FINAL

Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decisions for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia

US Army Corps of Engineers
Mobile District

Prepared by

CH2MHILL

June 2007

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Acronyms and Abbreviations

7Q10	lowest 7-consecutive-day stream flow likely to occur in a 10-year period
AADF	annual average daily flow
AADMF	annual average daily maximum flow
ACF	Apalachicola-Chattahoochee-Flint
ACT	Alabama-Coosa-Tallapoosa
ADMMF	average daily maximum month flow
APE	area of potential effects
AWRF	advanced water reclamation facility
BEA	Bureau of Economic Analysis
BMP	best management practice
BOD	biochemical oxygen demand
C	Celsius temperature scale
CAA	Clean Air Act
CDM	Camp, Dresser, and McKee
CEQ	Council on Environmental Quality
CFR	*Code of Federal Regulations*
cfs	cubic feet per second
CFU	colony forming unit
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel sound levels
DCWSD	DeKalb County Water and Sewer Division
DNR	Department of Natural Resources
DO	dissolved oxygen
DPU	Department of Public Utilities
EA	Environmental Assessment
EID	Environmental Information Document
EMC	Electric Membership Corporation
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPD	Environmental Protection Division
F	Fahrenheit temperature scale
FIRM	Flood Insurance Rate Maps

Acronyms and Abbreviations, Continued

FWHWRC	F. Wayne Hill Water Resources Center
L_{dn}	day-night weighted sound averages
L_{eq}	sound pressure equivalent levels
LAS	Land Application System
LTI	LimnoTech, Inc.
M&E	Metcalf & Eddy
MNGWPD	Metropolitan North Georgia Water Planning District
µg/L	micrograms per liter
mg/L	milligrams per liter
mgd	million gallons per day
mL	milliliter
MOU	memorandum of understanding
msl	mean sea level
MW	Megawatt
NEPA	National Environmental Policy Act of 1969
No.	Number
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPS	nonpoint source
NRA	National Recreation Area
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NWP	Nationwide Permit
O.C.G.A.	Official Code of Georgia Annotated
PM_{10}	Particulate matter greater than 10 microns
psi	pounds per square inch
REAS	Recreation Economic Assessment System
ROI	Region of Influence
ROW	right-of-way
SCS	Soil Conservation Service
SHPO	State Historic Preservation Office
SIP	State Implementation Plan

Acronyms and Abbreviations, Continued

TIP	Transportation Improvement Program
TP	total phosphorus
TN	total nitrogen
UPS	United Parcel Service
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDOC	U.S. Department of Commerce
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WPCP	water pollution control plant
WRD	Wildlife Resources Division
WRF	water reclamation facility
WWTP	wastewater treatment plant

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1.0 Purpose, Need, and Scope

1.1 Introduction

This Environmental Assessment (EA) has been prepared to analyze the potential environmental and socioeconomic effects of the routing of a discharge pipeline and outfall diffuser through wetland and aquatic areas under jurisdiction of the U.S. Army Corps of Engineers (USACE), Savannah District, and across government fee lands managed by the USACE Mobile District at Lake Sidney Lanier (Lake Lanier) in Georgia. Gwinnett County is expanding the F. Wayne Hill Water Resources Center (FWHWRC), an advanced water reclamation facility (AWRF), to increase treatment capacity. Previous investigations by Gwinnett County and the Georgia Environmental Protection Division (EPD) (see Appendix A) identified a discharge to Lake Lanier as the most suitable option at this time for returning reclaimed water to the Chattahoochee River Basin. That option was acted on when the Georgia EPD issued National Pollutant Discharge Elimination System (NPDES) Permit No. GA0038130 on November 9, 2000. NPDES Permit No. GA0038130 was contested as issued and ultimately the Georgia Supreme Court in November 2004 in Hughey et al. v. Gwinnett County et al., 278 Ga. 740, 609 S.E.2d 324 while affirming the Georgia EPD decision to allow the discharge into Lake Lanier, did require that lower permit limits be imposed. Georgia EPD issued a public notice of a draft revised permit and held a public hearing on September 22, 2006 (Appendix B). On November 3, 2006, after completion of negotiation among the former litigants, Georgia EPD reissued a final revised NPDES Permit No. GA0038130 (Appendix B) with more stringent permit limits (see Section 5.3.9) and a specified alternate discharge location approximately 1.1 miles upstream of Buford Dam near the mouth of the Shoal Creek embayment, at a depth of approximately 105 feet below the normal pool elevation of 1,070 feet mean sea level.

This document examines the direct, indirect, and cumulative impacts associated with:

- Issuance of a USACE easement across Gwinnett County Park and the Lake Lanier bottom for construction, operation, and maintenance of a pipeline transporting reclaimed water from the FWHWRC to a diffuser placed on the bottom of Lake Lanier; and
- Installation of a pipeline from the FWHWRC to a diffuser in Lake Lanier.

The purpose of the Proposed Action is to place a pipeline from the FWHWRC to a specified diffuser location to meet the requirements of an NPDES discharge permit issued by the Georgia EPD. There is no practicable way to place a pipeline into Lake Lanier that does not cross USACE fee lands and the Lake Lanier bottom. Therefore, Gwinnett County must obtain an easement from the USACE Mobile District. On February 13, 2007, Gwinnett County submitted an easement request to the USACE to allow the crossing of government fee lands at Lake Sidney Lanier (Appendix H).

