Post- Construction	Baseline	Year-One	Year-Two	Post- Construction	Baseline	Year-One	Year-Two	Post- Construction	Baseline	Year-One	Year-Two	Post- Construction	Baseline	Year-One	Year-Two	Post- Construction	Baseline	Year-One	Year-Two	Post- Construction	Baseline	Year-One	Year-Two	Post- Construction		
Fall Spring Summer Winter	WC1	58.53	62.07	66.10	61.04	12.10	7.73	12.81	10.86	11.09	6.84	11.75	9.85	8.99	6.64	9.66	6.73	7.79	7.71	7.46	7.46	0.92	0.97	0.97	0.97	0.92	0.97	0.97	1.17		
	WC1	58.04	58.34	63.20	57.77	7.94	5.27	10.51	7.92	7.03	4.53	9.46	6.75	6.86	7.54	6.87	12.34	8.01	7.72	7.77	9.12	0.93	0.57	0.67	0.67	0.93	0.57	0.67	1.23		
	WC1	80.27	80.36	79.78	81.52	6.79	7.60	9.82	11.18	5.90	6.65	8.80	10.07	5.19	3.91	2.42	0.58	8.32	7.52	7.34	7.14	0.67	0.70	0.70	0.70	0.67	0.70	0.70	0.50		
	WC1	42.63	48.26	*	46.03	6.59	6.74	*	9.13	5.70	5.82	*	8.11	13.13	13.00	*	11.55	7.92	7.60	*	8.14	1.40	1.80	*	1.80	1.40	1.80	*	1.80		
Fall Spring Summer Winter	WC2	57.72	61.58	65.67	62.36	12.24	7.47	12.59	11.14	11.26	6.58	11.54	10.12	8.14	7.34	8.74	6.61	8.18	7.84	7.64	7.88	0.98	1.17	1.17	1.00	0.98	1.17	1.00	1.23		
	WC2	56.63	59.88	63.52	57.73	8.14	5.24	10.59	7.91	7.22	4.51	9.56	6.71	6.75	8.85	6.98	11.96	8.09	7.69	8.04	9.15	1.07	0.70	0.87	1.07	0.70	0.87	0.87	1.40		
	WC2	80.27	80.28	79.92	81.63	6.77	7.95	25.10	11.17	5.87	6.98	8.72	10.20	1.56	2.78	3.48	1.38	8.34	7.78	7.55	7.88	0.77	0.83	0.90	0.77	0.83	0.90	0.87	0.70		
	WC2	42.47	48.02	*	46.69	6.91	6.31	*	9.16	5.99	5.99	5.44	*	8.15	11.61	12.62	*	7.50	8.01	7.73	*	8.41	1.50	0.60	*	1.50	0.60	*	1.50		
Fall Spring Summer Winter	WC3	57.55	60.93	66.21	62.36	12.35	7.36	12.92	11.05	11.33	6.50	11.87	10.04	10.76	6.94	8.46	7.32	8.02	7.93	7.70	7.97	1.20	1.13	1.07	1.20	1.13	1.07	1.07	1.30		
	WC3	56.21	57.86	63.09	58.00	8.15	5.96	10.61	7.77	7.22	5.08	9.57	6.60	6.07	8.72	7.54	11.85	8.00	7.60	8.21	9.18	1.07	0.67	0.87	1.07	0.67	0.87	0.87	1.47		
	WC3	80.17	80.11	80.00	81.43	6.88	8.08	9.78	11.29	5.98	7.11	8.73	10.18	2.02	3.54	2.70	1.09	8.32	7.70	7.68	7.70	0.77	0.83	0.90	0.77	0.83	0.90	0.87	0.87		
	WC3	42.51	48.45	*	45.73	6.90	6.61	*	9.10	5.98	5.74	*	8.08	12.36	12.28	*	10.82	7.94	7.76	*	8.46	1.70	0.90	*	1.80	1.70	0.90	*	1.80		
Fall Spring Summer Winter	WC4	58.19	61.61	65.37	62.70	12.65	7.78	12.73	10.99	11.62	6.91	11.68	9.98	11.00	5.33	7.84	7.55	6.56	7.89	7.75	8.04	1.25	0.83	1.00	1.25	0.83	1.00	1.00	1.27		
	WC4	56.34	56.78	62.66	57.43	8.17	6.18	10.58	7.80	7.24	5.38	9.55	6.63	6.31	8.82	6.73	12.36	8.12	7.59	8.14	9.28	1.15	0.80	0.90	1.15	0.80	0.90	0.90	1.40		
	WC4	80.33	80.36	79.56	81.70	6.86	8.17	9.54	11.23	5.96	7.19	8.53	10.12	3.72	3.10	2.56	1.52	8.39	7.98	7.86	7.77	0.77	0.90	0.96	0.77	0.90	0.96	1.00			
	WC4	42.73	48.41	38.71	46.73	7.06	7.11	9.68	9.15	6.14	5.77	8.54	8.14	12.01	12.36	12.17	1.17	7.93	7.69	7.28	8.55	1.75	0.70	1.30	1.75	0.70	1.30	1.30	1.80		
Fall Spring Summer Winter	WC5	57.52	61.46	65.01	62.81	12.42	7.77	12.84	11.15	11.39	6.83	11.79	10.14	10.11	5.76	8.11	7.33	6.63	7.85	7.74	8.08	1.25	0.93	1.00	1.25	0.93	1.00	1.00	1.30		
	WC5	55.95	56.45	62.44	57.31	8.19	6.21	10.72	7.83	7.26	5.40	9.69	6.67	5.54	8.91	6.84	11.44	8.14	7.72	8.04	9.22	1.18	0.80	0.90	1.18	0.80	0.90	0.90	1.43		
	WC5	80.69	79.95	79.73	81.25	6.84	8.25	9.69	11.50	5.93	7.27	8.67	10.40	4.42	3.75	3.21	1.38	8.26	7.92	7.84	7.54	0.77	1.17	0.92	0.77	1.17	0.92	1.00	1.00		
	WC5	42.16	48.66	38.47	46.83	7.04	6.68	9.72	9.14	6.07	5.81	8.58	8.13	11.51	11.56	11.84	11.13	7.80	7.70	7.62	8.58	1.60	1.00	1.30	1.60	1.00	1.30	1.30	1.60		
Fall Spring Summer Winter	WC6	57.48	61.00	65.68	62.54	12.38	7.36	13.09	11.43	11.34	6.49	12.06	10.41	11.04	6.83	8.47	8.72	6.63	7.97	7.79	8.24	1.21	1.33	1.07	1.21	1.33	1.07	1.07	1.30		
	WC6	55.59	56.16	61.72	56.55	8.12	6.64	11.02	7.82	7.19	5.81	9.99	6.61	5.98	9.31	8.83	11.78	8.17	7.67	8.11	9.28	1.25	0.90	1.10	1.25	0.90	1.10	1.10	1.47		
	WC6	80.08	79.88	79.74	81.11	7.09	8.31	10.30	11.52	6.17	7.34	9.05	10.40	3.68	4.26	4.81	2.38	8.92	8.01	7.94	8.07	0.80	0.87	1.04	0.80	0.87	1.04	1.00	1.00		
	WC6	41.71	48.64	38.61	49.02	7.31	6.66	9.99	9.51	6.35	5.79	8.83	8.50	11.66	11.75	12.64	10.63	7.81	7.49	7.72	8.83	2.00	1.10	1.20	2.00	1.10	1.20	1.20	1.50		

NOTE: Winter means are based on one value for both baseline and construction
* - Data not collected for this parameter due to frozen condition of station.

Table 18B
College Creek Mean Water Quality Data for In-situ Parameters
Weems and College Creeks Final Water Quality Monitoring Report (Post-Construction Phase Year Three)

Season	Station	Mean Surface Temperature (°F)				Mean Surface TDS g/L				Mean Surface Salinity (ppt)				Mean Bottom Dissolved Oxygen (mg/L)				Mean Surface pH				Mean Secchi (m)			
		Baseline	Year-One	Year-Two	Post- Construction	Baseline	Year-One	Year-Two	Post- Construction	Baseline	Year-One	Year-Two	Post- Construction	Baseline	Year-One	Year-Two	Post- Construction	Baseline	Year-One	Year-Two	Post- Construction	Baseline	Year-One	Year-Two	Post- Construction
Fall	CC1	56.02	60.94	65.91	61.44	11.95	7.47	13.21	11.61	10.90	6.62	12.16	6.93	10.67	8.21	8.84	7.66	6.34	7.94	7.20	7.06	1.23	1.23	0.97	1.53
Spring	CC1	56.50	56.44	62.46	56.87	8.10	6.39	11.05	7.76	7.11	5.59	10.01	6.57	7.09	9.54	7.85	8.81	7.03	7.79	7.29	8.81	1.50	0.87	1.17	1.40
Summer	CC1	78.87	80.07	79.25	81.00	6.90	8.39	9.96	11.64	6.00	7.41	8.92	10.53	3.10	1.70	3.11	7.53	8.06	6.82	7.34	7.53	0.90	0.80	0.82	0.80
Winter	CC1	41.92	47.59	*	48.65	6.93	6.38	*	9.57	6.01	5.52	*	8.55	12.79	12.76	*	8.60	7.78	6.35	*	8.60	1.60	1.30	*	1.20
Fall	CC2	56.07	60.41	65.59	61.53	11.93	7.30	13.20	11.63	10.88	6.44	12.15	10.61	10.80	7.33	8.97	7.78	6.42	7.93	7.57	7.78	1.02	1.47	1.03	1.63
Spring	CC2	56.19	56.68	62.59	56.77	8.10	6.46	11.09	7.72	7.18	5.63	10.05	6.53	7.29	8.97	8.37	9.00	7.96	7.70	7.93	9.00	1.65	0.93	1.27	1.43
Summer	CC2	79.17	80.08	79.24	81.02	6.99	8.41	10.10	11.77	6.08	7.41	9.06	10.66	3.43	3.21	3.80	7.64	8.10	7.47	7.51	7.64	0.83	0.93	0.90	0.87
Winter	CC2	41.60	47.96	*	48.05	6.94	6.31	*	9.57	5.99	5.47	*	8.55	11.72	12.47	*	8.63	7.57	7.00	*	8.63	1.00	0.90	*	1.50
Fall	CC3	56.56	60.35	65.55	61.54	12.11	7.20	13.23	11.60	11.07	6.35	12.17	10.58	11.27	7.04	9.33	7.51	6.45	7.91	7.70	7.80	1.28	1.57	1.03	1.60
Spring	CC3	55.73	56.62	61.92	56.55	8.08	6.44	11.10	7.59	7.16	5.62	10.06	6.47	6.12	9.21	8.89	9.08	8.00	7.64	7.87	9.08	1.58	0.97	1.27	1.43
Summer	CC3	79.58	79.95	79.27	81.12	6.97	8.38	10.04	11.78	6.06	7.39	9.00	10.67	3.72	3.13	3.73	7.79	8.06	7.65	7.56	7.79	0.83	1.07	0.92	0.87
Winter	CC3	40.47	48.09	*	49.11	6.92	6.35	*	9.57	5.97	5.50	*	8.56	11.63	12.88	*	8.53	7.71	7.32	*	8.53	1.30	1.00	*	0.90
Fall	CC4	56.79	60.17	65.59	60.10	12.42	7.15	13.26	11.68	11.26	6.30	12.21	10.66	10.63	7.95	9.32	7.71	6.49	7.95	7.81	7.95	1.32	1.57	1.03	1.53
Spring	CC4	55.38	57.35	62.83	56.43	8.19	5.35	11.14	7.65	7.25	5.53	10.10	6.45	6.22	9.23	9.47	7.67	7.80	7.67	8.08	9.24	1.57	0.93	1.23	1.43
Summer	CC4	79.62	80.32	79.45	81.51	7.06	8.47	10.22	11.85	6.15	7.47	9.18	10.73	3.96	4.11	4.27	7.88	8.17	7.88	7.77	7.89	0.90	1.00	1.00	0.90
Winter	CC4	41.62	48.62	*	48.02	7.04	6.39	*	9.59	6.10	5.54	*	8.57	10.98	12.86	*	11.65	7.75	7.49	*	8.61	2.20	1.00	*	1.50
Fall	CC5	57.09	60.32	65.45	61.87	12.30	7.18	13.26	11.54	11.26	6.33	12.21	10.52	11.28	7.68	8.83	7.88	6.55	8.00	7.87	7.98	1.29	1.63	1.03	1.47
Spring	CC5	55.12	57.76	62.51	57.01	8.16	6.51	11.15	7.68	7.22	5.68	10.11	6.56	6.71	9.28	9.02	11.87	7.98	7.80	8.08	9.23	1.37	0.93	1.30	1.43
Summer	CC5	79.40	79.65	79.60	81.11	7.08	8.47	10.10	11.70	6.17	7.49	9.06	10.59	3.81	4.37	4.00	7.91	8.21	7.91	7.83	7.96	1.07	1.00	1.08	0.87
Winter	CC5	41.45	48.41	39.58	47.71	7.00	6.31	9.82	9.54	6.07	5.46	8.68	8.52	12.04	12.28	12.63	11.97	7.73	7.54	7.76	8.63	1.70	1.00	1.60	1.50

