Appendix A
Statement of Finding (SOF)

Statement of Findings for Executive Order 11988 (Floodplain Management) and Executive Order 11990 (Wetland Protection)

Shakerag WRF Discharge Right–of-Way Request Forsyth County, Georgia

Environmental Assessment (PEPC Project # 23722)
Chattahoochee River National Recreation Area

Recommended: _____
Superintendent, CRNRA Date

Certified for Technical Adequacy and Service-wide Consistency:

_____
Chief, Water Resources Division Date

Concurred: _____
Southeast Regional Safety Officer Date

Approved: _____
Director, Southeast Region Date

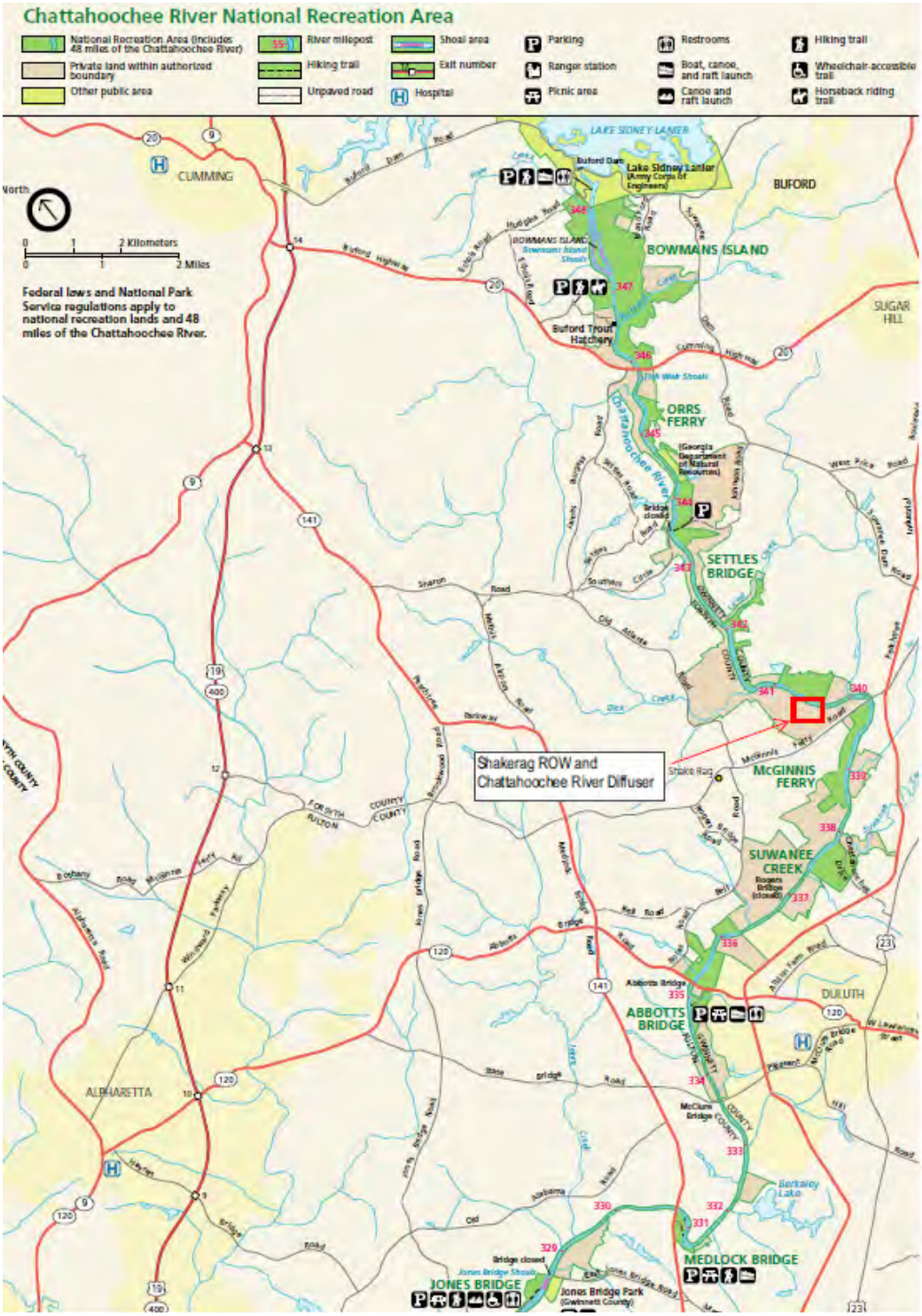
Introduction

Congress established the Chattahoochee River National Recreation Area (CRNRA) in 1978, and determined that the "natural, scenic, recreation, historic, and other values of a forty-eight-mile segment of the Chattahoochee River and certain adjoining lands in the State of Georgia from Buford Dam downstream to Peachtree Creek are of special national significance, and that such values should be preserved and protected from developments and uses which would substantially impair or destroy them." The park boundaries currently include 10,000 acres of land situated in a narrow corridor along the Chattahoochee River. (NPS, 2008)

While the Proposed Action would not cross terrain owned by the NPS, the NPS claims jurisdiction over activities within the Chattahoochee River per Title 16, Chapter 1, Section 460 ii, which defines the CRNRA as "the river and its bed together with the lands, waters and interests therein." In response to the request for a ROW permit under Title 36, Chapter 1, Part 14, the NPS notified Forsyth County Water and Sewer Department (FCWSD) that they would need to prepare an environmental assessment (EA) as part of their request for a right-of-way (ROW) within the CRNRA, between river miles 340 and 341, for the establishment of a discharge diffuser in the Chattahoochee River, see Figure 1. The only component of the proposed action to directly impact the CRNRA is the underground outfall diffuser pipe system located in the bank and bed of the Chattahoochee River just north of McGinnis Ferry Bridge in Forsyth County. The Shakerag WRF would be constructed well outside of the river buffer and would not affect any wetlands or floodplains. The location and components of the Proposed Action are illustrated in Attachment 1 and described in Section 1.3.

Pursuant to Executive Orders 11988 (Floodplain Management) and 11990 (Wetland Protection) and the National Park Service (NPS) Director's Orders #77-1 and #77-2, NPS has evaluated the impacts of the proposed action to floodplains and wetlands. This statement of findings (SOF) augments the EA by documenting full compliance with these NPS floodplain management and wetland protection procedures. It outlines the steps taken to first avoid wetlands and then minimize unavoidable impacts per DO #77-1. Since the adverse impact on wetlands (direct plus indirect impacts) from the entire project totals less than 0.1 acres and isolated within a single, highly localized area, Forsyth County is requesting that wetland compensation requirements be waived.

FIGURE 1
Location of Proposed Action within the CRNRA
Shakerag WRF Discharge Right–of-Way Request Forsyth County, Georgia [Wetland / Floodplain SOF]



1.1 Purpose and Need for the Proposed Action

As described further in Section 1.0 of the EA, the purpose of the Proposed Action is the establishment of a right-of-way (ROW) to authorize a special park use within the CRNRA for the installation and operation of a discharge diffuser in the Chattahoochee River between river miles 340 and 341 that would eventually discharge up to 6.0 million gallons per day (mgd). The diffuser would receive reclaimed water from the proposed FCWSD Shakerag Water Reclamation Facility (WRF) and existing Fowler WRF.

Forsyth County is a rapidly growing area located along GA 400 approximately 40 miles northeast of downtown Atlanta. Wastewater treatment in the areas served by FCWSD currently occurs through a combination of individual septic systems, publicly owned facilities, and contracted capacity in the City of Cumming, Fulton County, and small private treatment plants. The Forsyth County government desires to construct state-of-the-art treatment and distribution systems for the beneficial reuse of wastewater. These objectives and the FCWSD's projected wastewater needs are further described in the planning documents referenced in Section 1.3.1. The County currently operates the Fowler WRF membrane bioreactor (MBR) plant in the Big Creek drainage sub-basin which is permitted to treat to urban reuse standards as established by the GA EPD.

An 11-mile reuse force main (FM) extends through the southern part of the county, beginning at the Fowler WRF and terminating at the Threatt LAS. The buried drip system at the Threatt LAS is permitted to apply 1.25 mgd to open pasture, where hay is cultivated. Plans are underway to provide reuse water to major outdoor water users, offsetting potable water use and reducing additional withdrawal needs. The ROW permit would support Forsyth County's effort to expand its beneficial reuse system through construction of a new advanced treatment WRF (Shakerag WRF), that would produce a high-quality effluent using MBR technology, and the discharge of up to 6.0 mgd to the Chattahoochee River. This treatment technology meets the intent of Georgia's Antidegradation Rule (391-3-6-03(2)) by protecting existing instream water uses and water quality via the "highest statutory and regulatory requirements for all new and existing point sources ...." FCWSD has received a year-round wasteload allocation (WLA) from the Georgia Environmental Protection Division (GA EPD) for the proposed discharge (GA EPD #23-123) and is in the process of obtaining a National Pollutant Discharge Elimination System (NPDES) permit.

1.2 Description of Alternatives

Six alternatives to the Proposed Action were considered and are summarized in Table 1 along with a description of why they would not meet the project needs. These alternatives were identified during the wastewater planning process for the Shakerag WRF and were evaluated in the Environmental Information Document (EID) (CH2M HILL, 2005), which is required by GA EPD as part of the wastewater National Pollutant Discharge Elimination System (NPDES) permitting process.

TABLE 1
Description of Alternatives Considered
Shakerag WRF Discharge Right–of-Way Request Forsyth County, Georgia [Wetland / Floodplain SOF]

Alternative	Description
A – No Action	The No-Action Alternative would not meet the project needs, because it would not allow for FCWSD capacity expansion and beneficial reuse of reclaimed water. This alternative would have no direct or indirect adverse impacts on wetlands.
B - Land Application System (LAS)	Alternative B would not meet the project needs because there is not enough suitable property for creation or expansion of a LAS with adequate capacity to accommodate the discharge from the Shakerag WRF. This alternative would likely have both direct and indirect adverse impacts on wetlands.
C - Blended Reuse	Alternative C would not meet the project needs, because it is not economically feasible and would have high environmental impacts. This alternative would likely have indirect adverse impacts on wetlands.
D - Direct Reuse	Alternative D would not meet the project needs because of the high cost of implementation and the lack of a regulatory framework. This alternative would likely have indirect adverse impacts on wetlands.
E - Surface Water Discharge to Big Creek	Alternative E would not meet the project needs, because the WLA for Big Creek has already been completely allotted and any new discharge would further deteriorate water quality and would not be permitted. This alternative would likely have both direct and indirect adverse impacts on wetlands.
F – Surface Water Discharge to Etowah River Basin	Alternative F would not meet the project needs, because it would increase Inter-Basin Transfer (IBT) and would require costly infrastructure that is not economically feasible.
G (Proposed Action) – Surface Water Discharge to the Chattahoochee River	Alternative G would meet the project needs, because it would increase FCWSD capacity and make a beneficial reuse of reclaimed water while reducing IBT. The highly localized minor impacts to wetlands from the Proposed Action are discussed in Section 1.3.

1.3 Proposed Action

The components of the proposed diffuser are described in detail in the Shakerag WRF and Chattahoochee River Diffuser Design Development Report (CH2M HILL, 2005a) and are illustrated in the Design Drawings provided in Attachment 3. Attachment 3 provides the overall site plan, side plan view and other design drawings of the project components. The side plan view provides a cross section of the Chattahoochee River at the diffuser location to illustrate river depth under low flow conditions, 650 cubic feet per second (cfs), and how the diffuser ports would relate to the river bottom. The following facilities are proposed to be constructed and operated by FCWSD within the proposed ROW:

- An approximately 100-foot by 10-foot open trench would be cut excavated in the river bottom at the diffuser site.
- A total of 100 feet of 36–inch-diameter High Density Polyethylene (HDPE) pipe would be installed.
- The diffuser would occupy the last 77.5 feet of pipe with 10 ports (6-inch diameter) located at a spacing of 7.5 feet center to center.
- A 56-inch by 56-inch box of concrete would encase the entire length of 36-inch HDPE pipe, anchoring it and protecting it. This anchor would be constructed of concrete, rebar, and epoxy grout and would rest within a 4-foot deep trench drilled into the bedrock.
- After the diffuser is secured to the bedrock, it would be covered with 40 cubic yards of granular fill. The diffuser ports would protrude approximately 6 inches from the river bed over a footprint of approximate 800 sf / 0.018 acres.

Construction will be facilitated by the installation of a temporary coffer dam along the eastern bank of the river.

Floodplains

Review of Flood Insurance Rate Map community-panel number 13117C0265E (Attachment 2), produced by the Federal Emergency Management Agency (FEMA), indicates that the proposed action location is within Zone X and Floodway Areas in Zone AE. Zone X is defined by FEMA as an area where the flood hazard is yet to be determined outside the 0.2 percent annual chance floodplain. Floodway Areas in Zone AE are defined by FEMA as the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1 percent annual chance flood can be carried without substantial increases in flood height.

The proposed action location would be within the 100-year floodplain of the Chattahoochee River. A “100-year floodplain” or “100-year flood” describes an area or event subject to a 1 percent probability of a certain size flood occurring in any given year. The 100-year floodplain for the Chattahoochee River at this location begins at an elevation of 911.0 ft above mean sea level (msl) at McGinnis Ferry Road and rises to 912.0 ft msl approximately 4,000 ft upriver and continues at 912.0 ft msl beyond the project area. All above-ground construction for the WRF would occur at or above elevation 960 ft msl, which is well outside the 100-year and 500-year floodplains for the Chattahoochee River at this site. Therefore, no impacts to floodplains would occur from above-ground features.

Construction of the reclaimed water pipeline and diffuser would require temporary disturbance within the floodplain. However, the pipeline would be buried and the ground surface returned to the original contours. No impacts to floodplains would result from construction of the pipeline. Once installed, there would be no change in flood elevations, flood conveyance, or flood storage as a result of the project.

Wetlands

Approximately 152 acres of wetlands have been identified via the National Wetlands Inventory (NWI) throughout the CRNRA; see Table 2 (NPS, 2008). Major wetland types found in the CRNRA include: palustrine forested (21.5 acres), palustrine scrub/shrub (10.3 acres), palustrine unconsolidated bottom or shore (7.8 acres), palustrine emergent (6.2), lacustrine (33.4 acres), and riverine (72.7 acres) wetlands (NPS, 2008).

The largest percentages of the CRNRA's wetlands are classified as riverine wetlands, 48 percent (72.7 acres), which includes all wetlands and deepwater habitats contained in natural or artificial channels periodically or continuously containing flowing water or which form a connecting link between two bodies of standing water. The entire 48-mile reach of the Chattahoochee River within the CRNRA is classified as a riverine wetland including the location of the Proposed Action. As noted in Table 2, the Proposed Action is anticipated to adversely impact approximately 1000 sf (0.023 acres) during construction and to result in 800 sf / 0.018 acres of permanent adverse impacts to Riverine wetlands during operation. This is a fraction of a percent of the existing riverine wetlands within the CRNRA.

TABLE 2
CRNRA NWI wetlands as compared to Proposed Action
Shakerag WRF Discharge Right–of-Way Request Forsyth County, Georgia [Wetland / Floodplain SOF]

National Wetland Inventory Type	Acres of Each NWI Type in CRNRA	Proposed Action - Construction	Proposed Action - Operation
Palustrine Forested	21.5		
Palustrine Scrub/Shrub	10.3		
Palustrine Unconsolidated Bottom or Shore	7.8		
Palustrine Emergent	6.2		
Lacustrine	33.4		
Riverine	72.7	1000 sf / 0.023 acres	800 sf / 0.018 acres
Total:	151.9		

Source: USFWS, 2001 and NPS, 2008.

Riverine wetlands provide valuable aquatic habitats for the fish and invertebrates described in the EA and are a source of primary production (aquatic vascular plants). Riverine wetland functions and values include:

- Biotic functions – aquatic habitat for fish and invertebrates and primary production of aquatic vascular plants,
- Hydrologic functions - flood attenuation and stream flow maintenance,
- Cultural values from recreational users, and
- Economic value from fisheries management and tourism along the CRNRA.

While the Proposed Action is anticipated to adversely impact approximately 1000 sf of riverine wetlands during construction and 800 sf of permanent adverse impacts during operation, Table 2 illustrates that this is a fraction of a percent of the total existing riverine wetlands within the CRNRA. Further, there would be no permanent loss of wetland functions as a result of the Proposed Action.

From a biotic standpoint, the river substrate functions as habitat for invertebrates and invertebrates would be expected to recolonize the area once construction was complete. This section of the river does not contain appreciable growth of aquatic macrophytes, but these also would recolonize the area after construction is complete. The water column provides habitat for fish and there would be no change in fish species assemblages expected as a result of the Proposed Action (see description of Aquatic Resources below).

The discharges from the new facility would comply with NPDES permit limits established by the Georgia EPD, the agency responsible for maintaining water quality in the State of Georgia. Because the discharges would be regulated and compliant with established permit limits, any impacts to water quality would be limited to the mixing zone, a short segment of the Chattahoochee River downstream of the diffuser. There would be no reduction in water quality in downstream reaches.

Hydrologic function of this wetland is driven by the externality of releases from Buford Bam, which are controlled by the U.S. Army Corps of Engineers and electrical power generation needs. Implementation of the Proposed Action would not change the ability of the project area or downstream reaches to accommodate variable release volumes from Buford Dam.

Construction associated with the Proposed Action would have short-term moderate impacts on visitors using the river for boating or fishing. High visibility warning signage will be posted upstream of the project site on the river bank and at common access points to ensure visitors are aware of the construction activities. These impacts would be mitigated by the opportunity for users to temporarily relocate their activities to nearby upstream CRNRA locations. Impacts to visitors during operation of the facilities covered by the Proposed Action were assessed under low flow conditions (650 cfs) to fully bracket all potential scenarios. Appendix E of the EA describes the results of this analysis, which are illustrated by a side view of the diffuser location in Attachment 3 of Appendix A. The river depth would be approximately 5.4 ft at the diffuser location, providing a minimum of 4 ft of clearance for boaters (see Attachment 4 bathymetric survey). However, the potential would exist for the riverine pedestrian travel of those fly fishing to interact with the diffuser ports. These potential impacts to visitor use would be

mitigated through the posting and maintenance of highly visible warning signage. As a result, there would be negligible impacts on boaters and minor impacts on those fly fishing.

Other NWI types not impacted by the Proposed Action include lacustrine habitats which make up approximately 22 percent (33.4 acres) of the total wetlands within the CRNRA. Lacustrine wetlands are defined as wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses, or lichens with greater than 30 percent aerial coverage, and (3) total area exceeds 20 acres. Palustrine forested wetlands make up approximately 14 percent (21.5 acres) of the total acreage of wetlands in the CRNRA. Mature hardwood trees that inhabit the floodplains of the Chattahoochee River, tributary streams, and associated sloughs dominate palustrine wetlands. These areas experience variable degrees of flooding, but are flooded frequently enough to qualify as wetlands. The remaining wetland types, palustrine scrub/shrub, palustrine unconsolidated bottom or shore, and palustrine emergent are relatively small and geographically separated from one another. They are commonly associated with beaver ponds or the boundaries of lesser streams and ponds (NPS, 2008).

CH2M HILL conducted wetland delineations on the Threatt property in 1999 and 2007, following U.S. Army Corps of Engineers methods (USACE, 1987). The lead delineator from CH2M HILL was qualified to conduct the wetland delineation as a PhD Wetland Ecologist with a certificate of wetland training from the Institute for Wetland & Environmental Education & Research and with 15 years of experience in wetland delineations. Onsite wetlands were identified and were limited to bed and bank (defined by the ordinary high water level) palustrine forested systems associated with two streams and three ponds on the property (Attachment 1). The boundary of the CRNRA is defined, for the evaluation of wetlands impacts, as the ordinary high water level of the river.

Field inspection confirmed that the Chattahoochee River within the CRNRA conforms to the definition of a riverine wetland under the U.S. Fish and Wildlife Service classification system due to the shallow depth and substrate type at the proposed project location between river miles 340 and 341 (Cowardin, et al., 1979). However, field inspection also indicated that the river is more similar to a free flowing river system than a riverine wetland at this location, as the system lacks vegetation and hydric soils.

No wetlands occur on the Threatt LAS property along the proposed pipeline route. The only wetland that would be impacted by the project is the riverine wetlands defined by the ordinary high water mark of the Chattahoochee River. The river is incised at the proposed discharge location and there are no fringing wetlands above the ordinary high water mark. Figure 2 illustrates the upland area that will be crossed with the proposed pipeline and documents that the existing vegetation is dominated by grasses. The riparian upland adjacent to the river and stream bank is also illustrated in Figure 2. Vegetation in the riparian area is dominated by a shrub layer of river cane and privet with a limited canopy of ironwood, red maple, and small oaks. Within the streambank area the vegetation is limited to a sparse cover of privet and scattered grasses. These photos help to document that no impacts to wetlands outside of the Chattahoochee River would result from construction and operation of the proposed Shakerag WRF and Chattahoochee River diffuser.

FIGURE 2
View of Area of Proposed Action
Shakerag WRF Discharge Right–of-Way Request Forsyth County, Georgia [Wetland / Floodplain SOF]

View Looking East Towards Chattahoochee River

View Looking North (with Chattahoochee River Corridor on right)

FIGURE 2
View of Area of Proposed Action
Shakerag WRF Discharge Right–of-Way Request Forsyth County, Georgia [Wetland / Floodplain SOF]

View Looking North along the Western Bank of the Chattahoochee River

View Looking South along the Western Bank of the Chattahoochee River

At the design stage, the location of the proposed Shakerag WRF and the proposed route for the discharge line were selected to avoid wetlands on the Threatt property. However, further avoidance of impacts is not practicable because modeling to support the design indicates that the diffuser must be 100 ft out in the river channel to allow appropriate mixing of the discharge. The diffuser ports would be spaced over the last 77.5 ft.

Aquatic Resources

Aquatic resources within the Chattahoochee River have been described in detail in Section 2.2.3 of the EA. A list of fish species known and historically known to occur within the CRNRA were compiled in 2007 (Georgia Power, 2007). In all, at least 55 species of fish in 16 families were found along the 48-mile reach between Buford Dam (river mile 348) and Peachtree Creek (river mile 300) and within the Willeo Creek (river mile 316) and Big Creek (river mile 317) tributaries. Most of the species are native warm-water fishes. Fishery surveys have documented 38 fish species in the mainstem river between Buford Dam and Morgan Falls dam and 42 species in the river between Morgan Falls dam and Peachtree Creek. The cold releases from Buford Dam depress many warm-water species populations in the mainstem river (Hess, 1980; Biagi and Brown, 1997). Rare species of fish with potential to occur in the project vicinity are evaluated in Section 2.3 of the EA. No federally listed aquatic species presently are known to occur within the project vicinity.

Trout (rainbow and brown) are the primary fish species of interest in this reach of the Chattahoochee River. Based on an instream flow study conducted by Nestler et al. (1986), habitat area in the Chattahoochee River for adult rainbow trout and adult brown trout generally peaks at river flows of about 1,500 cfs and declines to its minimum at 12,000 cfs. Trout require water temperatures below about 25 degrees Celsius (°C) for survival and typically prefer temperatures below 20°C for feeding, growth, and reproduction (See Section 4.22 of EA).

In 2003 a freshwater mussel survey was conducted for the NPS (O'Brien and Brim Box, 2003). Eighteen sites were searched for the presence of mussels, including the Chattahoochee River 1,000 meters downstream of McGinnis Ferry Road and approximately 0.75 mile downstream of the diffuser project area; Island Ford (20 miles downstream of the diffuser project area); the Morgan Falls impoundment at Gold Branch (27 miles downstream of the diffuser project area); and four sites on the Chattahoochee River downstream of the Morgan Falls Dam (Johnson Ferry, Cochran Shoals, Powers Island, and Paces Mill). No live native mussel species were found.

The invasive Asian clam (C*orbicula fulminea*) was documented in the mainstem of the river at Island Ford, Big Creek (a major tributary), and four mainstem sites downstream of Morgan Falls Dam (O'Brien and Brim Box, 2003). Based on the survey findings, O'Brien and Brim Box (2003) concluded that the native freshwater mussel fauna appears to be extirpated from the upper Chattahoochee River, including the proposed project area. The absence of native mussel fauna has likely resulted from a combination of habitat alterations over the past 160 years, including impoundments, water quality changes, peaking discharges, habitat alteration, and sedimentation from nonpoint sources (O'Brien and Brim Box, 2003; Brim Box and Williams, 2000).

Results of the water quality analysis indicates that the quality of the effluent would not adversely impact aquatic resources within area immediately downstream of the diffuser (within the mixing zone) or further downstream in the river (Section 4.2 of the EA). Temperature conditions within the mixing zone will be within the normal temperature tolerance of the warm-water aquatic species that inhabitat the Chattahoochee River and the tolerance limits of the introduced trout species (Section 4.22 of the EA).

1.4 Justification for Use of the Floodplain and Wetlands

Floodplains

Attachment 2 illustrates the Flood Insurance Rate Map (FIRM) for the location of the proposed action. The nature of the proposed action, which requires access to the river for installation of a submerged multiport outfall diffuser, makes moving all project actions outside the floodplain infeasible. All above-ground structures would be located outside the floodplain, but the pipeline must cross the floodplain to reach the proposed diffuser location. At the proposed action location, construction of the reclaimed water pipeline and diffuser would require temporary disturbance within the floodplain. However, the main pipeline would be buried and the ground surface returned to the original contours. The diffuser ports will rise approximately 6 inches from the river bottom as illustrated in Attachment 3. While an overbank event is unlikely due to flow regulation by Buford Dam, flooding of the Chattahoochee River would not adversely affect system operation or the surrounding area. The proposed action location would require little physical development.

Wetlands

As described in Section 1.3, CH2M HILL (2007) determined that there are no wetlands inside the proposed project area at the proposed action location except for the Chattahoochee River. Further avoidance of impacts is not practicable because the design requires the diffuser to extend 100 feet (ft) out in the channel with the diffuser ports spaced over the last 77.5 ft. However, impacts to these wetlands from the diffuser and pipeline construction would be minimized by working within a coffer dam and utilizing appropriate best management practices (BMPs) during construction. The majority of the impacts would be temporary however there would be a negligible adverse permanent impact within a single, highly localized area as quantified in Table 2. Sediment traps (silt fencing) would be established around the perimeter of construction staging or general construction areas to control sedimentation and erosion into the nearby wetland areas. All disturbed areas would be stabilized and seeded as soon as practical to further limit erosion potential.

1.5 Wetland Avoidance, Minimization and Mitigation Actions

Efforts were made throughout the project design to avoid and reduce impacts to sensitive wetland resources. Appropriate best management practices (BMPs) will be utilized during construction to further reduce and mitigate potential impacts as described below.

Floodplain Mitigation

Construction of the reclaimed water pipeline and diffuser at the proposed action location would not substantially alter the grades or drainage patterns of the site. Existing vegetation would be removed only as required during initial site preparation operations. Areas would be graded to match pre-construction conditions, where feasible. Final site restoration would include seeding all disturbed areas that were mowed grass prior to construction activities or surfaced with crushed aggregate. Only native plant seed mixtures approved by Park staff would be used. Any areas that were natural prior to construction activities would be rehabilitated using appropriate native plant materials approved by NPS. All disturbed areas would be stabilized as soon as practical to further limit erosion.

All construction entrances would be provided with stabilized stone traps to limit tracking of sediment offsite. Sediment traps (silt fencing) would be established around the perimeter of construction areas for sedimentation and erosion control. Forsyth County would have an inspector that is certified through the State of Georgia Erosion and Sediment Control Education and Training Certification Program overseeing the installation of silt fencing. The silt fencing would be maintained by the County through the duration of construction activities, and removed from the site at the end of construction activities.

Wetland Mitigation

Unavoidable temporary wetland impacts from open trenching used to complete the pipeline and diffuser installation in the Chattahoochee River would disturb riverine wetland areas of approximately 1,000 sf, or 0.023 acres (estimated 10 ft by 100 ft disturbed area). The initial 20 ft of the diffuser would be completely underground so an 800 sf, or 0.018 acre (estimated 10 ft by 80 ft), footprint represents the area where diffuser ports would be exposed. The diffuser ports would be spaced over the last 77.5 ft. After the diffuser is secured to the bedrock the excavated sediment will be used to return the disturbed area to the pre-construction river bottom elevation. The area would provide the same functions as before the disturbance, except for the physical presence of the diffuser ports. Permanent impacts from operation of the Proposed Action would be limited to 800 sf or less.

Wetlands within the construction area, the Chattahoochee River, would be isolated by silt fencing and a coffer dam to prevent ingress of sediment. Fuel for construction vehicles would not be stored onsite. All work associated with the pumping facilities and pipeline would be performed in accordance with Forsyth County plans for stormwater management and environmental controls, which would incorporate these and additional site-specific BMPs consistent with the *Manual for Erosion and Sediment Control in Georgia* (Georgia Soil and Water Conservation Commission, 2000), the *Field Manual for Erosion and Sediment Control in Georgia* (Georgia Soil and Water Conservation Commission, 2002), and the January 1, 2009, updates to

the *Manual for Erosion and Sediment Control in Georgia* (Georgia Soil and Water Conservation Commission, 2009).

Because there would be no permanent loss of wetland function from implementation of the Proposed Action, and because the adverse impact on wetlands (direct plus indirect impacts) from the entire project totals less than 0.1 acres that would be isolated within a highly localized area, Forsyth County is requesting that wetland compensation requirements be waived.

1.6 Conclusion

The proposed action was designed to avoid and minimize impacts to the floodplain and wetland areas. Because this alternative would not reduce flood storage capacity, flood conveyance, or flood elevations, there would be no effect on natural floodplain functions. Temporary impacts to wetlands would be minimized by returning excavated native river stone to the trench and then placing native river sediments to return the river bottom to pre-construction elevation. In addition, BMPs, such as sediment traps (silt fencing), would be placed around the perimeter of construction areas to control sedimentation and erosion into the nearby wetland areas.

Because there would be no permanent loss of wetland function or wetland acreage from implementation of the Proposed Action, and because the adverse impact on wetlands (direct plus indirect impacts) from the entire project totals less than 0.1 acres that would be isolated within a highly localized area, Forsyth County is requesting that wetland compensation requirements be waived. NPS finds that this proposed action is consistent with the policies and procedures of Director's Order #77-1: Wetland Protection, and Director's Order #77-2: Floodplain Management, including the "no net loss of wetlands" policy.

References

CH2M HILL, 2005. Final Environmental Information Document: Shakerag WRF, Diffuser, and Discharge to the Chattahoochee River. Prepared for Forsyth County Water and Sewer Department. December 2005.

CH2M HILL. 2005a. *Shakerag WRF and Chattahoochee River Diffuser Design Development Report*. Prepared for the Forsyth County Water and Sewer Department. Final May 2007.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service.

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National Park Service (NPS). *Chattahoochee River National Recreation Area Supplemental Draft General Management Plan / Environmental Impact Statement*. June 2008.

NPS. *Procedural Manual #77-1: Wetland Protection*. Reissued February 2008.

Appendix B
GA EPD Wasteload Allocation Letter, NPDES Permit, Stream Buffer Variance and 401 Certification

Georgia Department of Natural Resources

Environmental Protection Division, Water Protection Branch
4220 International Parkway, Suite 101, Atlanta, Georgia 30354
404/675-6232

Reply to:
Engineering & Technical Support Program
Phone: 404/675-6233; Fax 404/675-6246

RECEIVED
SEP 15 2004
WATER & SEWER

September 8, 2004

Mr. Tim Perkins, Director
Forsyth County Department of Public Works
101 East Main Street
Cumming, Georgia 30130

RE: EPD # 23-123
Wasteload Allocation
Fowler Wastewater Treatment Plant
Forsyth County

Dear Mr. Perkins:

The analysis has been completed for discharge limits for the referenced treatment facility. The wasteload allocation (WLA) is attached, and **is provided for planning purposes only.** This wasteload is for a flow of 6.0 MGD into the Chattahoochee River. EPD reserves the right to reevaluate the WLA if the project does not progress within one year.

Attached is our guidance document ***Planning for Domestic Wastewater Systems*** which describes the steps necessary to gain a discharge of treated wastewater to waters of the state. **The referenced limits will only be allowed if land application is not a feasible option either technically or economically, therefore, an antidegradation review must be completed.** The procedures for conducting an antidegradation review are included in the planning guidance.

Final approval of the project is contingent upon completion of the Environmental Information Document and permit public notice requirements and issuance of the permit. If you should have any questions please do not hesitate to contact Mary Barcala, at (404) 675-1698.

Sincerely,

Frances Carpenter

Frances Carpenter, P.E., Unit Manager
Engineering & Technical Support Program

ATTACHMENT

cc: Dave Bullard, Permitting, Compliance & Enforcement Program
Paul Lamarre, Watershed Planning and Monitoring Program

ATTACHMENT

Fowler Facility Discharge Permit Limits (1, 2)

Parameter	Limit
Flow, million gallons per day (MGD)	6.0
5-Day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), mg/l	2.9
Ammonia (NH_3), mg/l	0.5
Dissolved Oxygen (D.O.), mg/l	7.0
Total Suspended Solids (TSS), mg/l	10.0
Total Residual Chlorine (TRC) (daily maximum), mg/l	0.5
Total Phosphorus, mg/l	0.3
Fecal Coliform Bacteria (count/100 ml)	200
pH (standard units)	6.0 - 9.0
Organic Nitrogen	Monitor
Ortho- Phosphorus	Monitor
Effluent Temperature	Monitor

NOTES:

1. Values are monthly averages except as noted.
2. Priority pollutant limits and aquatic toxicity testing requirements be determined by the Permitting, Compliance, and Enforcement Program.

Georgia Department of Natural Resources

2 Martin Luther King, Jr. Drive, S.E., Suite 1152 East Tower, Atlanta, Georgia 30334-9000
Chris Clark, Commissioner
F. Allen Barnes, Director
Environmental Protection Division
404/656-4713

August 18, 2010

Mr. Tim Perkins, Director
Forsyth County Department of Water and Sewer
110 East Main Street, Suite 150
Cumming, Georgia 30040

RE: Forsyth County - Fowler/Shakerag WRF
NPDES Permit No. GA0038954

Dear Mr. Perkins:

Pursuant to the Georgia Water Quality Control Act, as amended; the Federal Water Pollution Control Act, as amended; and the Rules and Regulations promulgated thereunder, we have today issued the attached National Pollutant Discharge Elimination System (NPDES) permit for the referenced water pollution control plant.

Please be advised that on and after the effective date indicated in the attached NPDES permit, the permittee must comply with all the terms, conditions and limitations of this permit.

Sincerely,

F. Allen Barnes
Director

FAB/hsy
ATTACHMENT
cc: Environmental Protection Agency

PERMIT NO. GA0038954

STATE OF GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Georgia Water Quality Control Act (Georgia Laws 1964, p. 416, as amended), hereinafter called the "State Act;" the Federal Water Pollution Control Act, as amended (33 U.S. C. 1251 et seq.), hereinafter called the "Federal Act;" and the Rules and Regulations promulgated pursuant to each of these Acts,

Forsyth County Department of Water and Sewer
Fowler WRF/Shakerag WRF
110 East Main Street, Suite 150
Cumming, Georgia 30040

is authorized to discharge from a facility located at

Fowler WRF/Shakerag WRF
545 Kemp Road
Suwanee, Georgia 30024
(Forsyth County)

to receiving waters

Chattahoochee River

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II and III hereof.

This permit shall become effective on August 18, 2010.

This permit and the authorization to discharge shall expire at midnight, August 17, 2015.

Signed this 18th day of August 2010.

F. Allen Barnes

Director,
Environmental Protection Division

PART I

EPD is the Environmental Protection Division of the Department of Natural Resources.

The Federal Act referred to is The Clean Water Act.

The State Act referred to is The Water Quality Control Act (Act No. 870).

The State Rules referred to are The Rules and Regulations for Water Quality Control (Chapter 391-3-6).

A. SPECIAL CONDITIONS

1. MONITORING

The concentration of pollutants in the discharge will be limited as indicated by the table(s) labeled "Effluent Limitations and Monitoring Requirements." The effluent shall meet the requirements in the table(s) or the condition in paragraph I.A.1.a., whichever yields the higher quality effluent.

a. For 5 day biochemical oxygen demand (BOD_5) and total suspended solids (TSS), the arithmetic mean of the values of the effluent samples collected during a month shall not exceed 15 percent of the arithmetic mean of values for influent samples collected at approximately the same times (85 percent removal). For water pollution control plants followed by a polishing pond or consisting of a waste stabilization pond, the 85 percent removal for TSS is not applicable.

b. The monthly average, other than for fecal coliform bacteria, is the arithmetic mean of values obtained for samples collected during a calendar month.

c. The weekly average, other than for fecal coliform bacteria, is the arithmetic mean of values obtained for samples collected during a 7 day period. The week begins at 12:00 midnight Saturday and ends at 12:00 midnight the following Saturday. To define a different starting time for the sampling period, the permittee must notify the EPD in writing. For reporting required by I.C.2. of this permit, a week that starts in one month and ends in another month shall be considered part of the second month. The permittee may calculate and report the weekly average as a 7 day moving average.

d. Fecal coliform bacteria will be reported as the geometric mean of the values for the samples collected during the time periods in I.A.1.b. and I.A.1.c.

e. Untreated wastewater influent samples required by I.B. shall be collected before any return or recycle flows. These flows include returned activated sludge, supernatants, centrates, filtrates, and backwash.

f. Effluent samples required by I.B. of this permit shall be collected after the final treatment process and before discharge to receiving waters. Composite samples may be collected before disinfection with written EPD approval.

g. A composite sample shall consist of a minimum of 13 subsamples collected at least once every 2 hours for at least 24 hours and shall be composited proportionately to flow.

h. Flow measurements shall be conducted using the flow measuring device(s) in accordance with the approved design of the facility. If instantaneous measurements are required, then the permittee shall have a primary flow measuring device that is correctly installed and

maintained. If continuous recording measurements are required, then flow measurements must be made using continuous recording equipment. Calibration shall be maintained of the continuous recording instrumentation to ± 10% of the actual flow.

Flow shall be measured manually to check the flow meter calibration at a frequency of once a month. If secondary flow instruments are in use and malfunction or fail to maintain calibration as required, the flow shall be computed from manual measurements or by other method(s) approved by EPD until such time as the secondary flow instrument is repaired. For facilities which utilize alternate technologies for measuring flow, the flow measurement device must be calibrated semi-annually by qualified personnel.

Records of the calibration checks shall be maintained.

i. If secondary flow instruments malfunction or fail to maintain calibration as required in I.A.1.h., the flow shall be computed from manual measurements taken at the times specified for the collection of composite samples.

j. Quarterly analyses required in I.B. shall be performed in March, June, September, and December. Analyses required twice per year will be performed in June and December. Analyses required annually will be performed in June.

k. Some parameters must be analyzed to the detection limits specified by the EPD. These parameters will be reported as "not detected" when they are below the detection limit and will then be considered in compliance with the effluent limit. The detection limit will also be reported.

2. SLUDGE DISPOSAL REQUIREMENTS

Sludge shall be disposed of according to the regulations and guidelines established by the EPD and the Federal Act section 405(d) and (e), and the Resource Conservation and Recovery Act (RCRA). In land applying nonhazardous municipal sewage sludge, the permittee shall comply with the general criteria outlined in the most current version of the EPD "Guidelines for Land Application of Sewage Sludge (Biosolids) at Agronomic Rates" and with the State Rules, Chapter 391-3-6-.17. Before disposing of municipal sewage sludge by land application or any method other than co-disposal in a permitted sanitary landfill, the permittee shall submit a sludge management plan to EPD for written approval. This plan will become a part of the NPDES Permit after approval and modification of the permit. The permittee shall notify the EPD of any changes planned in an approved sludge management plan.

If an applicable management practice or numerical limitation for pollutants in sewage sludge is promulgated under Section 405(d) of the Federal Act after approval of the plan, then the plan shall be modified to conform with the new regulations.

3. SLUDGE MONITORING REQUIREMENTS

The permittee shall develop and implement procedures to ensure adequate year-round sludge disposal. The permittee shall monitor and maintain records documenting the quantity of sludge removed from the facility. Records shall be maintained documenting that the quantity of solids removed from the facility equals the solids generated on an average day. The total quantity of sludge removed from the facility during the reporting period shall be reported each month with the Discharge Monitoring Reports as required under Part I.C.2. of this permit. The quantity shall be reported on a dry weight basis.

Pond treatment systems are required to report the total quantity of sludge removed from the facility only during the months that sludge is removed.

4. INTRODUCTION OF POLLUTANTS INTO THE PUBLICLY OWNED TREATMENT WORKS (POTW)

The permittee must notify EPD of:

a. Any new introduction of pollutants into the POTW from an indirect discharger that would be subject to Sections 301 or 306 of the Federal Act if the pollutants were directly discharged to a receiving stream; and

b. Any substantial change in the volume or character of pollutants from a source that existed when the permit was issued.

This notice shall include information on the quality and quantity of the indirect discharge introduced and any anticipated impact on the quantity or quality of effluent to be discharged from the POTW.

5. EFFLUENT TOXICITY AND BIOMONITORING REQUIREMENTS

The permittee shall comply with effluent standards or prohibitions established by section 307(a) of the Federal Act and with Chapter 391-3-6-.03(5) of the State Rules and may not discharge toxic pollutants in concentrations or combinations that are harmful to humans, animals, or aquatic life.

If toxicity is suspected in the effluent, the EPD may require the permittee to perform any of the following actions:

a. Acute biomonitoring tests;

b. Chronic biomonitoring tests;

c. Stream studies;

d. Priority pollutant analyses;

e. Toxicity reduction evaluations (TRE); or

f. Any other appropriate study.

The EPD will specify the requirements and methodologies for performing any of these tests or studies. Unless other concentrations are specified by the EPD, the critical concentration used to determine toxicity in biomonitoring tests will be the effluent instream wastewater concentration (IWC) based on the permitted monthly average flow of the facility and the critical low flow of the receiving stream (7Q10). The endpoints that will be reported are the effluent concentration that is lethal to 50% of the test organisms (LC50) if the test is for acute toxicity, and the no observed effect concentration (NOEC) of effluent if the test is for chronic toxicity.

The permittee must eliminate effluent toxicity and supply the EPD with data and evidence to confirm toxicity elimination.

B.1. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The discharge(s) from the water pollution control plant shall be limited and monitored by the permittee as specified below effective upon completion of construction of the 2.50 MGD Fowler facility, the sidestream phosphorus removal system at the Shakerag WRF, and upon EPD written authorization prior to initiation of operation at 2.50 MGD.

Parameter	Discharge Limitations mg/L (kg/day) unless otherwise specified		Monitoring Requirements		
	Monthly Avg.	Weekly Avg.	Measurement Frequency	Sample Type	Sample Location
Fowler WRF + Shakerag WRF Combined Flow (MGD)	1.75	2.19	Seven/Week	Continuous Recording	Final Effluent [a]
Flow (MGD) Fowler WRF	1.75	2.19	Seven/Week	Continuous Recording	Fowler WRF Effluent [b]
Flow (MGD) Shakerag WRF	0	--	--	--	--
Carbonaceous Biochemical Oxygen Demand (5-day)	2.9 (19.27)	4.35 (24.05)	Three/Week	Composite	Effluent
Total Suspended Solids	10 (66.34)	15 (82.93)	Three/Week	Composite	Effluent
Ammonia as N	0.5 (3.32)	0.75 (4.15)	Three/Week	Composite	Effluent
Total Phosphorus as P	0.3 (1.99)	0.45 (2.49)	Three/Week	Composite	Effluent
Ortho-Phosphorus as P	Report	Report	Three/Week	Composite	Effluent
Organic Nitrogen	Report	Report	Three/Week	Composite	Effluent
Temperature (Fahrenheit) [c]	Refer to Part I.C.8	--	Hourly	Grab	Effluent, Upstream and Downstream
Fecal Coliform Bacteria (#/100 mL)	200/100 mL	400/100 mL	Two/Week	Grab	Effluent
Priority Pollutants [d]	--	--	--	Grab	Effluent
Chronic Whole Effluent Toxicity (WET) [e]	Report NOEC	--	--	Composite	Effluent

The pH shall not be less than 6.0 standard units or greater than 9.0 standard units and shall be monitored on the final effluent by analyzing grab samples taken seven days per week.
The minimum effluent dissolved oxygen shall be 6.0 mg/L or higher and shall be monitored on the final effluent by analyzing grab samples taken seven days per week.

a. Final Effluent - Flow shall be measured at the final discharge point to the Chattahoochee River.
b. Effluent - Flow from Fowler WRF to the final discharge point to the Chattahoochee River.
c. Refer to Part I.C.8. The treated wastewater discharge shall not increase the temperature of the Chattahoochee River between the upstream and downstream monitoring locations. Effluent Temperature shall be measured at the final discharge point prior to the Chattahoochee River.
d. Refer to Part I.C.9.
e. Refer to Part I.C.10. The testing must include the most current U.S. Environmental Protection Agency (EPA) chronic aquatic toxicity testing manuals. The referenced document is entitled Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, 4th Edition, U.S. EPA, 821-R-02-013, October 2002. Definitive tests must be run on the same samples concurrently using both an invertebrate species (i.e., *Ceriodaphnia dubia*) and a vertebrate species (i.e., Fathead Minnow, *Pimephales promelas*).

B.2. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The discharge(s) from the water pollution control plant shall be limited and monitored by the permittee as specified below effective upon completion of construction of the 2.50 MGD Fowler facility and the 1.25 MGD Shakerag facility including the sidestream phosphorus removal system, and upon EPD written authorization prior to initiation of operation at 2.50 MGD and 1.25 MGD respectively.

Parameter	Discharge Limitations mg/L (kg/day) unless otherwise specified		Monitoring Requirements		
	Monthly Avg.	Weekly Avg.	Measurement Frequency	Sample Type	Sample Location
Fowler WRF + Shakerag WRF Combined Flow (MGD)	3.0	3.75	Seven/Week	Continuous Recording	Final Effluent [a]
Flow (MGD) Fowler WRF	1.75	2.19	Seven/Week	Continuous Recording	Fowler WRF Effluent [b]
Flow (MGD) Shakerag WRF	1.25	1.56	Seven/Week	Continuous Recording	Shakerag WRF Effluent [c]
Carbonaceous Biochemical Oxygen Demand (5-day)	2.9 (32.98)	4.35 (41.23)	Three/Week	Composite	Effluent
Total Suspended Solids	10 (113.73)	15 (142.16)	Three/Week	Composite	Effluent
Ammonia as N	0.5 (5.69)	0.75 (7.11)	Three/Week	Composite	Effluent
Total Phosphorus as P	0.3 (3.41)	0.45 (4.26)	Three/Week	Composite	Effluent
Ortho-Phosphorus as P	Report	Report	Three/Week	Composite	Effluent
Organic Nitrogen	Report	Report	Three/Week	Composite	Effluent
Temperature (Fahrenheit) [d]	Refer to Part I.C.8	--	Hourly	Grab	Effluent, Upstream and Downstream
Fecal Coliform Bacteria (#/100 mL)	200/100 mL	400/100 mL	Two/Week	Grab	Effluent
Priority Pollutants [e]	--	--	--	Grab	Effluent
Chronic Whole Effluent Toxicity (WET) [f]	Report NOEC	--	--	Composite	Effluent

The pH shall not be less than 6.0 standard units or greater than 9.0 standard units and shall be monitored on the final effluent by analyzing grab samples taken seven days per week.
The minimum effluent dissolved oxygen shall be 6.0 mg/L or higher and shall be monitored on the final effluent by analyzing grab samples taken seven days per week.

a. Final Effluent - Flow shall be measured at the final discharge point to the Chattahoochee River.
b. Fowler WRF Effluent - Flow from Fowler WRF before combined with Shakerag WRF's effluent.
c. Shakerag WRF Effluent - Flow from Shakerag WRF before combined with Fowler WRF's effluent.
d. Refer to Part I.C.8. The treated wastewater discharge shall not increase the temperature of the Chattahoochee River between the upstream and downstream monitoring locations. Effluent Temperature shall be measured at the final discharge point prior to the Chattahoochee River.
e. Refer to Part I.C.9.
f. Refer to Part I.C.10. The testing must include the most current U.S. Environmental Protection Agency (EPA) chronic aquatic toxicity testing manuals. The referenced document is entitled Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, 4th Edition, U.S. EPA, 821-R-02-013, October 2002. Definitive tests must be run on the same samples concurrently using both an invertebrate species (i.e., *Ceriodaphnia dubia*) and a vertebrate species (i.e., Fathead Minnow, *Pimephales promelas*).

B.3. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The discharge(s) from the water pollution control plant shall be limited and monitored by the permittee as specified below effective upon completion of construction of the 2.50 MGD Fowler facility and the 2.50 MGD Shakerag facility including the sidestream phosphorus removal system, and upon EPD written authorization prior to initiation of operation at 2.50 MGD and 2.50 MGD respectively.

Parameter	Discharge Limitations mg/L (kg/day) unless otherwise specified		Monitoring Requirements		
	Monthly Avg.	Weekly Avg.	Measurement Frequency	Sample Type	Sample Location
Fowler WRF + Shakerag WRF Combined Flow (MGD)	4.5	5.625	Seven/Week	Continuous Recording	Final Effluent [a]
Flow (MGD) Fowler WRF	2.0	2.5	Seven/Week	Continuous Recording	Fowler WRF Effluent [b]
Flow (MGD) Shakerag WRF	2.5	3.125	Seven/Week	Continuous Recording	Shakerag WRF Effluent [c]
Carbonaceous Biochemical Oxygen Demand (5-day)	2.9 (49.47)	4.35 (61.84)	Three/Week	Composite	Effluent
Total Suspended Solids	10 (170.59)	15 (213.24)	Three/Week	Composite	Effluent
Ammonia as N	0.5 (8.53)	0.75 (10.66)	Three/Week	Composite	Effluent
Total Phosphorus as P	0.3 (5.12)	0.45 (6.40)	Three/Week	Composite	Effluent
Ortho-Phosphorus as P	Report	Report	Three/Week	Composite	Effluent
Organic Nitrogen	Report	Report	Three/Week	Composite	Effluent
Temperature (Fahrenheit) [d]	Refer to Part I.C.8	--	Hourly	Grab	Effluent, Upstream and Downstream
Fecal Coliform Bacteria (#/100 mL)	200/100 mL	400/100 mL	Two/Week	Grab	Effluent
Priority Pollutants [e]	--	--	--	Grab	Effluent
Chronic Whole Effluent Toxicity (WET) [f]	Report NOEC	--	--	Composite	Effluent

The pH shall not be less than 6.0 standard units or greater than 9.0 standard units and shall be monitored on the final effluent by analyzing grab samples taken seven days per week.
The minimum effluent dissolved oxygen shall be 6.0 mg/L or higher and shall be monitored on the final effluent by analyzing grab samples taken seven days per week.

a. Final Effluent - Flow shall be measured at the final discharge point to the Chattahoochee River.
b. Fowler WRF Effluent - Flow from Fowler WRF before combined with Shakerag WRF's effluent.
c. Shakerag WRF Effluent - Flow from Shakerag WRF before combined with Fowler WRF's effluent.
d. Refer to Part I.C.8. The treated wastewater discharge shall not increase the temperature of the Chattahoochee River between the upstream and downstream monitoring locations. Effluent Temperature shall be measured at the final discharge point prior to the Chattahoochee River.
e. Refer to Part I.C.9.
f. Refer to Part I.C.10. The testing must include the most current U.S. Environmental Protection Agency (EPA) chronic aquatic toxicity testing manuals. The referenced document is entitled Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, 4th Edition, U.S. EPA, 821-R-02-013, October 2002. Definitive tests must be run on the same samples concurrently using both an invertebrate species (i.e., *Ceriodaphnia dubia*) and a vertebrate species (i.e., Fathead Minnow, *Pimephales promelas*).

B.4. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The discharge(s) from the water pollution control plant shall be limited and monitored by the permittee as specified below effective upon completion of construction of the 2.50 MGD Fowler facility and the 3.75 MGD Shakerag facility including the sidestream phosphorus removal system, and upon EPD written authorization prior to initiation of operation at 2.50 MGD and 3.75 MGD respectively.

Parameter	Discharge Limitations mg/L (kg/day) unless otherwise specified		Monitoring Requirements		
	Monthly Avg.	Weekly Avg.	Measurement Frequency	Sample Type	Sample Location
Fowler WRF + Shakerag WRF Combined Flow (MGD)	6.0	7.5	Seven/Week	Continuous Recording	Final Effluent [a]
Flow (MGD) Fowler WRF	2.25	2.813	Seven/Week	Continuous Recording	Fowler WRF Effluent [b]
Flow (MGD) Shakerag WRF	3.75	4.688	Seven/Week	Continuous Recording	Shakerag WRF Effluent [c]
Carbonaceous Biochemical Oxygen Demand (5-day)	2.9 (65.96)	4.35 (82.45)	Three/Week	Composite	Effluent
Total Suspended Solids	10 (227.45)	15 (284.32)	Three/Week	Composite	Effluent
Ammonia as N	0.5 (11.37)	0.75 (14.22)	Three/Week	Composite	Effluent
Total Phosphorus as P	0.3 (6.82)	0.45 (8.53)	Three/Week	Composite	Effluent
Ortho-Phosphorus as P	Report	Report	Three/Week	Composite	Effluent
Organic Nitrogen	Report	Report	Three/Week	Composite	Effluent
Temperature (Fahrenheit) [d]	Refer to Part I.C.8	--	Hourly	Grab	Effluent, Upstream and Downstream
Fecal Coliform Bacteria (#/100 mL)	200/100 mL	400/100 mL	Two/Week	Grab	Effluent
Priority Pollutants [e]	--	--	--	Grab	Effluent
Chronic Whole Effluent Toxicity (WET) [f]	Report NOEC	--	--	Composite	Effluent

The pH shall not be less than 6.0 standard units or greater than 9.0 standard units and shall be monitored on the final effluent by analyzing grab samples taken seven days per week.
The minimum effluent dissolved oxygen shall be 6.0 mg/L or higher and shall be monitored on the final effluent by analyzing grab samples taken seven days per week.

a. Final Effluent - Flow shall be measured at the final discharge point to the Chattahoochee River.
b. Fowler WRF Effluent - Flow from Fowler WRF before combined with Shakerag WRF's effluent.
c. Shakerag WRF Effluent - Flow from Shakerag WRF before combined with Fowler WRF's effluent.
d. Refer to Part I.C.8. The treated wastewater discharge shall not increase the temperature of the Chattahoochee River between the upstream and downstream monitoring locations. Effluent Temperature shall be measured at the final discharge point prior to the Chattahoochee River.
e. Refer to Part I.C.9.
f. Refer to Part I.C.10. The testing must include the most current U.S. Environmental Protection Agency (EPA) chronic aquatic toxicity testing manuals. The referenced document is entitled Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, 4th Edition, U.S. EPA, 821-R-02-013, October 2002. Definitive tests must be run on the same samples concurrently using both an invertebrate species (i.e., *Ceriodaphnia dubia*) and a vertebrate species (i.e., Fathead Minnow, *Pimephales promelas*).

C. MONITORING AND REPORTING

1. REPRESENTATIVE SAMPLING

Samples and measurements of the monitored waste shall represent the volume and nature of the waste stream. The permittee shall maintain a written sampling and monitoring schedule.

2. REPORTING

All reports or information submitted in compliance with this permit or requested by EPD must be signed and certified by a principal executive officer, elected official, or other authorized representative. Required analytical results obtained by the permittee shall be summarized on a Discharge Monitoring Report form and any additional EPD specified forms. Monitoring results shall be submitted to the EPD postmarked no later than the 15th day of the month following the end of the reporting period. The EPD may require in writing that additional monitoring results be reported. Signed copies of these and all other required reports shall be submitted to:

Environmental Protection Division
Permitting, Compliance, and Enforcement Program
4220 International Parkway, Suite 101
Atlanta, Georgia 30354

3. MONITORING PROCEDURES

Analytical procedures, sample containers, sample preservation techniques, and sample holding times must be consistent with the techniques and procedures listed in 40 CFR Part 136 for monitoring specified in I.B. EPA approved methods used must be applicable to the concentration ranges of the NPDES samples.

4. RECORDING OF RESULTS

For each required parameter analyzed, the permittee shall record:

a. The exact place, date, and time of sampling, and the person(s) collecting the sample. For flow proportioned composite samples, this shall include the instantaneous flow and the corresponding volume of each sample aliquot, and other information relevant to document flow proportioning of composite samples;

b. The dates and times the analyses were performed;

c. The person(s) who performed the analyses;

d. The analytical procedures or methods used; and

e. The results of all required analyses.

5. ADDITIONAL MONITORING BY PERMITTEE

If the permittee monitors required parameters at the locations designated in I.B. more frequently than required, the permittee shall analyze all samples using approved analytical methods specified in I.C.3. The results of this additional monitoring shall be included in calculating and reporting the values on the Discharge Monitoring Report forms. The permittee shall indicate the monitoring

frequency on the report. The EPD may require in writing more frequent monitoring, or monitoring of other pollutants not specified in this permit.

6. RECORDS RETENTION

The permittee shall retain records of:

a. All laboratory analyses performed including sample data, quality control data, and standard curves;

b. Calibration and maintenance records of laboratory instruments;

c. Calibration and maintenance records and recordings from continuous recording instruments;

d. Process control monitoring records;

e. Facility operation and maintenance records;

f. Copies of all reports required by this permit;

g. All data and information used to complete the permit application; and

h. All monitoring data related to sludge use and disposal.

These records shall be kept for at least three years. Sludge handling records must be kept for at least five years. Either period may be extended by EPD written notification.

7. PENALTIES

Both the Federal and State Acts provide that any person who falsifies or tampers with any monitoring device or method required under this permit, or who makes any false statement, representation, or certification in any record submitted or required by this permit shall, if convicted, be punished by a fine or by imprisonment or by both. The Acts include procedures for imposing civil penalties for violations or for negligent or intentional failure or refusal to comply with any final or emergency order of the Director of the EPD.

8. TEMPERATURE MONITORING AND LIMITATIONS

Effluent temperature shall be monitored and recorded hourly in degrees Fahrenheit. The treated wastewater discharge shall not increase the temperature of the Chattahoochee River between the upstream and downstream temperature monitoring locations described below. The effluent temperature shall be measured at a location as close to the discharge outfall as practicable. Prior to initiation of operation of the facility under the B.1.effluent limitations, the permittee must submit for EPD approval, the exact locations (latitude and longitude) for temperature monitoring. Upon EPD approval, those monitoring locations will become a part of this permit.

Continuous or instantaneous monitoring devices may be used according to the permittee's preference. Properly installed and calibrated monitoring instruments are essential to collecting accurate data, and EPD may request to observe the effluent temperature monitoring installation and calibration procedures.

Temperature shall also be measured in the Chattahoochee River upstream and downstream from the effluent discharge. The downstream sampling location shall not be more than 0.5 miles from the

discharge location. The upstream sampling location must be outside of the area impacted by the discharge.

Temperature data must be recorded and reported hourly at a time corresponding to the whole hour. The hourly effluent, upstream and downstream temperature data shall be archived using a digital format such as a spreadsheet developed in coordination with EPD. Archived data should be permanently maintained by the permittee and submitted to EPD by January 31st, April 30th, July 31st and October 31st each year. In addition, the permittee shall report the daily average to EPD upon request prior to the data submittal date. The permittee shall report the daily average, maximum, and minimum effluent, upstream and downstream temperatures, based on 24 hours of data collected beginning at 12:00 a.m. and ending at 11:00 p.m., on the monthly monitoring report form used for daily data information.

9. PRIORITY POLLUTANTS

The permittee must conduct one scan of priority pollutants, measured at least to EPD detection limits, within 90 days of receiving EPD authorization to discharge at the B.1., B.2., B.3. and B.4. limits of the permit. The permittee must conduct two additional priority pollutant scans during the first year after receiving EPD written authorization to discharge at the B.1., B.2., B.3. and B.4. limits of the permit. If substances are measured at levels of concern, then the permittee may be required to perform additional priority pollutant analyses or the permit may be modified to include effluent limitations for priority pollutants.

10. CHRONIC WHOLE EFFLUENT TOXICITY

The permittee shall begin to conduct four quarterly chronic whole effluent toxicity (WET) test during the first year after receiving EPD written approval of completion of the facility construction and upon EPD written authorization to commence operation at the B.1., B.2., B.3. and B.4. limits of the permit. The first WET test must be conducted within 90 days of receiving EPD written approval. The testing must incorporate the most current U.S. Environmental Protection Agency (EPA) chronic aquatic toxicity testing manuals. The referenced document is entitled Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, 4th Edition, U.S. EPA, 821-R-02-013, October 2002 or the most recently approved edition. Definitive tests must be run on the same samples concurrently using both *Ceriodaphnia dubia* and Fathead Minnows (*Pimephales promelas*). If the permittee's test results indicate effluent toxicity, the permittee will be required to submit a toxicity reduction evaluation upon notification by the EPD and/or the permit will be reopened to incorporate a WET limit.

11. WATERSHED PROTECTION PLAN

The permittee has developed a watershed protection plan and the plan has been approved by EPD. The watershed protection plan shall be enforceable through this permit.

The watershed protection plan provides for the following:

a. The watershed protection plan shall apply to all areas contained within the permittee's political boundaries and to any other areas to which the permittee provides sewer service. The plan will utilize the information generated in the permittee's watershed assessment to establish a baseline of watershed conditions and to provide ongoing long-term monitoring according to the approved plan to either verify that the plan is effective or to modify the plan such that water quality standards will be achieved.

b. The watershed protection plan must include a schedule for correcting current water quality problems that are causing water quality standards violations. The permittee shall provide ongoing monitoring to verify that the actions taken to correct the water quality problems are effective.

c. The permittee shall develop and put in place best management practices (BMPs) to prevent future water quality standards violations.

d. The permittee shall provide ongoing monitoring to verify that the BMPs are working or to provide the information necessary to modify the BMPs to achieve water quality standards.

Annual Report

Each June 30th the permittee is to submit the following to EPD:

a. An annual certification statement documenting that the plan is being implemented as approved. The certification statement shall read as follows: " I certify, under penalty of law, that the watershed protection plan is being implemented. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

b. All watershed plan data collected during the previous year in an electronic format. This data shall be archived using a digital format such as a spreadsheet developed in coordination with EPD. All archived records, data, and information pertaining to the watershed protection plan shall be maintained permanently.

c. A progress report that provides a summary of the BMPs that have been implemented and documented water quality improvements. The progress report shall also include any necessary changes to the Watershed Protection Plan.

PART II

A. MANAGEMENT REQUIREMENTS

1. FACILITY OPERATION

The permittee shall maintain and operate efficiently all treatment or control facilities and related equipment installed or used by the permittee to achieve compliance with this permit. Efficient operation and maintenance include effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. Back-up or auxiliary facilities or similar systems shall be operated only when necessary to achieve permit compliance.

2. CHANGE IN DISCHARGE

Any anticipated facility expansions, or process modifications which will result in new, different, or increased discharges of pollutants requires the submission of a new NPDES permit application. If the changes will not violate the permit effluent limitations, the permittee may notify EPD without submitting an application. The permit may then be modified to specify and limit any pollutants not previously limited.

3. NONCOMPLIANCE NOTIFICATION

If, for any reason the permittee does not comply with, or will be unable to comply with any effluent limitations specified in the permitee's NPDES permit, the permittee shall provide EPD with an oral report within 24 hours from the time the permittee becomes aware of the circumstances followed by a written report within five (5) days of becoming aware of such condition. The written submission shall contain the following information:

a. A description of the noncompliance and its cause; and

b. The period of noncompliance, including the exact date and times; or, if not corrected, the anticipated time the noncompliance is expected to continue; and

c. The steps taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

4. ANTICIPATED NONCOMPLIANCE NOTIFICATION

The permittee shall give written notice to the EPD at least 10 days before:

a. Any planned changes in the permitted facility; or

b. Any activity which may result in noncompliance with the permit.

5. OTHER NONCOMPLIANCE

The permittee must report all instances of noncompliance not reported under other specific reporting requirements, at the time monitoring reports are submitted. The reports shall contain the information required under conditions of twenty-four hour reporting.

6. OPERATOR CERTIFICATION REQUIREMENTS

The person responsible for the daily operation of the facility must be a Class I Certified Operator in compliance with the Georgia State Board of Examiners for Certification of Water and Wastewater Plant Operators and Laboratory Analysts Act, as amended, and as specified by Subparagraph 391-3-6-.12 of the Rules and Regulations for Water Quality Control. All other operators must have the minimum certification required by this Act.

7. LABORATORY ANALYST CERTIFICATION REQUIREMENTS

Laboratory Analysts must be certified in compliance with the Georgia State Board of Examiners for Certification of Water and Wastewater Treatment Plant Operators and Laboratory Analysts Act, as amended.

8. BYPASSING

Any diversion of wastewater from or bypassing of wastewater around the permitted treatment works is prohibited, except if:

a. Bypassing is unavoidable to prevent loss of life, personal injury, or severe property damage;

b. There are no feasible alternatives to bypassing; and

c. The permittee notifies the EPD at least 10 days before the date of the bypass.

Feasible alternatives to bypassing include use of auxiliary treatment facilities and retention of untreated waste. The permittee must take all possible measures to prevent bypassing during routine preventative maintenance by installing adequate back-up equipment.

The permittee shall operate the facility and the sewer system to minimize discharge of pollutants from combined sewer overflows or bypasses and may be required by the EPD to submit a plan and schedule to reduce bypasses, overflows, and infiltration.

Any unplanned bypass must be reported following the requirements for noncompliance notification specified in II.A.3. The permittee may be liable for any water quality violations that occur as a result of bypassing the facility.

9. POWER FAILURES

If the primary source of power to this water pollution control facility is reduced or lost, the permittee shall use an alternative source of power if available, to reduce or control all discharges to maintain permit compliance.

10. ADVERSE IMPACT

The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge disposal which might adversely affect human health or the environment.

11. NOTICE CONCERNING ENDANGERING WATERS OF THE STATE

Whenever, because of an accident or otherwise, any toxic or taste and color producing substance, or any other substance which would endanger downstream users of the waters of the State or would damage property, is discharged into such waters, or is so placed that it might flow, be washed, or fall

into them, it shall be the duty of the person in charge of such substances at the time to forthwith notify EPD in person or by telephone of the location and nature of the danger, and it shall be such person's further duty to immediately take all reasonable and necessary steps to prevent injury to property and downstream users of said water.

Spills and Major Spills:

A "spill" is any discharge of raw sewage by a Publicly Owned Treatment Works (POTW) to the waters of the State.

A "major spill" is any discharge of raw sewage that exceeds 10,000 gallons or results in water quality violations in the waters of the State or the discharge of pollutants into waters of the State by a POTW that exceeds the weekly average permitted effluent limit for BOD_5 or TSS by 50 percent or greater for any one day.

"Consistently exceeding effluent limitation" means a POTW exceeding the 30 day average limit for biochemical oxygen demand or total suspended solids for at least five days out of each seven day period during a total period of 180 consecutive days.