NOTE: Winter means are based on one value for both baseline and construction

* - Data not collected for this parameter due to frozen condition of station.

Table 19
QA/QC Results for Baseline through Post-Construction Monitoring
Weems and College Creeks Final Water Quality Monitoring Report (Post-Construction Phase Year Three)

Baseline Monitoring											
Station	CC2			WC4			CC3			WC5	
Sampling Date	10/30/2003*			10/30/2003*			11/24/2003*			11/24/2003*	
Sample Status	Regular	Duplicate	RPD	Regular	Duplicate	RPD	Regular	Duplicate	RPD	Regular	RPD
TSS (mg/L)	6.00	5.00	18.2%	6.00	7.00	15.4%	6.00	6.00	0.0%	5.00	0.0%
NO ₃ + NO ₂ (mg/L)	0.40	0.40	0.0%	0.30	0.30	0.0%	1.00	0.50	66.7%	0.10	0.0%
TKN (mg/L)	0.50	0.60	18.2%	0.30	0.20	40.0%	0.80	0.70	13.3%	1.30	26.1%
TP (mg/L)	<0.10	<0.15	NA	<0.10	<0.10	NA	<0.10	<0.10	NA	<0.10	NA
Oil & Grease (mg/L)	<5.00	<5.00	NA	<5.00	<5.00	NA	<5.00	<5.00	NA	<5.00	NA

Year One Construction											
Station	CC2			CC3			WC4			WC5	
Sampling Date	5/10/2005			5/10/2005			5/10/2005			5/10/2005	
Sample Status	Regular	Duplicate	RPD	Regular	Duplicate	RPD	Regular	Duplicate	RPD	Regular	RPD
TSS (mg/L)	6.00	6.00	0.0%	6.00	6.00	0.0%	5.00	5.00	0.0%	5.00	0.0%
NO ₃ + NO ₂ (mg/L)	0.50	0.50	0.0%	0.50	0.50	0.0%	0.40	0.40	0.0%	0.30	28.6%
TKN (mg/L)	<0.10	<0.10	NA	<0.10	<0.10	NA	<0.10	<0.10	NA	<0.10	NA
TP (mg/L)	<0.10	<0.10	NA	<0.10	<0.10	NA	<0.10	<0.10	NA	<0.10	NA
Oil & Grease (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Year Two Construction											
Station	CC2			CC3			WC4			WC5	
Sampling Date	3/22/2006			3/22/2006			3/22/2006			3/22/2006	
Sample Status	Regular	Duplicate	RPD	Regular	Duplicate	RPD	Regular	Duplicate	RPD	Regular	RPD
TSS (mg/L)	5.00	5.00	0.0%	4.00	4.00	0.0%	8.00	8.00	0.0%	9.00	0.0%
NO ₃ + NO ₂ (mg/L)	<0.10	<0.10	NA	<0.10	<0.10	NA	<0.10	<0.10	NA	<0.10	NA
TKN (mg/L)	0.40	0.40	0.0%	0.10	<0.10	NA	0.20	0.50	85.7%	0.10	100.0%
TP (mg/L)	<0.10	<0.10	NA	<0.10	<0.10	NA	<0.10	<0.10	NA	<0.10	NA
Oil & Grease (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Post-Construction											
Station	CC2			CC3			WC4			WC5	
Sampling Date	11/14/2006			11/14/2006			11/14/2006			11/14/2006	
Sample Status	Regular	Duplicate	RPD	Regular	Duplicate	RPD	Regular	Duplicate	RPD	Regular	RPD
TSS (mg/L)	3.00	3.00	0.0%	3.00	3.00	0.0%	4.00	4.00	0.0%	4.00	0.0%
NO ₃ + NO ₂ (mg/L)	0.30	0.30	0.0%	0.30	0.30	0.0%	0.20	0.20	0.0%	0.20	0.0%
TKN (mg/L)	0.80	0.70	13.3%	0.60	0.70	15.4%	0.60	0.60	0.0%	0.70	15.4%
TP (mg/L)	<0.10	<0.10	NA	<0.10	<0.10	NA	<0.10	<0.10	NA	<0.10	NA
Oil & Grease (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Post-Construction											
Station	CC2			CC3			WC4			WC5	
Sampling Date	5/15/2007			5/15/2007			5/15/2007			5/15/2007	
Sample Status	Regular	Duplicate	RPD	Regular	Duplicate	RPD	Regular	Duplicate	RPD	Regular	RPD
TSS (mg/L)	5.00	6.00	18.2%	5.00	6.00	18.2%	5.00	5.00	0.0%	6.00	18.2%
NO ₃ + NO ₂ (mg/L)	0.40	0.40	0.0%	0.40	0.40	0.0%	0.40	0.40	0.0%	0.40	0.0%
TKN (mg/L)	1.10	0.80	31.6%	1.40	1.40	0.0%	2.00	2.00	0.0%	1.70	0.0%
TP (mg/L)	<0.10	<0.10	NA	<0.10	<0.10	NA	<0.10	<0.10	NA	<0.10	NA
Oil & Grease (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: RPD- relative percent difference (per DNR, 2001). The general "rule of thumb" for precision for this project is 20%.

TSS- total dissolved solids

NO₃ + NO₂- nitrite and nitrate

TKN- Total Kjeldahl Nitrogen

TP- total phosphorus

mg/L- milligrams per liter

*- sample collected during the baseline monitoring period

FIGURES

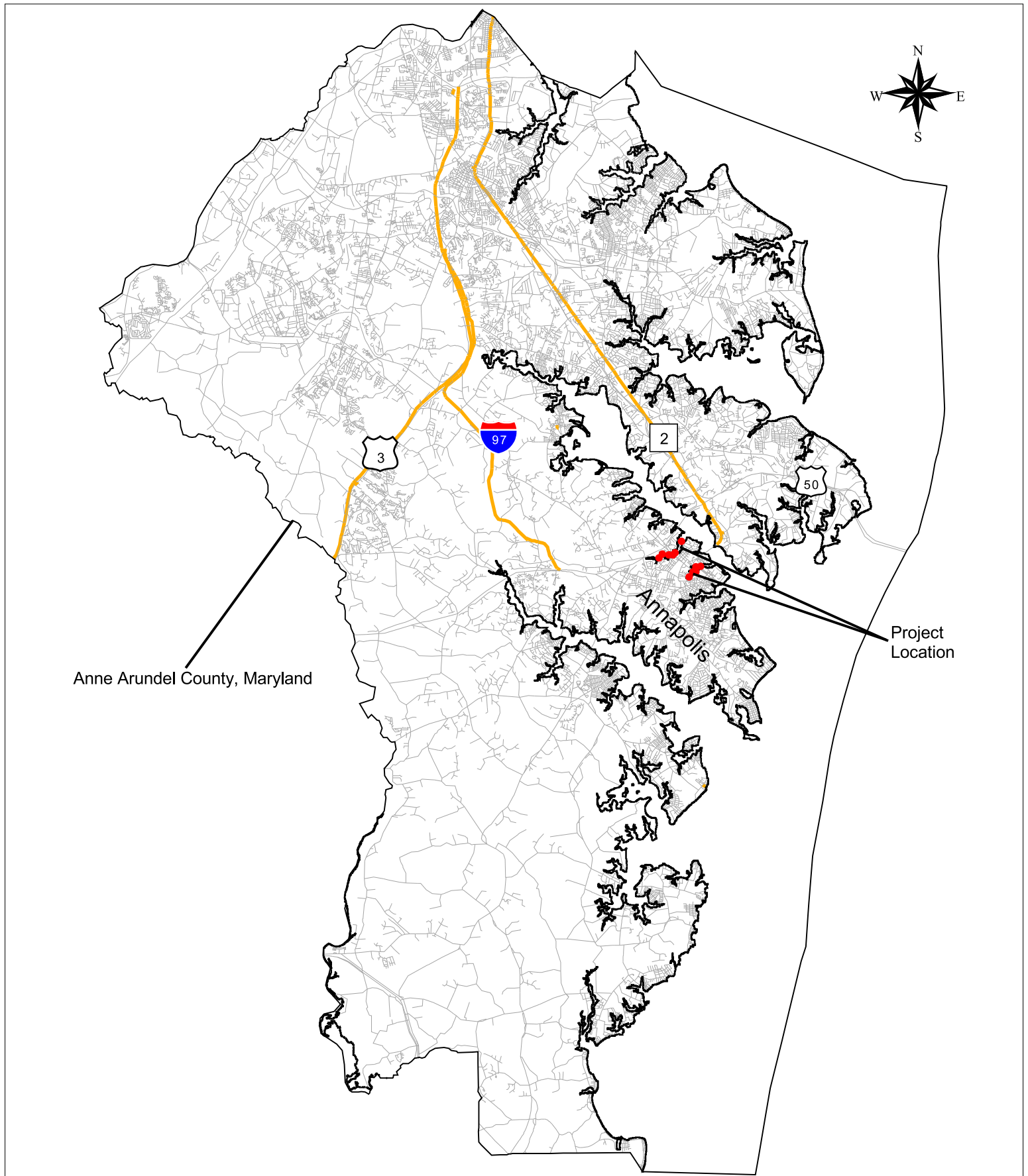


Figure 1: Vicinity Map
 MD 70 Bridge Replacement/Rehabilitation Project
 Anne Arundel County, MD
 Final Water Quality Monitoring Report
 Post-Construction Phase, Year Three

Legend	
	County Boundary
	Sampling Sites
	Major Roadways
	Minor Roadways



Figure 2: Weems Creek Sampling and Outfall Locations
 MD 70 Bridge Replacement/Rehabilitation Project
 Anne Arundel County, MD
 Final Water Quality Monitoring Report
 Post-Construction Phase, Year Three