The following specific requirements shall apply to POTW's. If a spill or major spill occurs, the owner of a POTW shall immediately:

a. Notify EPD, in person or by telephone, when a spill or major spill occurs in the system.

b. Report the incident to the local health department(s) for the area affected by the incident. The report at a minimum shall include the following:

    1. Date of the spill or major spill;
    2. Location and cause of the spill or major spill;
    3. Estimated volume discharged and name of receiving waters; and
    4. Corrective action taken to mitigate or reduce the adverse effects of the spill or major spill.

c. Post a notice as close as possible to where the spill or major spill occurred and where the spill entered State waters and also post additional notices along portions of the waterway affected by the incident (i.e. bridge crossings, boat ramps, recreational areas, and other points of public access to the affected waterway). The notice at a minimum shall include the same information required in 11(b)(1-4) above. These notices shall remain in place for a minimum of seven days after the spill or major spill has ceased.

d. Within 24 hours of becoming aware of a spill or major spill, the owner of a POTW shall report the incident to the local media (television, radio, and print media). The report shall include the same information required in 11(b)(1-4) above.

e. Within five (5) days (of the date of the spill or major spill), the owner of a POTW shall submit to EPD a written report which includes the same information required in 11(b)(1-4) above.

f. Within 7 days (after the date of a major spill), the owner of a POTW responsible for the major spill, shall publish a notice in the largest legal organ of the County where the incident occurred. The notice shall include the same information required in 11(b)(1-4) above.

g. The owner of a POTW shall immediately establish a monitoring program of the receiving waters affected by a major spill or by consistently exceeding an effluent limit, with such

monitoring being at the expense of the POTW for at least one year. The monitoring program shall include an upstream sampling point as well as sufficient downstream locations to accurately characterize the impact of the major spill or the consistent exceedence of effluent limitations described in the definition of "Consistently exceeding effluent limitation" above. As a minimum, the following parameters shall be monitored in the receiving stream:

1. Dissolved Oxygen;
2. Fecal Coliform Bacteria;
3. pH;
4. Temperature; and
5. Other parameters required by the EPD.

The monitoring and reporting frequency as well as the need to monitor additional parameters, will be determined by EPD. The results of the monitoring will be provided by the POTW owner to EPD and all downstream public agencies using the affected waters as a source of a public water supply.

h. Within 24 hours of becoming aware of a major spill, the owner of a POTW shall provide notice of a major spill to every county, municipality, or other public agency whose public water supply is within a distance of 20 miles downstream and to any others which could be potentially affected by the major spill.

12. UPSET PROVISION

Provision under 40 CFR 122.41(n)(1)-(4), regarding "Upset" shall be applicable to any civil, criminal, or administrative proceeding brought to enforce this permit.

B. RESPONSIBILITIES

1. COMPLIANCE

The permittee must comply with this permit. Any permit noncompliance is a violation of the Federal Act, State Act, and the State Rules, and is grounds for:

a. Enforcement action;

b. Permit termination, revocation and reissuance, or modification; or

c. Denial of a permit renewal application.

It shall not be a defense of the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the conditions of this permit.

2. RIGHT OF ENTRY

The permittee shall allow the Director of the EPD, the Regional Administrator of EPA, and their authorized representatives, agents, or employees after they present credentials to:

a. Enter the permittee's premises where a regulated activity or facility is located, or where any records required by this permit are kept;

b. Review and copy any records required by this permit;

c. Inspect any facilities, equipment, practices, or operations regulated or required by this permit; and

d. Sample any substance or parameter at any location.

3. SUBMITTAL OF INFORMATION

The permittee shall furnish any information required by the EPD to determine whether cause exists to modify, revoke and reissue, or terminate this permit or to determine compliance with this permit. The permittee shall also furnish the EPD with requested copies of records required by this permit. If the permittee determines that any relevant facts were not included in a permit application or that incorrect information was submitted in a permit application or in any report to the EPD, the permittee shall promptly submit the additional or corrected information.

4. TRANSFER OF OWNERSHIP OR CONTROL

A permit may be transferred to another person by a permittee if:

a. The permittee notifies the Director in writing at least 30 days in advance of the proposed transfer;

b. An agreement is written containing a specific date for transfer of permit responsibility including acknowledgment that the existing permittee is liable for violations up to that date, and that the new permittee is liable for violations from that date on. This agreement must be submitted to the Director at least 30 days in advance of the proposed transfer; and

c. The Director does not notify the current permittee and the new permittee within 30 days of EPD intent to modify, revoke and reissue, or terminate the permit. The Director may require that a new application be filed instead of agreeing to the transfer of the permit.

5. AVAILABILITY OF REPORTS

Except for data determined to be confidential by the Director of EPD under O.C.G.A. 12-5-26 or by the Regional Administrator of EPA under the Code of Federal Regulations, Title 40, Part 2, all reports prepared to comply with this permit shall be available for public inspection at an EPD office. Effluent data, permit applications, permittees' names and addresses, and permits shall not be considered confidential.

6. PERMIT MODIFICATION

This permit may be modified, terminated, or revoked and reissued in whole or in part during its term for causes including, but not limited to:

a. Permit violations;

b. Obtaining this permit by misrepresentation or by failure to disclose all relevant facts;

c. Changing any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge;

d. Changes in effluent characteristics; and

e. Violations of water quality standards.

The filing of a request by the permittee for permit modification, termination, revocation and reissuance, or notification of planned changes or anticipated noncompliance does not negate any permit condition.

7. CIVIL AND CRIMINAL LIABILITY

The permittee is liable for civil or criminal penalties for noncompliance with this permit and must comply with applicable State and Federal laws including promulgated water quality standards. The permit cannot be interpreted to relieve the permittee of this liability even if it has not been modified to incorporate new requirements.

8. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights of either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, or any infringement of Federal, State or local laws or regulations.

9. EXPIRATION OF PERMIT

The permittee shall submit an application for permit reissuance at least 180 days before the expiration date of this permit. The permittee shall not discharge after the permit expiration date without written authorization from the EPD. To receive this authorization, the permittee shall submit the information, forms, and fees required by the EPD no later than 180 days before the expiration date.

10. CONTESTED HEARINGS

Any person aggrieved or adversely affected by any action of the Director of the EPD shall petition the Director for a hearing within 30 days of notice of the action.

11. SEVERABILITY

The provisions of this permit are severable. If any permit provision or the application of any permit provision to any circumstance is held invalid, the provision does not affect other circumstances or the remainder of this permit.

PART III

INDUSTRIAL PRETREATMENT PROGRAM FOR PUBLICLY OWNED TREATMENT WORKS (POTW)

1. The permittee may establish and operate an approved industrial pretreatment program.

2. If the EPD determines that the permittee is required to develop a local industrial pretreatment program, the permittee will be notified in writing. The permittee shall immediately begin development of an industrial pretreatment program and shall submit it to the EPD for approval no later than one year after the notification.

3. During the interim period between determination that a program is needed and approval of the program, all industrial pretreatment permits shall be issued by the EPD.

4. The permittee shall notify the EPD of all industrial users connected to the system or proposing to connect to the system from the date of issuance of this permit.

5. Implementation of the Pretreatment Program developed by the State can be delegated to the permittee following the fulfillment of requirements detailed in 391-3-6-.09 of the Rules and Regulations for Water Quality Control.

Georgia Department of Natural Resources

2 Martin Luther King, Jr. Drive, S.E., Suite 1152 East Tower, Atlanta, Georgia 30334-9000
Chris Clark, Commissioner
F. Allen Barnes, Director
Environmental Protection Division
404/656-4713

RECEIVED

AUG 31 2010

WATER & SEWER

August 18, 2010

Mr. Tim Perkins
Forsyth County Water and Sewer Department
110 East Main Street, Suite 150
Cumming, Georgia 30040

cc: Barry
John

Re: Water Quality Certification
Joint Public Notice 200800913
Wastewater Diffuser Pipe
Chattahoochee River Basin
Forsyth County

Dear Mr. Perkins:

Pursuant to Section 401 of the Federal Clean Water Act, the State of Georgia issues this certification to the Forsyth County Water and Sewer Department, an applicant for a federal permit or license to conduct an activity in, on or adjacent to the waters of the State of Georgia.

The State of Georgia certifies that there is no applicable provision of Section 301; no limitation under Section 302; no standard under Section 306; and no standard under Section 307, for the applicant's activity. The State of Georgia certifies that the applicant's activity will comply with all applicable provisions of Section 303.

This certification is contingent upon the following conditions:

1. All work performed during construction will be done in a manner so as not to violate applicable water quality standards.

2. No oils, grease, materials or other pollutants will be discharged from the construction activities which reach public waters.

This certification does not relieve the applicant of any obligation or responsibility for complying with the provisions of any other laws or regulations of other federal, state or local authorities.

It is your responsibility to submit this certification to the appropriate federal agency.

Sincerely,

F. Allen Barnes

F. Allen Barnes
Director

FAB:kp

cc: Mr. Justin Hammonds
Mr. Bob Lord
Debbie Harris
Ms. Betsy Jorgensen

Georgia Department of Natural Resources

2 Martin Luther King, Jr. Drive, S.E., Suite 1152 East Tower, Atlanta, Georgia 30334-9000
Chris Clark, Commissioner
F. Allen Barnes, Director
Environmental Protection Division
404/656-4713

August 18, 2010

Mr. Tim Perkins, Director
Forsyth County Department of Water and Sewer
110 E. Main St. Suite 150
Cumming, Georgia 30040

Re: Request for Variance under
Provisions of O.C.G.A. 12-7-6(b)(16)
Pipe Installation for Chattahoochee River
Diffuser and Discharge Facility
Forsyth County

Dear Mr. Perkins:

Your stream buffer variance request for the above referenced project has been reviewed by the Georgia Environmental Protection Division's Watershed Protection Branch. The review was conducted to consider the potential impact of the proposed project's encroachment on State waters within the context of the Georgia Erosion and Sedimentation Act. Pursuant to DNR Rule 391-3-7.05(2)(a), authorization is hereby granted to encroach within the 50-foot buffer adjacent to State waters for the above referenced project subject to the following conditions:

1. As per your application dated January 23, 2009 and the revisions received April 27, 2009;

2. All graded slopes 3:1 or greater must be hydroseeded and covered with Georgia DOT approved wheat straw, wood fiber matting or coconut fiber matting. If not hydroseeded, Georgia DOT approved matting that has been incorporated with seed and fertilizer must be used. All slopes must be properly protected until a permanent vegetative stand is established;

3. The amount of land cleared during construction must be kept to a minimum;

4. All disturbed areas must be seeded, fertilized and mulched as soon as the final grade is achieved. Also, these disturbed areas must be protected until permanent vegetation is established;

5. Georgia DOT type "C" silt fence or an approved high performance silt fence must be installed on the site perimeter wherever the stormwater may be discharged, and a double row must be installed between the land disturbing activities and State waters;

6. Buffer variance conditions must be incorporated into any Land Disturbing Activity Permit which may be issued by Forsyth County for this project; and

7. This project must be conducted in strict adherence to the approved erosion and sedimentation control plan and any Land Disturbing Activity Permit which may be issued by Forsyth County for this project.

The granting of this approval does not relieve you of any obligation or responsibility for complying with the provisions of any other law or regulations of any federal, local or additional State authority, nor does it obligate any of the aforementioned to permit this project if they do not concur with its concept of development/control. As a delegated "Issuing Authority," Forsyth County is expected to ensure that the stream buffer variance requirements are met for this project and is empowered to be more restrictive in this regard.

If you have any questions concerning this letter, please contact Peggy Chambers, Erosion and Sedimentation Control Unit, NonPoint Source Program, at (404) 675-6240.

Sincerely,

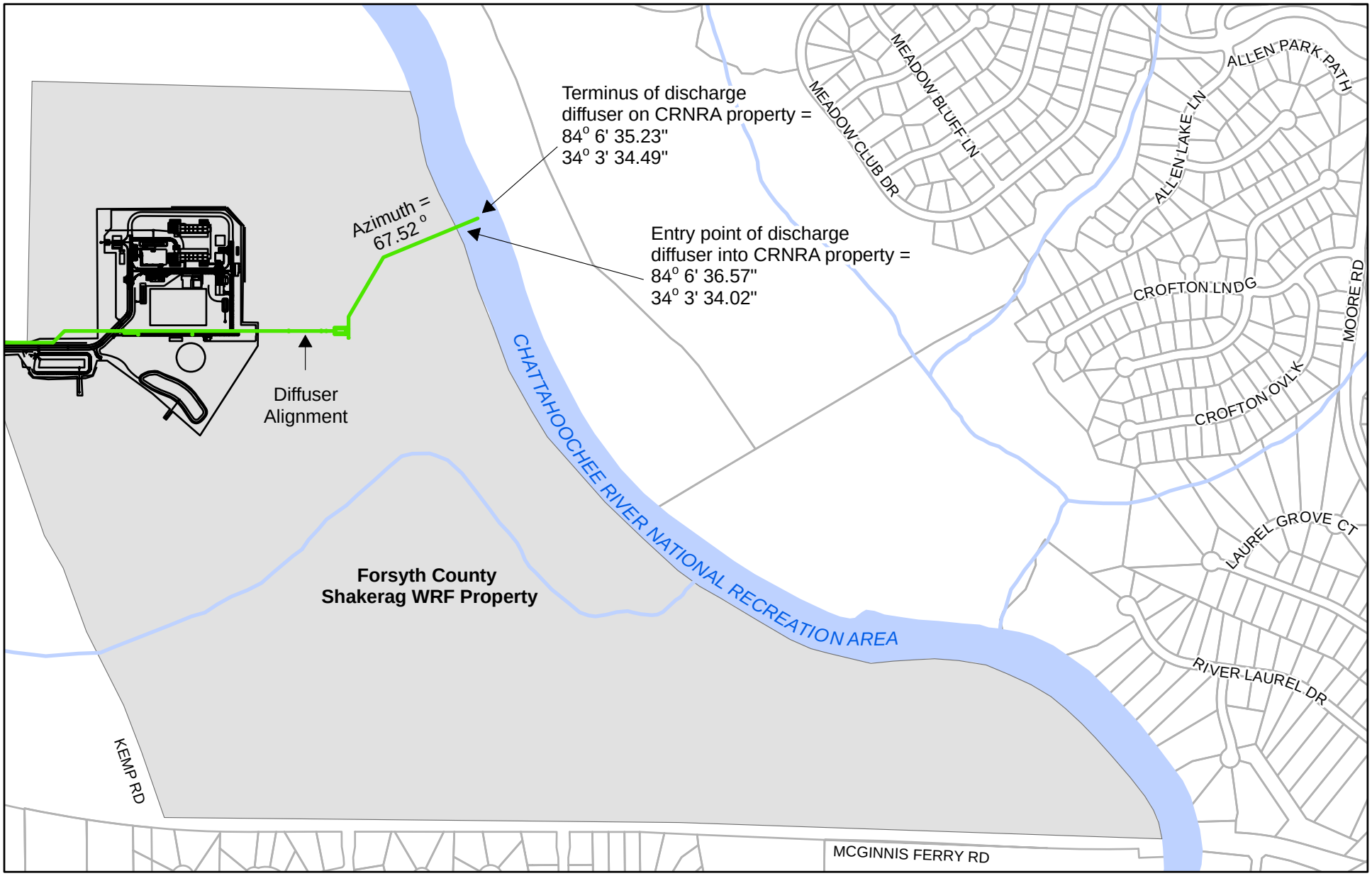
F. Allen Barnes
Director

FAB:pc

cc: Honorable Charles Laughinghouse
Juliet Cohen
Jeff Durniak
Robert Amos
Tony Campbell
Keith Parsons

File: TSV-058-09-01

Appendix C
Metes and Bounds Drawing



Legend

- Diffuser
- Proposed Site Layout
- River/Stream
- Shakerag WRF Property
- Chattahoochee River NRA
- Parcels

0 500 1,000 Feet

Appendix C
Metes and Bounds Drawing Specification
Shakerag WRF ROW and Discharge Environmental Assessment

CH2MHILL

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Appendix D
Public Comments and Agency Correspondence

A public meeting was held on Thursday, November 17th, 2005 from 7 PM to 9 PM in the Commissioners Chambers at the Forsyth County Administration Building, 110 East Main Street, Suite 150, Cumming, Georgia 30040. A public notice (attached, with affidavits) was posted in the newspaper of record (Forsyth County News) every Wednesday for a period of 4 weeks. Four people attended the public meeting and no comments were received at the meeting, or by telephone, mail, or email within the 30-day comment period. A sign-in sheet from the meeting, the public comment form, and a list of frequently asked questions are included in this appendix.

Shakerag Water Reclamation Facility (WRF) and Chattahoochee Diffuser Public Hearing

November 17, 2005 - 7 pm to 9 pm

Sign-in Sheet

Name	Address	Phone
Rick KARASIEWICZ	5665 New Northside Dr Atlanta 30328	770-933-0280
BOB PRATT	3745 BRIDLE RIDGE DR 30024	770-886-1838
Richard Shore	2943 Wills Orchard Rd 30040	770-521-9277
Peaks Laughing House		

Shakerag Water Reclamation Facility (WRF) and Chattahoochee Diffuser Public Hearing

November 17, 2005 - 7 pm to 9 pm

Frequently Asked Questions (FAQs)

Why is Forsyth County seeking a permit to treat wastewater at the Shakerag WRF?

To treat existing and future wastewater flows to beneficial reuse standards.

Will the county be acquiring land for the Shakerag WRF?

No, the proposed plant would be built at the site of the existing Threatt LAS. This property is already owned by Forsyth County.

What technology will be used to treat wastewater at the Shakerag WRF?

The proposed Shakerag WRF will treat wastewater using membrane bioreactors, the latest technology for removing impurities in wastewater.

Why is Forsyth County proposing a year-round discharge to the Chattahoochee River?

Year round discharge will increase operational flexibility of the existing reuse system, and will return high quality water to the Chattahoochee River.

Will the flow of reclaimed water have an impact on the Chattahoochee River?

Because of the quality of the reclaimed water, no impacts on water quality are anticipated. There will be a very small temperature increase within a few feet of the diffuser.

What is a diffuser, and how does it work?

The diffuser is a series of small pipe openings on the river bottom that will blend treated wastewater with river water. By spreading the flow across many openings, negative impacts are reduced.

Will there be any impact to the environment or properties due to construction of the plant and diffuser?

Typical construction activity will be required to build the Shakerag WRF, with temporary land disturbance. Part of the river bed will be excavated for installation of the diffuser, and restored to its original condition after work is complete.

Shakerag Water Reclamation Facility (WRF) and Chattahoochee Diffuser Public Hearing

November 17, 2005 - 7 pm to 9 pm

Public Comment Form

Name Address Phone

Comments:

of the Court's discretion and in the best interest of the children, the children need not be brought before the Court at the hearing.

WITNESS, the Honorable J. Russell Jackson, Judge of said Court, this the 3 day of October, 2005.

/s/ CLERK
FORSYTH COUNTY JUVENILE COURT
FORSYTH COUNTY COURTHOUSE
CUMMING, GEORGIA

L075 10/19, 26, 11/2

ADNUM: L078
STATE OF GEORGIA
COUNTY OF FORSYTH

Notice to Foreclose Right to Redeem

TO: James A. Mulkey
1605 Martins Creek Rd., Murphy, NC 28906

Take notice that:

The right to redeem the following described property to wit:

All that tract or parcel of land lying and being in Land Lot 150 of the 14TH District, 1ST Section of Forsyth County, Georgia and being Lots 168 and 169 of Hill Dale Section of Shady Shores Development per plat thereof recorded in Plat Book 4, page 18, Forsyth County, Georgia records, which plat is incorporated herein and made a part hereof by reference.

Will expire and be forever foreclosed and barred on and after the 10th day of November, 2005.

The tax deed to which this notice relates is dated the 7th day of September, 2004 and is recorded in the office of the Clerk of the Superior Court of Forsyth County, Georgia, in Deed Book 3548, Page 261.

The property may be redeemed at any time before the 10th day of November, 2005, by payment of the redemption price as fixed and provided by law to the undersigned at the following address:

BOLING, RICE, MCGRUDER, BARRON & BEAUDIN, LLC
Chris R. Shaw
P.O. Box 244
Cumming, Georgia, 30028.

Please be governed accordingly.

THIS LAW FIRM IS ATTEMPTING TO COLLECT A DEBT. ANY INFORMATION OBTAINED WILL BE USED FOR THAT PURPOSE.

L078 10/19, 26, 11/2, 9

ADNUM: L080

NOTICE OF ABANDONED VEHICLE

Re: Mfr. I.D. No. 1FTJE34H7KUB47489
License No. 1989 Ford - F250

TO WHOM IT MAY CONCERN:

The above automobile was initially removed from: It is presently located at 2865 Dahlonega Hwy., Cumming, GA 30040 and is in the possession of

Attempts to locate the owner have been unsuccessful. The vehicle is deemed abandoned under O.C.G.A. § 40-11-2 and will be disposed of if not redeemed. This notice is given pursuant to Georgia law.

L080 10/19, 26

ADNUM:L081

APPLICATION TO REGISTER A BUSINESS TO BE CONDUCTED UNDER TRADE NAME, PARTNERSHIP OR OTHERS

STATE OF GEORGIA
COUNTY OF FORSYTH

The undersigned does hereby certify that Owens Contracting, Inc. conducting a business as JLO Enterprises and Real Estate in the City of Cumming County of Forsyth in the State of Georgia, under the name of JLO Enterprises and Real Estate and that the nature of the business is Real estate consulting and planning and that the names and addresses of the persons, firms or partnership owning and carrying on said trade or business are

Joni L. Owens
Schiffley R. Owens, Jr.
9055 Bethel Rd.
Gainesville, GA 30506

L081 10/19, 26

ADNUM:L082

APPLICATION TO REGISTER A BUSINESS TO BE CONDUCTED

Associates, P.C.
2500 Hospital Boulevard
Suite 450
Roswell, Georgia 30076

L086 10/19, 26

ADNUM:L087

NOTICE

Notice is hereby given that the business operated at One Plaza Road, Suite 100, Greenvale, NY 11548 in the trade name of Clearlight Mortgage is owed and carried on by Coastal Capital Corp. DBA The Mortgage Shop whose address is One Plaza Road, Suite 100, Greenvale, NY 11548, and the statement relating thereto required by by O.C.G.A. 10-1-490, has been filed with the clerk of the Superior Court of Forsyth County, Georgia.

L087 10/19, 26

ADNUM: L113

NOTICE OF PUBLIC SALE

For sale at public auction at Storage Xxtra, 4015 Mini Trail, Cumming, Georgia, 30041, of storage units containing household and miscellaneous goods, on Tuesday, November 15th, 2005, at 11:00 a.m. to the highest bidder, bids being payable in cash, money order, or credit card.

Unit# B-25 Kristina Trenor
Unit# B-27 Chris Morgan
Unit# B-31 Tasha Frady
Unit# C-6 Jody Bruder
Unit# D-31 Martin King
Unit# H-15 Laura Mahalak

L113 10/26, 11/2

ADNUM: L114

NOTICE OF PUBLIC SALE

Your Extra Attic, located at 1715 Peachtree Parkway, Cumming, GA 30041 will hold a public sale to the highest bidder on 11-11-05 at 3:00. This sale is to enforce a lien on said personal property pursuant to the "Georgia Self-Storage Facility Act" Georgia Code Section 10-4-210 — 10-4-215.

Registered or Motor vehicles sold "as is/parts only" no titles or registration. Your Extra Attic, reserves the right to withdraw from such sale and reject any bids.

Unit# 5110C, Johanbakhsh Yadegar, Household good, furniture boxes
Unit# E515, John Sewell, Household good, boxes, furniture

L114 10/26, 11/2

ADNUM: L125

PUBLIC NOTICE
NOTICE OF ANTIDEGRADATION REVIEW OF A PROPOSED WASTEWATER RECLAMATION FACILITY IN SOUTHEAST FORSYTH COUNTY

Having reviewed and approved the request which has been submitted, the Georgia Environmental Protection Division (EPD) is considering issuance of a permit for the construction of a new wastewater reclamation facility (WRF) at the Shakerag site located in the southeast portion of the County. The design includes plans for a wastewater diffuser that will discharge up to 6 million gallons per day (MGD) of high quality reuse water into the Chattahoochee River. The approval of the antidegradation review was based upon the technical details of the proposed work, as the non-discharge alternative would impose a mid-range financial impact on the rate payers.

The request for review of the design is made by the following applicant:

Forsyth County Department of Water and Sewer, 110 East Main Street, Suite 150, Cumming, Georgia 30040.

The construction of the Shakerag WRF and Chattahoochee River diffuser is part of Forsyth County's wastewater master plan. The new plant will produce high quality effluent using membrane bioreactor technology, and will further Forsyth County's efforts to treat wastewater to a very high standard.

There is recognition at the regulatory level that return of highly treated wastewater to waterways is preferable to non-beneficial disposal alternatives, which do not offset

ADNUM:L116

APPLICATION TO REGISTER A BUSINESS TO BE CONDUCTED UNDER TRADE NAME, PARTNERSHIP OR OTHERS

STATE OF GEORGIA
COUNTY OF FORSYTH

The undersigned does hereby certify that VOLMI PROPERTIES LLC conducting a business as OLGA SEVA in the City of Alpharetta County of Forsyth in the State of Georgia, under the name of OLGA SEVA and that the nature of the business is Real Estate, construction and that the names and addresses of the persons, firms or partnership owning and carrying on said trade or business are

Olga Yepifantseva
6550 Barrington Run
Alpharetta, GA 30005

L116 10/26, 11/2

ADNUM:L117

APPLICATION TO REGISTER A BUSINESS TO BE CONDUCTED UNDER TRADE NAME, PARTNERSHIP OR OTHERS

STATE OF GEORGIA
COUNTY OF FORSYTH

The undersigned does hereby certify that Maximum Real Estate, Inc. conducting a business as Maximum Cycle in the City of Cumming County of Forsyth in the State of Georgia, under the name of Maximum Cycle and that the nature of the business is motorcycle and jet ski sales, accessories to accompany the same and that the names and addresses of the persons, firms or partnership owning and carrying on said trade or business are

Michael Nelson Hurley
3895 Pinewood Ct.
Cumming, GA 30041

Michael Robert Meadows
200 Moore Valley Way
Canton, GA 30115

L117 10/26, 11/2

ADNUM:L118

APPLICATION TO REGISTER A BUSINESS TO BE CONDUCTED UNDER TRADE NAME, PARTNERSHIP OR OTHERS

STATE OF GEORGIA
COUNTY OF FORSYTH

The undersigned does hereby certify that Jason Allen Jackson conducting a business as The Pool Doctor in the City of Ball Ground County of Forsyth in the State of Georgia, under the name of The Pool Doctor and that the nature of the business is open, closing, and maintenance of pools and that the names and addresses of the persons, firms or partnership owning and carrying on said trade or business are

Jason Jackson
8455 River Bluff Place
Ball Ground, GA 30107

L118 10/26, 11/2

ADNUM:L119

APPLICATION TO REGISTER A BUSINESS TO BE CONDUCTED UNDER TRADE NAME, PARTNERSHIP OR OTHERS

STATE OF GEORGIA
COUNTY OF FORSYTH

The undersigned does hereby certify that Christine E. Morrison conducting a business as A-Team Trainers in the City of Cumming County of Forsyth in the State of Georgia, under the name of A-Team Trainers and that the nature of the business is personal training and fitness and that the names and addresses of the persons, firms or partnership owning and carrying on said trade or business are

Christine Morrison
5420 Glenhaven Drive
Cumming, GA 30041

L119 10/26, 11/2

ADNUM:L120

APPLICATION TO REGISTER A BUSINESS TO BE CONDUCTED UNDER TRADE NAME, PARTNERSHIP

See **LEGALS**, Page 9B

LEGALS from Page 6B

DNUM: L889

REQUEST FOR PROPOSAL

he Forsyth County Public Library (FCPL) oard of Trustees requests proposals for rofessional microfilming and digitization ervices for a Preservation Project of the orsyth County News.

CPL will break the project into five phas-s, based on funding considerations. hase 1 is to microfilm the print issues om January 2001 to the present, using isting funds. Phases 2, 3 and 4 involve gitization, indexing, and remote hosting nd will be paid for by funds to be applied r. Phase 5 is to continue microfilming nd digitizing papers as they are issued, eeping the project current.

espondents must indicate intent to espond by Friday, October 14, 2005 to low time to receive and process sam-es.

roposals will be received until 2:00 p.m. ednesday, November 30, 2005 at FCPL, 35 Dahlonega Road, Cumming, GA 0040. Any proposal received after this ate and time will not be accepted. roposals will be publicly opened and nly names of submitting firms will be ead aloud at 3:00 p.m. November 30, 005.

roposal specifications can be obtained y contacting Carla Beasley, FCPL, FAX 78-513-8474, beasleyc@forsythpl.org.

CPL reserves the right to reject any or l proposals, and to waive technicalities nd informalities.

L889 9/28, 10/5, 12, 19, 26, 11/2, 19, 16, 23, 30

DNUM:L075

IN THE JUVENILE COURT OF FORSYTH COUNTY STATE OF GEORGIA

I THE INTEREST OF:

.A.

EX: F; AGE: 07; DOB: 12/16/97; CASE O. 05JCV-110

.P.

EX: F; AGE: 03; DOB: 04/11/02; CASE O. 052JCV-111

inor children under the age of eighteen ears.

NOTICE OF SUMMONS

O: KRISTIE ANGEL and any PUTATIVE ATHERS OF THE ABOVE-NAMED HILDREN

y order for service by publication dated e 4 day of October, 2005, you are here-y notified that on the 7th day of SEP-EMBER, 2005, the Forsyth County epartment of Family and Children ervice filed a Petition for Deprivation gainst you as to C.A. AND A.P. You are quired to file with the Clerk of Juvenile ourt, and to serve upon Petitioner's torney, Rochelle A. Doyle, an answer in riting within sixty (60) says of the date of e Order of Publication.

ou are hereby notified that a Petition for eprivation on the above-named children as been filed in the Forsyth County uvenile Court by the Forsyth County epartment of Family and Children ervices. A copy of the Petition is avail-ble from the Clerk of Juvenile Court of orsyth County.

ou are further notified that a hearing for e purpose of determining the custody of e minor children will be held by the ourt on the 5th day of December, 2005, 9:00 a.m., at which time you should ake your objections known or, you may e a written response with the Juvenile ourt within thirty (30) days of this notice. etitioner seeks to obtain custody of your inor children for a period of up to one ear.

ne children and other parties involved ay be represented by a lawyer at all ages of these proceedings. If you want a wyer, you may choose and hire your wn lawyer. If you want to hire a lawyer, ease contact your lawyer immediately. If ou want a lawyer but are not able to hire lawyer without undue financial hardship, ou may ask for a lawyer to be appointed represent you. The Court would inquire

UNDER TRADE NAME, PARTNERSHIP OR OTHERS

STATE OF GEORGIA
COUNTY OF FORSYTH

The undersigned does hereby certify that Owens Contracting, Inc. conducting a business as Owens Security Systems in the City of Cumming County of Forsyth in the State of Georgia, under the name of Owens Security Systems and that the nature of the business is security systems installation and service/ monitoring and that the names and addresses of the persons, firms or partnership owning and carrying on said trade or business are

Joni L. Owens
Schiffley R. Owens, Jr.
9055 Bethel Rd.
Gainesville, GA 30506

L082 10/19, 26

ADNUM:L083

APPLICATION TO REGISTER A BUSINESS TO BE CONDUCTED UNDER TRADE NAME, PARTNERSHIP OR OTHERS

STATE OF GEORGIA
COUNTY OF FORSYTH

The undersigned does hereby certify that Wilson & Wilson Homes, Inc. conducting a business as Wilson & Wilson Homes in the City of Cumming County of Forsyth in the State of Georgia, under the name of Wilson & Wilson Homes and that the nature of the business is residential builder and that the names and addresses of the persons, firms or partnership owning and carrying on said trade or business are

Wilson & Wilson Homes, Inc.
4740 Rambling Rose Dr.
Cumming, GA 30040

L083 10/19, 26

ADNUM:L084

APPLICATION TO REGISTER A BUSINESS TO BE CONDUCTED UNDER TRADE NAME, PARTNERSHIP OR OTHERS

STATE OF GEORGIA
COUNTY OF FORSYTH

The undersigned does hereby certify that Derek Knorr conducting a business as The Cumming Second in the City of Cumming County of Forsyth in the State of Georgia, under the name of The Cumming Second and that the nature of the business is electronic media and that the names and addresses of the persons, firms or partnership owning and carrying on said trade or business are

Derek Knorr: Owner
Cumming, GA 30041

L084 10/19, 26

ADNUM:L085

APPLICATION TO REGISTER A BUSINESS TO BE CONDUCTED UNDER TRADE NAME, PARTNERSHIP OR OTHERS

STATE OF GEORGIA
COUNTY OF FORSYTH

The undersigned does hereby certify that Russell D. Akin conducting a business as Johns Creek Insurance in the City of Suwanee County of Forsyth in the State of Georgia, under the name of Johns Creek Insurance and that the nature of the business is insurance and financial services and that the names and addresses of the persons, firms or partnership owning and carrying on said trade or business are

Russell D. Akin

L085 10/19, 26

ADNUM:L086

APPLICATION TO REGISTER A BUSINESS TO BE CONDUCTED UNDER TRADE NAME, PARTNERSHIP OR OTHERS

STATE OF GEORGIA
COUNTY OF FORSYTH

The undersigned does hereby certify that North Fulton Ear, Nose & Throat Associates, P.C. conducting a business as Cumming Sinus and Sleep Specialists in

consumptive use. The return of reclaimed water to the watershed is a form of beneficial reuse and is in line with the goals of the Metropolitan North Georgia Water Planning District Long-Term Wastewater Management Plan. The plan recommends that Forsyth County return up to 6 MGD to the Chattahoochee River by the year 2010.

Persons wishing to comment on the DDR for the proposed Shakerag WRF are invited to submit the same in writing to Forsyth County at the address above within 30 days of this notice. All comments received prior to or on that date will be considered and submitted to EPD. "Forsyth County Antidegradation Review for Shakerag WRF" should be placed at the top of the first page of comments.

The Antidegradation Report is available for review at the Forsyth County Administration Building in the Water & Sewer Department, Suite 150 during normal business hours, Monday through Friday 8:30 am through 5:00 p.m.

Please bring the foregoing to the attention of persons who you know will be interested in this matter.

L125 10/26, 11/2, 9, 16

ADNUM: L126

PUBLIC NOTICE

Forsyth County hereby gives notice that the Forsyth County Water & Sewer Department will hold a public meeting on Thursday, November 17th, 2005 from 7PM to 9PM. The meeting location will be in the Commissioners Chambers at the Forsyth County Administration Building, 110 East Main Street, Suite 150, Cumming, Georgia 30040.

The purposes of the public meeting are to:

1. Inform the public of the need for improvements to the county's wastewater system.
2. Inform the public of the proposed water reclamation system, which will include a new wastewater treatment facility (WRF) located in the southeast portion of Forsyth County (Shakerag site) and a wastewater diffuser that will discharge up to 6 million gallons per day (mgd) of high quality reuse water into the Chattahoochee River.
3. To comply with Section 391-3-6-02 of Georgia's Water Quality Control Rules (and amendments thereto).
4. To encourage public involvement in the development of the plan to improve the County's wastewater system.

The public meeting will attempt to identify public preferences for the proposed improvements to the County's wastewater facilities. The environmental impacts of the proposed improvements will be evaluated and included in the County's Environmental Information Document (EID), a major document required by the State of Georgia. All public comments will be included in the EID submitted to the State of Georgia, Department of Natural Resources, Environmental Protection Division (EPD) with the permit application. A draft of the EID will be made for review by October 24th, 2005 at the Forsyth County Water & Sewer Department located at the same address shown above.

Public participation is considered essential to the selection and development of the final plan to be adopted prior to its approval by the State of Georgia, Department of Natural Resources.

L126 10/26, 11/2, 9, 16

ADNUM:L115

APPLICATION TO REGISTER A BUSINESS TO BE CONDUCTED UNDER TRADE NAME, PARTNERSHIP OR OTHERS

STATE OF GEORGIA
COUNTY OF FORSYTH

The undersigned does hereby certify that Jinger M. Davison conducting a business as Davison Photography in the City of Cumming County of Forsyth in the State of Georgia, under the name of Davison Photography and that the nature of the

AFFIDAVIT OF PUBLICATION

STATE OF GEORGIA
COUNTY OF FORSYTH

Before me, the undersigned a Notary Public, this day came Carlene Pass, who being duly sworn, according to law, says she is the Office Manager of the FORSYTH COUNTY NEWS, the official newspaper in which the Sheriff's advertisements in and for said County are published, and a Newspaper of general circulation and that a NOTICE OF PUBLICATION RE: NOTICE OF ANTI-DEGRADATION REVIEW OF A PROPOSED WASTEWATER RECLAMATION FACILITY IN SOUTH-EAST FORSYTH COUNTY was published 4 time(s) on the dates of OCTOBER 26, NOVEMBER 2, NOVEMBER 9, NOVEMBER 16, 2005 (Ref. L125)

Carlene Pass

CARLENE PASS, OFFICE MANAGER

Subscribed and sworn to before me
this 16 day of November, 2005.

Sabrena P. Murphy

NOTARY PUBLIC (seal)

SEBRENA P. MURPHY
NOTARY PUBLIC
LUMPKIN COUNTY

AFFIDAVIT OF PUBLICATION

STATE OF GEORGIA
COUNTY OF FORSYTH

Before me, the undersigned a Notary Public, this day came Carlene Pass, who being duly sworn, according to law, says she is the Office Manager of the FORSYTH COUNTY NEWS, the official newspaper in which the Sheriff's advertisements in and for said County are published, and a Newspaper of general circulation and that a NOTICE OF PUBLICATION RE: PUBLIC MEETING FOR THE FORSYTH COUNTY WATER & SEWER DEPARTMENT ON THURSDAY, NOV. 17, 2005 was published 4 time(s) on the dates of OCTOBER 26, NOVEMBER 2, NOVEMBER 9, NOVEMBER 16, 2005 (Ref. L126)

Carlene Pass

CARLENE PASS, OFFICE MANAGER

Subscribed and sworn to before me
this 16 day of November, 2005.

Sabrena P. Murphy

NOTARY PUBLIC (seal)

SEBRENA P. MURPHY
NOTARY PUBLIC
GEORGIA
LUMPKIN COUNTY

Appendix E-1
Technical Memorandum: Evaluation of Outfall Diffuser Design

Evaluation of Outfall Diffuser and Mixing of Effluent Discharged to Chattahoochee River

PREPARED FOR: Forsyth County Water and Sewer Department

PREPARED BY: Tyagi Aditya/AUS

COPIES: Doug Baughman/ATL, Muckerman, Dave/ATL

DATE: February. 24, 2009

Objective

The objective of this technical memorandum (TM) is to evaluate the design of an outfall diffuser for a National Pollutant Discharge Elimination System (NPDES) permit application. An analysis was completed of the preliminary diffuser design (CH2M HILL, 2005) for the Environmental Information Document (EID) required by the Georgia Environmental Protection Division (GAEPD) discharge permitting process. Based on its preliminary design the effluent diffuser met the temperature standards for Chattahoochee River. However, since 2005, the final design of the diffuser was completed and the minimum stream flows in the Chattahoochee River have been reduced therefore, this TM was prepared to document the temperature impacts of the proposed discharge and diffuser under the new design and stream flow conditions.

In this TM, it has been assumed that all water quality parameters except temperature are within the permitted range of wastewater disposal characteristics and cause no water quality concerns. The Georgia Environmental Protection Division (GA EPD) has evaluated the potential effects of the proposed discharge on water quality at this general location and has issued a wasteload allocation. This allocation establishes the effluent treatment levels required to maintain downstream water quality. Thus, the main focus of this TM is the discharge of effluent through a multiport diffuser so that it would cause no adverse aquatic and river water quality impacts in the vicinity of the diffuser. The effluent would be discharged from the Forsyth County reuse system serving the Fowler Water Reclamation Facility (WRF) and two future plants.

Defining Critical Conditions for Temperature Mixing Modeling

Receiving Stream Flow

In 2008, the U.S. Army Corps of Engineers (USACE) requested that releases from Buford Dam be reduced in order to achieve a minimum flow of 650 cfs at the confluence of the Chattahoochee River with Peachtree Creek during Winter months (November through April). The goal of this reduction is to conserve critically needed storage in Lake Lanier. The revised minimum flow is 100 cfs less than the targeted summer minimum flow of 750 cfs (Table 1).

TABLE 1
Chattahoochee River Minimum Seasonal Flow for Proposed Outfall Site

Statistic	Summer (May to Oct.) (cfs)	Winter (Nov. to April Months) (cfs)
Minimum Flow (cfs)	750	650

Effluent Flow

The proposed diffuser would discharge effluent from Forsyth County's reuse force main. The 11-mile supply line transects the southern part of the county, beginning at the Fowler WRF, collecting treated effluent from the James Creek WRF (under construction) and terminating at the Threatt Land Application Site on McGinnis Ferry Road. The Fowler and James WRFs are membrane bioreactor (MBR) plants, permitted to treat to urban reuse standards as established by the GA EPD. The maximum month average daily effluent flow, peak daily flow, and peak hour flows are provided in Table 2.

TABLE 2
Effluent Discharge

Item	Maximum Month Average Daily Flow (mgd)	Peak Daily Flow (mgd)	Peak Hour Flow (mgd)
Effluent (cfs)	6.0	9.6	14.4

Temperature of Receiving Stream and Discharged Effluent

Based on previous analysis (CH2M HILL 2005) of historical temperature data for the Chattahoochee River near the proposed outfall site, average summer and winter temperatures are shown in Table 3.

Additionally, based on the effluent temperature data measured at the Fowler WRF from June 2004 to February 2005, the average and 90th percentile temperature values for both summer and winter are also given in Table 3.

TABLE 3
Temperature Characteristics of Receiving Stream and Plant Effluent

Item	Effluent Temperature (°C)		Chattahoochee River Temperature (°C)	
	Average Daily	90th percentile	Average Daily	90th percentile
Summer	24.0	26.6	11.40	13.73
Winter	20.0	23.0	09.69	12.39

Cross-Sectional Area and Hydraulic Conditions of Receiving Stream

Stream cross-sectional information such as water depth and velocity is needed to model mixing and review the results for vertical and lateral spreading. Ambient stream velocity greatly influences both the dynamics and shape of a plume, so diffuser performance is very sensitive to stream ambient velocity. The velocity that corresponds to the critical flows needs to be determined. In order to determine the critical ambient velocities, a HEC-RAS model was developed using surveyed cross-sectional information (CH2M HILL 2008). The developed HEC-RAS model was used to determine the water depth and stream velocity corresponding to the summer and winter minimum flows as characterized in the preceding section. The cross-sectional data for the Chattahoochee River at three locations in a 1-mile stream segment (Figure 1) are presented in Figure 2.

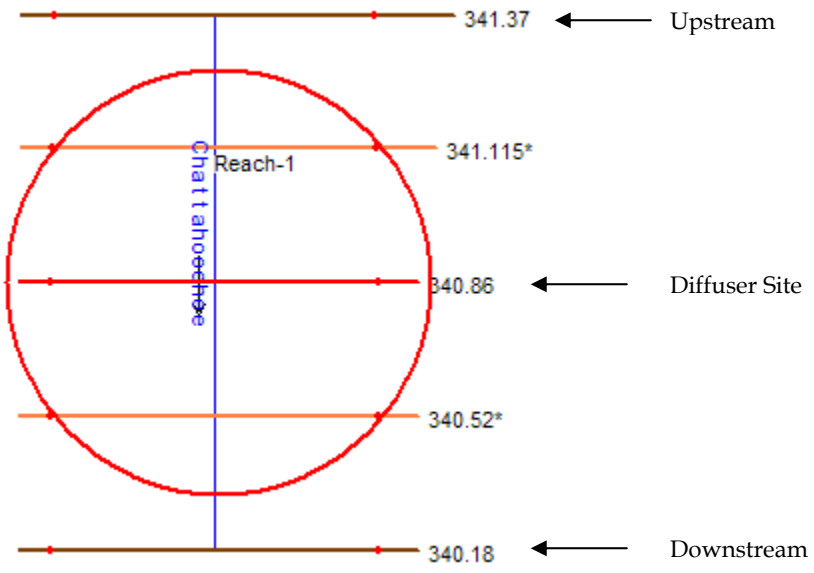


FIGURE 1
Chattahoochee River Cross-Sections Locations: Outfall Site, Upstream, Downstream, and Mid-Points

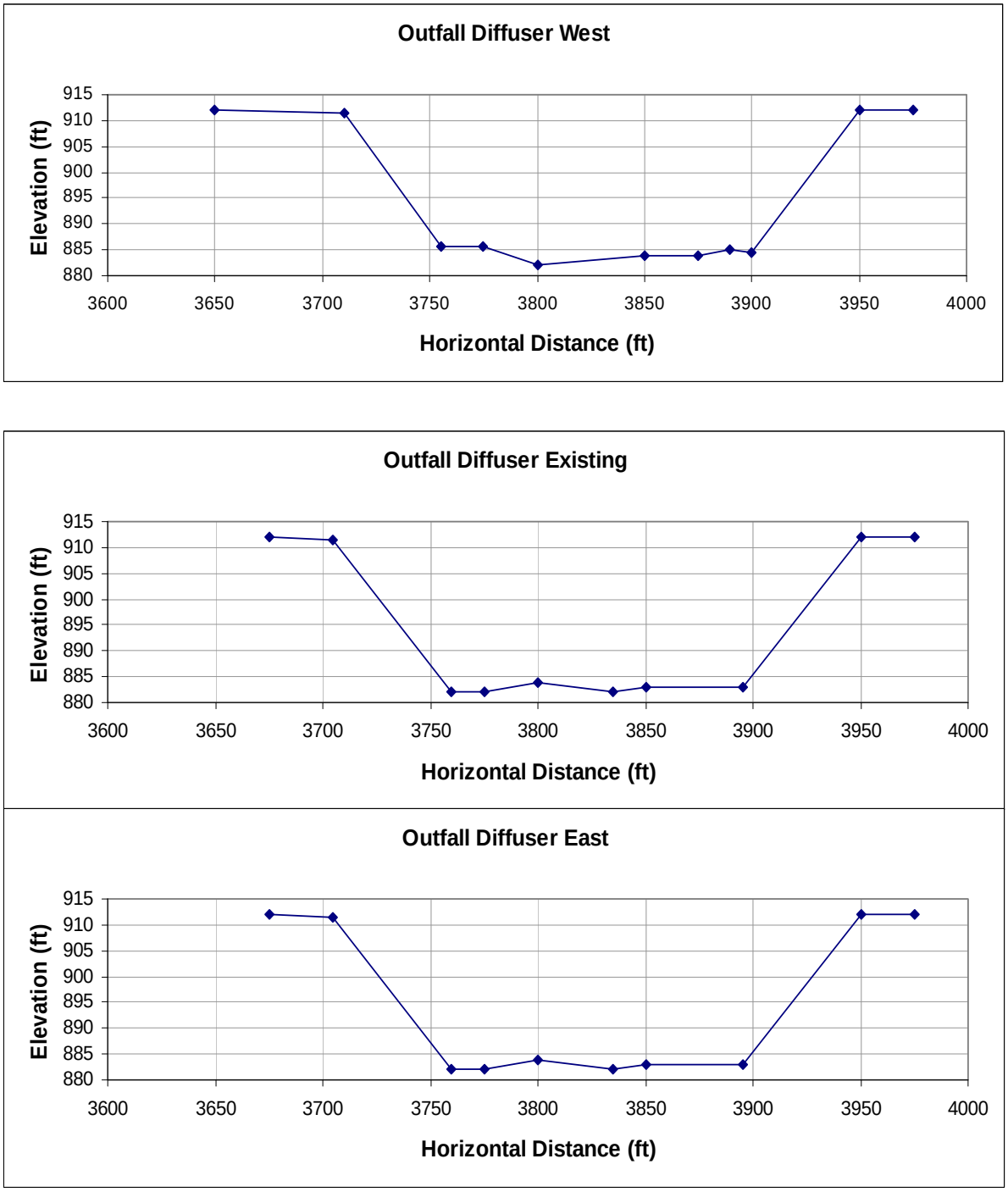


FIGURE 2
Chattahoochee River Cross-Sectional Data at Outfall Site and Upstream and Downstream Locations

The HEC-RAS model results based on the channel roughness, surveyed slope data, and downstream subcritical boundary condition during minimum seasonal flows are presented in Table 4. Figure 3 presents the resulted profiles under the minimum flow conditions for both summer and winter seasons.

TABLE 4

HEC-RAS Results Corresponding to Minimum Seasonal Flow Rates in Chattahoochee River

River Station	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Avg. Water Depth (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)
Winter Min. Flow (650 cfs) Profile									
341.37	650	882	887.24	5.24	887.27	7.21E-04	1.33	490.42	152.99
341.115	650	881.75	887.18	5.43	887.21	4.94E-04	1.19	546.59	151.59
340.86	664.85	881.75	887.15	5.4	887.17	2.59E-04	0.98	681.05	155.35
340.52	664.85	881.75	887.11	5.36	887.13	4.57E-04	1.23	540.4	133.92
340.18	664.85	882	887.07	5.07	887.09	3.60E-04	1.09	612.26	152.19
Summer Min. Flow (750 cfs) Profile									
341.37	750	882	887.61	5.61	887.64	6.75E-04	1.37	546.96	154.3
341.115	750	881.75	887.55	5.8	887.58	4.85E-04	1.24	603.17	154.07
340.86	764.85	881.75	887.52	5.77	887.54	2.65E-04	1.04	738.8	156.71
340.52	764.85	881.75	887.48	5.73	887.51	4.65E-04	1.3	590.34	136.98
340.18	764.85	882	887.44	5.44	887.46	3.60E-04	1.14	668.65	153.57

Q = Flow (cfs)
Ch. Elev = Channel Elevation (ft)
W. S. Elev = Water Surface Elevation (ft)
E.G. Elev = Energy Gradient Elevation (ft)
Vel Chanl = Channel Velocity (ft./sec)

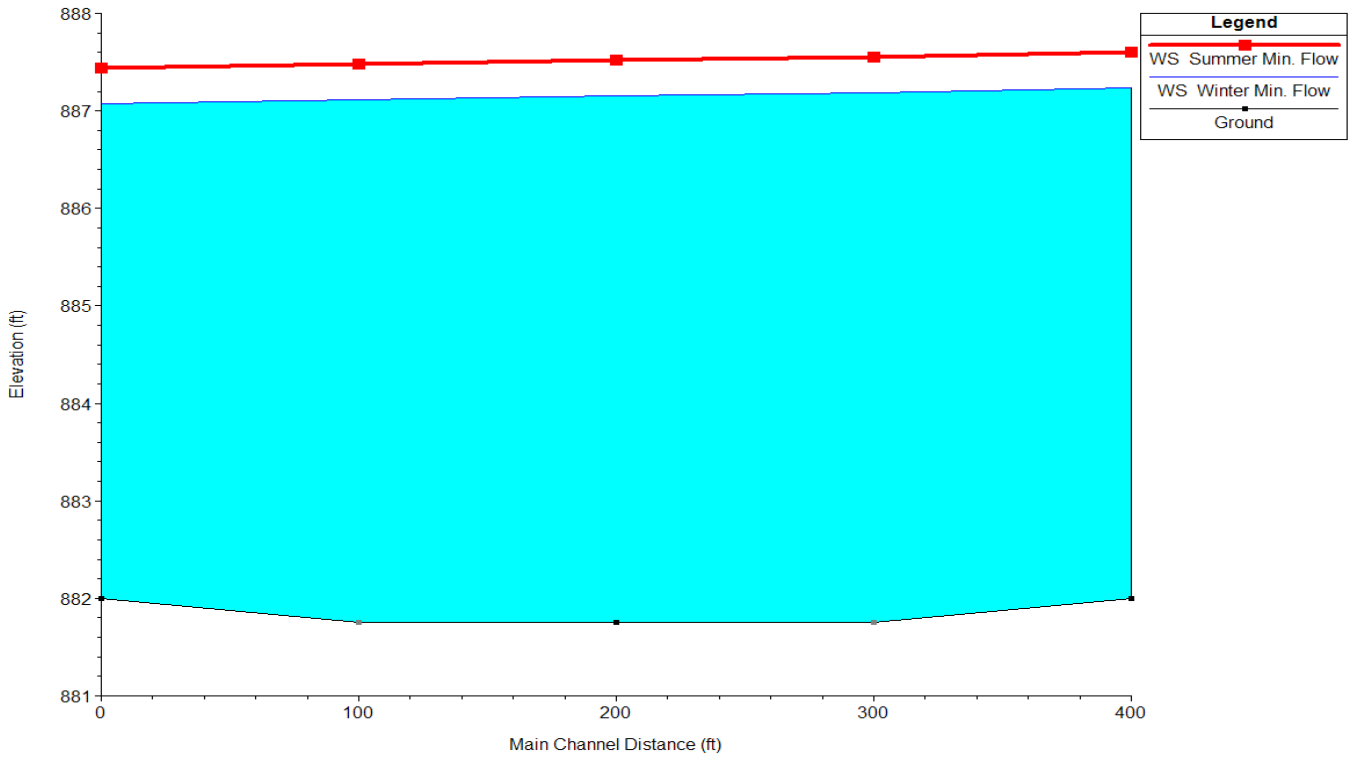


FIGURE 3

Chattahoochee River Profile Plot for the Outfall Location and its vicinity Cross-sectios as defined in Figure 1

Design of Outfall Diffuser

To design the multiport diffuser, the Visual Plumes (VP) model (Frick et al., 2001) was selected. VP was also used to model the dispersion of effluent discharged through the submerged diffuser at the outfall site.

Diffuser Alignment and Port Characteristics

For a submerged multiport outfall diffuser, the direction of the ambient current relative to the discharge ports is one of many important factors that determine the mixing performance of the existing diffuser in the near-field region. In this case, the diffuser is aligned perpendicular to channel flow. The diffuser includes 10 ports, each located at a spacing of 7.5 feet center to center. The upward vertical angles for the odd and even ports are 45 degrees from horizontal. Figure 4 provides schematic drawings of the diffuser and its orientation.

Model Input

The input required for modeling dilution and plume behavior includes the receiving stream hydraulic parameters, effluent characteristics, diffuser port number and orientation relative to flow, and diffuser physical parameters. To prepare the input data, several preliminary model runs were performed assuming various combinations of port diameter, port spacing, port length, vertical and horizontal angles, etc. The results were analyzed for exit discharge velocity, diffuser length that is suitable for the outfall site, port diameter, number and spacing of ports, and overall diffuser performance. Based on the preliminary diffuser modeling analysis, the following diffuser parameters were selected:

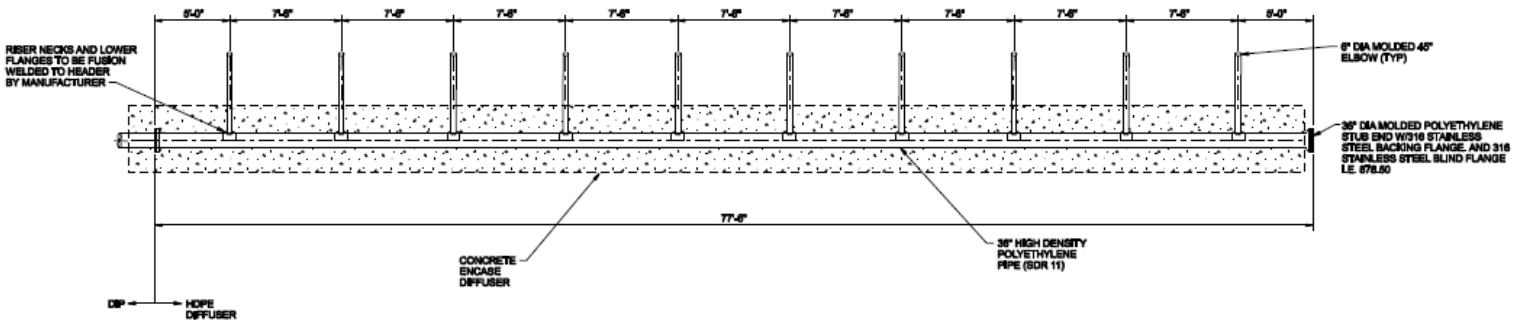
- Depth of water under minimum flow conditions = 5-6 feet (see Table 4 or Figure 3)
- River width = 172 feet
- Diffuser length = 77.5 feet
- Number of ports = 10
- Port diameter = 6 inches
- Spacing of ports = 7.5 feet center to center
- Vertical port angle (relative to horizontal) = 45 degrees
- Angle of diffuser axis relative to ambient current direction = 270 degrees
- Port elevation above riverbed = 6 inches

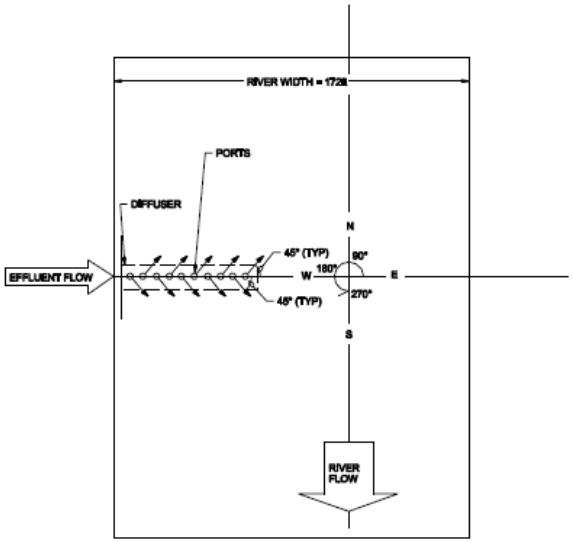
The performance of the multiport diffuser was evaluated based on the following criteria:

(1) The elevation in temperature above ambient river temperature; the maximum allowed temperature increase is 1.10°C within a plume.

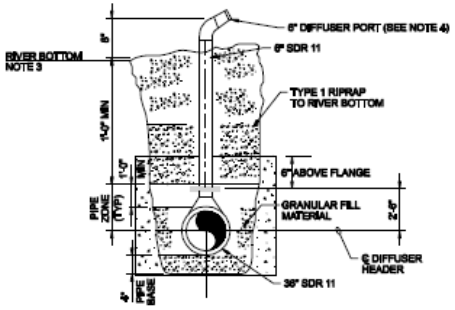
(2) Downstream distance affected by temperature elevation should be minimum.

(3) Downstream distance from the diffuser to the point where individual plumes merge, reach water surface, or contact riverbed.





DIFFUSER PORT ORIENTATION LAYOUT
NTS



NOTES:
1. CONTRACTOR SHALL SUBMIT PLAN TO THE ENGINEER FOR PROTECTING DIFFUSER DURING PLACEMENT.
2. SEE PLAN VIEW FOR DIFFUSER PORT ORIENTATION LAYOUT
3. SEE DWG C-5A FOR BATHYMETRIC SURVEY OF RIVER BOTTOM.
4. INSTALL 6-INCH CHECK VALVE ON END OF EACH DIFFUSER PORT. VALVE SHALL BE TIDEFLEX SERIES TF-2 OR EQUAL.

DIFFUSER TRENCH AND RISER DETAIL
NTS

FIGURE 4
Schematic of Diffuser

Modeling Results and Analysis

A detailed analysis was performed using the above diffuser parameters. The performance of the multiport diffuser was analyzed relative to winter and summer critical conditions for various efflouent flow rates namely maximum month average daily flow of 6 mgd, peak daily flow of 9.6 mgd, and peak hourly flow of 14.4 mgd. The modeling results of the diffuser under the winter and summer scenarios are presented graphically in Figures 5 and 6, respectively. These results are also summarized in Tables 5 and 6.

In general, increasing the effluent velocity increases the initial mixing; as a result, the plumes reach the targeted temperature (i.e. within 1.1°C of ambient) at a shorter distance from the diffuser. It was observed that individual plumes do not merge except in the case of effluent discharge of 14.4 mgd. In this case however, the plume merging takes place about 4.8 ft away from the diffuser. It can be seen from Figures 5 and 6 that for the 14.4 mgd case, the plumes reach in the allowed temperature zone in a distance shorter than 4.8 ft. Therefore results are not affected by the plume merging.

Further, it can be noticed from Figures 5 and 6 that for all the cases plumes are well within 10 feet of the diffuser. Thus, it is concluded that the receiving water temperature difference produced by plumes discharged at rates of 6 mgd, 9.6 mgd, and 14.4 mgd would be within 1.1 degree Celsius of ambient temperature within a distance of 10 feet downstream of the diffuser.

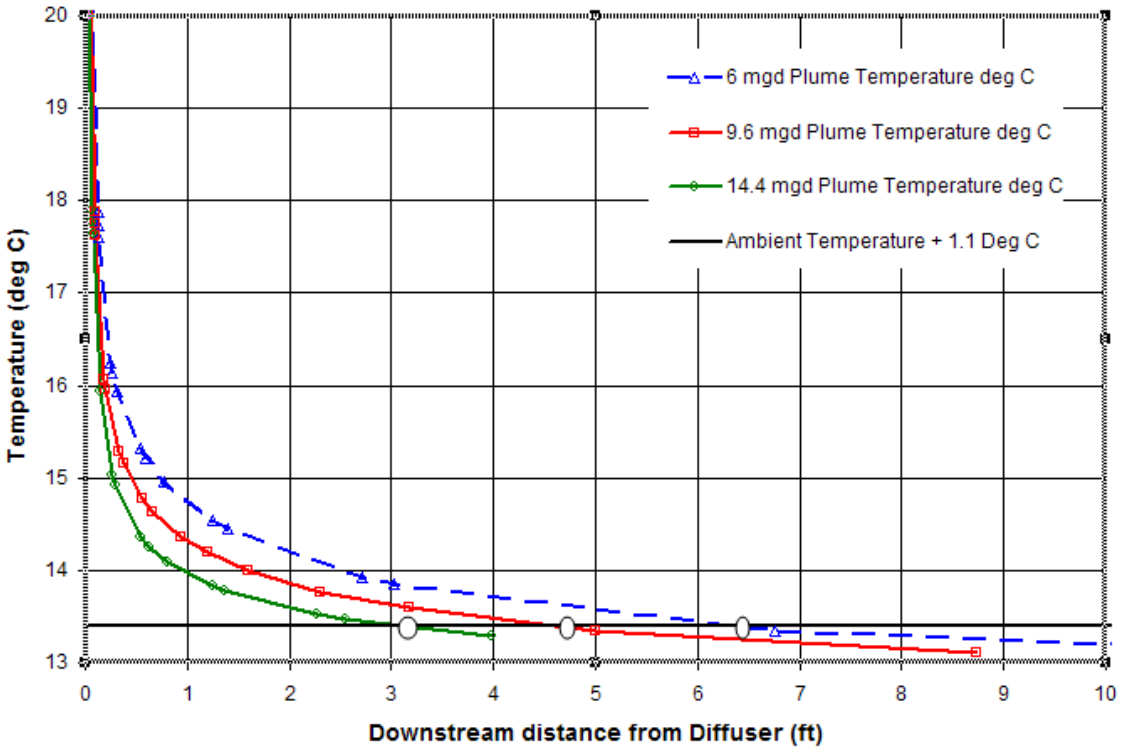


FIGURE 5
Plume Temperature as Function of Distance from Diffuser Under Winter Critical Conditions

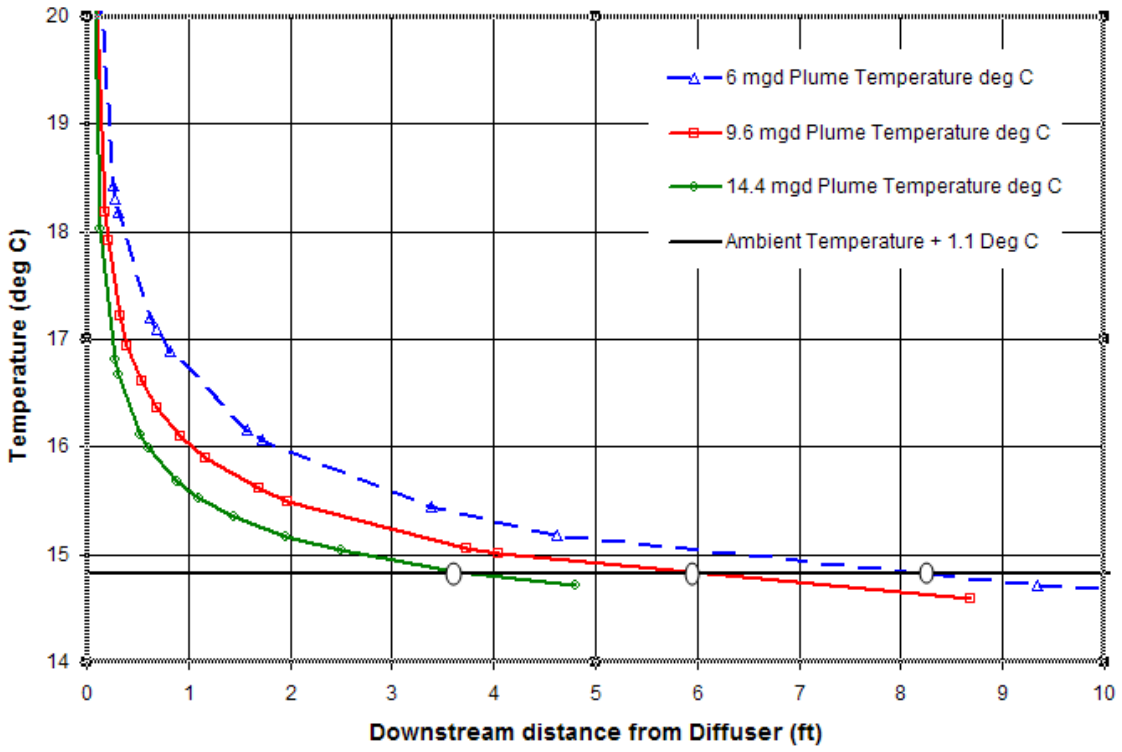


FIGURE 6
Plume Temperature as Function of Distance from Diffuser Under Summer Critical Conditions

TABLE 5

Summary of Hydrodynamic Mixing Results Given Winter Critical Conditions

Resulting Mixing Characteristic at the End of Initial Mixing Zone					
6 MGD Discharge		9.6 MGD Discharge		14.4 MGD Discharge	
Distance (ft)	Plume Temperature (°C)	Distance (ft)	Plume Temperature (°C)	Distance (ft)	Plume Temperature (°C)
0	23.00	0	23.00	0	23.00
0.13	17.88	0.10	17.88	0.07	17.89
0.13	17.74	0.10	17.75	0.07	17.77
0.14	17.61	0.10	17.62	0.08	17.65
0.25	16.24	0.19	16.06	0.14	15.93
0.27	16.13	0.20	15.95	0.26	15.04
0.31	15.94	0.33	15.28	0.29	14.92
0.54	15.32	0.37	15.15	0.54	14.36
0.60	15.22	0.55	14.78	0.62	14.26
0.78	14.96	0.66	14.63	0.81	14.08
1.25	14.54	0.95	14.36	1.25	13.83
1.39	14.45	1.20	14.19	1.37	13.78
2.72	13.92	1.59	14.00	2.27	13.53
3.02	13.85	2.30	13.77	2.54	13.48
6.75	13.35	3.18	13.59	3.98	13.29
14.35	13.02	5.00	13.35	3.98	13.29
15.62	12.99	8.74	13.11		
16.89	12.96	9.37	13.09		
19.44	12.92				

ΔT Criteria: Receiving Water Temperature in Winter Critical Condition $\leq 13.39\ ^{0}C$

TABLE 6

Summary of Hydrodynamic Mixing Results Given Summer Critical Conditions

Resulting Mixing Characteristic at the End of Initial Mixing Zone					
6 MGD Discharge		9.6 MGD Discharge		14.4 MGD Discharge	
Distance (ft)	Plume Temperature (°C)	Distance (ft)	Plume Temperature (°C)	Distance (ft)	Plume Temperature (°C)
0	26.6	0	26.6	0	26.6
0.13	20.37	0.09	20.39	0.07	20.39
0.14	20.21	0.10	20.23	0.07	20.25
0.14	20.05	0.10	20.07	0.07	20.12
0.27	18.43	0.18	18.18	0.14	18.03
0.29	18.3	0.21	17.92	0.28	16.81
0.31	18.18	0.32	17.22	0.31	16.68
0.63	17.20	0.40	16.94	0.52	16.12
0.69	17.09	0.54	16.61	0.60	15.99
0.82	16.89	0.69	16.36	0.89	15.68
1.58	16.16	0.92	16.10	1.10	15.53
1.73	16.07	1.17	15.9	1.45	15.35
3.38	15.44	1.70	15.61	1.95	15.17
4.62	15.18	1.98	15.49	2.49	15.04
9.34	14.72	3.74	15.05	3.63	14.84
15.68	14.46	4.04	15.01	4.81	14.72
16.96	14.43	8.69	14.59		
19.50	14.37	11.21	14.49		
24.60	14.29				

ΔT Criteria:

Receiving Water Temperature in Summer Critical Condition $\leq$ 14.83 ^{0}C

Summary and Conclusions

Modeling runs were completed using the seasonal critical flow and temperature conditions for the proposed outfall location on the Chattahoochee River. Results of the modeling indicate that the increase in temperature would not exceeed 1.1 °C within a downstream distance of 10 feet from the diffuser using any of three different discharge rates: 6 mgd, 9.6 mgd, and 14.4 mgd.