Scale: Not to Scale

Legend

- WC-1 ● Sampling Locations
- WCOS-1 ○ Outfall Locations

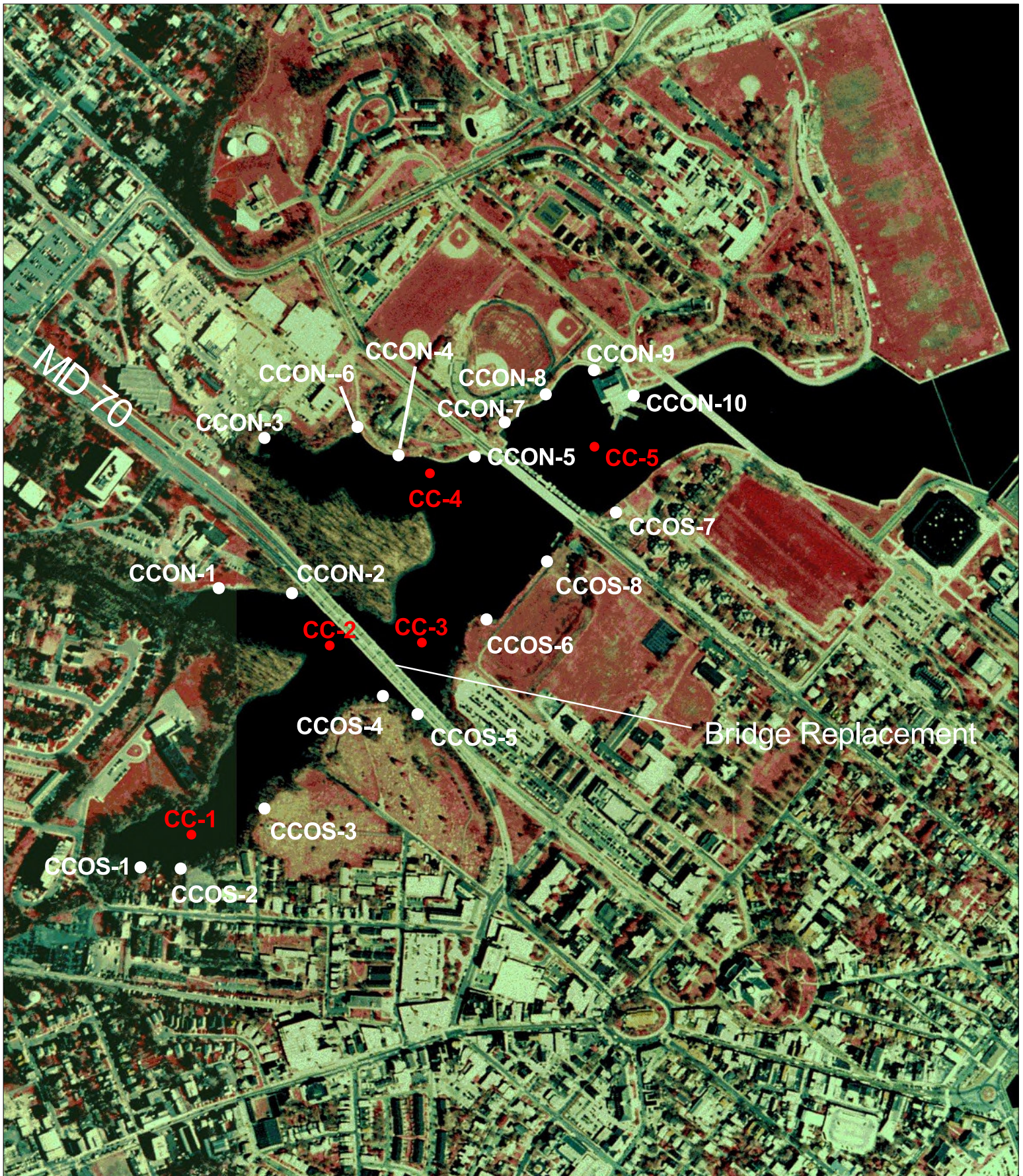


Figure 3: College Creek Sampling and Outfall Locations
MD 70 Bridge Replacement/Rehabilitation Project
Anne Arundel County, MD
Final Water Quality Monitoring Report
Post-Construction Phase, Year Three



Legend

- CC-1 ● Sampling Locations
- CCOS-1 ○ Outfall Locations

Figure 4: Weems Creek Surface Water Temperature (F)

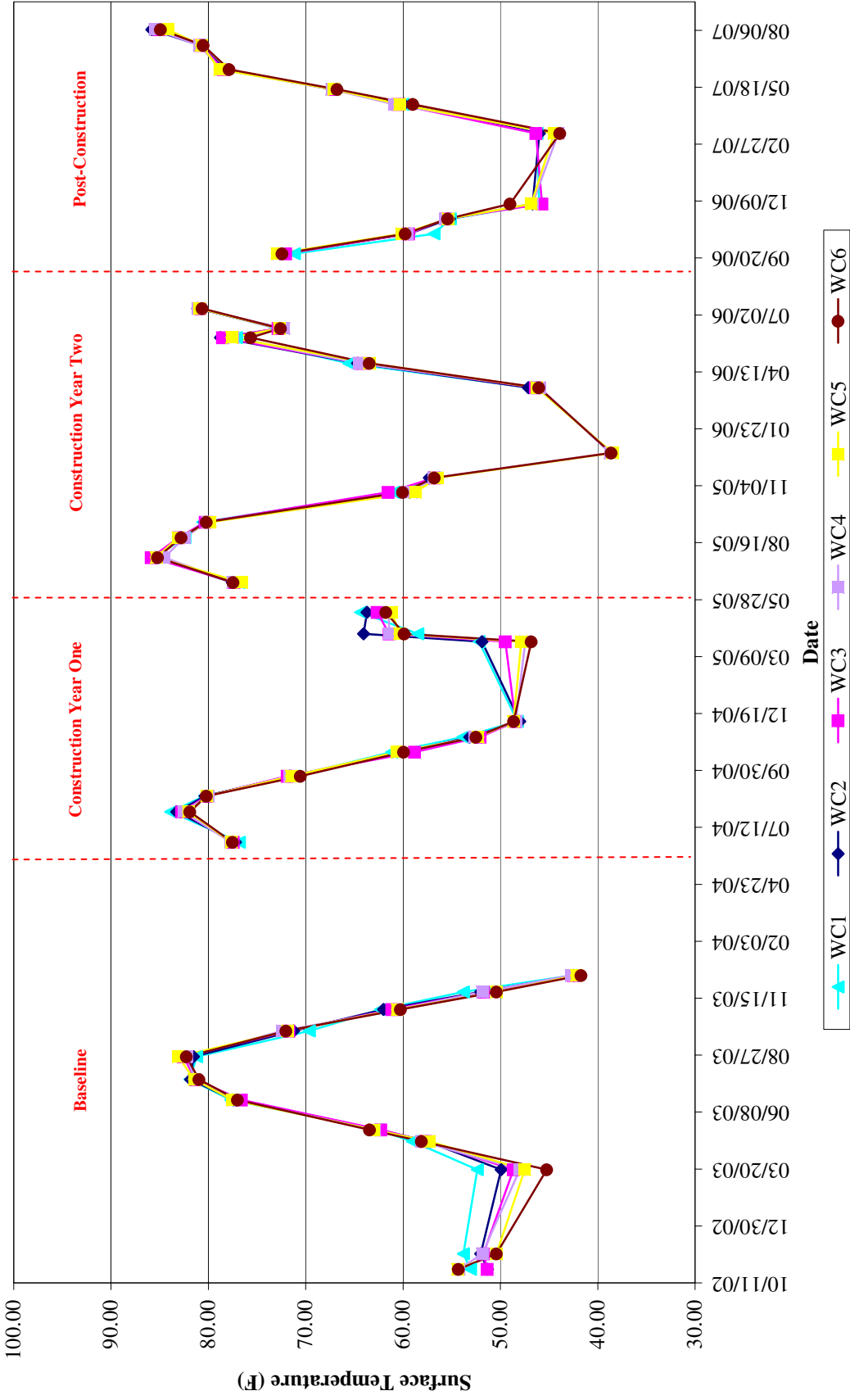


Figure 5: Weems Creek Surface Total Dissolved Solids (g/L)
(October 30, 2002 - August 7, 2007)
Weems and College Creeks Final Water Quality Monitoring Report

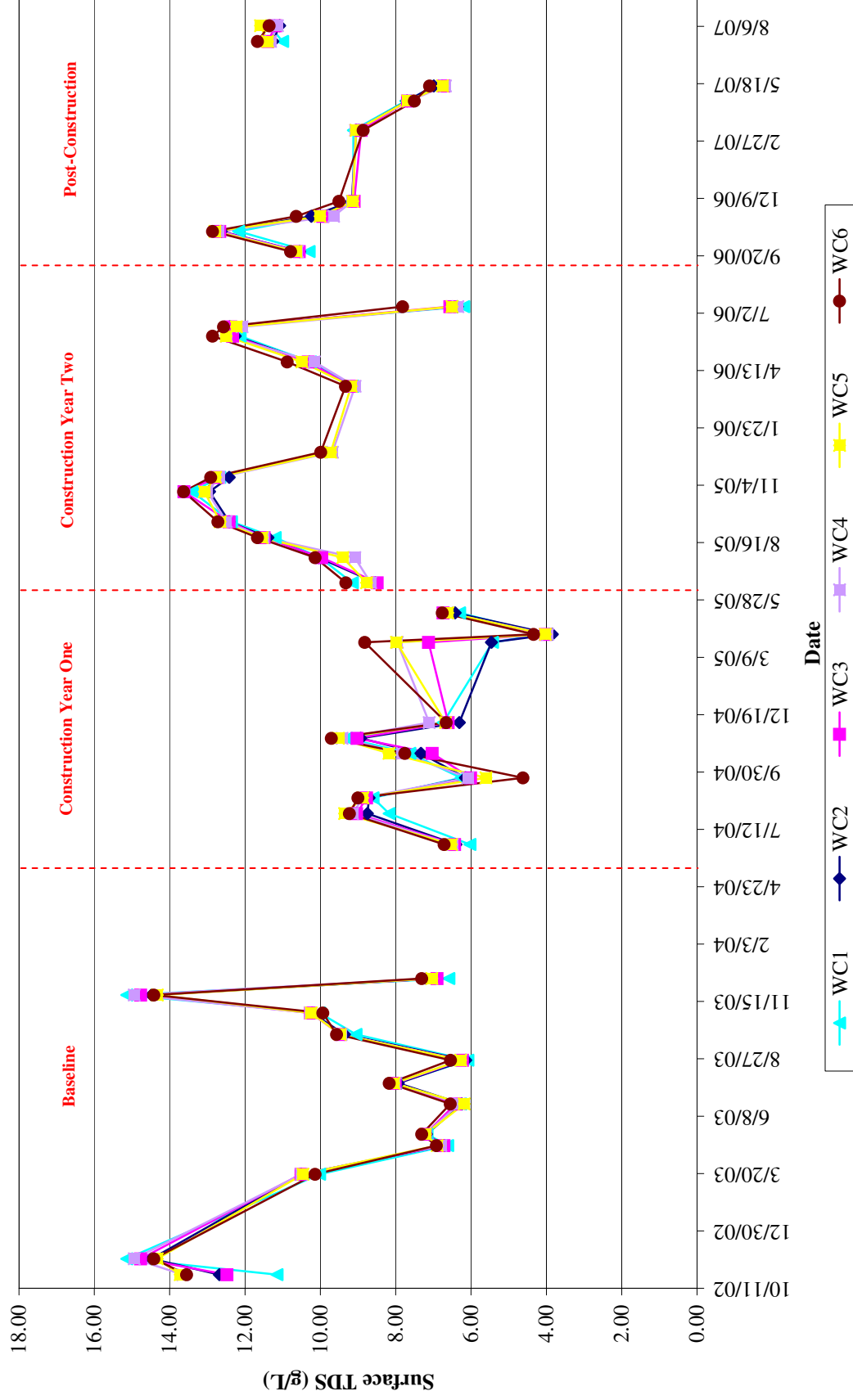


Figure 6: Weems Creek Surface Salinity (ppt)
(October 30, 2002 - August 7, 2007)
Weems and College Creeks Final Water Quality Monitoring Report

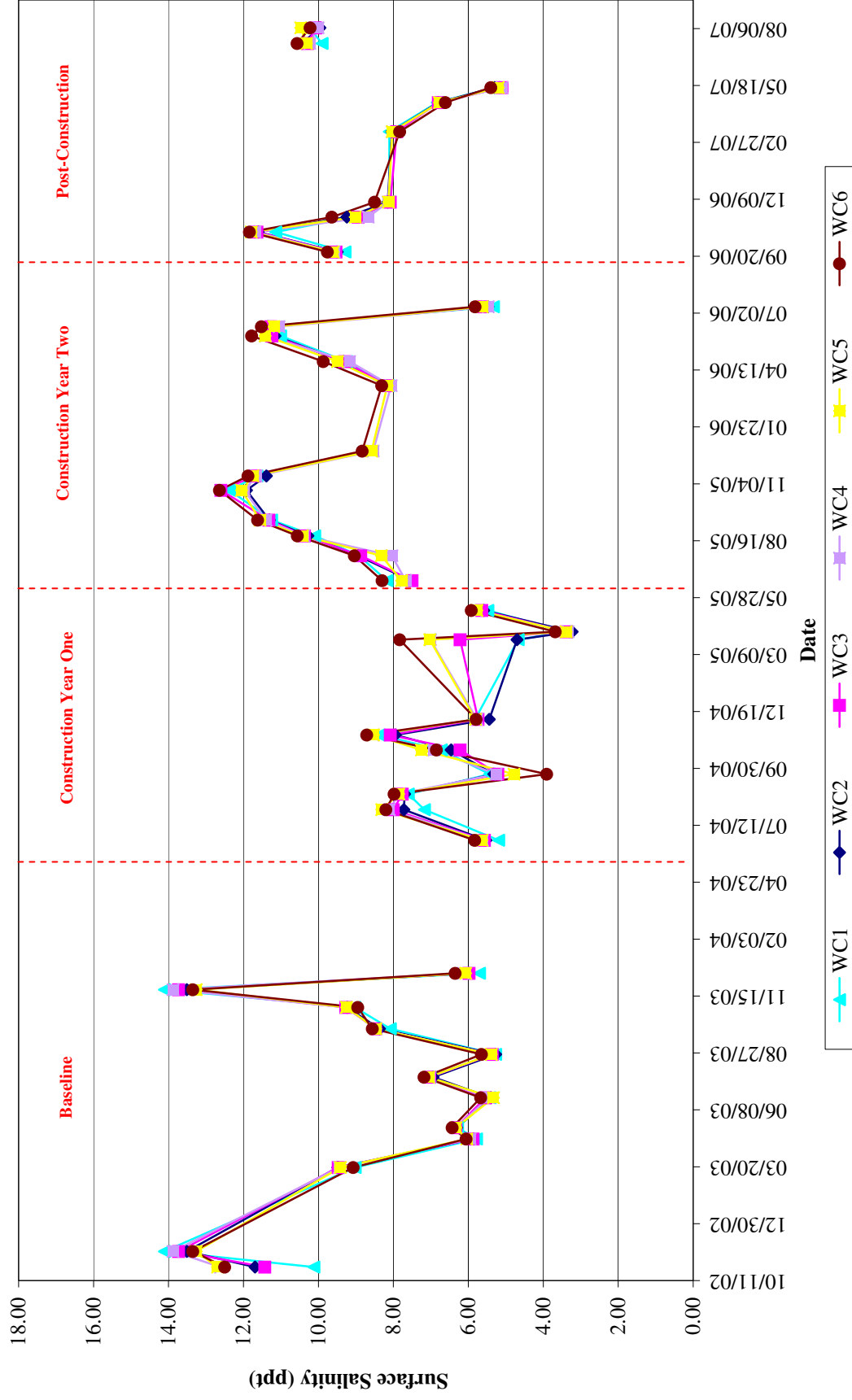
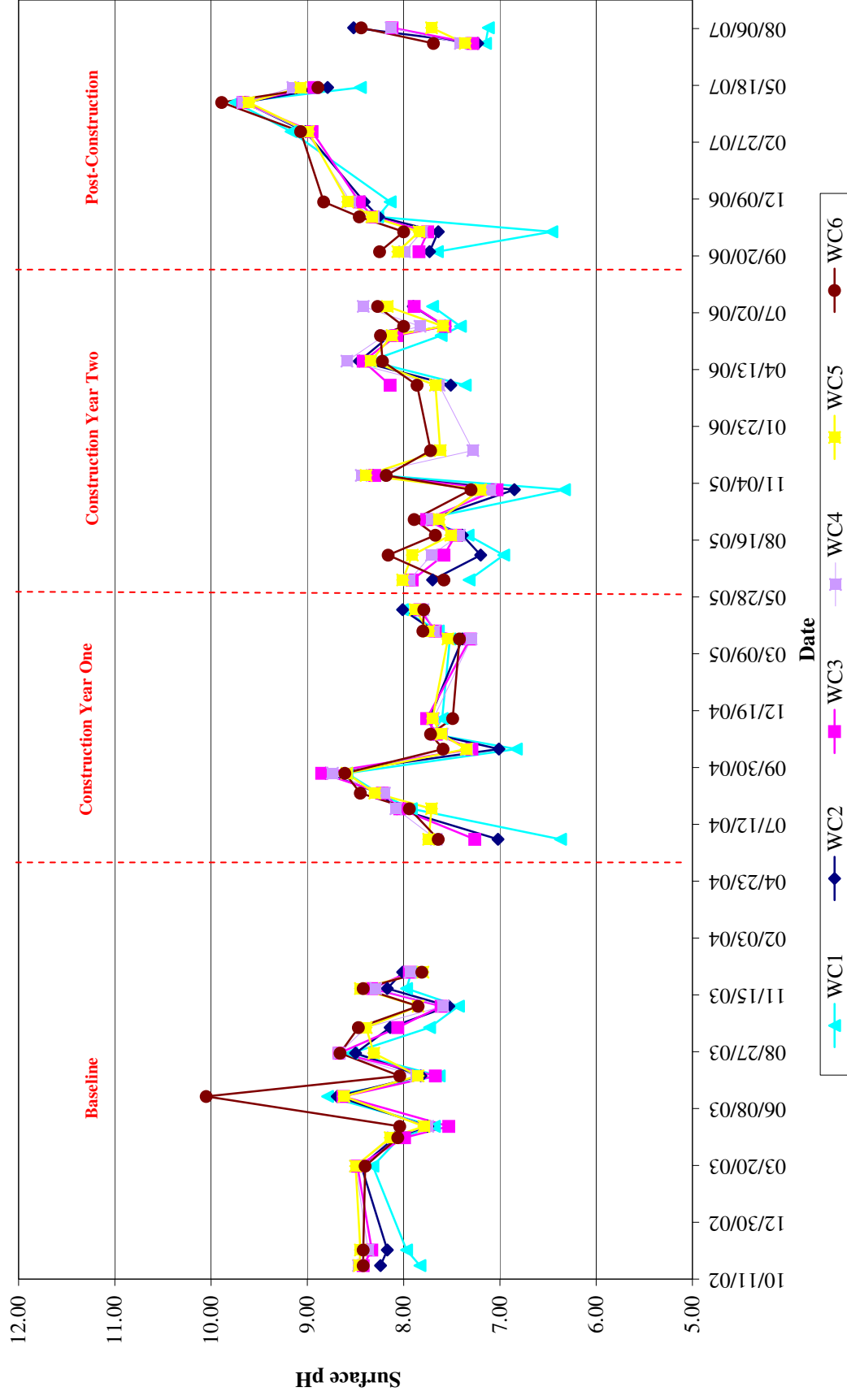


Figure 7: Weems Creek Surface pH
(October 30, 2002 - August 7, 2007)
Weems and College Creeks Final Water Quality Monitoring Report



Weems and College Creeks Final Water Quality Monitoring Report

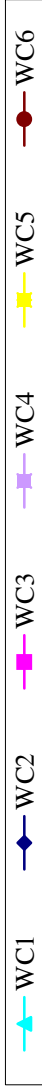


Figure 9: Weems Creek Secchi Depth (m)
(October 30, 2002 - August 7, 2007)
Weems and College Creeks Final Water Quality Monitoring Report