References

Frick, W. E., Roberts, P. J. W., Davis, L.R., Keyes. J., Baumgartner, D.J., and George, K. P. (2001). Dilution Models for Effluent Discharges, 4th Edition (Visual Plumes) Draft, Environmental Research Division, NERL, ORD, Environmental Protection agency, Athens, Georgia.

CH2M HILL 2005. Evaluation of Outfall Diffuser Design and Mixing of Effluent Discharged to Chattahoochee River, Technical Memorandum prepared for Forsyth County Water and Sewer Department.

CH2M HILL 2008. Chattahoochee Diffuser Design Specifications. May 2008.

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/ DKHW
Case 1; ambient file C:\Plumes\VP plume 0.002.001.db; Diffuser table record 1:
---------------------------------
      Depth    Amb-cur    Amb-dir    Amb-sal    Amb-tem    Amb-pol      Decay    Far-spd    Far-dir
Disprsn
          m        m/s        deg        psu          C      kg/kg        s-1        m/s        deg
m0.67/s2
        0.0      0.317      270.0        0.0      13.73      100.0        0.0      0.317      270.0
0.0003
       1.37      0.317      270.0        0.0      13.73      100.0        0.0      0.317      270.0
0.0003
   P-dia  P-elev V-angle H-angle   Ports Spacing AcuteMZ ChrncMZ P-depth Ttl-flo Eff-sal    Temp Polutnt
    (in)    (in)   (deg)   (deg)      ()    (ft)    (ft)    (ft)    (ft)   (MGD)   (psu)     (C) (kg/kg)
     6.0     6.0    45.0     0.0    10.0     7.5    15.0   100.0     4.5     6.0     1.0    26.6     1.0
Froude number:      26.94
        Depth  Amb-cur    P-dia     Temp   Dilutn  CL-diln   x-posn   y-posn
Step     (ft)    (m/s)     (in)      (C)       ()       ()     (ft)     (ft)
   0       4.5    0.317      6.0     26.6      1.0      0.0      0.0      0.0;
   2     3.526    0.317    16.26    20.37     2.16    1.207    0.971   -0.133;
   3     3.512    0.317    16.69    20.21    2.234    1.248    0.985   -0.138;
   4     3.498    0.317    17.09    20.05    2.309     1.29    0.998   -0.143;
  16     3.289    0.317     22.6    18.43    3.589    2.005    1.206   -0.266;
  17     3.264    0.317    23.19     18.3    3.753    2.097     1.23   -0.286;
  18     3.241    0.317    23.78    18.18    3.918    2.189    1.254   -0.308;
  26     2.988    0.317    29.68     17.2    5.834    3.259    1.503   -0.628;
  27     2.951    0.317    30.51    17.09    6.137    3.428    1.539   -0.689;
  29     2.881    0.317    32.13    16.89    6.729    3.759    1.608   -0.816;
  36     2.569    0.317    39.09    16.16    9.663    5.398    1.912   -1.579;
  37     2.522    0.317    40.12    16.07    10.15    5.669    1.959   -1.725;
  45     2.106    0.317    48.94    15.44    14.81    8.272    2.358   -3.381;
  49     1.875    0.317    53.66    15.18    17.69    9.885    2.576   -4.621;
  58     1.243    0.317    65.98    14.72     26.6    14.86    3.151   -9.337; axial vel    0.37
  65      0.65    0.317    77.01    14.46    36.16    19.21    3.657   -15.68;
  66     0.549    0.317    78.82    14.43    37.89     20.2    3.739   -16.96; acute zone,
  68     0.359    0.317     82.2    14.37    41.22    23.03    3.891    -19.5;
  72    0.0151    0.317    88.23    14.29    47.49    26.53    4.154    -24.6; local maximum rise or fall,
/ DKHW
Case 2; ambient file C:\Plumes\VP plume 0.002.001.db; Diffuser table record 2:
---------------------------------
      Depth    Amb-cur    Amb-dir    Amb-sal    Amb-tem    Amb-pol      Decay    Far-spd    Far-dir
```

```
Disprsn
         m        m/s        deg        psu          C      kg/kg        s-1        m/s        deg
m0.67/s2
       0.0      0.317      270.0        0.0      13.73      100.0        0.0      0.317      270.0
0.0003
      1.37      0.317      270.0        0.0      13.73      100.0        0.0      0.317      270.0
0.0003
   P-dia  P-elev V-angle H-angle   Ports Spacing AcuteMZ ChrncMZ P-depth Ttl-flo Eff-sal    Temp Polutnt
    (in)    (in)   (deg)   (deg)      ()    (ft)    (ft)    (ft)    (ft)   (MGD)   (psu)     (C) (kg/kg)
     6.0     6.0    45.0     0.0    10.0     7.5    15.0   100.0     4.5     9.6     1.0    26.6     1.0
Froude number:       43.1
        Depth  Amb-cur    P-dia     Temp   Dilutn  CL-diln   x-posn   y-posn
Step     (ft)    (m/s)     (in)      (C)       ()       ()     (ft)     (ft)
   0       4.5    0.317      6.0     26.6      1.0      0.0      0.0      0.0;
   2     3.322    0.317    16.38    20.39    2.015    1.126    1.176  -0.0938; axial vel   0.504
   3     3.308    0.317    16.77    20.23     2.07    1.156     1.19  -0.0968;
   4     3.294    0.317    17.17    20.07    2.127    1.188    1.204  -0.0997;
  17     3.046    0.317    24.17    18.18    3.254    1.818    1.451   -0.181;
  19     2.992    0.317    25.63    17.92    3.529    1.972    1.504   -0.207;
  24     2.811    0.317    30.39    17.22    4.538    2.535    1.685   -0.321;
  26     2.713    0.317    32.83    16.94    5.135    2.869    1.782   -0.401;
  29     2.573    0.317    36.22    16.61    6.038    3.373    1.921   -0.538;
  32     2.443    0.317    39.29    16.36    6.936    3.875     2.05   -0.693;
  34     2.283    0.317    42.99     16.1     8.11    4.531    2.208   -0.921;
  36     2.139    0.317     46.3     15.9    9.246    5.165    2.351   -1.168;
  40     1.886    0.317    52.05    15.61    11.39    6.364      2.6     -1.7;
  42     1.774    0.317    54.57    15.49     12.4     6.93     2.71   -1.978;
  48     1.235    0.317    66.42    15.05    17.79    9.941    3.236   -3.737; axial vel   0.536
  49     1.161    0.317    68.03    15.01    18.61    10.39    3.307    -4.04;
  58     0.314    0.317    85.87    14.59    28.93    16.16    4.114   -8.687;
  62   -0.0183    0.317    92.87    14.49    33.46    18.69    4.422   -11.21; local maximum rise or fall,
merging,
/ DKHW
Case 3; ambient file C:\Plumes\VP plume 0.002.001.db; Diffuser table record 3:
---------------------------------
      Depth    Amb-cur    Amb-dir    Amb-sal    Amb-tem    Amb-pol      Decay    Far-spd    Far-dir
Disprsn
         m        m/s        deg        psu          C      kg/kg        s-1        m/s        deg
m0.67/s2
       0.0      0.317      270.0        0.0      13.73      100.0        0.0      0.317      270.0
```

```
0.0003
       1.37      0.317      270.0        0.0      13.73      100.0        0.0      0.317      270.0
0.0003
   P-dia  P-elev V-angle H-angle   Ports Spacing AcuteMZ ChrncMZ P-depth Ttl-flo Eff-sal    Temp Polutnt
    (in)    (in)   (deg)   (deg)      ()    (ft)    (ft)    (ft)    (ft)   (MGD)   (psu)     (C) (kg/kg)
     6.0     6.0    45.0     0.0    10.0     7.5    15.0   100.0     4.5    14.4     1.0    26.6     1.0
Froude number:      64.65
        Depth  Amb-cur    P-dia     Temp   Dilutn  CL-diln   x-posn   y-posn
Step     (ft)    (m/s)     (in)      (C)       ()       ()     (ft)     (ft)
   0      4.5    0.317      6.0     26.6      1.0      0.0      0.0      0.0;
   2    3.139    0.317    16.38    20.39    1.965    1.098     1.36  -0.0702; axial vel   0.664
   3    3.125    0.317    16.73    20.25     2.01    1.123    1.374  -0.0722;
   4    3.111    0.317    17.09    20.12    2.055    1.148    1.387  -0.0741;
  19    2.803    0.317    25.24    18.03     3.16    1.765    1.695   -0.139;
  27     2.45    0.317    34.84    16.81     4.73    2.642    2.048   -0.281;
  28    2.397    0.317    36.26    16.68    4.992    2.789      2.1   -0.309;
  33    2.091    0.317    44.09    16.12    6.639    3.709    2.405   -0.519;
  34    1.994    0.317     46.5    15.99    7.207    4.026    2.501   -0.602;
  37     1.72    0.317    53.03    15.68    8.927    4.987    2.774   -0.886;
  39    1.552    0.317    56.97    15.53    10.07    5.625    2.941   -1.101; axial vel   0.691
  42    1.319    0.317    62.32    15.35    11.75    6.563    3.172   -1.451;
  44    1.043    0.317    68.58    15.17    13.88    7.756    3.444   -1.954;
  46    0.797    0.317    74.17    15.04    15.93      8.9    3.687   -2.492;
  50    0.376    0.317    83.58    14.84    19.73    11.02    4.101   -3.627;
  53   0.0256    0.317    91.42    14.72    23.16    12.94    4.445   -4.809; merging,
  53   0.0256    0.317    91.42    14.72    23.16     19.3    4.445   -4.809; local maximum rise or fall,
 ;
```

/ DKHW
Case 1; ambient file C:\Plumes\Forsyth.001.db; Diffuser table record 1: ----------

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	0.299	270.0	0.0	12.39	100.0	0.0	0.299	270.0	0.0003
1.28	0.299	270.0	0.0	12.39	100.0	0.0	0.299	270.0	0.0003

P-dia (in)	P-elev (in)	V-angle (deg)	H-angle (deg)	Ports ()	Spacing (ft)	AcuteMZ (ft)	ChrncMZ (ft)	P-depth (ft)	Ttl-flo (MGD)	Eff-sal (psu)	Temp (C)	Polutnt (ppm)
6.0	6.0	45.0	0.0	10.0	7.5	15.0	100.0	4.2	6.0	1.0	23.0	1.0

Froude number: 34.59

Step	Depth (ft)	Amb-cur (ft/s)	P-dia (in)	Temp (C)	Dilutn ()	CL-diln ()	x-posn (ft)	y-posn (ft)	
0	4.2	0.98	6.0	23.0	1.0	0.0	0.0	0.0;	
2	3.2	0.326	16.3	17.88	2.13	1.19	0.998	-0.127;	
3	3.186	0.326	16.69	17.74	2.202	1.23	1.012	-0.132;	
4	3.172	0.326	17.09	17.61	2.274	1.27	1.026	-0.136;	
16	2.961	0.326	22.8	16.24	3.518	1.965	1.236	-0.251;	
17	2.936	0.326	23.43	16.13	3.68	2.056	1.26	-0.271;	
19	2.888	0.326	24.61	15.94	4.004	2.237	1.308	-0.312;	
25	2.691	0.326	29.25	15.32	5.441	3.04	1.504	-0.54;	
26	2.651	0.326	30.16	15.22	5.75	3.212	1.543	-0.598;	
29	2.541	0.326	32.68	14.96	6.652	3.716	1.652	-0.781;	
34	2.323	0.326	37.64	14.54	8.598	4.803	1.867	-1.25;	
35	2.269	0.326	38.82	14.45	9.117	5.093	1.921	-1.39;	
43	1.875	0.326	47.44	13.92	13.25	7.4	2.306	-2.719;	
44	1.805	0.326	48.9	13.85	14.05	7.848	2.374	-3.019;	
54	1.17	0.326	61.97	13.35	22.23	12.42	2.985	-6.754;	axial vel 0.369
64	0.384	0.326	77.28	13.02	34.38	19.21	3.71	-14.35;	
65	0.281	0.326	79.21	12.99	36.13	19.21	3.802	-15.62;	
66	0.183	0.326	81.06	12.96	37.83	20.19	3.889	-16.89;	acute zone,
68	0.000248	0.326	84.49	12.92	41.07	22.94	4.049	-19.44;	local maximum rise or fall,

Plumes not merged, Brooks method may be overly conservative.
Const Eddy Diffusivity. Farfield dispersion based on wastefield width of 22.72 m

conc (ppm)	dilutn	width (m)	distnce (m)	time (hrs)	(kg/kg)	(s-1)	(m/s)	(m0.67/s2)
-5.12E+6	41.12	23.47	30.48	0.0208	100.0	0.0	0.326	3.00E-4

count: 1
/ DKHW
Case 2; ambient file C:\Plumes\Forsyth.003.db; Diffuser table record 2: ----------

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	0.326	270.0	0.0	12.39	100.0	0.0	0.326	270.0	0.0003
1.22	0.326	270.0	0.0	12.39	100.0	0.0	0.326	270.0	0.0003

Ttl-flo (MGD)
9.6

Froude number: 55.35

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Temp (C)	Dilutn ()	CL-diln ()	x-posn (ft)	y-posn (ft)	
0	4.2	0.326	6.0	23.0	1.0	0.0	0.0	0.0;	
2	3.034	0.326	16.34	17.88	2.018	1.127	1.165	-0.0958;	axial vel 0.51
3	3.02	0.326	16.77	17.75	2.075	1.159	1.179	-0.0988;	
4	3.005	0.326	17.17	17.62	2.132	1.191	1.193	-0.102;	
17	2.758	0.326	24.17	16.06	3.278	1.831	1.44	-0.186;	
18	2.732	0.326	24.88	15.95	3.416	1.908	1.467	-0.199;	
24	2.525	0.326	30.31	15.28	4.577	2.557	1.673	-0.331;	
25	2.476	0.326	31.54	15.15	4.877	2.725	1.721	-0.371;	
29	2.29	0.326	36.02	14.78	6.084	3.399	1.906	-0.554;	
31	2.204	0.326	38.07	14.63	6.685	3.735	1.992	-0.658;	
34	2.006	0.326	42.64	14.36	8.152	4.554	2.188	-0.945;	
36	1.865	0.326	45.87	14.19	9.28	5.184	2.329	-1.195;	
39	1.676	0.326	50.16	14.0	10.89	6.084	2.516	-1.594;	
43	1.408	0.326	56.22	13.77	13.37	7.469	2.781	-2.3;	axial vel 0.458
46	1.143	0.326	62.09	13.59	16.05	8.969	3.044	-3.178;	
52	0.718	0.326	71.34	13.35	20.8	11.62	3.461	-5.003;	
58	0.101	0.326	84.33	13.11	28.64	16.0	4.06	-8.739;	
59	0.016	0.326	86.1	13.09	29.81	16.65	4.142	-9.368;	local maximum rise or fall,

Plumes not merged, Brooks method may be overly conservative.
Const Eddy Diffusivity. Farfield dispersion based on wastefield width of 22.76 m

conc (ppm)	dilutn	width (m)	distnce (m)	time (hrs)	(kg/kg)	(s-1)	(m/s)	(m0.67/s2)
-3.12E+6	29.84	23.68	30.48	0.0254	100.0	0.0	0.299	3.00E-4