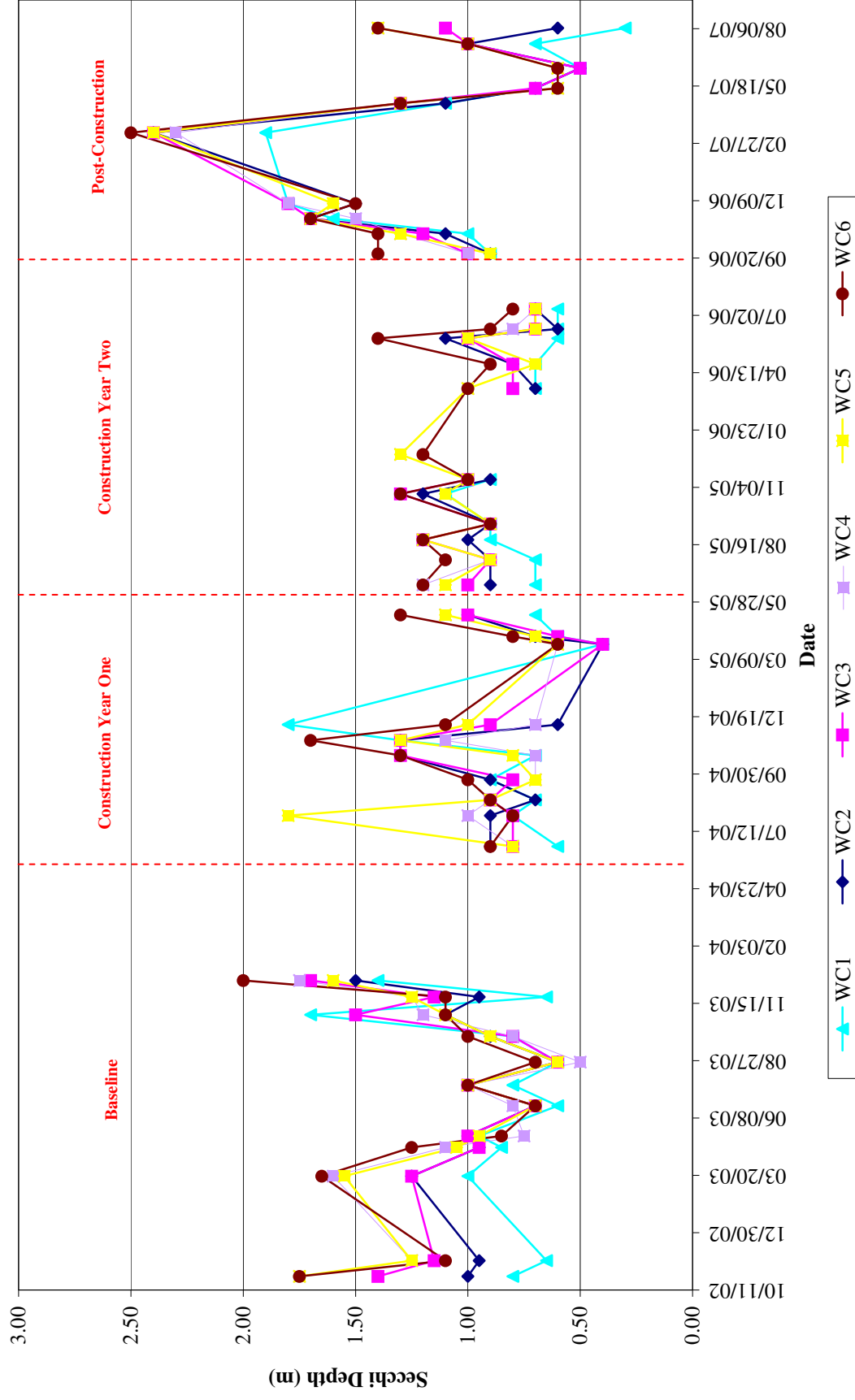


Figure 10: College Creek Surface Water Temperature (F)
(October 30, 2002 - August 7, 2007)
Weems and College Creeks Final Water Quality Monitoring Report

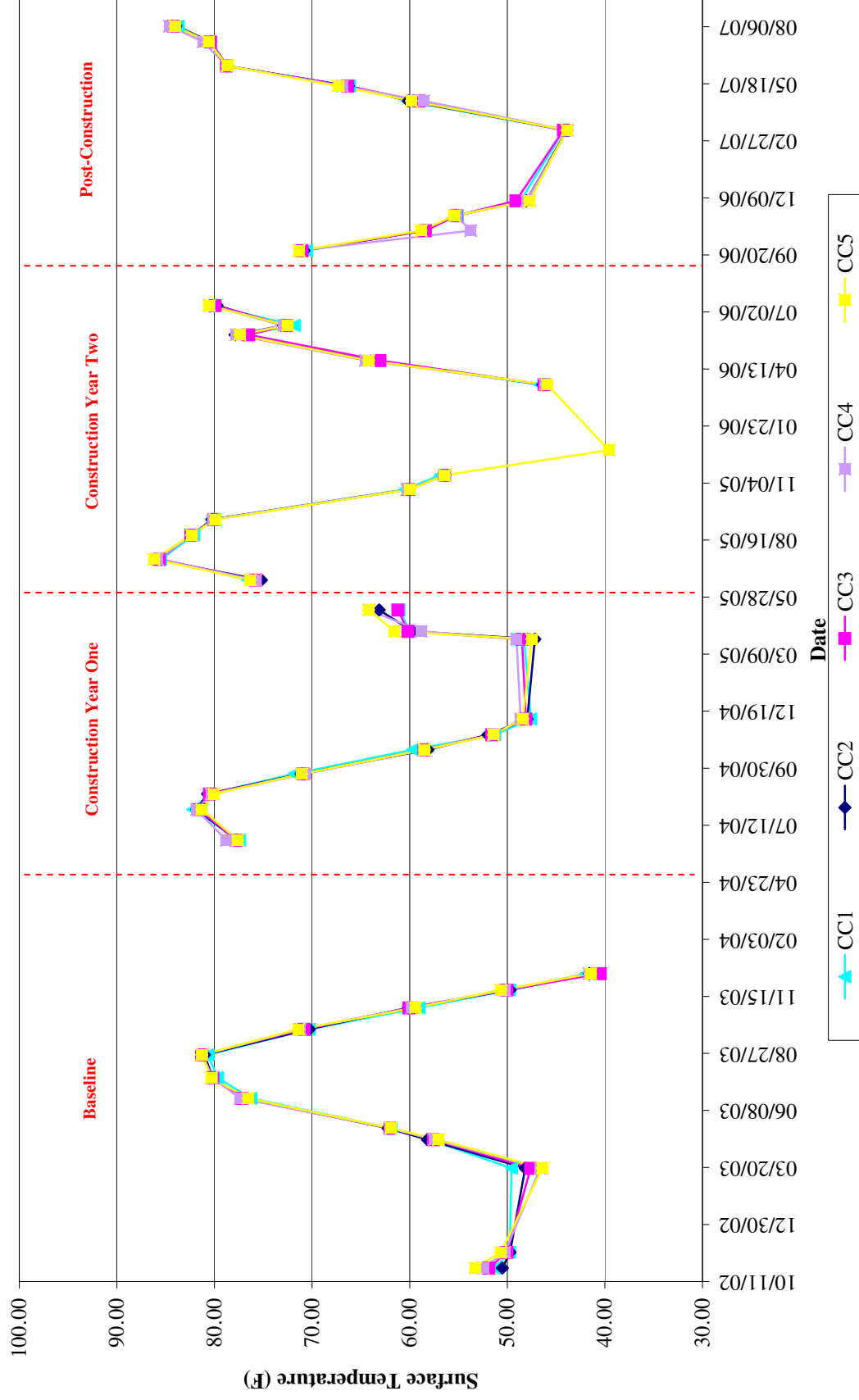


Figure 11: College Creek Surface Total Dissolved Solids (g/L)
(October 30, 2002 - August 7, 2007)
Weems and College Creeks Final Water Quality Monitoring Report

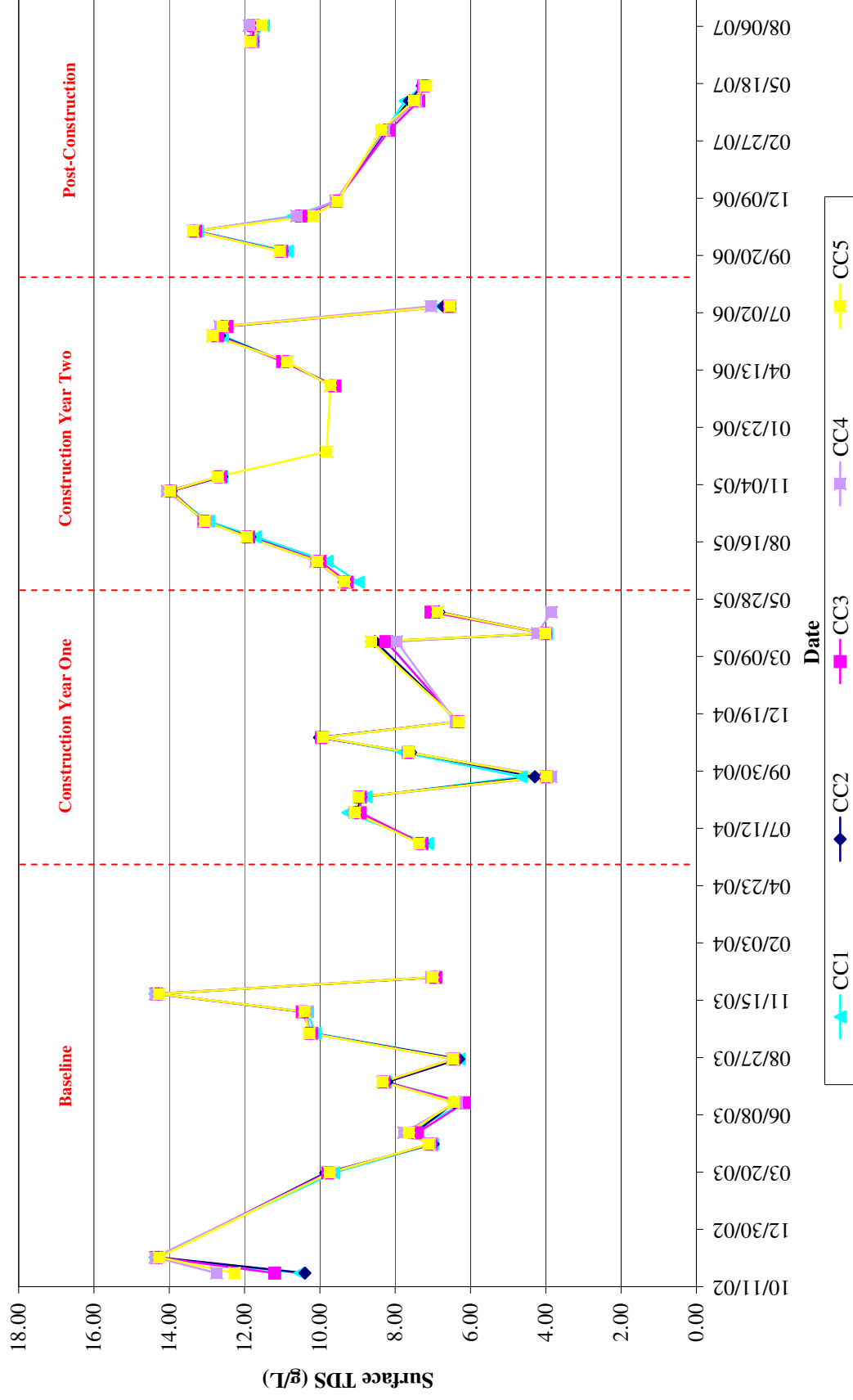


Figure 12: College Creek Surface Salinity (ppt)
(October 30, 2002 - August 7, 2007)
Weems and College Creeks Final Water Quality Monitoring Report

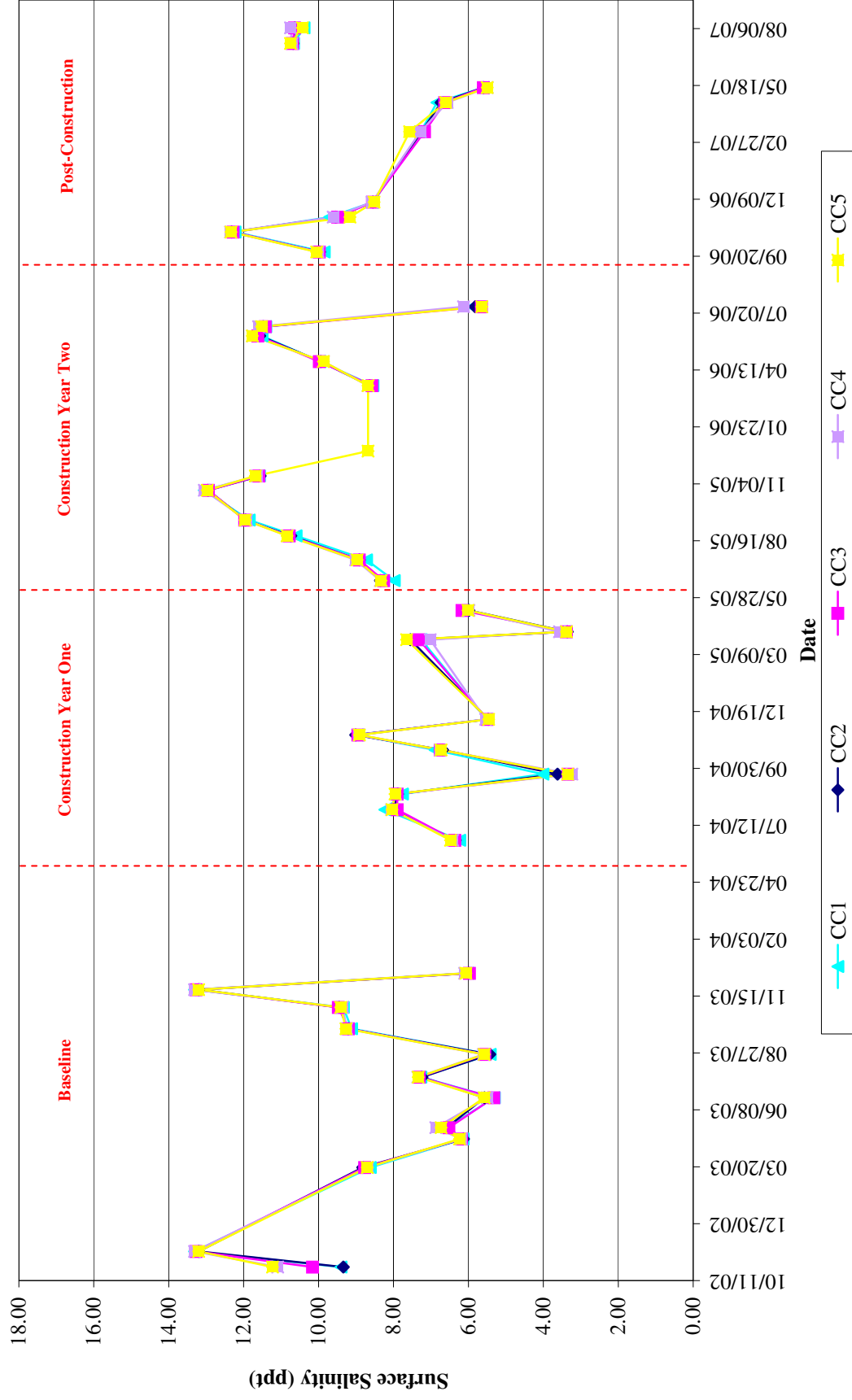


Figure 13: College Creek Surface pH
(October 30, 2002 - August 7, 2007)
Weems and College Creeks Final Water Quality Monitoring Report

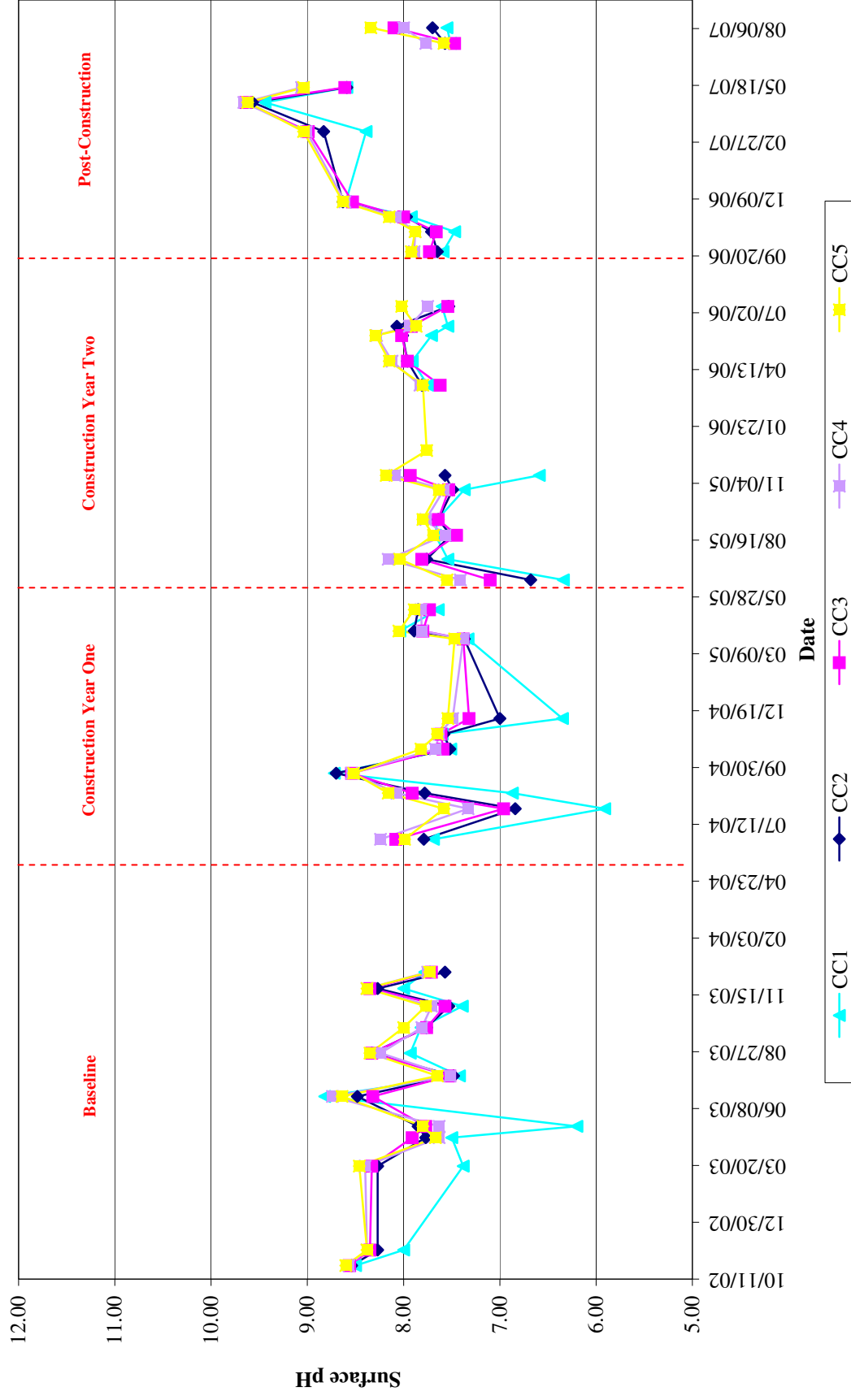


Figure 14: College Creek Bottom Dissolved Oxygen (mg/L)
(October 30, 2002 - August 7, 2007)
Weems and College Creeks Final Water Quality Monitoring Report

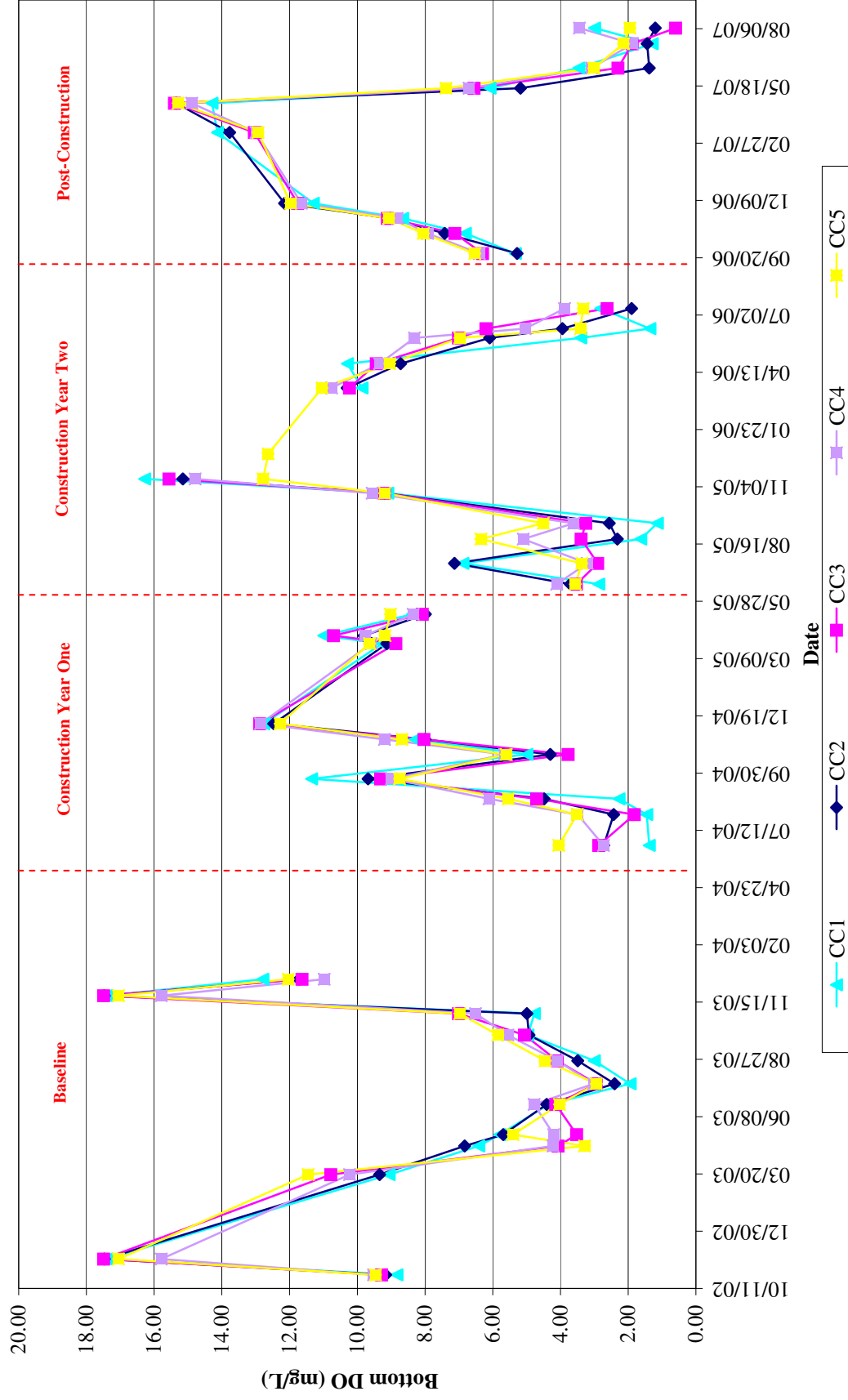


Figure 15: College Creek Secchi Depth (m)
(October 30, 2002 - August 7, 2007)
Weems and College Creeks Final Water Quality Monitoring Report