```
count: 1
/ DKHW
Case 3; ambient file C:\Plumes\Forsyth.003.db; Diffuser table record 3: ----------------------------------
      Depth    Amb-cur    Amb-dir    Amb-sal    Amb-tem    Amb-pol      Decay    Far-spd    Far-dir
Disprsn
          m        m/s        deg        psu          C      kg/kg        s-1        m/s        deg
m0.67/s2
        0.0      0.326      270.0        0.0      12.39      100.0        0.0      0.326      270.0
0.0003
       1.22      0.326      270.0        0.0      12.39      100.0        0.0      0.326      270.0
0.0003
   P-dia  P-elev V-angle H-angle   Ports Spacing AcuteMZ ChrncMZ P-depth Ttl-flo Eff-sal    Temp Polutnt
    (in)    (in)   (deg)   (deg)      ()    (ft)    (ft)    (ft)    (ft)   (MGD)   (psu)     (C)   (ppm)
     6.0     6.0    45.0     0.0    10.0     7.5    15.0   100.0     4.2    14.4     1.0    23.0     1.0
Froude number:      83.02
        Depth  Amb-cur    P-dia     Temp   Dilutn  CL-diln   x-posn   y-posn
Step     (ft)    (m/s)     (in)      (C)       ()       ()     (ft)     (ft)
   0       4.2    0.326      6.0     23.0      1.0      0.0      0.0      0.0;
   2     2.851    0.326    16.38    17.89    1.966    1.098    1.348  -0.0718; axial vel   0.688
   3     2.837    0.326    16.73    17.77    2.012    1.124    1.362  -0.0735;
   4     2.823    0.326    17.09    17.65    2.057    1.149    1.376  -0.0755;
  19     2.516    0.326    25.28    15.93    3.181    1.777    1.683   -0.143;
  26     2.216    0.326    33.46    15.04    4.515    2.522    1.982   -0.262;
  27     2.163    0.326    34.88    14.92    4.776    2.668    2.035    -0.29;
  33     1.808    0.326    43.98    14.36    6.706    3.746     2.39   -0.536;
  34     1.712    0.326    46.34    14.26    7.278    4.066    2.485   -0.622;
  36     1.529    0.326    50.71    14.08    8.428    4.708    2.667   -0.812;
  40     1.199    0.326    58.43    13.83     10.7     5.98    2.996   -1.249; axial vel   0.916
  41     1.123    0.326    60.16    13.78    11.26    6.291    3.071   -1.368;
  45     0.658    0.326    70.79    13.53    14.96    8.358    3.534   -2.268;
  46     0.542    0.326    73.43    13.48    15.96    8.916     3.65   -2.543;
  51    0.0426    0.326    84.61    13.29    20.59     11.5    4.144    -3.98;
  51    0.0426    0.326    84.61    13.29    20.59     11.5    4.144    -3.98; local maximum rise or fall,
Plumes not merged, Brooks method may be overly conservative.
Const Eddy Diffusivity.  Farfield dispersion based on wastefield width of      22.72 m
    conc  dilutn   width distnce    time
   (ppm)            (m)     (m)    (hrs) (kg/kg)   (s-1)   (m/s)(m0.67/s2)
-2.19E+6   20.61    23.6   30.48  0.0245   100.0     0.0   0.326 3.00E-4
count: 1
 ;
```

Appendix E-2
Temperature Modeling Technical Memoranda

Natural Resource Engineering, Inc.
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Technical Memorandum

June 10, 2009

To: Mr. Doug Baughman- CH2M Hill

From: Mr. Robert W. Olson

Re: Temperature Effects of Forsyth County NPDES Discharge

Natural Resource Engineering, Inc. (NRE) is providing this technical memorandum as documentation regarding the effects of the proposed Forsyth County Wastewater Treatment Facility (WTF) discharge on the temperatures in the Chattahoochee River between Buford Dam and the headwaters of Bull Sluice Lake. It is our understanding that CH2M Hill's previous near field analyses (2005 and 2009) of the discharge indicate that the "increase in temperature would not exceed 1.1^{o}C within a downstream distance of 10 feet from the diffuser." The intent of this analysis was to evaluate the far field temperature effect of the proposed discharge. The following memorandum provides a brief description of the procedures used to evaluate the temperature effects, presents the assumptions used in the modeling efforts and summarizes and discusses the results of the analyses.

Temperature Effect Procedure

The temperature effects on the Chattahoochee River were evaluated using the computer model developed by the Georgia Environmental Protection Division (GAEPD) for their Chattahoochee River Modeling Project (CRMP). The objective of the CRMP was to develop a hydrodynamic modeling system to analyze the complex issues within the Chattahoochee River watershed. The foundation of the model used for the CRMP was the Corps of Engineer's RIV1 model. EPDRiv1, a one-dimensional hydrodynamic model, was extensively modified and tested by the GAEPD prior to its use in simulating the water quality in the Chattahoochee River.

The hydrodynamic model for the 115 miles of the Chattahoochee River downstream from Buford Dam was calibrated and verified by GAEPD using data collected during 1994 and 1995. The data collected during 1994 and 1995 are considered to represent critical flow (low tributary flow) and temperature (high ambient air temperature) conditions. Since calibration and verification, the calibrated model has been used to establish NPDES permit limits and to evaluate numerous scenarios that could potentially stress various Chattahoochee River resources.

The input required to simulate temperature effects include: 1) Buford Dam flows and temperatures; 2) tributary/WTF flows and temperatures; 3) withdrawal flow rates, and; 4) meteorological data (air temperature, wind speed, barometric pressure and cloud cover). The conditions and data used for the temperature effects model were selected to represent a critical dynamic (variable flows and temperatures) scenario that could reasonably be expected and not a steady state scenario that would not occur. The assumptions used for the input data are the following:

- All withdrawals and wastewater treatment facilities (WTF) operating at the maximum permit limits (Table 1)
- Observed 1995 hourly flows and temperatures from Buford Dam
- Observed 1995 tributary flows and temperatures
- Meteorological conditions as measured in 1995
- Observed diurnal flow pattern for the Big Creek WTF was used to represent the Forsyth County discharge (Figure 1), based on a comparison of service areas
- Observed diurnal temperatures for the Crooked Creek WTF were used to represent the Forsyth County discharge temperatures (Figure 2), based on comparable WTF design and higher temperatures than John's Creek and Big Creek WTFs

Table 1
Summary of Wastewater Discharges

Wastewater Treatment Facility	Political Jurisdiction	EPDRiv1 River Mile	Existing Permitted Discharge (mgd)
New Forsyth County Plant	Forsyth County	339.0	6
Crooked Creek	Gwinnett County	325.15	45
John's Creek	Fulton County	324.0	15

Results

The model developed using the above assumptions was used to project the temperature effect of the Forsyth County discharge by calculating the downstream temperatures with and without the Forsyth discharge. The results of the two model simulations were then subtracted to determine the net temperature effect at various locations in the Chattahoochee River. The May through October time period was selected for the analyses because it is considered to be the critical period for the protection of the designated use (Secondary Trout).

The natural warming of the Chattahoochee River, shown in Figure 3, shows that the temperature can rise as much as 13^{o} C as the water moves downstream to Morgan Falls Dam. The Chattahoochee River downstream from Buford Dam is an unnaturally cool river resulting from the discharge of hypolimnetic waters from Lake Lanier. As shown in Figure 3, the observed in-stream temperature gradient has a steep increase as the water temperature rises due to the warm ambient air temperature and natural warmwater tributary discharges. The Chattahoochee River water temperature will naturally increase to the equilibrium (background) temperature that would be realized if Buford Dam had not been constructed.

In addition to the unnaturally cool temperature discharges, the study section of the Chattahoochee River also experiences "highly regulated" (unnatural) flow conditions due to the hydropower releases through Buford Dam. These releases result in flows that can range from approximately 550 cubic feet

per second (cfs) to as much as 12,000 cfs. The fluctuations in river flows coupled with the daily diurnal temperature swings result in significant daily temperature variations. Figure 4 illustrates the July 1995 temperature simulation at Medlock Bridge without any upstream WTF (Forsyth County) discharge. As shown in Figure 4, the daily water temperature can naturally vary by as much as 6^{o} C due to the variable flow and climatological conditions.

The net effects of the proposed Forsyth County WTF are illustrated using the temperature difference at select identifiable locations. The results, summarized in Table 2 and shown on Figures 5- 9, represent the calculated temperature difference just downstream from the Forsyth County discharge, at Medlock Bridge Road, at Holcomb Bridge Road, at Ball Mill Creek, and just upstream from the Big Creek and Chattahoochee River confluence. Though the maximum temperature difference is 0.234 ^{o}C just downstream from the proposed Forsyth County discharge, this occurred on one day and the average temperature increase over the 6 month simulation is 0.097 ^{o}C. Also of note in Table 2 is that the effects of any upstream temperature increase are lessened as the water progresses downstream. The maximum and average differences just upstream of the Big Creek Confluence are 0.072 and .024 ^{o}C, respectively.

Table 2
Summary of Results
Net Temperature Effect With and Without
Forsyth County WTF Discharge

Location	EPDRIV1 River Mile	Temperature Difference (Deg C)		
		Maximum	Minimum	Average
Just DS Forsyth County Discharge	338.9	0.234	0	0.097
Medlock Bridge Road	330.0	0.168	-0.001	0.062
Holcomb Bridge Road	325.1	0.13	-0.17	0.048
Ball Mill Creek	319.9	0.084	-0.34	.029
US Big Creek Confluence	317.1	0.072	-0.052	0.024

As shown in Figures 5-9, the maximum net temperature differences are relatively constant over the simulation period. For example, the maximum temperature differences at Medlock Bridge on May 14, July 23, and September 17, are 0.1, 0.11 and 0.11 ^{o}C, respectively. This subdued effect is the result of unnaturally cool waters being discharged under highly variable flow conditions in a naturally warm environment. This discharge results in the water temperatures striving towards the equilibrium (background) temperature during all seasons.

Figure 1
Forsyth County Daily Flow

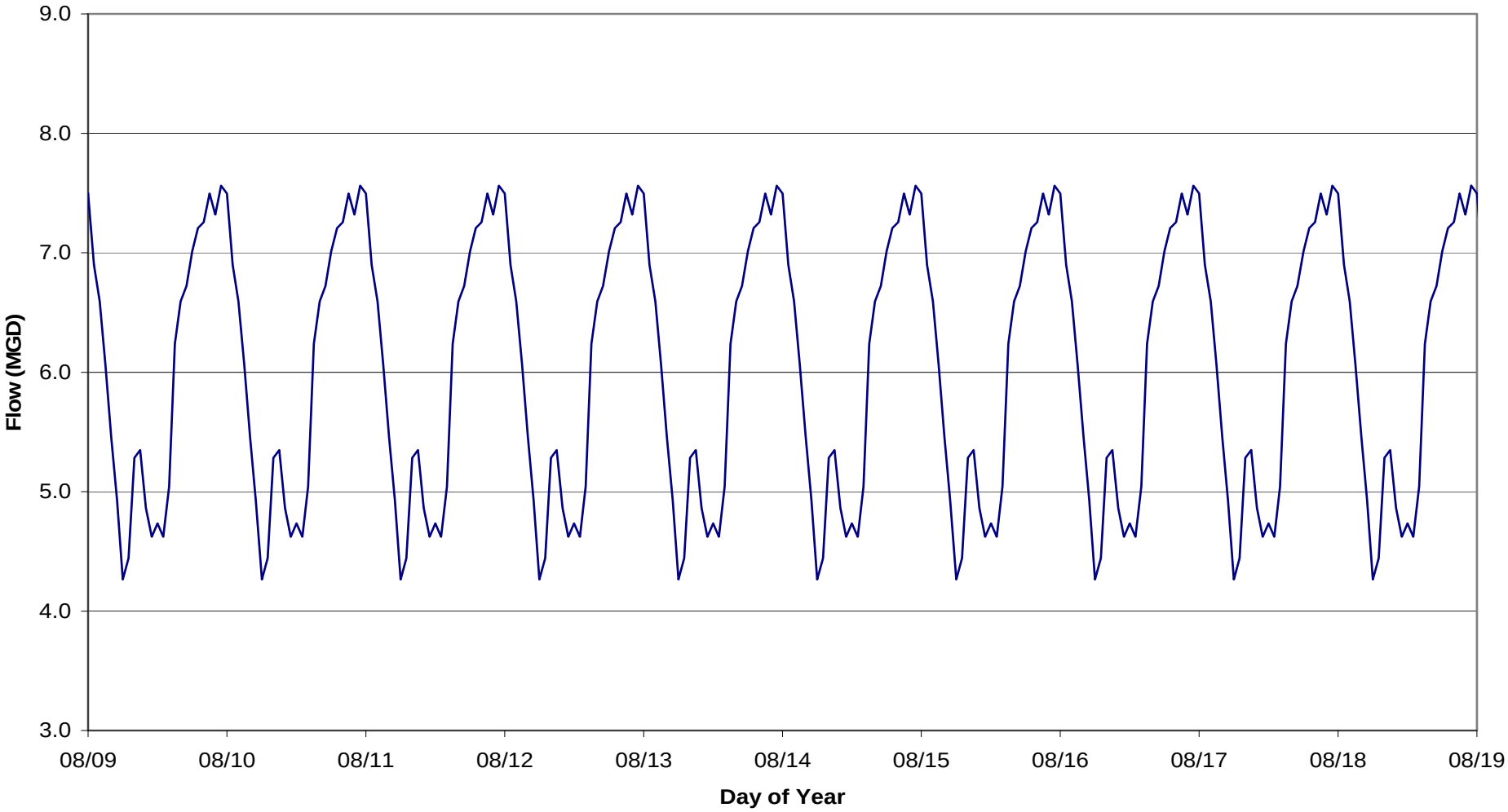


Figure 2
Forsyth County WTF Temperature

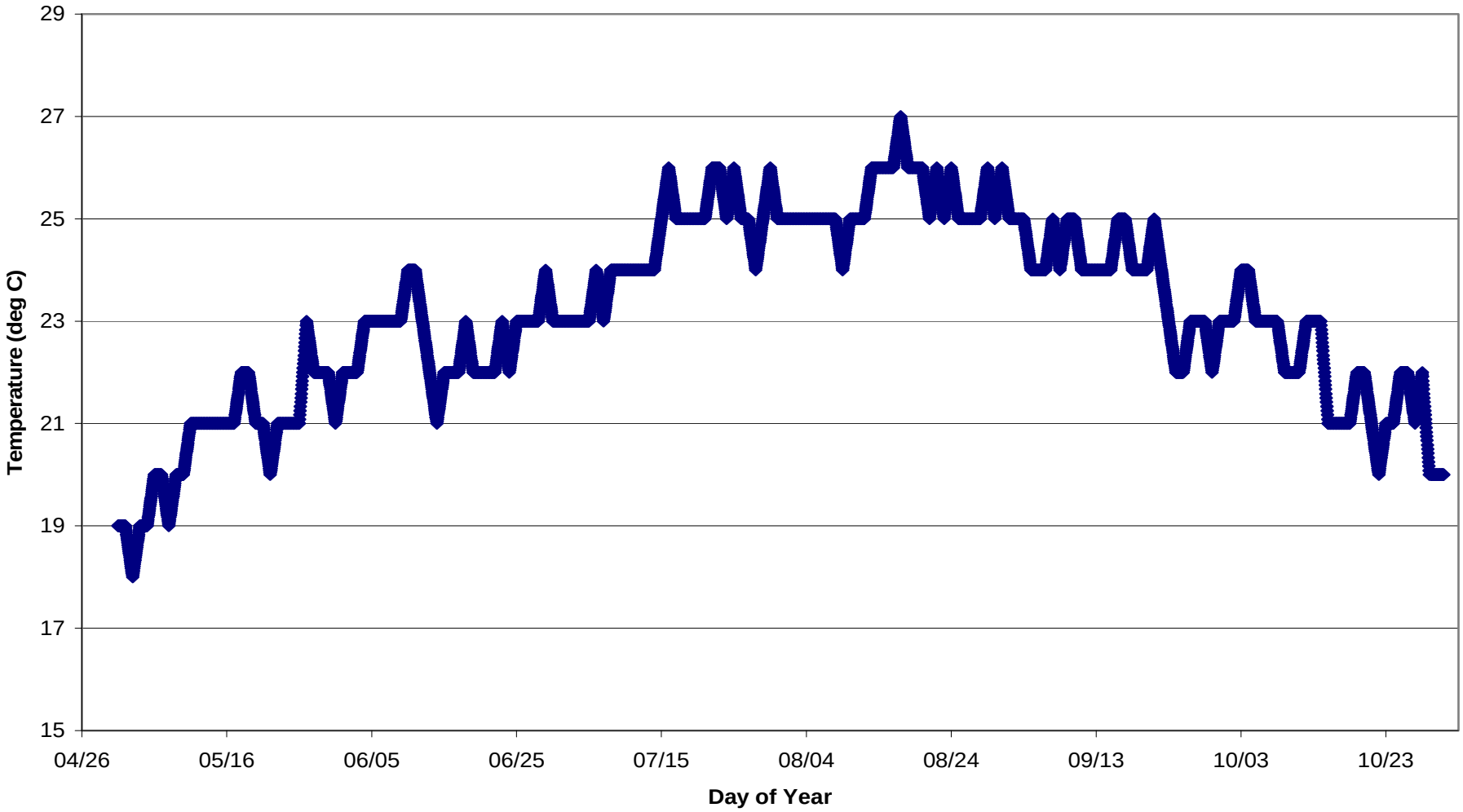


Figure 3
Simulated Chattahoochee River Temperatures

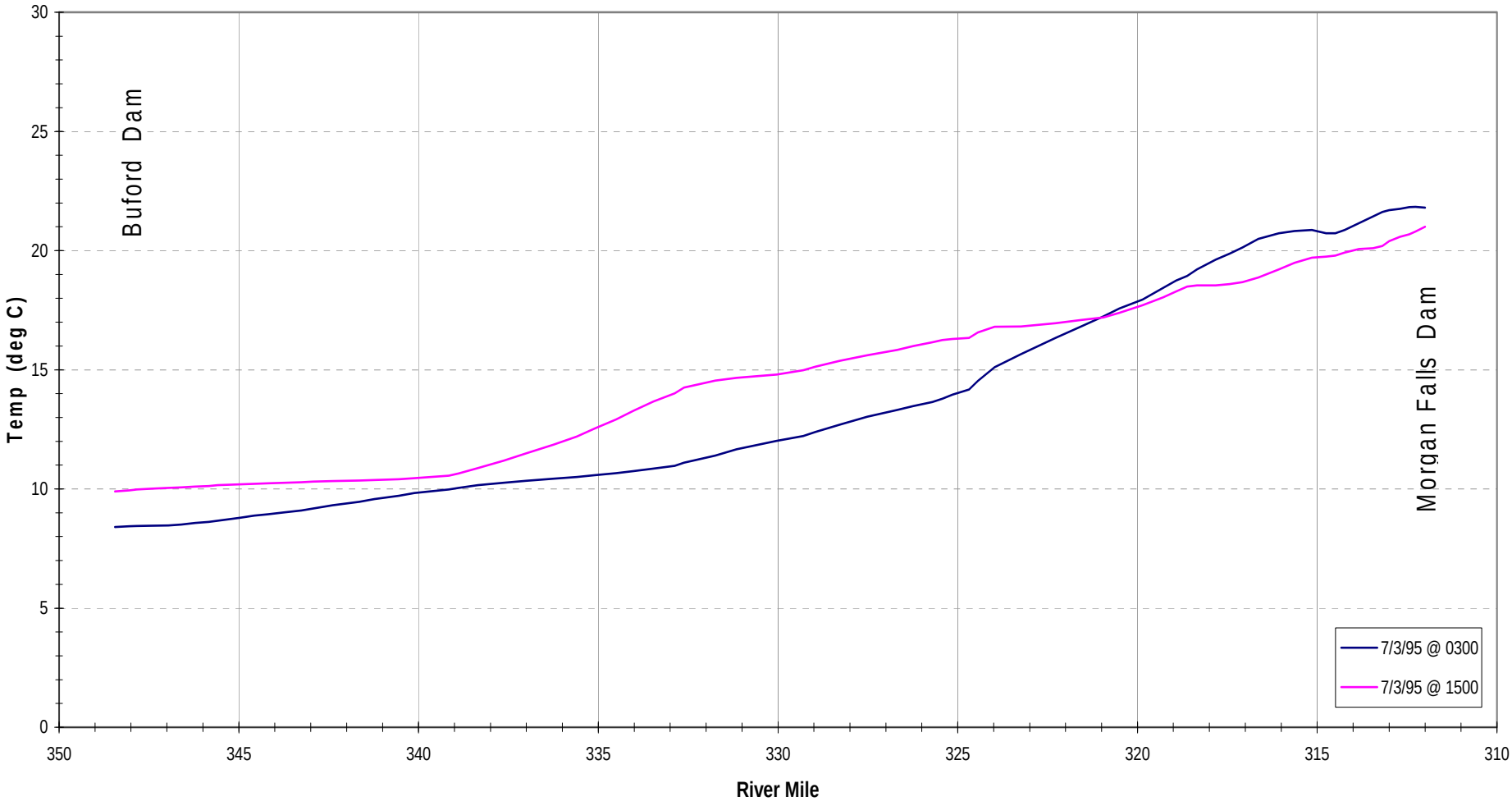


Figure 4
Temperature
@ Medlock Bridge Road*

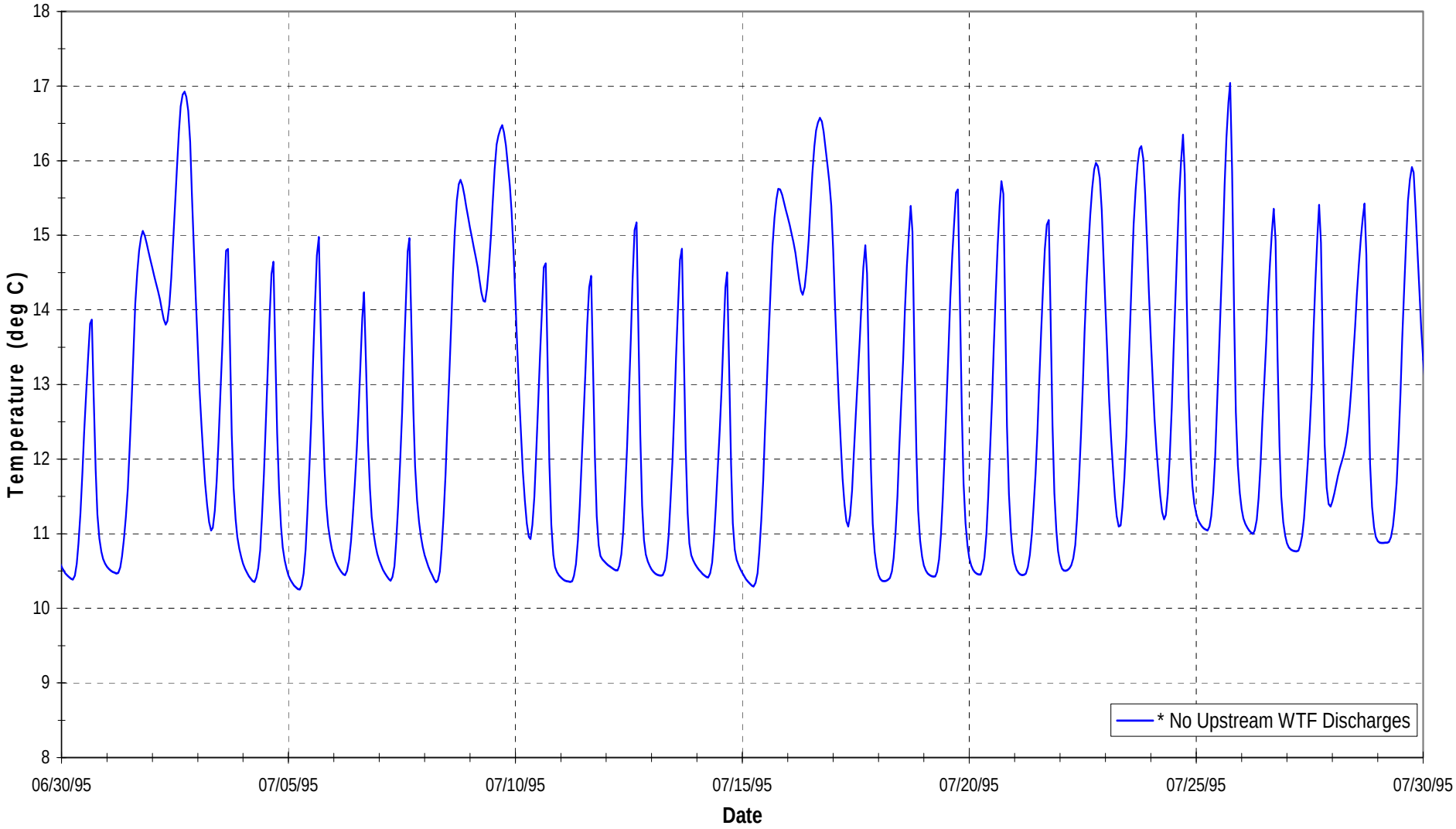


Figure 5
Temperature Difference
Just Downstream of Forsyth Discharge

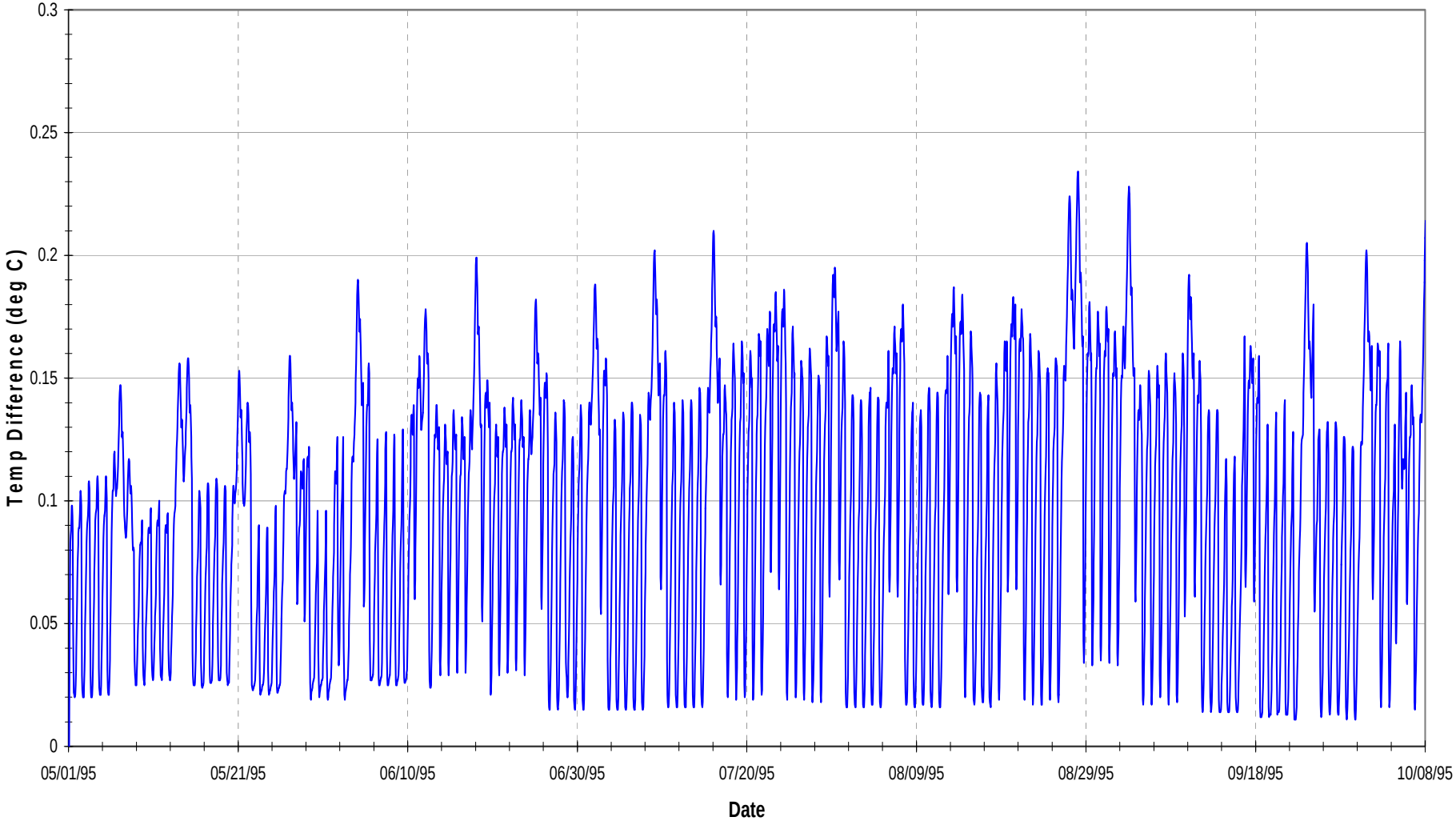


Figure 6
Temperature Difference
@ Medlock Bridge Road

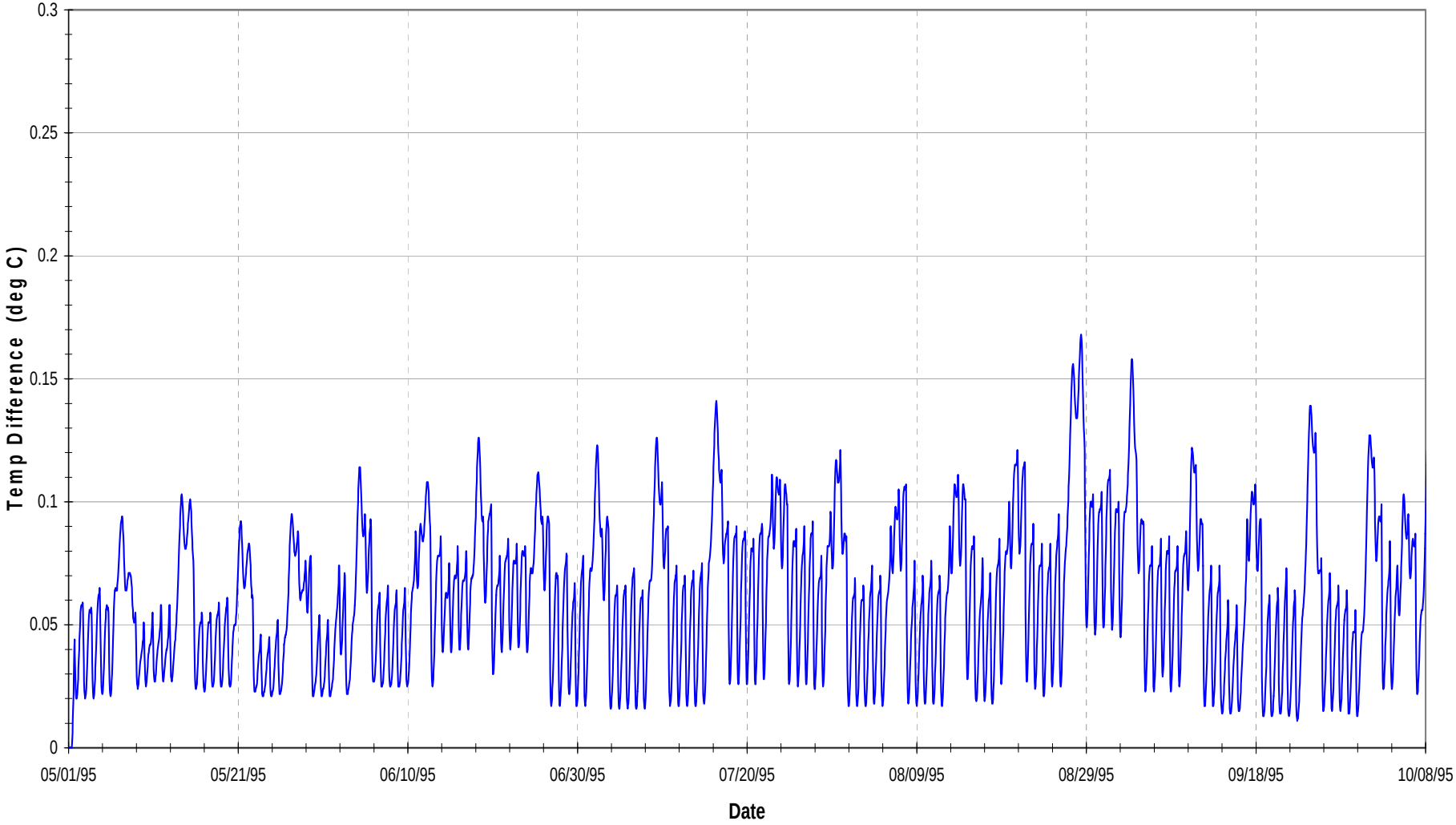


Figure 7
Temperature Difference
@ Holcomb Bridge Road

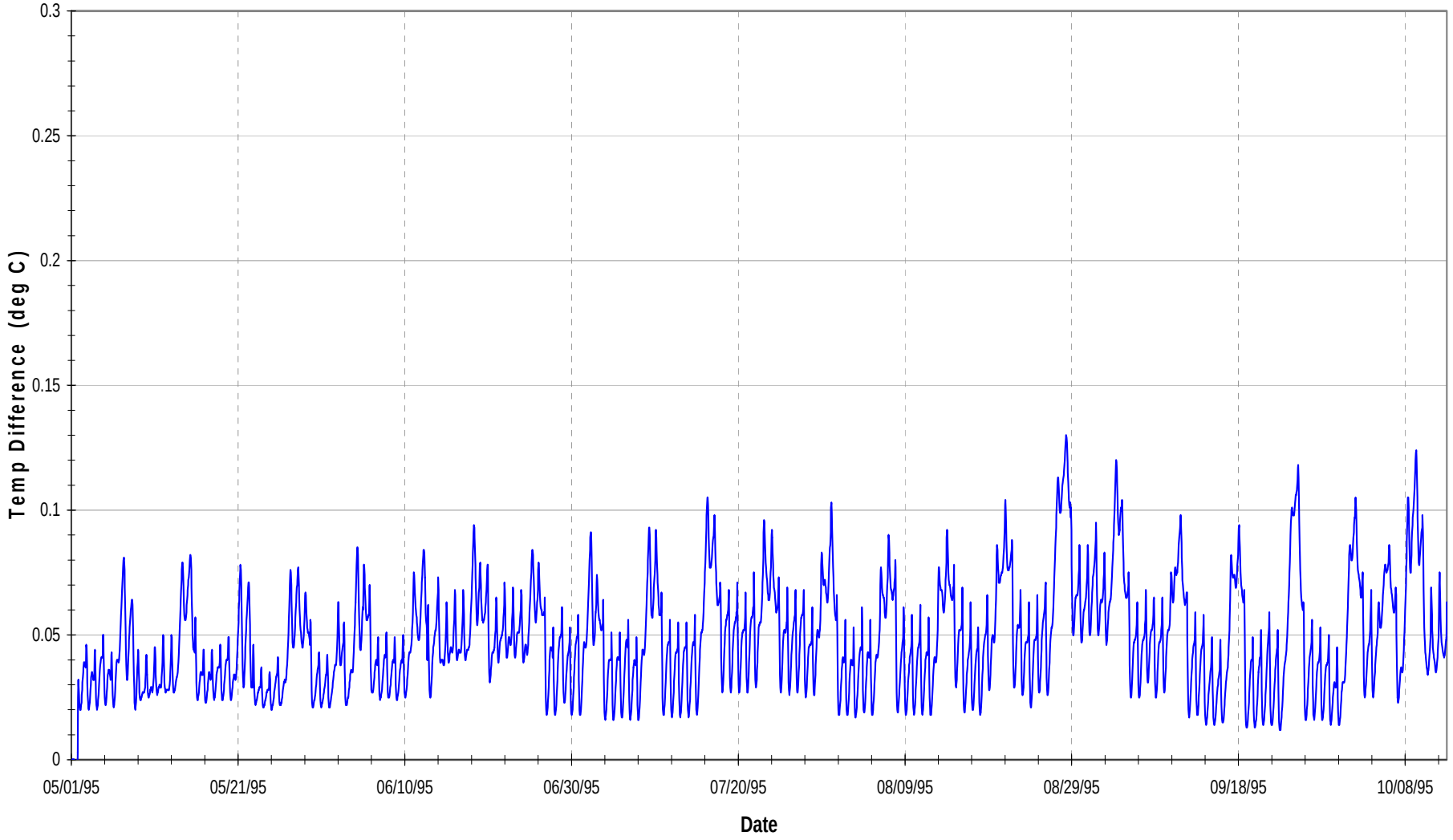


Figure 8
Temperature Difference
@ Ball Mill Creek

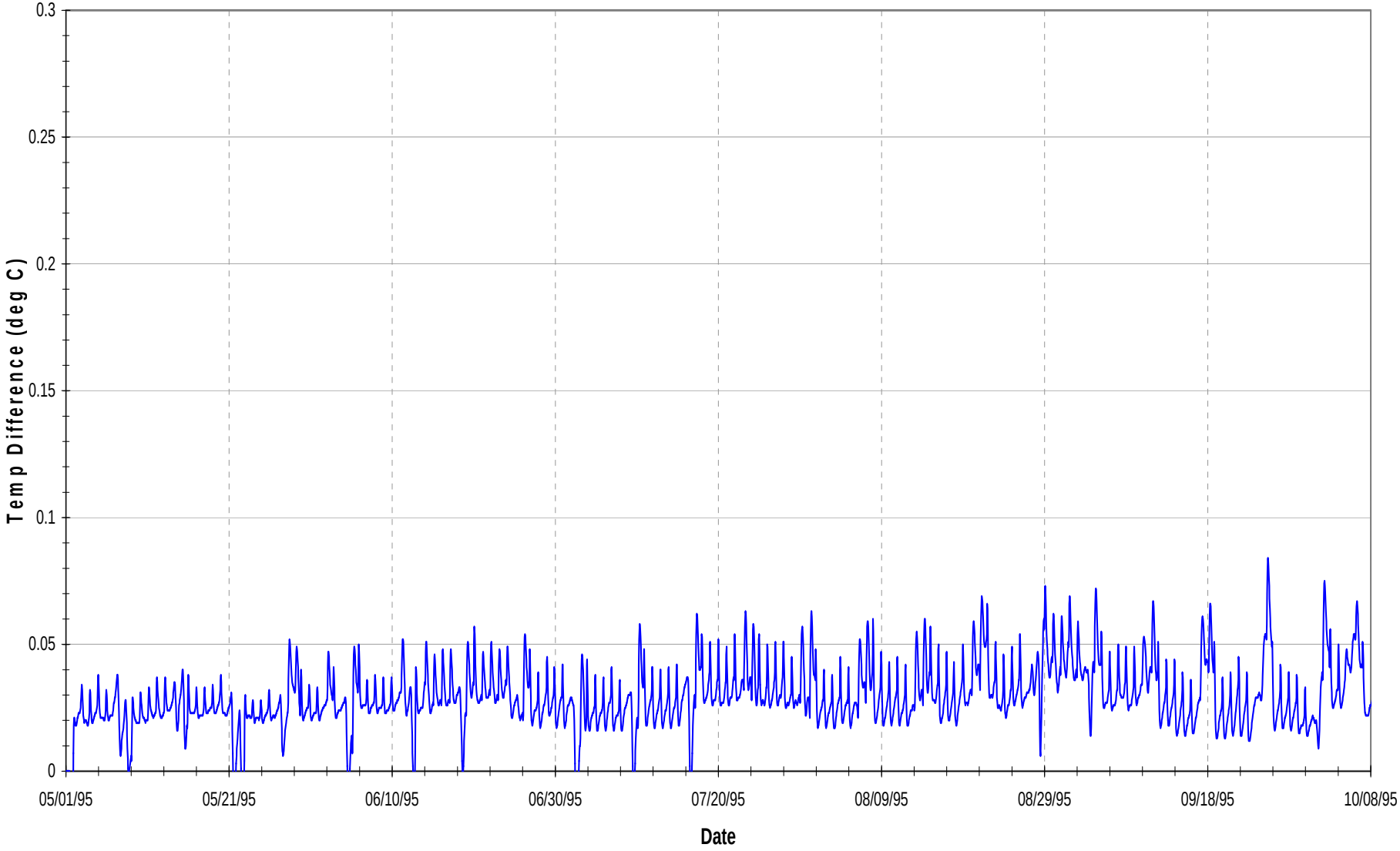
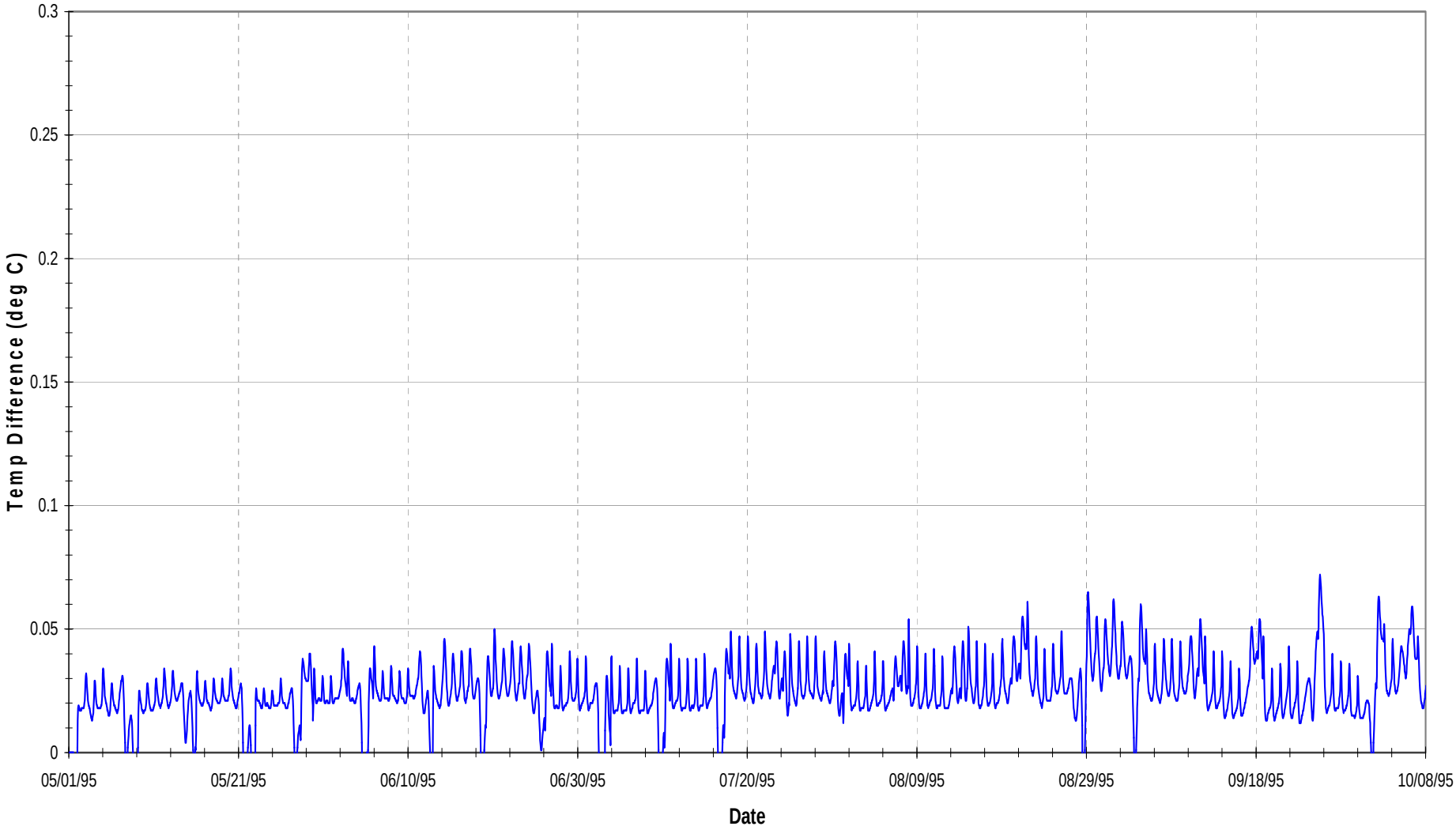


Figure 9
Temperature Difference
Upstream of Big Creek



Appendix F
List of State Protected Species Known to Occur within the CRNRA or within Three Miles of the CRNRA

APPENDIX F

List of State Protected Species Known to Occur within the CRNRA or within 3 Miles of the Park

Shakerag WRF ROW and Discharge Environmental Assessment

Common Name	Scientific Name	Global Rank, State Rank, Federal Status, and State Status[1]
Birds		
Bald Eagle [2]	*Haliaeetus leucocephalus*	G5, S2, (PS:LT,PDL), T
Red Cockaded Woodpecker [2]	*Picoides borealis*	G3, S2, LE, E
Swallow-tailed Kite [2]	*Elanoides forficatus*	G5, S2, ---, R
Wood Stork [2]	*Mycteria americana*	G4, S2, LE, E
Mammals		
Gray Bat [2]	*Myotis grisescens*	G3, S1, LE, E
Fish		
Alabama Shad [2]	*Alosa alabamae*	G3, S1, ---, T
Apalachicola redhorse	*Moxostoma sp. 1*	G3, S3, ---, ---
Bluestripe Shiner	*Cyprinella callitaenia*	G2G3, S2, --, R
Highscale Shiner	*Notropis hypsilepis*	G3, S3, ---, R
Shoal Bass	*Micropterus caracterae*	G3, S3, ---, ---
Invertebrates		
Brother Spike (Mussel)	*Elliptio fraterna*	G1, S1, ---,---
Delicate Spike	*Elliptio arcata*	G2G3Q, S1S3, ---, ---
Sculptured Pigtoe (Mussel)	*Quincuncina infucata*	G3, S3, ---, ---
Shiny-rayed Pocketbook (Mussel)	*Hamiota subangulata*	G2, S2, LE, E
Plants		
American Ginseng	*Panax quinquefolius*	G3G4, S3, ---, ---
Bay Starvine	*Schisandra glabra*	G3, S2, ---, T
Broadleaf Bunchflower	*Melanthium latifolium*	G5, S2?, --- , ---
Dwarf Sumac	*Rhus michauxii*	G2G3, S1, LE, E
Flatrock Onion [2]	*Allium speculae*	G2, S2, ---, T
Florida Anise Tree [2]	*Illicium floridanum*	G5, S1, ---, E
Georgia Aster	*Symphyotrichum georgianus*	G2G3, S2, C, T
Georgia Rockcress [2]	*Arabis georgiana*	G1, S1, C, T
Goldenseal	*Hydrastis canadensis*	G4, S2, ---, E
Indian Olive	*Nestronia umbellula*	G4, S3, ---, R
Mountain Witch-alder	*Fothergilla major*	G3, S1, --- , T
Ozark Bunchflower	*Veratrum woodii*	G5, S2, ---, R
Piedmont Barren Strawberry	*Waldsteinia lobata*	G2, S2, ---, R
Smooth Purple Coneflower [2]	*Echinacea laevigata*	G2, S2, LE, E
Sweet Pinesap	*Monotropsis odorata*	G3, S1, --- , T

[1]Listed in order left to right by state global rank, state rank, federal status, and state status. Line (---) indicates no status has been assigned to that species. The following is an explanation of these rankings:

STATE [GLOBAL] RANK
S1[G1]: Critically imperiled in state [globally] because of extreme rarity (5 or fewer occurrences).
S2[G2]: Imperiled in state [globally] because of rarity (6 to 20 occurrences).

S3[G3]: Rare or uncommon in state [rare and local throughout range or in a special habitat or narrowly endemic] (on the order of 21 to 100 occurrences).
S4[G4]: Apparently secure in state [globally] (of no immediate conservation concern).
S5[G5]: Demonstrably secure in state [globally].
Q:
? Denotes questionable rank; best guess given whenever possible (e.g. S3?).

FEDERAL STATUS (U.S. Fish and Wildlife Service)
LE: Listed as endangered. The most critically imperiled species. A species that may become extinct or disappear from a significant part of its range if not immediately protected.
LT: Listed as threatened. The next most critical level of threatened species. A species that may become endangered if not protected.
PS: Partial status. Status in only a portion of the species' range.
PDL: Proposed for delisting.
C: Candidate species presently under status review for federal listing for which adequate information exists on biological vulnerability and threats to list the taxa as endangered or threatened.

STATE STATUS
E: Listed as endangered. A species that is in danger of extinction throughout all or part of its range
T: Listed as threatened. A species that is likely to become an endangered species in the foreseeable future throughout all or parts of its range.
R: Listed as rare. A species that may not be endangered or threatened but that should be protected because of its scarcity.
U: Listed as unusual (and thus deserving of special consideration). Plants subject to commercial exploitation would have this status.

[2]Species reported as occurring within the park by the National Park Service Southeast Coast Inventory and Monitoring Program as being “Present in the Park” or “Historic” based on inclusion in the NPSpecies database as of August 26, 2004. These data are subject to revision following the completion of ongoing biological inventories, database quality assurance procedures, and any updates to State Listing status.

Sources:
Georgia Department of Natural Resources (GADNR). 2008a. Special Concern Animals in Georgia. http://georgiawildlife.dnr.state.ga.us/content/specialconcernanimals.asp, accessed May 19, 2010.

Georgia Department of Natural Resources (GADNR). 2008b. Special Concern Plants in Georgia. http://georgiawildlife.dnr.state.ga.us/content/specialconcernplants.asp, accessed May 19, 2010.

Appendix G
Evaluation of Chattahoochee River Total Phosphorus Projections

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Technical Memorandum

August 22, 2003

To: Ms. Pat Stevens - Metropolitan North Georgia Water Planning District

From: Mr. Robert W. Olson

Re: Technical Memorandum –
Evaluation of Chattahoochee River Discharges
Long-Term Wastewater Management Plan

Natural Resource Engineering, Inc. (NRE) is providing this technical memorandum as documentation regarding the assimilative capacity of the Chattahoochee River between Buford Dam and the headwaters of West Point Lake for the Long Term Wastewater Management Plan. The following memorandum provides a brief description of the procedures used to evaluate the discharge alternatives for dissolved oxygen (DO) consuming constituents and presents the assumptions and results of the analyses.

Dissolved Oxygen Procedures and Results

The Chattahoochee River discharge limits for DO demanding constituents were evaluated using the computer model developed by the Georgia Environmental Protection Division (GAEPD) for their Chattahoochee River Modeling Project (CRMP). The objective of the CRMP was to develop a hydrodynamic modeling system to analyze the complex issues within the Chattahoochee River watershed. The foundation of the model used for the CRMP was the Corps of Engineer's RIV1 model.. EPDRiv1, a one-dimensional hydrodynamic model, was extensively modified and tested by the GAEPD prior to its use in simulating the water quality in the Chattahoochee River. The modifications to the model were made to more accurately simulate the impact of the following:

47 tributaries,
11 wastewater treatment discharges,
4 municipal water withdrawals, and
4 power plant thermal discharges.

The hydrodynamic model for the 115 miles of the Chattahoochee River downstream from Buford Dam was calibrated and verified by GAEPD using data collected during 1994 and 1995. The calibrated model and the study area data were then used with "critical conditions" for DO and temperature in the river segment to evaluate NPDES permit limits. The critical DO conditions were determined to be the following:

- All withdrawals and wastewater treatment facilities (WTF) operating at the maximum permit limits (i.e. flow, CBOD, organic nitrogen, ammonia, DO, etc.)

- Constant monthly flows from Buford Dam to maintain the minimum regulatory flow of 750 cfs just upstream from the Peachtree Creek and Chattahoochee River confluence.
- Monthly 7-day 10-year (7Q10) low flows from the tributaries as estimated by US Geological Survey (USGS) regression equations
- Meteorological conditions as measured in 1994 and 1995

The objective of the "critical conditions" analyses was to compare the calculated DO to the DO standard (5.0 mg/l 24-hour average, never below 4.0 mg/l) in the downstream sections of the Chattahoochee River. A list of the WTF discharges identified in the long and/or short term plans and simulated in the model is presented in Table 1.

Table 1
Summary of Wastewater Discharges

Proposed Wastewater Treatment Facility	Political Jurisdiction	Plan	River Mile
New Forsyth County Plant	Forsyth County	Short & Long	339.0*
Crooked Creek	Gwinnett County	Short & Long	325.15
John's Creek	Fulton County	Short & Long	324.0
Big Creek	Fulton County	Short & Long	315.11
R.L. Sutton	Cobb County	Short & Long	300.45
R.M. Clayton	City of Atlanta	Short & Long	300.4
South Cobb	Cobb County	Short & Long	294.34
Utoy Creek	City of Atlanta	Short & Long	291.54
South River	City of Atlanta	Short & Long	291.34
Polebridge	Dekalb County	Long	291.34*
Sweetwater Creek	Douglas County	Short & Long	286.67
Camp Creek	Fulton County	Short & Long	283.53
New South Central	Douglas County	Long	270*

* Proposed locations

GAEPD first used the critical conditions model to simulate the WTF discharges at their current (2003) permit limits. The results of this analysis, shown in Table 2, indicated that the DO standard would not be achieved at the current NPDES permit limits. Next, the model was used by NRE to evaluate lower

permit limits for the short term plan that could be used for the 2003 NPDES permitting activities. The procedures used to reduce the limits took into account the following factors:

- The proposed "GAEPD – Metro Limits" CBOD5 = 2.9 mg/l, ammonia = 0.5 mg/l, organic nitrogen = 1.5 mg/l and DO = 7.0 mg/l
- The ability of the WTF to treat to lower limits
- Projected loading into the each WTF and anticipated WTF expansion/upgrades
- Water quality kinetics of the River

Two of the underlying principles used to evaluate near term permit limits were: 1) abide by the GAEPD guideline that any facility requesting an increase in hydraulic capacity would have to design the WTF to meet the "metro limits" and; 2) no increase in the existing permit concentration limits. During the short term planning process, each WTF evaluated their recent operational performance and proposed acceptable limits. All of the WTFs were operating such that their existing permit limits could be significantly reduced. In particular, several WTFs (Crooked Creek, John's Creek, and R.L. Sutton) had been previously designed or are operating such that the treated wastewater would currently comply with the "metro limits".

The short term plan modeling efforts considered various the heat load scenarios from the Georgia Power Plants. The scenarios evaluated for the short term plan address the commitment by Georgia Power to remove existing heat loads from the river during critical conditions. The following heat load scenarios were considered in the short term plan:

1. Full heat load – this assumed that both plants McDonough and Atkinson would operate in a manner consistent with the 1995 observations.
2. Partial heat load – this assumed that only Plant McDonough would operate at their permit limits during critical conditions.
3. No heat load – this assumed that all power plant heat loads would be removed from the river.

In addition to the heat load removal scenarios, several other milestones will effect the DO resources of the River during the 2003-2008 permitting cycle. As a result, staged permits were requested so that each WTF can accommodate the anticipated increases in flow while complying with their NPDES permits and achieving water quality standards in the Chattahoochee River. The milestones that will trigger the stages requested in the permits are the completion of more efficient WTFs and the removal of heat loads. Each of these milestones results in the availability of additional assimilative capacity. The results of the analyses prior to total heat load removal are presented in Table 2. A description of the modeling efforts for the short term plan, including the no heat load scenario, is included as an Appendix in the final "Short-Term Wastewater Capacity Plan" dated August 7, 2002.

The time horizon for the long term plan was 2030. Jordan, Jones & Golding, Inc. (JJ&G) used population projections, service areas, existing infrastructures, and political boundaries to estimate various alternative wastewater discharge scenarios for 2030. The alternatives are described in detail in technical memoranda provided to the MNGWPD by JJ&G (http://www.northgeorgiawater.org/). The resulting projections were evaluated using the Chattahoochee River model to assess compliance with water quality

standards. The long term modeling efforts assumed that Georgia Power has removed the heatloads from the river. All of the alternatives analyzed resulted in compliance with the DO water quality standards. The discharge flows and modeling results for the recommended alternative are provided in Table 2.

As previously mentioned, any request for additional hydraulic capacity necessitates the WTF's compliance with the "Metro Limits". The flow rates (Table 2) for the City of Atlanta's RM Clayton, Utoy Creek and South River facilities show their flow rates increasing with discharge limits remaining constant. These apparent increases in flow rates are not the result of future capacity being added but an acknowledgement of the existing designed hydraulic capacities of these facilities. Table 2 shows that the permitted discharge flows for these facilities would be staged, in conjunction with the reduction of the heat load in the Chattahoochee, until the facilities' existing flow capacities can be allowed.

Table 2

Summary of Results
Chattahoochee River Assimilative Capacity
MNGWPD Draft Long Term Wastewater Management Plan

Parameter	Forsyth County	Crooked Creek	John's Creek	Big Creek	R.L. Sutton	R.M. Clayton[3]	South Cobb	Utoy Creek	South River	PoleBridge	Douglas Sweetwater Creek	Camp Creek	Douglas South Central	West Coweta	Total Flow (MGD)	Minimum DO (mg/l)
Current Permit																
Flow (mgd)	--	36	7	24	40	96	40	40	48	0	3	13	0	0	347	
BOD5 (mg/l)	--	2.9	14	9.1	10	15	15	15	15	--	20	25	--	--		
NH3 (mg/l)	--	0.77	1.2	1.4	1.8	3.7	1.8	3.7	4.4	--	3.6	0.5	--	--		1.9
DO (mg/l)	--	5	5	5	5	5	5	5	5	--	5	5	--	--		
Proposed 2004 Permit Limits (December 2003)- August 2002 Short Term Plan[1]																
Flow (mgd)	10	50	15	24	50	103	40	40	48	0	3	16	0	0	399	
BOD5 (mg/l)	2.9	2.9	2.9	4	2.9	3.5	4	3.5	3.5	--	10	5	--	--		5
NH3 (mg/l)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	--	2	2	--	--		
DO (mg/l)	7	6	7	7	7	6	7	6	6	--	5	7	--	--		
Permit Limits after Camp Creek Plant upgrade (Fall 2004) - August 2002 Short Term Plan[1]																
Flow (mgd)	10	50	15	24	50	110	40	40	48	0	3	24	0	0	414	
BOD5 (mg/l)	2.9	2.9	2.9	4	2.9	3.5	4	3.5	3.5	--	10	2.9	--	--		5.24
NH3 (mg/l)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	--	2	0.5	--	--		
DO (mg/l)	7	6	7	7	7	6	7	6	6	--	5	7	--	--		
Draft Long Term Plan- Recommended Alternative April 2003																
Flow (mgd)	20	45	15	43	60	122	50	44	54	30	6	24	12	0	525	5.17
BOD5 (mg/l)	2.9	2.9	2.9	2.9	2.9	3.5	2.9	3.5	3.5	2.9	2.9	2.9	2.9	2.9		
NH3 (mg/l)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5		
DO (mg/l)	7	6	7	7	7	6	7	6	6	7	7	7	7	7		

1. Short Term calculations assume partial power plant heat load (McDonough only) remains
2. All discharges include 1.5 mg/l of organic nitrogen
3. RM Clayton Design flow is 122 mgd

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Technical Memorandum September 25, 2003

To: Ms. Pat Stevens - ARC

From: Mr. Robert W. Olson - NRE

Re: Technical Memorandum –
Evaluation of Chattahoochee River Total Phosphorus Projections
Long-Term Wastewater Management Plan

Natural Resource Engineering, Inc. (NRE) has completed the evaluation of total phosphorus (TP) loading into the Chattahoochee River between Buford Dam and the headwaters of West Point Lake for the Metropolitan North Georgia Water Planning District (MNGWPD) long term plans. The MNGWPD long term plans address the District's water, wastewater and watershed needs through the year 2030. The following technical memorandum summarizes recent TP studies, provides an estimate of future TP loading through the 2030 planning period and discusses uncertainties surrounding point source permit limits and the total phosphorus standard.

Background Information

Chlorophyll "a" is an indicator used by GAEPD to evaluate the trophic state of a lake. Chlorophyll "a" concentrations are primarily dependent on the availability of nutrients and sunlight and water velocities in the receiving water body. In the southeastern US, the limiting nutrient for chlorophyll is phosphorus. As a consequence, to control eutrophication of West Point Lake, the GAEPD established an annual limit (1,400,000 pounds) of total phosphorus (TP) that can be discharged into the lake via the Chattahoochee River. This annual loading should allow for compliance with the maximum average chlorophyll "a" standard (27 ug/l) established by GAEPD for West Point Lake.

The TP loading can be attributed to point and nonpoint sources. The point sources are the wastewater treatment facilities (WTF) that discharge directly to the River and those that discharge to tributaries that flow into the river. Presently, the point source contributions also include the discharge from the City of Atlanta's combined sewer overflows (CSO). This CSO contribution will be greatly reduced upon the completion of the CSO treatment projects. The nonpoint sources include the TP from Lake Lanier (Buford Dam), storm water runoff and the TP load from the tributary base flow. A simple spreadsheet model approach was developed for the short-term plan and used to evaluate the sources of TP and assist in establishing a recommended TP limit for the WTFs that would assure compliance with the West Point Lake TP standard. The methodology used and the results of the short-term plan evaluation are summarized in the memorandum included as Appendix B of the "Short-Term Wastewater Capacity Plan, August 7, 2002." The results of this evaluation indicated that the West Point Lake TP standard could be met through about 2010 with WTF discharge limits at or below 0.38 mg/l.

Since completion of this short-term plan, the MNGWPD has completed previously referenced long term planning activities for water, wastewater and watershed needs through the year 2030. These planning activities included the development of projections for point and nonpoint source TP loading. These plans used projections of population growth and land development to project resulting wastewater flows and nonpoint source pollutant loading. The watershed planning efforts, performed by CH2Mhill (CH2) are described in the draft report "District-Wide Watershed Management Plan" dated June 2003. The results of the modeling efforts for the long term watershed management plan (WMP) indicated that the nonpoint pollutant load into all the major rivers will measurably increase unless development controls are implemented and existing ordinances and regulations enforced. The CH2 results for the Chattahoochee River watersheds indicate that uncontrolled development would result in a 32 percent increase in nonpoint source TP loading into the river upstream from West Point Lake. The WMP results also indicate that implementation of recommended development controls would essentially eliminate the increase in nonpoint source TP loading and in fact future TP loading would be less than the existing load.

NRE used the spreadsheet model to provide estimates of the timing and potential limits for phosphorus removal upgrades to the WTFs. This procedure incorporates some of the same conservative assumptions that were used in the short-term evaluation:

- No loss/assimilation of TP in the Buford Dam to West Point Lake River segment
- WTFs operate at the average monthly permit limits

The point source flows used for the WMP were obtained from the wastewater planning activities described in the Jordan, Jones & Goulding, Inc. draft report "Long-Term Wastewater Management Plan" dated June 2003. The mainstem and tributary WTF flows used for this analysis are shown in attached Tables 1 and 2, respectively.

The nonpoint source loading factors used for this long-term evaluation are those that were used for the short-term evaluation (see above referenced NRE short-term memo). The uncontrolled existing nonpoint loads were extrapolated to the year 2030 by applying the same increase (approximately 32%) in nonpoint source TP loading as was calculated in the CH2 long-term modeling effort. Similarly, the percent reduction in TP loading for storm water control devices or Best Management Practices implemented in the watershed was obtained from the long-term modeling results. It should be noted that CH2 used the same loading factors as NRE for their long-term modeling efforts and as a result, the existing and 2030 nonpoint source loads are essentially the same. The point source discharge concentrations were then varied over time for comparison with the existing TP standard.

The results of this spreadsheet model are summarized in Table 3 and Figure 1. As shown in Figure 1, the results indicate that without nonpoint source controls, a WTF permit limit of 0.3 mg/l (for mainstem WTFs) would result in an exceedance of the TP standard in approximately 2025. The tributary WTF loading was calculated using a 0.13 mg/l discharge limit. Additional calculations indicate that if the TP limit for the mainstem WTF discharges is reduced to 0.25 mg/l prior to 2025, the TP standard will not be exceeded in 2030. Also, Figure 1 indicates that implementation of recommended controls would result in compliance with the West Point Lake 1.4 million lb/yr TP with a WTF 0.3mg/l TP discharge limit.

Compliance

Presently, GAEPD annually determines compliance with the TP limit using observed flow and TP concentrations from the USGS gage at Franklin, Georgia. In addition to the TP compliance determination, GAEPD calculates the average chlorophyll "a" concentration observed in West Point during the growing season for comparison with the West Point Lake chlorophyll "a" standard (27 ug/l). If either of the above limits are exceeded for 2 consecutive years, the water segment will be included on the 303(d) list. When a water segment is on the 303(d) list, regulations mandate that a Total Maximum Daily Load (TMDL) be established to bring the water body into compliance with the standard. If a TMDL study is undertaken, it more than likely would result in a reduction in the TP discharge limits for the WTF's.

The GAEPD TP and chlorophyll "a" compliance results for 1996 through 2001 are presented in Figures 2 and 3, respectively. As noted on Figure 2, there are two (2) other TP standards for West Point Lake. One regulating the TP load on the New River (14,000 lb/yr) and the other for the Yellowjacket Creek (11,000 lb/yr). Though the data over this period of time indicate compliance with the TP and the chlorophyll "a" standards, there are periods that the standard is approached. In particular, the average chlorophyll concentrations were near the standard in 2000 while the observed TP was near the standard in 1996. Though a review of the data does not indicate a direct correlation with flow, our experience says that one would experience high chlorophyll concentrations during hot sunny low flow periods and high TP loading during high flow periods.

Other Factors

Several factors could directly or indirectly dictate the timing and need for increased phosphorus removal from WTF discharges. As stated above, low flow conditions are conducive to high chlorophyll concentrations. The present regulations specify a minimum flow at Peachtree Creek of 750 cfs. If this minimum flow requirement is significantly reduced, higher chlorophyll concentrations could result during the sustained low flow periods (i.e. summer time droughts). Also, there are other possible (at present unknown) changes to environmental regulations that could result in the need to lower phosphorus concentrations from the WTF.

In addition to the existing phosphorus and chlorophyll standards, the USEPA has mandated that all states have a plan to promulgate or have promulgated in-stream nutrient standards by the end of 2004. Since Georgia is one of the states that does not presently have in-stream nutrient standards, GAEPD is in the process of evaluating the various approaches to assist in developing Georgia's standards. EPA has published a guidance document ("Ambient Water Quality Criteria Recommendations – Information Supporting the Development of State and Tribal Nutrient Criteria – Rivers and Streams in Nutrient Ecoregion IX [EPA 822-B-00-019], electronically available at (www.epa.gov/OST/standards/nutrient.html) that indicates the magnitude of the potential standards. The range of in-stream concentrations of total phosphorus and total nitrogen presented in this document were 0.0225- 0.1 and 0.07-1.0 mg/l, respectively. Data from the subecoregion (No.45) containing the majority of the MNGWPD indicate potential total phosphorus and total nitrogen in-stream standards (25^{th} percentile of the data) of 0.03 and 0.41 mg/l, respectively. If the Georgia in-stream nutrient

standards are in the range of the above concentrations, most WTFs will require additional treatment to remove nutrients and the resulting WTF discharge limits for TP would probably be below the existing 0.3 mg/l limit.

Recommendations

As a result of the uncertainty in the TP loading, NRE recommends that the following:

- MNGWPD annually request the results of GAEPD's compliance evaluation of the TP and chlorophyll "a" standard
- MNGWPD request a representative(s) be allowed to attend deliberations on the nutrient standard, and be proactive in assisting GAEPD establish the nutrient standards.

Table 1
Summary of
Mainstem Point Source Total Phosphorus Load
NPDES Permit Renewal

Parameter	Forsyth County	Crooked Creek	John's Creek	Big Creek	R.L. Sutton	R.M. Clayton	South Cobb	Utoy Creek	South River	PoleBridge	Sweetwater Creek	Camp Creek	Douglas South Central	West Coweta	Totals
Current Permit															
Flow (mgd)	0	36	7	24	40	96	40	40	48	0	3	13	0	0	347
Current TP (mg/l)	0.3	0.41	0.75	0.75	0.75	0.64	0.75	0.64	0.64	0	0.75	0.3	0	0	
Total Load (lbs/yr)	0	44931	15982	54794	91323	187030	91323	77929	93515	0	6849	11872	0	0	675547
2004 Permit Limits															
Flow (mgd)	10	36	15	24	50	110	40	40	48	0	3	16	0	0	392
TP Limit (mg/l)=	0.3														
Total Load (lbs/yr)	9132	32876	13698	21918	45662	100455	36529	36529	43835	0	2740	14612	0	0	357986
2010 Projected Limits															
Flow (mgd)	20	36	15	24	50	122	40	44	54	0	6	24	6	0	441
TP Limit (mg/l)=	0.3														
Total Load (lbs/yr)	18265	32876	13698	21918	45662	111414	36529	40182	49314	0	5479	21918	5479		402734
2020 Projected Limits															
Flow (mgd)	20	40	15	43	50	122	40	44	54	30	6	24	9	0	507
TP Limit (mg/l)=	0.3														
Total Load (lbs/yr)	18265	36529	13698	39269	54794	111414	36529	40182	49314	27397	5479	21918	8219		463008
Alt. Projected Limits															
Flow (mgd)	20	45	15	43	50	122	50	44	54	30	6	24	12	0	525
TP Limit (mg/l)=	0.3														
Total Load (lbs/yr)	18265	41095	13698	39269	54794	111414	45662	40182	49314	27397	5479	21918	10959	0	479446
TP Limit (mg/l)=	0.25														
Total Load (lbs/yr)	15221	34246	11415	32724	45662	92845	38051	33485	41095	22831	4566	18265	9132	0	399538

Table 2
Summary of Tributary Point Source Total Phosphorus Load

Parameter	Buford Westside	Buford Southside	Tyson Foods	Cumming	Douglasville South	Villa Rica	Douglasville South	Newnan	**Total Phosphorus (lbs/yr)**
Current Permit Limits									
Flow (mgd)	0.30	2.00	1.50	2.00	0.60	0.52	3.25	2.30	
Total P (mg/l)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	
Total Load (lbs/yr)	685	4566	3425	4566	1370	1187	7420	5251	28470
Metro Tributary Limits - 2004									
Flow (mgd)	0.30	2.00	1.50	2.00	0.60	0.52	3.25	3.00	
Total P (mg/l)	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	
Total Load (lbs/yr)	119	791	594	791	237	206	1286	1187	5212
Metro Tributary Limits - 2010									
Flow (mgd)	0.50	3.00	1.50	2.00	0.00	0.52	0.00	3.00	
Total P (mg/l)	0.13	0.13	0.13	0.13	0	0.13	0	0.13	
Total Load (lbs/yr)	198	1187	594	791	0	206	0	1187	4163
Metro Tributary Limits - 2020									
Flow (mgd)	0.50	3.00	1.50	2.00	0.00	0.52	0.00	3.00	
Total P (mg/l)	0.13	0.13	0.13	0.13	0	0.13	0	0.13	
Total Load (lbs/yr)	198	1187	594	791	0	206	0	1187	4163
Metro Tributary Limits - 2030									
Flow (mgd)	0.00	0.00	1.50	2.00	0.00	0.00	0.00	3.00	
Total P (mg/l)	0.13	0.13	0.13	0.13	0	0.13	0	0.13	
Total Load (lbs/yr)	0	0	594	791	0	0	0	1187	2572

Table 3
Summary of Results
Total Phosphorus NPDES Permit Limits

Total Phosphorus Source	Total Phosphorus Load (lbs/yr)			
	2004	2010	2020	2030
Buford Dam Load				
Average Buford Dam Flow (MGD)	1324			
Average Buford Dam TP (mg/l)	0.03			
Total P (lbs/yr)	120939	120939	120939.049	120939
Point Source Loads				
Main Stem				
Mainstem Point Sources (0.3 mg/l)	357986	402734	463008	479446
Mainstem Point Sources (0.25 mg/l)				399538
Tributary				
Tributary Point Sources (0.13 mg/l)	5212	4163	4163	2572
Combined Sewer Overflow	7660	1840	1840	1840
Nonpoint Source Loads				
Non point sources (uncontrolled)	642996	689939	768177	846415
Non point sources (controlled)	642996	628061	603168	578275
Total Phosphorus (uncontrolled)	1134793	1219616	1358127	1451212
Total Phosphorus (controlled)	1134793	1157737	1193118	1183072

Figure 1
Projected Total Annual Phosphorus Load
at Franklin, GA

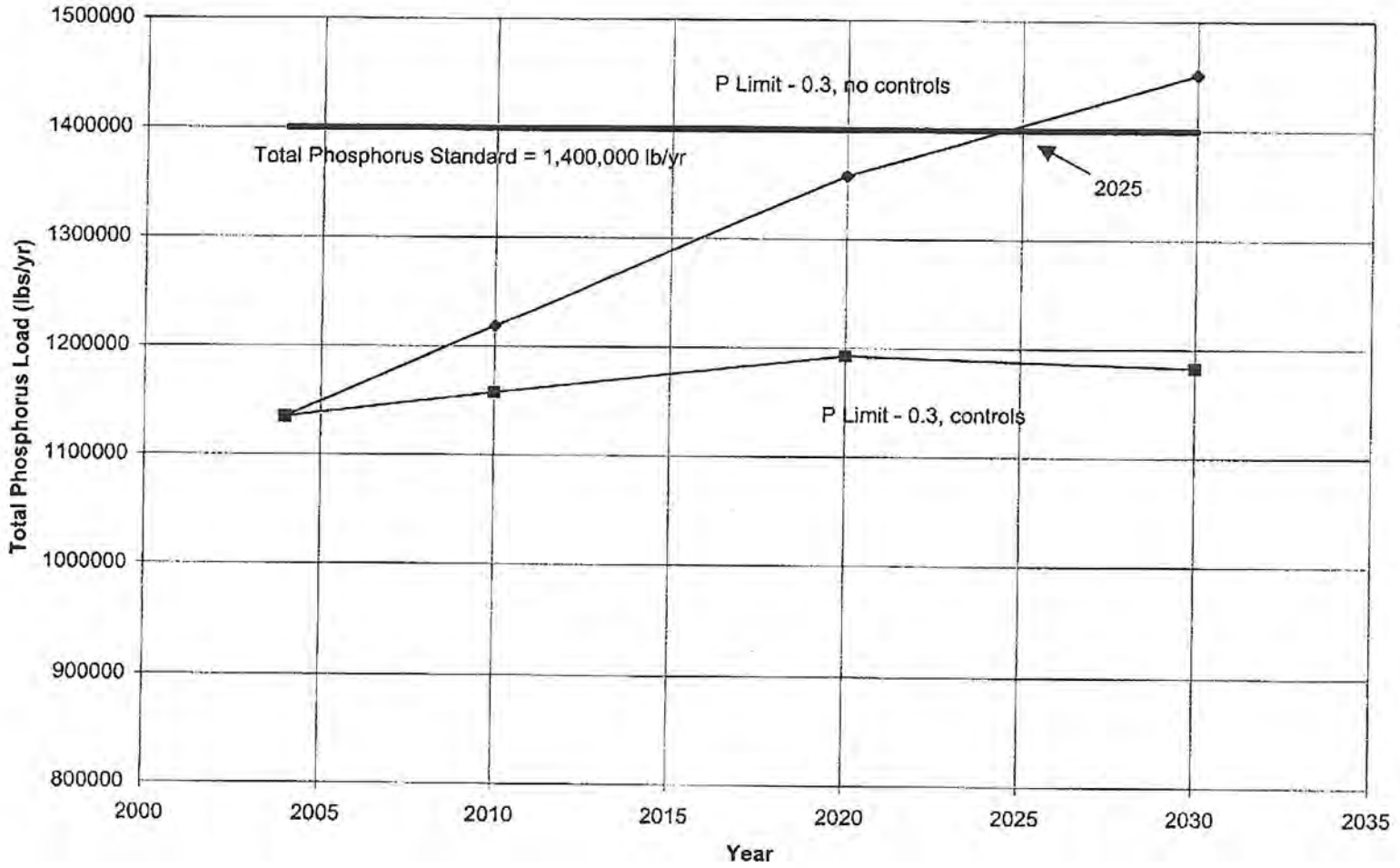
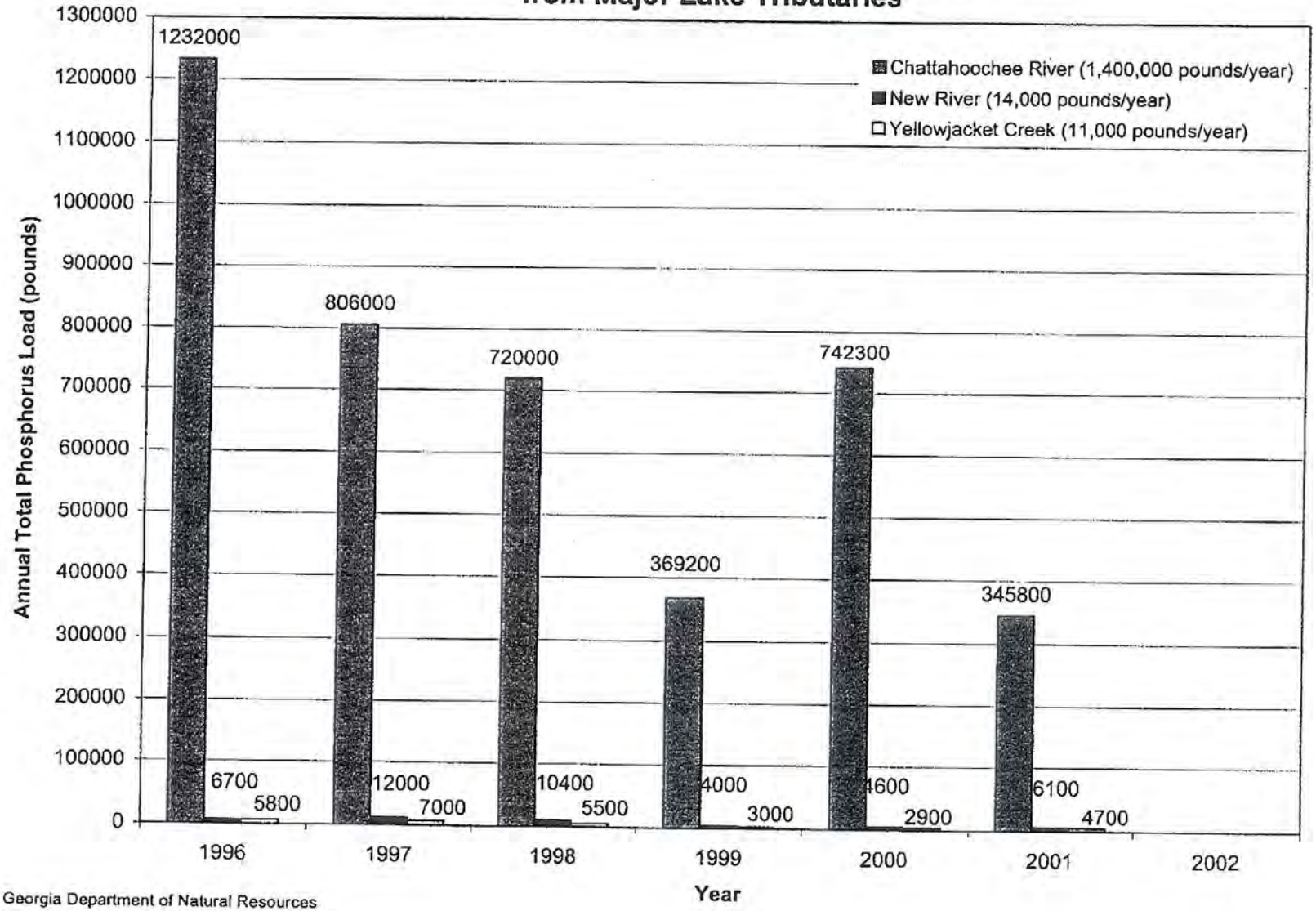
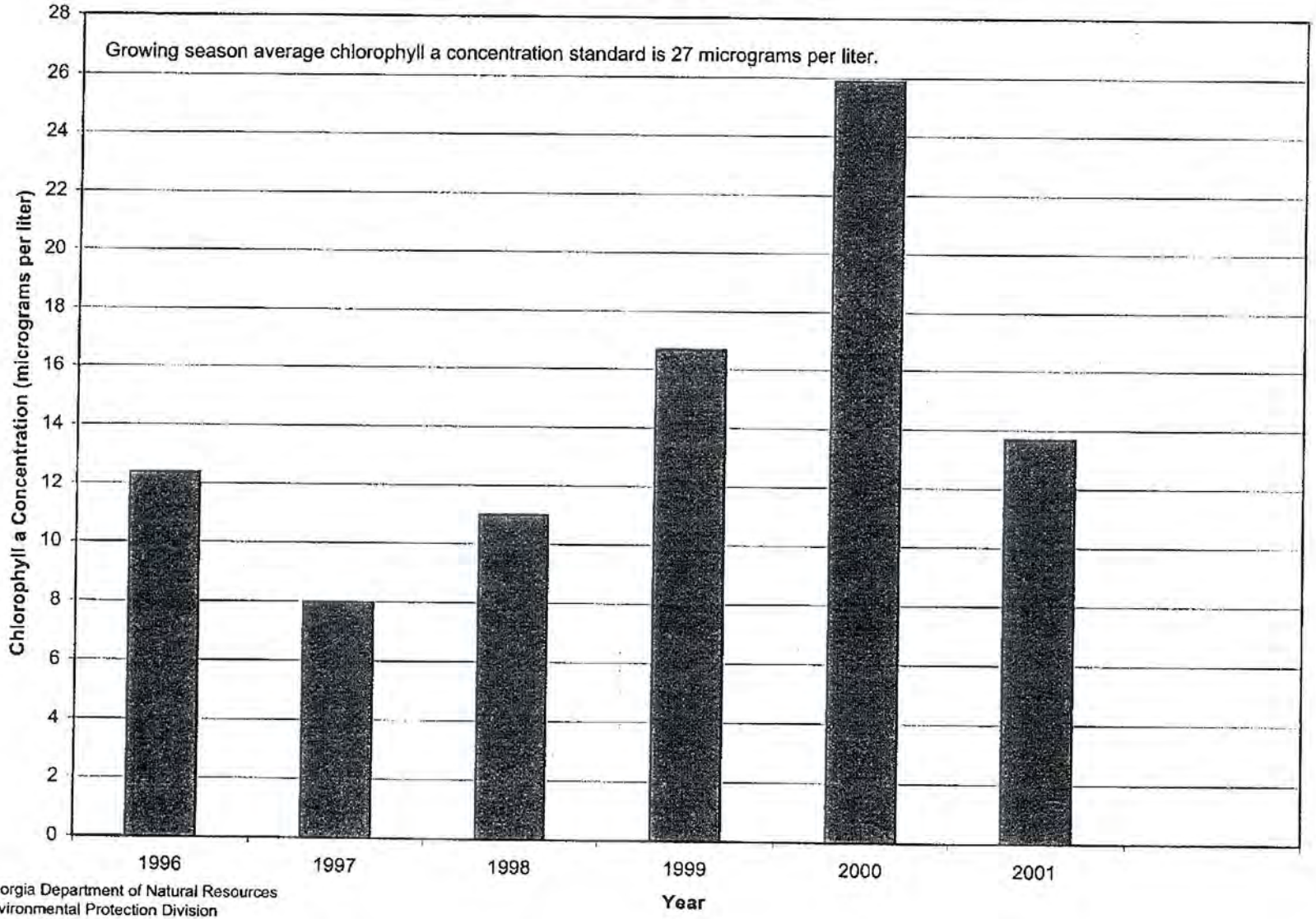


Figure 2
Lake West Point Annual Total Phosphorus Load from Major Lake Tributaries



Georgia Department of Natural Resources
Environmental Protection Division
Atlanta, Georgia

Figure 3
Growing Season Average Chlorophyll a Concentration at LaGrange Water Intake



Georgia Department of Natural Resources
Environmental Protection Division
Atlanta, Georgia

Appendix H
Phase I Cultural Resources Survey

#3517
Library

PHASE I CULTURAL RESOURCE SURVEY OF 286 ACRES WEST OF THE CHATTAHOOCHEE RIVER IN FORSYTH COUNTY, GEORGIA

FINAL

GARROW & ASSOCIATES, INC.

ABSTRACT

A cultural resource survey was conducted for Hayes, James & Associates, Inc., prior to development of a wastewater treatment plant in the southeast corner of Forsyth County, Georgia. The 285.97 acre project tract is adjacent to the Chattahoochee River. Much of the project tract has been impacted by agricultural, animal husbandry, and sand processing activities.

The survey was performed in September 1995 by Garrow & Associates, Inc. A combined pedestrian survey and subsurface testing program was pursued throughout the project tract. One previously recorded archaeological site (9FO218) is located in the tract. Six previously recorded archaeological sites are located within one-half mile of the project tract. No previously identified National Register of Historic Places (NRHP) properties are located either in the project tract or within one mile of the project tract. The literature search also indicated that no historically significant individuals or events were associated with the project tract.

This survey identified seven archaeological sites (9FO218, 9FO267, 9FO268, 9FO269, 9FO270, 9FO271, and 9FO272) and two isolated finds within the project tract. Site 9FO218, a previously recorded site, was relocated and initially evaluated as potentially eligible for the NRHP. Site 9FO269 is a partially maintained cemetery still in use. This cemetery could be recommended potentially eligible for the NRHP; however, it is now protected by Georgia's Abandoned Cemeteries and Burial Grounds Act (OCGA 1991). The remaining five sites (9FO267, 9FO268, 9FO270, 9FO271, 9FO272) and two isolated finds are recommended ineligible for the NRHP. The six standing structures in the project tract were built within the past 50 years and are therefore ineligible for nomination to the NRHP.

The cemetery, site 9FO269, is located on a separate parcel and will not be purchased as part of the development proposed for the remainder of the project tract. There will be no impact on the cemetery as a result of the proposed development, and no further action will be required for the cemetery under federal or state statutes. It would be in the County's best interest for the cemetery boundaries to be verified before construction begins. Cemetery boundary verification can be accomplished through systematic probing up to 9.0 m in all directions beyond the outermost marked graves.

Site 9FO218 was initially recommended potentially eligible for the NRHP. On review, the U.S. Army Corps of Engineers, Savannah District, and the Georgia SHPO deemed 9FO218 eligible for the NRHP. The preferred management recommendation for 9FO218 is preservation in place. Proposed development plans indicate that this site is outside the proposed limits of construction. A Memorandum of Agreement (MOA) stating that 9FO218 is to be preserved in place will be prepared by the Corps of Engineers, Savannah District. The MOA will be agreed upon and signed by appropriate parties for the Savannah District, Georgia SHPO, and Forsyth County. A preservation plan specifying the methods for ensuring the preservation of 9FO218 will be developed through consultation between the Savannah District, Georgia SHPO, and Forsyth County.

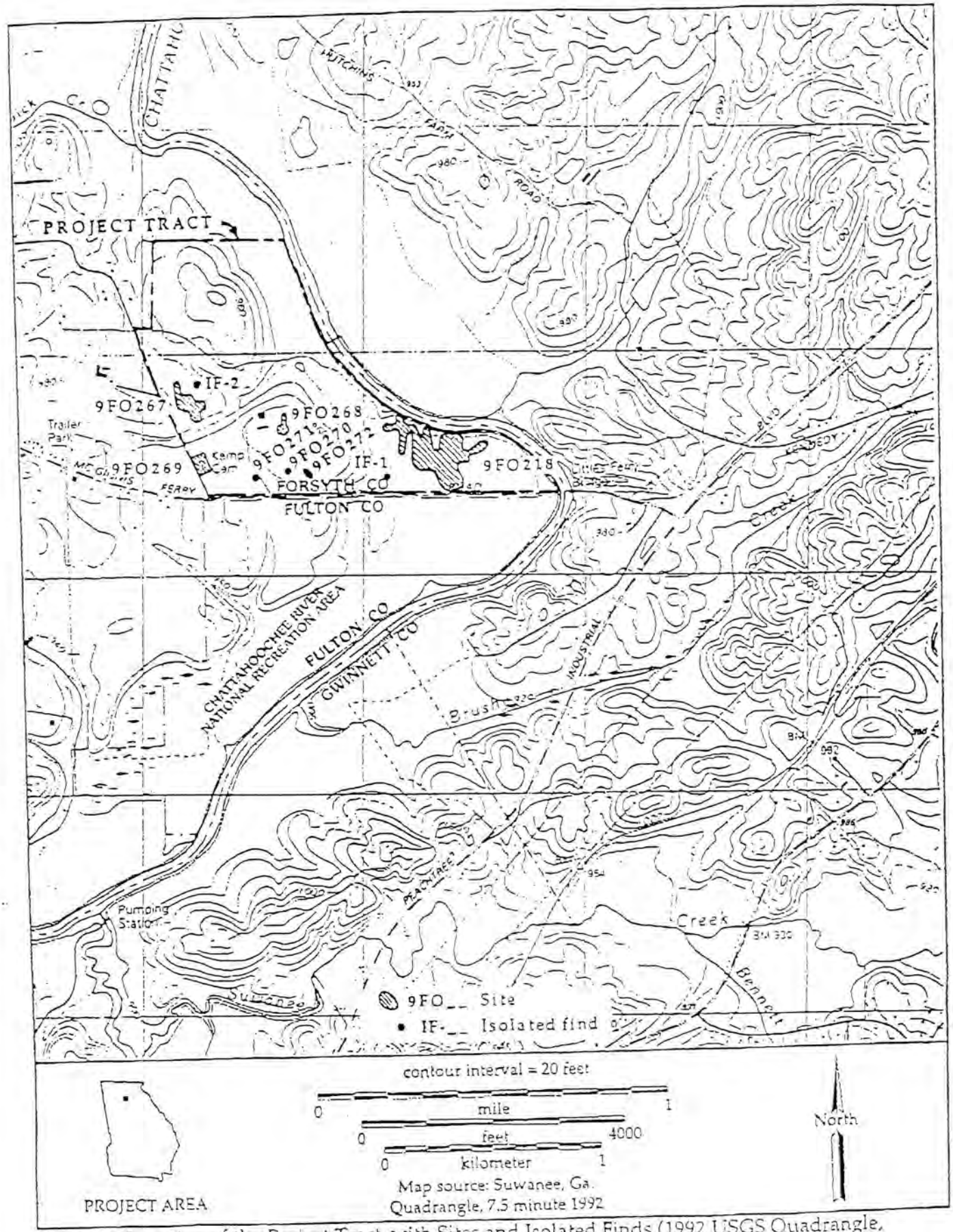


Figure 1. Location of the Project Tract, with Sites and Isolated Finds (1992 USGS Quadrangle, Suwanee, Georgia, 7.5 Minute).

VI. RECOMMENDATIONS

This survey identified seven archaeological sites (9FO218, 9FO267, 9FO268, 9FO269, 9FO270, 9FO271, and 9FO272), two isolated finds, and six modern structures in the project tract.

Site 9FO218, measuring 104 x 440 m, is on the floodplain of the Chattahoochee River (Figures 1 and 5). This previously recorded site reportedly was once characterized by an earthen mound (Flanigan 1943; Thomas 1891; Wauchope 1966); however, no evidence of an earthen mound was observed during survey. This moderately dense site most likely represents occupations dating to the Mississippian through protohistoric periods.

Site 9FO218 was first recommended potentially eligible for the NRHP. Review by the Corps of Engineers, Savannah District, and the Georgia SHPO found 9FO218 eligible for the NRHP. The preferred management recommendation for 9FO218 is preservation in place; proposed development plans indicate that it is outside the proposed construction limits. A Memorandum of Agreement (MOA) stating that 9FO218 is to be preserved in place will be prepared by the Corps of Engineers, Savannah District. A preservation plan specifying the methods of preserving 9FO218 will be developed through consultation between appropriate parties for the Corps, Georgia SHPO, and Forsyth County, and will be incorporated into the MOA.

Site 9FO267, 120 x 150 m, is in the western part of the project tract (Figures 1 and 7). The low-density scatter of prehistoric and historic materials represents occupations dating to the Middle Archaic through Mississippian periods, as well as the late nineteenth century through the present. Site 9FO267 is recommended NRHP-ineligible. No further management is necessary.

Site 9FO268, measuring 40 x 90 m, is located in the central portion of the project tract (Figures 1 and 7). The low-density scatter of prehistoric artifacts at this site probably represents occupations between the Early Woodland and Mississippian periods. Site 9FO268 is recommended ineligible for the NRHP. No further management consideration is recommended.

Site 9FO269 is a cemetery in the westernmost part of the project tract (Figures 1 and 7). Portions of this cemetery are currently maintained by relatives of the interred (Thomas Threatt, personal communication May 1, 1996). In previous years, the now defunct Mt. Calvary Church, in Fulton County, maintained the cemetery (Ms. Donna Parrish, personal communication April 26, 1996). Site 9FO269 could be recommended potentially eligible for the NRHP; however, it is presently protected under Georgia's Abandoned Cemeteries and Burial Grounds Act (OCGA 1991). Archival research could determine if individuals interred at the site had significant historic roles. It is recommended that 9FO269 be preserved in place and avoided by future development. The cemetery is on a separate parcel and will not be purchased as part of the development proposed for the rest of the project tract. There will be no impact on the cemetery as a result of the proposed development.

Site 9FO270, measuring 10 x 20 m, is in the south-central portion of the project tract (Figures 1 and 7). Six potsherds recovered from two shovel tests represent site occupation anytime between the Early Woodland and Mississippian periods. Site 9FO270 is recommended ineligible for the NRHP. No further management consideration is recommended.

Site 9FO271, measuring 10 x 10 m, is in the southwestern portion of the project tract (Figure 1 and 7). This site, represented by a single positive shovel test, suggests site occupation anytime between the Late Archaic and Mississippian periods. Site 9FO271 is recommended ineligible for the NRHP. No further management is necessary.

Site 9FO272, measuring 10 x 30 m, is in the south-central portion of the project tract (Figures 1 and 7). Ten potsherds recovered from three shovel test, represent occupations between the Early Woodland and Mississippian periods. Site 9FO272 is recommended ineligible for the NRHP. No further management consideration is recommended.

Isolated Find 1 is a single nail in the south-central part of the project tract (Figures 1 and 5). This artifact is likely associated with an old field road 30 m west of the single positive shovel test. Isolated Find 1 is recommended ineligible for the NRHP; no further management is needed.