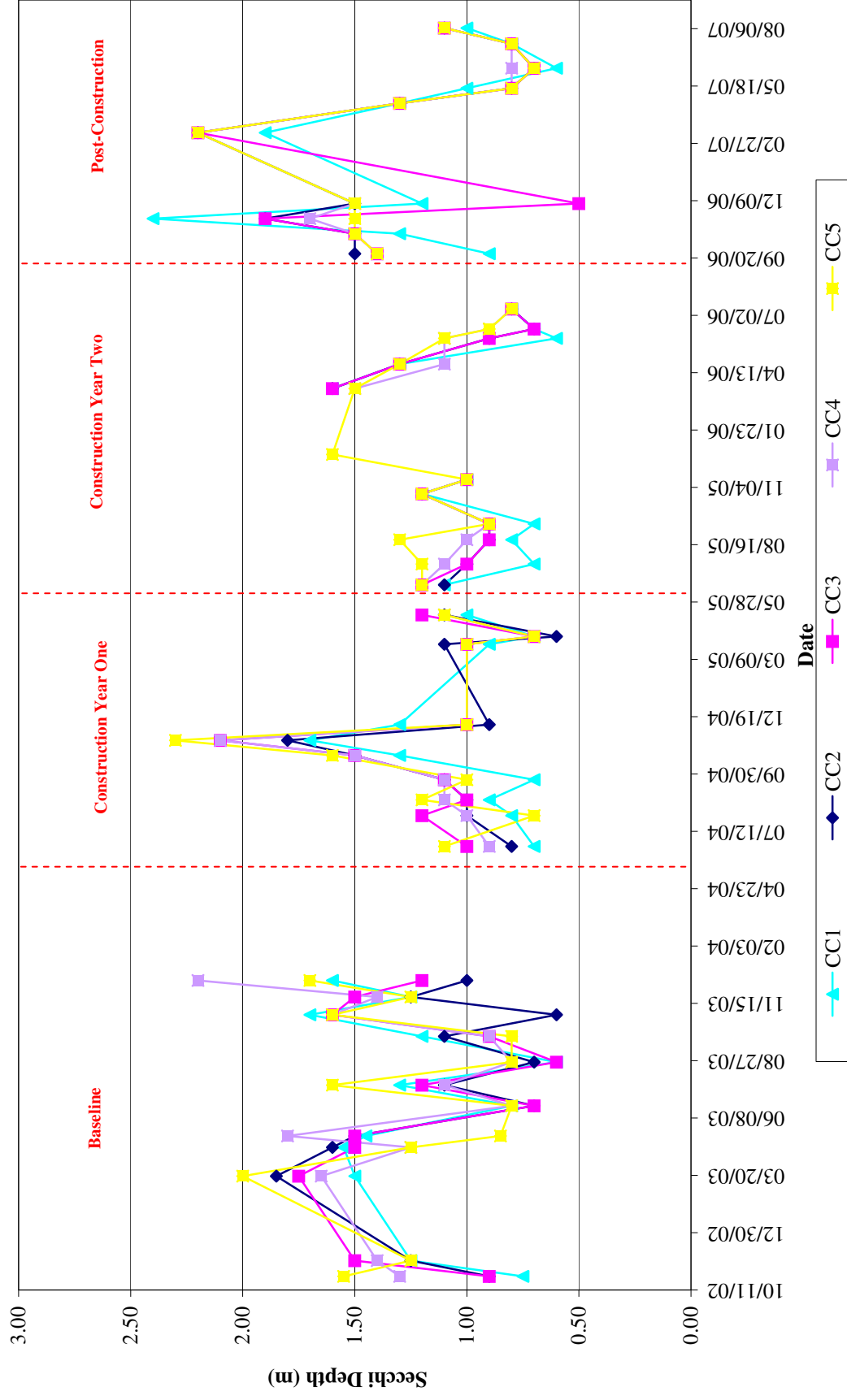


Figure 16: Weems Creek and College Creek Surface Total Turbidity (NTU)
(October 30, 2002 - July 11, 2006)
Weems and College Creeks Final Water Quality Monitoring Report

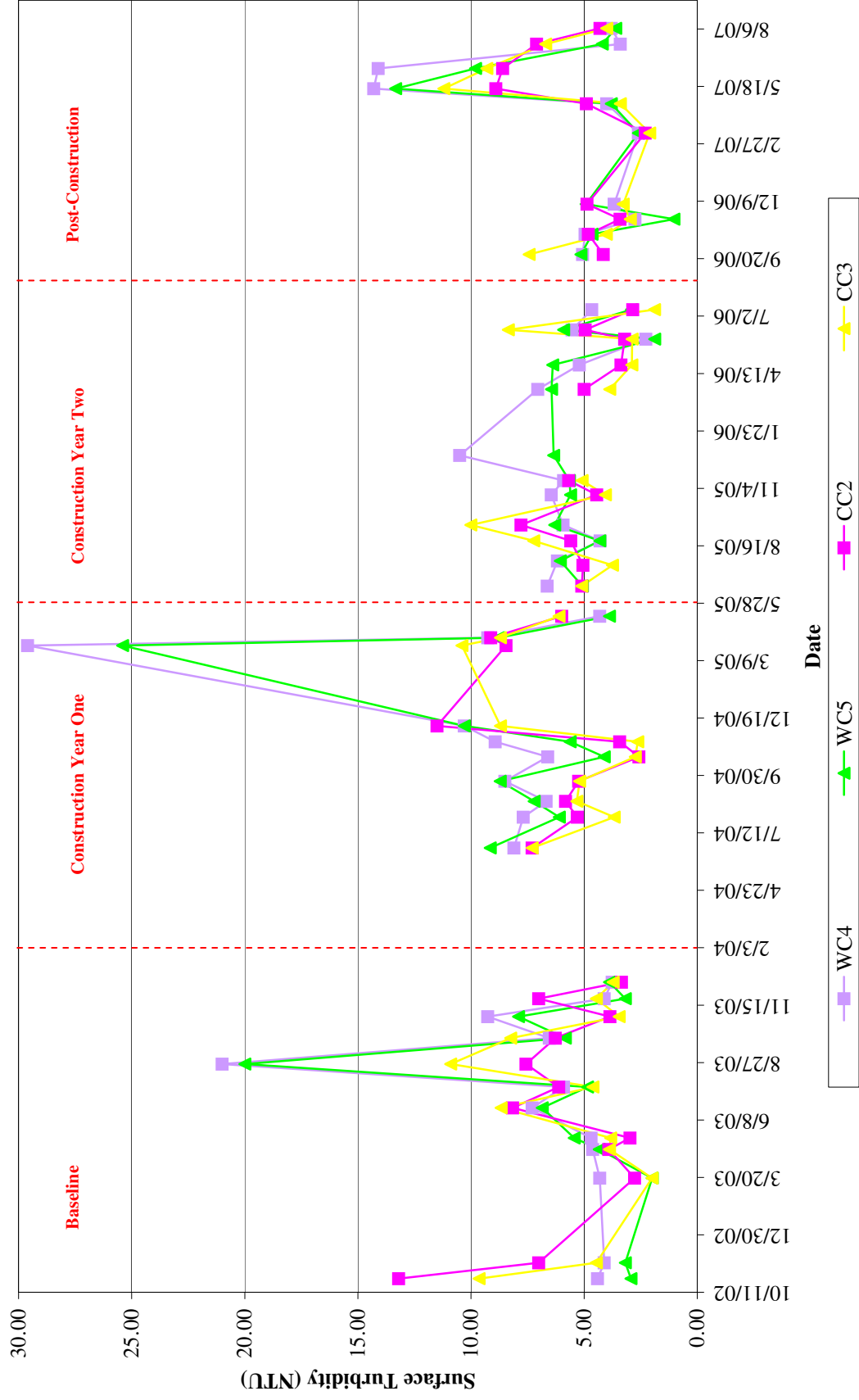


Figure 17: Weems Creek and College Creek Surface Total Suspended Solids (mg/L)
(October 30, 2002 - August 7, 2007)
Weems and College Creeks Final Water Quality Monitoring Report

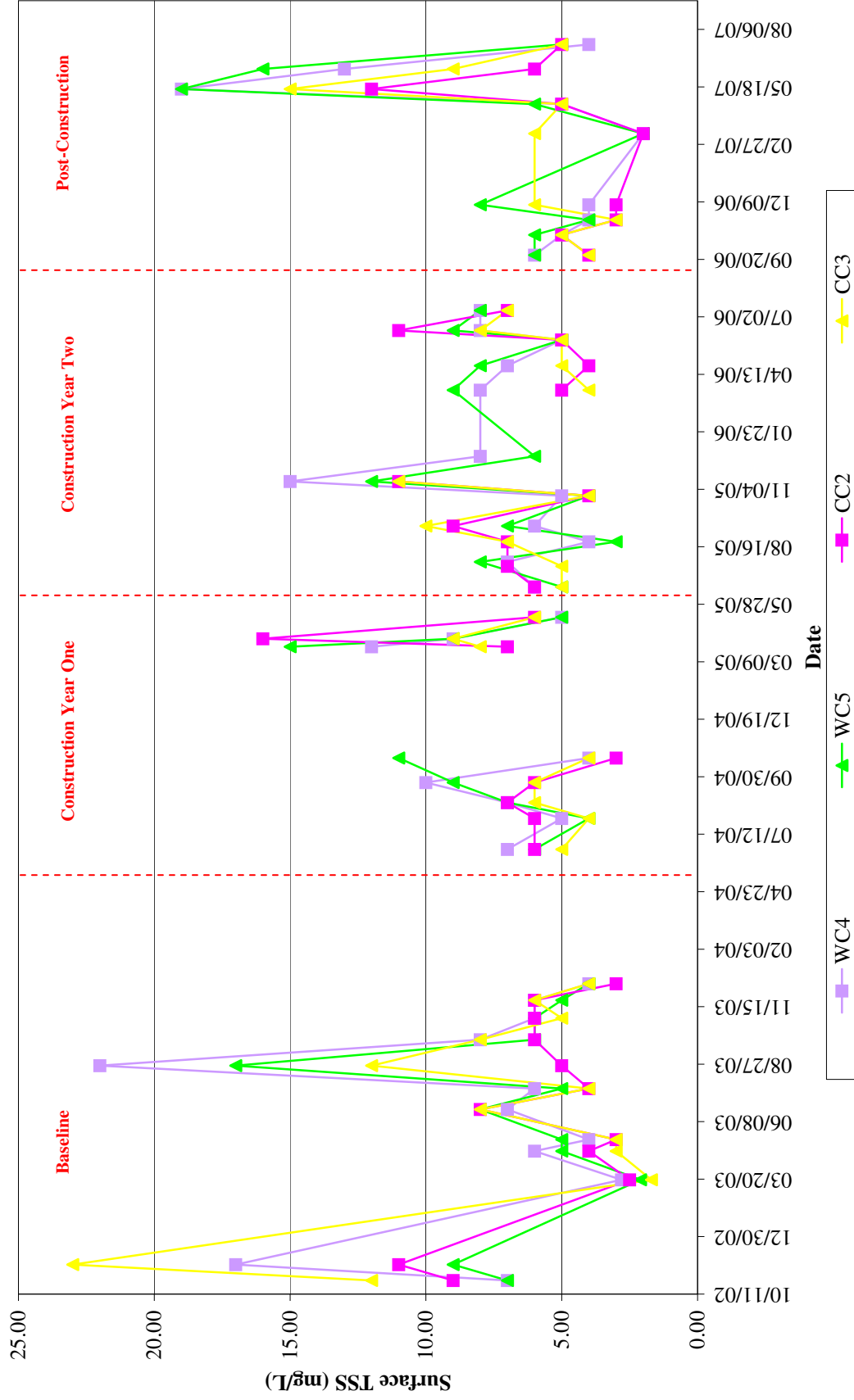


Figure 18: Weems Creek and College Creek Surface Total Nitrogen (mg/L)
(October 30, 2002 - August 7, 2007)
Weems and College Creeks Final Water Quality Monitoring Report