Isolated Find 2 is a single eroded potsherd in the western part of the project tract (Figures 1 and 7). This single potsherd may be associated with 9FO267, 60 m to the southeast; however, the distance between the shovel test representing Isolated Find 2 and shovel tests representing site 9FO267 precludes including this find within the 9FO267 site boundaries. Isolated Find 2 is recommended ineligible for the NRHP. No further management consideration is recommended.

All six standing structures identified in the project tract have been constructed within the past 50 years and are therefore ineligible for the NRHP.

TRC

Customer-Focused Solutions

PHASE I CULTURAL RESOURCES SURVEY OF THE 30-ACRE TRACT WEST OF KEMP ROAD, FORSYTH COUNTY, GEORGIA

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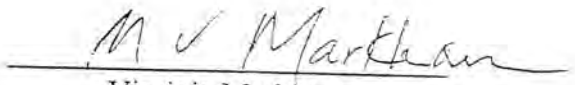

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Mark Chancellor, Architectural Historian

March 2000

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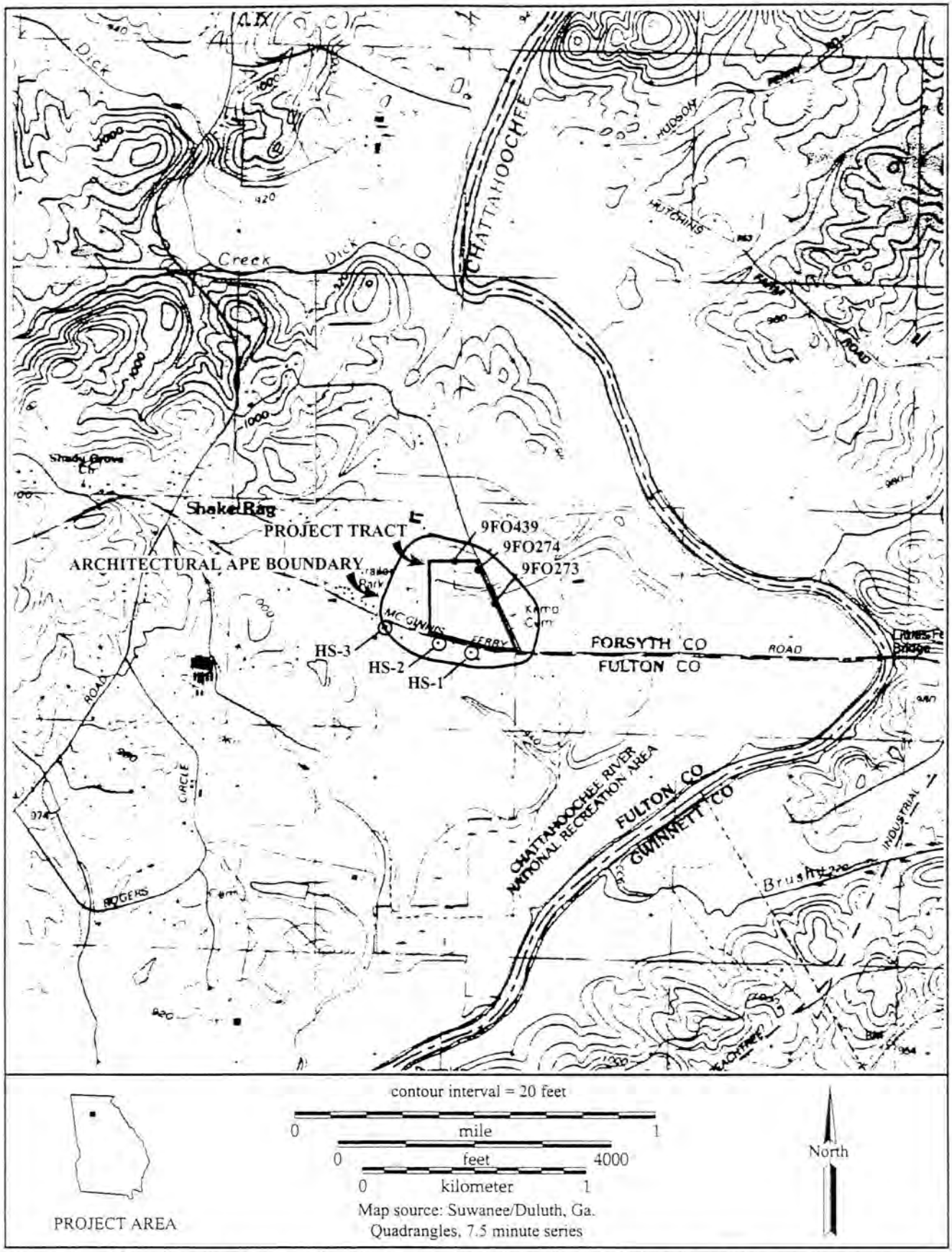

Figure 1. Map showing proposed project tract, APE boundary for historic architectural resources, and locations of identified cultural resources.

MANAGEMENT SUMMARY

TRC Garrow Associates, Inc. (TRC), conducted background research, and archaeological and architectural field surveys in February and March 2000 on a 30-acre tract west of Kemp Road in Forsyth County, Georgia. This tract is slated for development as a wastewater treatment facility.

Background research determined that no properties listed on the National Register of Historic Places (NRHP) are located in the project tract or within 1 mile of the project tract. Two previously recorded prehistoric archaeological sites, 9FO273 and 9FO274, occur within the project tract, and 29 previously recorded sites occur within a 1-mile radius of the project tract. One previously recorded archaeological site, 9FO273, could not be relocated in the current survey. The other previously recorded site, 9FO274, was relocated and its boundaries expanded. A newly identified prehistoric site, 9FO439, also was located in the project area, as well as an isolated find of a single nail. Sites 9FO274 and 9FO439, and the isolated find, are recommended ineligible for the NRHP

Research identified no historic architectural resources in the project's APE that are listed on the NRHP or that have been determined eligible for listing on the NRHP. Additionally, research indicated that historic architecture surveys of Forsyth and Fulton counties have been conducted previously.

The historic architecture survey consisted of pedestrian and vehicular reconnaissance of the project's Area of Potential Effects (APE). The APE was defined as the area in which the proposed project would physically or visually affect any historic architectural resources. Three resources (all dwellings) were identified in the project's APE. In accordance with 36 CFR 60.4, all three of the dwellings (HS-1, HS-2, and HS-3) are recommended ineligible for the NRHP due to alterations. No further work is recommended for these three resources.

VI. SUMMARY AND RECOMMENDATIONS

TRC Garrow Associates conducted an intensive cultural resource survey in February and March 2000 on a 30-acre tract west of Kemp Road in Forsyth County, Georgia. This tract is located approximately 1 mile west of the Chattahoochee River, just north of McGinnis Ferry Road, which forms the boundary between Forsyth and Fulton counties. The project area is slated for development as a wastewater treatment facility. The purpose of the survey was to identify any historic sites or properties in the project. Historic properties include archaeological sites, both prehistoric and historic, as well as above-ground resources such as buildings, structures, objects, sites, and districts.

Background research was performed at the state archaeological site files, the University of Georgia's main library in Athens, and the offices of the Georgia Historic Preservation Division (HPD) in Atlanta. No properties that are listed or pending listing for the National Register of Historic Places (NRHP) are located within the project corridor or within 1 mile of the project corridor. Two previously recorded prehistoric archaeological sites, 9FO273 and 9FO274, occur within the project tract and 29 previously recorded sites occur within a 1-mile radius of the project tract.

One previously recorded archaeological site, 9FO273, could not be relocated in the current survey. The other previously recorded site, 9FO274, was relocated and its boundaries expanded. A newly identified prehistoric site, 9FO439, also was located in the project area, as well as an isolated find consisting of a single nail. These archaeological resources are recommended ineligible for the NRHP

Three historic architectural resources were identified in the project's APE. All three resources (HS-1, HS-2, and HS-3) are recommended ineligible for the NRHP due to alterations, and no further work is recommended for these three resources.

Appendix I
Resource Area Impact Thresholds

Impact thresholds associated with each Resource Area are defined in the following tables to provide context for the potential environmental effects identified in Section 4.0. For the purposes of this EA, the term "no effect" is used to reflect that there is no impact anticipated for a particular resource area.

TABLE I-1
Impact Thresholds Used in Assessment of Cultural Resources
Shakerag WRF Discharge Right–of-Way Request - Forsyth County, Georgia - Environmental Assessment

Impact	Threshold
	A change that would:
Negligible Adverse	Not be detectable to the visitor and would have no discernable effect on historic or archaeological resources within the CRNRA.
Minor Adverse	Be slightly or clearly detectable to the visitor but would not be expected to have an overall short-term or long-term effect on historic or archaeological resources within the CRNRA as indicated by a Phase I cultural resource survey.
Moderate Adverse	Be clearly detectable to the visitor and could have an appreciable adverse short-term or long-term effect on historic or archaeological resources within the CRNRA as indicated by a Phase I cultural resource survey.
Major Adverse	Have a substantial and noticeable adverse short-term or long-term effect on historic or archaeological resources within the CRNRA.
Negligible Beneficial	Be slightly detectable to the visitor and would be expected to have an overall minimal short-term or long-term benefit by lessening existing adverse effects on historic or archaeological resources within the CRNRA.
Minor Beneficial	Be slightly detectable to the visitor and would be expected to have an overall noticeable short-term or long-term benefit by lessening existing adverse effects on historic or archaeological resources within the CRNRA.
Moderate Beneficial	Be clearly detectable to the visitor and could be expected to have an appreciable beneficial short-term or long-term benefit by lessening existing adverse effects on historic or archaeological resources within the CRNRA.
Major Beneficial	Have a substantial and noticeable beneficial short-term or long-term effect by lessening existing adverse effects on historic or archaeological resources within the CRNRA.

TABLE I-2
Impact Thresholds Used in Assessment of Natural Resources (Aquatic and Terrestrial)
Shakerag WRF Discharge Right–of-Way Request - Forsyth County, Georgia - Environmental Assessment

Impact	Terrestrial Threshold	Aquatic Threshold
Negligible Adverse	No native forests would be affected or some individual trees or other native vegetation would be affected but there would be no effect on species composition. Short term and long term effects would be on a small scale.	Short term and long term effects of construction and operation on aquatic resources (fish and benthic invertebrates) in the CRNRA are not detectable or would have no discernable effect on populations of aquatic species.
Minor Adverse	Some individual native trees or other vegetation would be affected over the short and long term but overall would affect a minor part of the total population. Mitigation to offset impacts would be required and effective.	Short term and long term effects on aquatic resources in the CRNRA due to construction and operation are slightly detectable but with no overall change. State and federal water quality standards are met. Mitigation of potentially adverse effects are implemented via BMPs and other management plans to minimize potential for adverse impacts.
Moderate Adverse	Would have short and long term effects on some individual native trees or other vegetation. Would also affect a sizable segment of the species population and over a relatively large area. Mitigation to offset adverse effects could be extensive but would probably be successful.	Short term and long term effects on aquatic resources in the CRNRA due to construction and operation are clearly detectable and may have an appreciable effect on populations of fish and benthic invertebrates. State and federal water quality standards may be exceeded infrequently. Mitigation of potentially adverse effects on aquatic resources is implemented, with effective results.
Major Adverse	Short term and long term effects would be considerable on deciduous forests and would affect a relatively large area. Mitigation measures to offset adverse effects would be required and would be extensive. Success of mitigation would not be guaranteed and would only be deemed successful after a long period of monitoring.	Short term and long term effects of runoff on aquatic resources in the CRNRA due to construction and operation are substantial and highly noticeable. And are expected to have a permanent effect on populations of fish and benthic invertebrates. Potential to exceed state and federal water quality standards with resultant adverse effects on these aquatic resources. Mitigation of potentially adverse effects on aquatic resources is implemented, but with minimal results.
Negligible Beneficial	Implementation of management plans and BMPs improves diversity and abundance of some individual trees or other native vegetation within a very small area of the CRNRA. Overall short-term and long-term effects are detectable but very small.	Implementation of management plans and BMPs improves diversity and abundance of fish and benthic invertebrate populations within a very small area of the CRNRA. Overall short-term and long-term effects are detectable but very small.
Minor Beneficial	Implementation of management plans and BMPs improves diversity and abundance of some individual trees or other native vegetation within a small area of the CRNRA. Overall short-term and long-term effects are clearly detectable.	Implementation of management plans and BMPs improves diversity and abundance of fish and benthic invertebrate populations within a small area of the CRNRA. Overall short-term and long-term effects are clearly detectable.
Moderate Beneficial	Implementation of management plans and BMPs improves diversity and abundance of some individual trees or other native vegetation in several small areas inside the CRNRA. Overall short-term and long-term	Implementation of management plans and BMPs improves diversity and abundance of fish and benthic invertebrate populations in several small areas inside of the CRNRA. Overall short-term and long-term effects are clearly detectable.

TABLE I-2
Impact Thresholds Used in Assessment of Natural Resources (Aquatic and Terrestrial)
Shakerag WRF Discharge Right–of-Way Request - Forsyth County, Georgia - Environmental Assessment

Impact	Terrestrial Threshold	Aquatic Threshold
	effects are clearly detectable.	
Major Beneficial	Implementation of management plans and BMPs improves diversity and abundance of some individual trees or other native vegetation in several small areas and / or several large areas inside the CRNRA. Overall short-term and long-term effects are clearly detectable.	Implementation of management plans and BMPs improves diversity and abundance of fish and benthic invertebrate populations in several small areas inside of the CRNRA. Overall short-term and long-term effects are clearly detectable.

TABLE I-3
Impact Thresholds Used in Assessment of Special Status Species Other Than Federally Listed Threatened and Endangered Species[a]
Shakerag WRF Discharge Right–of-Way Request - Forsyth County, Georgia - Environmental Assessment

Impact	Threshold
Negligible Adverse	Not be detectable to the visitor and would have no discernable effect on Special Status Species.
Minor Adverse	Be slightly detectable but would not be expected to have an overall short-term or long-term effect on Special Status Species.
Moderate Adverse	Be clearly detectable to the visitor and could have an appreciable adverse short-term or long-term effect on Special Status Species.
Major Adverse	Have a substantial and noticeable adverse short-term or long-term effect on Special Status Species within the CRNRA.
Negligible Beneficial	Be slightly detectable and would be expected to have an overall minimal short-term or long-term benefit by improving habitat of Special Status Species.
Minor Beneficial	Be slightly detectable and would be expected to have an overall noticeable short-term or long-term benefit by improving habitat of Special Status Species.
Moderate Beneficial	Be clearly detectable to the visitor and could have an appreciable beneficial short-term or long-term effect on the habitat of by improving habitat of Special Status Species.
Major Beneficial	Have a substantial and noticeable beneficial short-term or long-term effect on the quality of the habitat of Special Status Species.

[a] Impacts to federally threatened and endangered species are evaluated and determined in consultation with the U.S. Fish and Wildlife Service pursuant to Section 7 of the Endangered Species Act.

TABLE I-4
Impact Thresholds Used in Assessment of Wetlands and Floodplains
Shakerag WRF Discharge Right–of-Way Request - Forsyth County, Georgia - Environmental Assessment

Impact	Threshold
Negligible Adverse	Impacts on wetlands and floodplains due to construction and operation are perceptible and can be measured, and are highly localized and confined to a single, limited area ((direct plus indirect impacts) from the entire project totals less than 0.1 acres). Wetland compensation and mitigation would be waived per Director's Orders #77-1 and #77-2.
Minor Adverse	Effects on wetlands and floodplains due to construction and operation are measurable and perceptible, or occur at more than one location. The majority of the area is returned to pre-construction conditions with minor permanent impacts to a highly localized area ((direct plus indirect impacts) from the entire project total less than 0.1 acres). Wetland compensation and mitigation would be waived per Director's Orders #77-1 and #77-2.
Moderate Adverse	Effects on wetlands and floodplains due to construction and operation at several small sites or a larger area in a single location. Mitigation would result in returning the majority of the area to pre-construction conditions with minor permanent impacts to a highly localized area.
Major Adverse	Effects on wetlands due to construction and operation at numerous large sites or a single large wetland. Mitigation would result offsetting acreage, functions and values of affected wetlands.
Negligible Beneficial	Implementation of management plans and best management practices protects measurable and perceptible areas of floodplains and wetlands at more than one location. Overall effect is within a very small area.
Minor Beneficial	Implementation of management plans and best management practices, and addition of new park areas protects measurable and perceptible areas of floodplains and wetlands at more than one location. Overall effect is still within a very small area.
Moderate Beneficial	Implementation of management plans and best management practices, and addition of new park areas protects several small wetlands or a larger wetland at a single location.
Major Beneficial	Implementation of management plans and best management practices, and addition of new park areas protects floodplains and wetlands at numerous locations of larger size or a single large wetland.

TABLE I-5
Impact Thresholds Used in Assessment of Geology and Soils
Shakerag WRF Discharge Right–of-Way Request - Forsyth County, Georgia - Environmental Assessment

Impact	Threshold
Negligible Adverse	Short term and long term effects of runoff on geology and soils related to construction, operation or visitor use are not detectable within the CRNRA.
Minor Adverse	Short term and long term effects on geology and soils related to construction, operation or visitor use are slightly detectable within the CRNRA with no overall change in soil stability. Structural and non-structural mitigation of potentially adverse effects is implemented via best management practices, resource management plans and other related plans to minimize potential for adverse effects.
Moderate Adverse	Short term and long term effects on geology and soils related to construction, operation or visitor use are clearly detectable within the CRNRA and are expected to have an appreciable effect on soil stability. Mitigation of potentially adverse effects is implemented, with effective results.
Major Adverse	Short term and long term effects on geology and soils related to construction, operation or visitor use are substantial and highly noticeable within the CRNRA and are expected to have a permanent effect on soil stability. Mitigation of potentially adverse effects is implemented but with minimal beneficial results.
Negligible Beneficial	Implementation of Management Plans and BMPs improves soil stability in a very small area. Overall short term and long term effects on geology and soils are detectable but very small.
Minor Beneficial	Implementation of Management Plans and BMPs improves soil stability in a small area within the CRNRA. Overall short term and long term effects on geology and soils are clearly detectable.
Moderate Beneficial	Implementation of Management Plans and BMPs improves soil stability in several small areas within the CRNRA. Overall short term and long term effects on geology and soils are clearly detectable.
Major Beneficial	Implementation of Management Plans and BMPs improves soil stability in several small areas and / or several large areas within the CRNRA. Overall short term and long term effects on geology and soils are clearly detectable.

TABLE I-6
Impact Thresholds Used in Assessment of Water Quality and Flow
Shakerag WRF Discharge Right–of-Way Request - Forsyth County, Georgia - Environmental Assessment

Impact	Threshold
Negligible Adverse	Short term and long term effects of runoff on water quality and flow related to construction, operation or visitor use are not detectable.
Minor Adverse	Short term and long term effects on water quality and flow related to construction, operation or visitor use are slightly detectable. State and federal water quality standards are met. Structural and non-structural mitigation of potentially adverse effects is implemented via best management practices, resource management plans and other related plans to minimize potential for adverse effects.
Moderate Adverse	Short term and long term effects on water quality and flow related to construction, operation or visitor use are clearly detectable within the CRNRA and are expected to have an appreciable effect on surface water quality. State and federal water quality standards may be exceeded infrequently. Mitigation of potentially adverse effects is implemented, with effective results.
Major Adverse	Short term and long term effects on water quality and flow related to construction, operation or visitor use are substantial and highly noticeable within the CRNRA and are expected to have a permanent effect on surface water quality. Potential to exceed state and federal water quality standards. Mitigation of potentially adverse effects is implemented but with minimal beneficial results.
Negligible Beneficial	Implementation of Management Plans and BMPs improves water quality and flow in a very small area within the CRNRA. Overall short term and long term effects on water quality are detectable but very small.
Minor Beneficial	Implementation of Management Plans and BMPs improves water quality and flow in a small area within the CRNRA. Overall short term and long term effects on water quality are clearly detectable.
Moderate Beneficial	Implementation of Management Plans and BMPs improves water quality and flow in several small areas within the CRNRA. Overall short term and long term effects on water quality are clearly detectable.
Major Beneficial	Implementation of Management Plans and BMPs improves water quality and flow in several small areas and / or several large areas within the CRNRA. Overall short term and long term effects on water quality are clearly detectable.

TABLE I-7
Impact Thresholds Used in Noise Assessment
Shakerag WRF Discharge Right–of-Way Request - Forsyth County, Georgia - Environmental Assessment

Impact	Threshold
	A change that would:
Negligible Adverse	Not be detectable to the visitor and would have no discernable effect on ambient noise levels.
Minor Adverse	Be slightly detectable but would not be expected to have an overall short-term or long-term effect on ambient noise levels.
Moderate Adverse	Be clearly detectable to the visitor and could have an appreciable adverse short-term or long-term effect on ambient noise levels within the CRNRA.
Major Adverse	Have a substantial and noticeable adverse short-term or long-term effect on ambient noise levels within the CRNRA.
Negligible Beneficial	Be slightly detectable and would be expected to have an overall minimal short-term or long-term benefit by improving ambient noise levels.
Minor Beneficial	Be slightly detectable and would be expected to have an overall noticeable short-term or long-term benefit by improving ambient noise levels.
Moderate Beneficial	Be clearly detectable to the visitor and could be expected to have an appreciable beneficial short-term or long-term benefit by improving ambient noise levels within the CRNRA.
Major Beneficial	Have a substantial and noticeable beneficial short-term or long-term effect on ambient noise levels.

TABLE I-8
Impact Thresholds Used in Assessment of Visitor Use, Experience and Public Safety
Shakerag WRF Discharge Right–of-Way Request - Forsyth County, Georgia - Environmental Assessment

Impact	Threshold
	A change that would:
Negligible Adverse	Not be detectable to the visitor and would have no discernable effect on visitor use, experience or public safety within the CRNRA.
Minor Adverse	Be slightly detectable to the visitor but would not be expected to have an overall short-term or long-term effect on visitor use, experience or public safety within the CRNRA.
Moderate Adverse	Be clearly detectable to the visitor and could have an appreciable adverse short-term or long-term effect on visitor use, experience or public safety within the CRNRA.
Major Adverse	Have a substantial and noticeable adverse short-term or long-term effect on visitor use, experience or public safety within the CRNRA.
Negligible Beneficial	Be slightly detectable to the visitor and would be expected to have an overall minimal short-term or long-term benefit by lessening existing adverse effects on visitor use, experience or public safety within the CRNRA.
Minor Beneficial	Be slightly detectable to the visitor and would be expected to have an overall noticeable short-term or long-term benefit by lessening existing adverse effects on visitor use, experience or public safety within the CRNRA.
Moderate Beneficial	Be clearly detectable to the visitor and could be expected to have an appreciable beneficial short-term or long-term benefit by lessening existing adverse effects on visitor use, experience or public safety within the CRNRA.
Major Beneficial	Have a substantial and noticeable beneficial short-term or long-term effect by lessening existing adverse effects on visitor use, experience or public safety within the CRNRA.