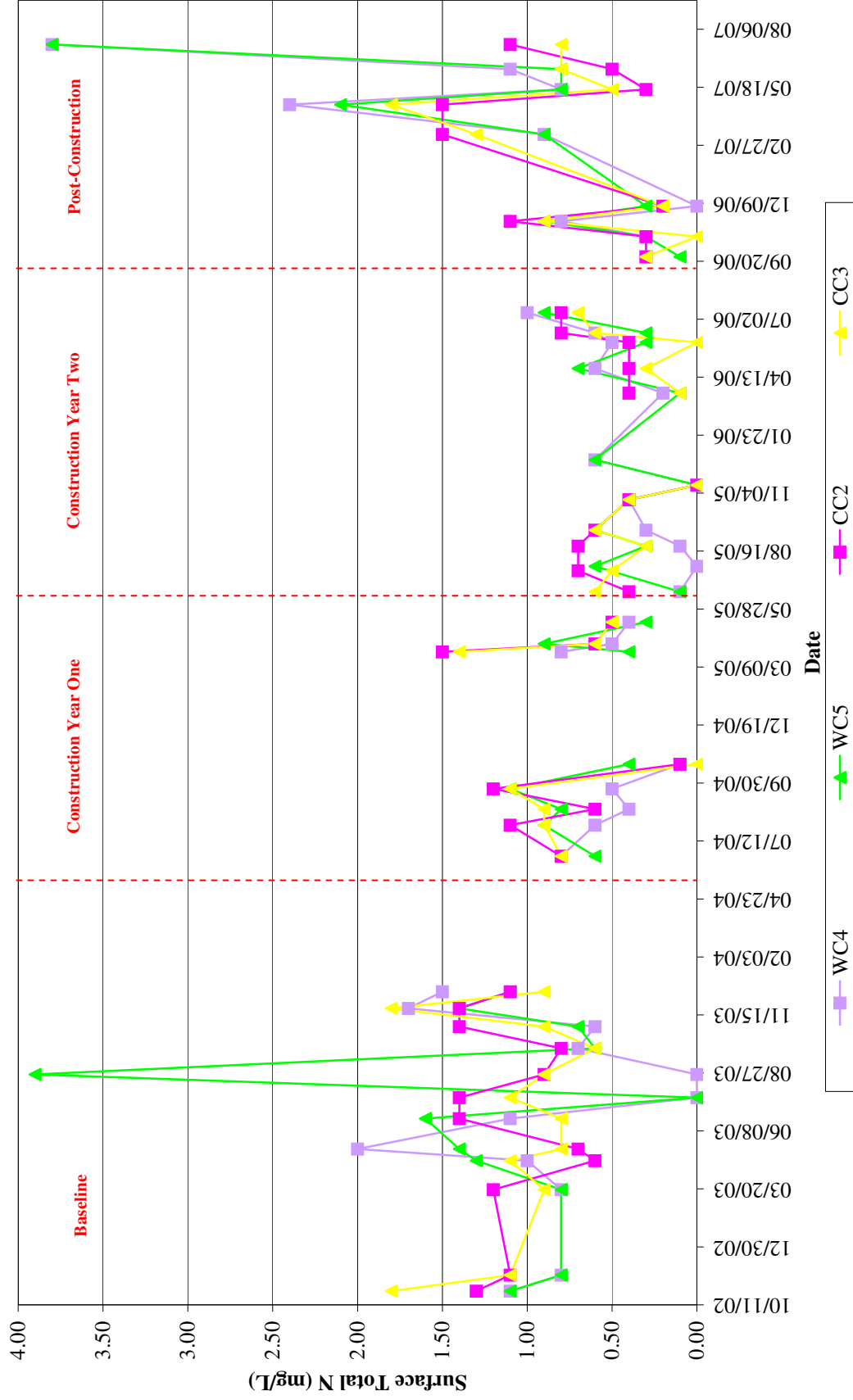
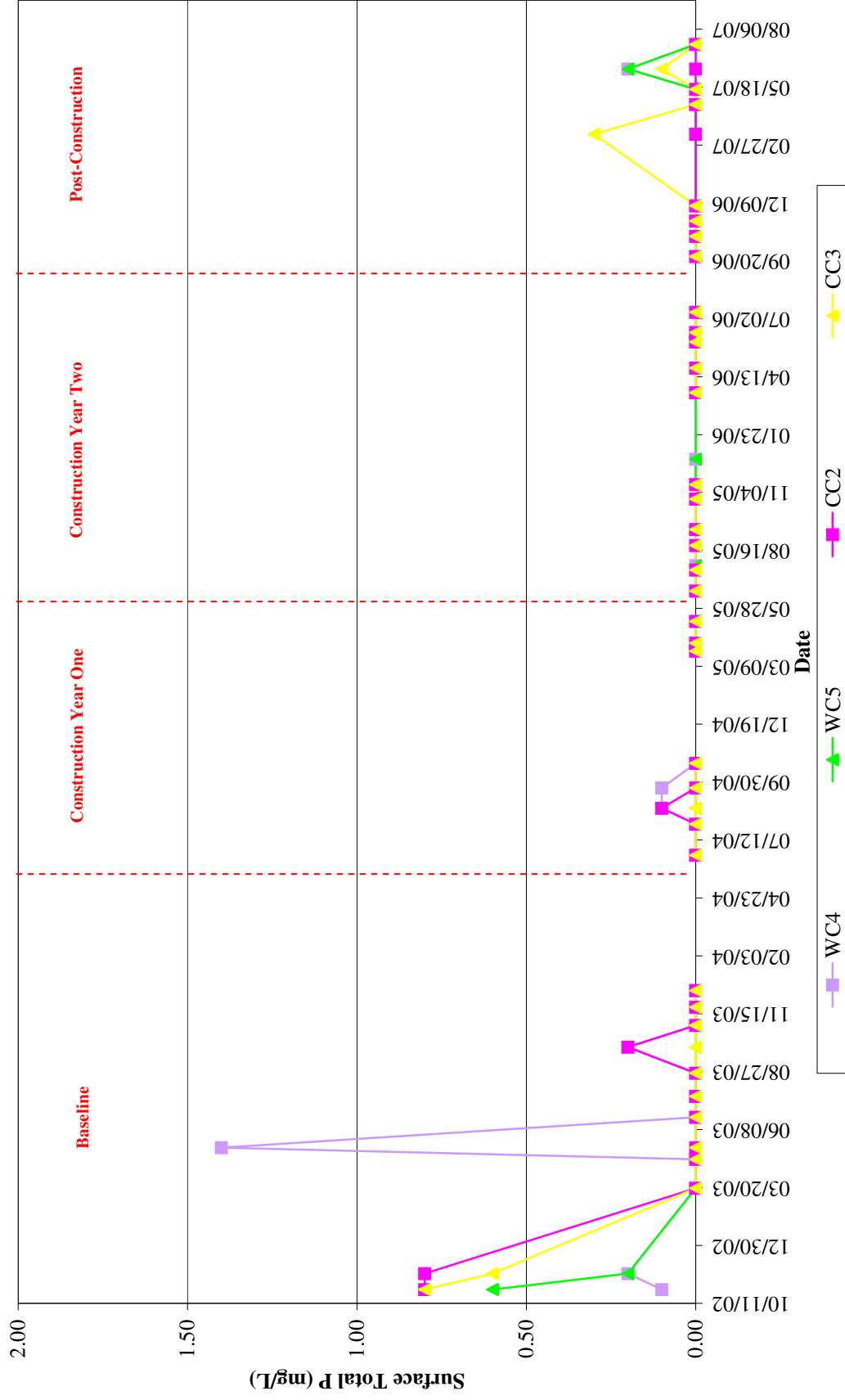


Figure 19: Weems Creek and College Creek Surface Total Phosphorus (mg/L)
(October 30, 2002 - August 7, 2007)
Weems and College Creeks Final Water Quality Monitoring Report



APPENDIX A

Photograph Log

Weems Creek Monitoring Stations



WC1 Facing West



WC2 Facing West



WC1 Facing East



WC2 Facing East

Weems Creek Monitoring Stations



WC3 Facing West



WC4 Facing West



WC3 Facing East



WC4 Facing East

Weems Creek Monitoring Stations



WC5 Facing West



WC6 Facing West



WC5 Facing East



WC6 Facing East

College Creek Monitoring Stations



CC1 Facing West



CC2 Facing West

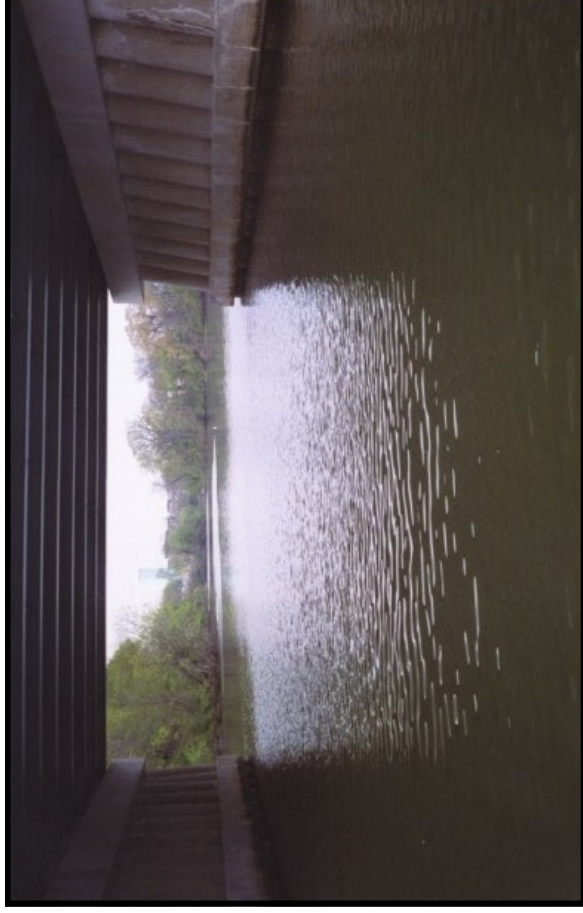


CC1 Facing East



CC2 Facing East

College Creek Monitoring Stations



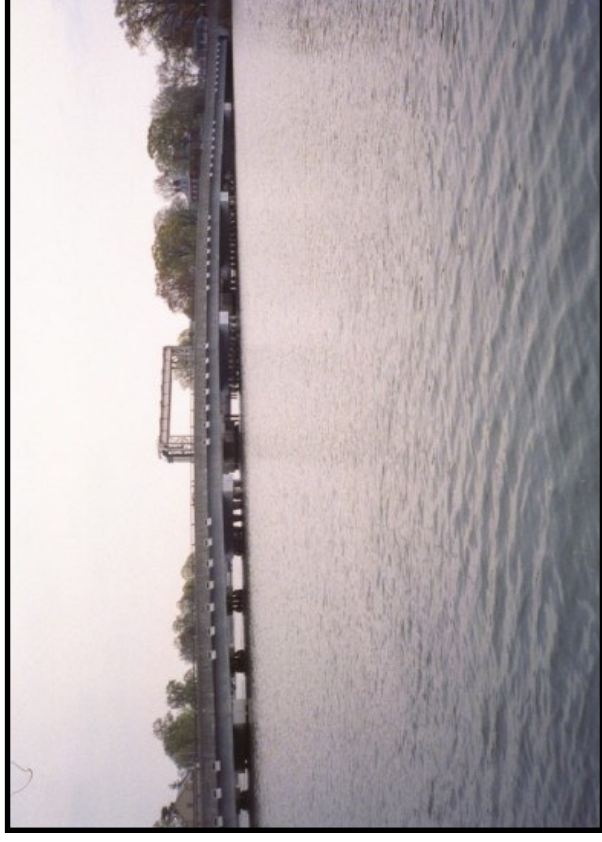
CC3 Facing West



CC4 Facing West



CC3 Facing East



CC4 Facing East

College Creek Monitoring Stations



CC5 Facing West



CC5 Facing East