The release of reclaimed water to Lake Lanier has been identified under the Metropolitan North Georgia Water Planning District Act (Official Code of Georgia Annotated [O.C.G.A.] 12-5-570 et seq.) as one of the key components of the overall regional strategy for water resource management. Discharge of reclaimed water into Lake Lanier would reduce or avoid interbasin transfer of water and provide flexibility in managing water in the lake through increased lake volume. Regionally, the application of indirect reuse—the return of highly treated water to regional storage reservoirs (including Lakes Lanier and Allatoona)—is critical for meeting future water supply demands in North Georgia, according to the Georgia EPD and the Metropolitan North Georgia Water Planning District (MNGWPD).

1.2 Regulatory Overview

The proposed pipeline and diffuser are subject to regulation through the USACE, Savannah District, under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Federal Water Pollution Control Act of 1972, as amended, commonly called the Clean Water Act (CWA, 33 USC 1344). The pipeline would cross through wetlands and other aquatic areas that are subject to Section 404 jurisdiction and the diffuser would be placed in Lake Lanier, which is subject to Section 10 and Section 404 jurisdiction (Section 10/404). A Section 404 permit would be required for construction of the pipeline through the Section 404 jurisdictional areas and a Section 10/404 permit would be required for work in Lake Lanier.

In the USACE Nationwide Permit (NWP) Program in 33 *Code of Federal Regulations* (CFR) Part 330, NWP 12 authorizes the construction of pipelines and associated outfall structures and NWP 7 authorizes the construction of outfall structures. NWPs are subject to certain general and regional conditions and may also have a notification requirement. The authorizing USACE district may impose additional conditions. The National Environmental Policy Act of 1969 (NEPA) analysis has been completed for the NWP program and the activities authorized under the NWPs have been determined to have no significant direct, indirect, or cumulative environmental impacts, provided all applicable conditions are met. The USACE Savannah District will use the coordination and findings of this EA and the decision by the Mobile District on the requested easement to determine whether the proposed action would be considered to meet the terms and conditions of the NWP program.

The State of Georgia and its political subdivisions have principal authority and responsibility to enforce Georgia laws on the Lake Lanier project. The State has its own water quality control law, which establishes enforcement authority through the Georgia EPD. The Georgia EPD is also authorized by the U.S. Environmental Protection Agency (EPA) to implement and enforce the CWA within the State of Georgia. A major component of this federal law involves the NPDES permitting program. This is a permit program that authorizes certain discharges of effluent into open waters. A common example of a permitted discharge includes treated wastewater from a municipal sewage treatment facility. The Georgia EPD has authority to establish state water quality standards for the State of Georgia and to regulate discharges under the approved NPDES permit program.

NEPA requires federal agencies to consider environmental consequences in their decision-making process. The Council on Environmental Quality (CEQ) issued regulations on

implementing NEPA that include provisions for both the content and the procedural aspects of the required environmental analysis. CEQ regulations for implementing NEPA apply to the project, along with USACE regulations in 33 CFR 230.

Normally, activities authorized under NWPs are not subject to separate NEPA analysis absent an additional federal nexus or if part of a larger project subject to a federal action. The additional federal nexus for the proposed project is the granting of an easement to cross government land managed by the USACE Mobile District. USACE regulations on implementing NEPA (33 CFR 230) provide for categorical exclusions from NEPA documentation for actions that, when considered individually and cumulatively, do not have significant effects on the quality of the human environment. Categorical exclusions are provided for minor utility distribution and collection lines with only minor disturbances to the earth, air, or water. However, the district engineer has determined that public interest factors and the potential for impact to the Lake Lanier Shoreline Management Plan warrant preparation of a NEPA document for the Proposed Action. For this reason, USACE must address in a NEPA document the direct, indirect and cumulative impacts of the construction and operation of the outfall structures on the aquatic environment and other project purposes or resources under the management responsibility of the Mobile District.

In addition to complying with implementing regulations from CEQ and USACE, completion of NEPA analysis involves coordination among federal and state governmental agencies and direction by federal statutes and Executive Orders (EOs). Table 1-1 identifies the federal statutes and EOs that apply to this document.

TABLE 1-1
Federal Environmental Statutes and Executive Orders (EOs)
USACE Gwinnett County Diffuser/Pipeline EA

Acts
American Indian Religious Freedom Act (42 USC 1996)
Antiquities Act of 1906 (16 USC 431)
Archaeological and Historic Preservation Act of 1974, as amended (16 United States Code [USC] 469)
Archaeological Resources Protection Act of 1979, as amended (16 USC 470)
Bald Eagle Protection Act of 1972 (16 USC 668)
Clean Air Act, as amended (42 USC 7401, et seq.)
Clean Water Act, as amended (33 USC 1251, et seq.)
Comprehensive Environmental Response, Compensation and Liability Act of 1980 (42 USC 9601)
Endangered Species Act of 1973, as amended (16 USC 1531)
Farmland Protection Policy Act of 1981 (7 USC 4201 et seq.)
Federal Water Project Recreation Act of 1965, as amended (16 USC 4601)
Fish and Wildlife Conservation Act of 1980 (16 USC 2901-2911)
Fish and Wildlife Coordination Act, as amended (16 USC 661, et seq.)
Flood Control Act of 1944, as amended, Section 4 (16 USC 460d)
Food Security Act of 1985 (16 USC 3801 et seq.)
Hazardous Materials Transportation Act of 1974 (49 USC 1801-1819)
Historic Sites Act of 1935 (16 USC 461)
Historical and Archeological Data – Preservation (16 USC 469)
Land and Water Conservation Fund Act of 1965 (16 USC 4601)
Migratory Bird Treaty Act (16 USC 701, et seq.)
National Environmental Policy Act of 1969 (42 USC 4321 et seq.)
National Historic Preservation Act of 1966, as amended (16 USC 470 et seq.)
Native American Graves Protection and Repatriation Act (25 USC 3001)
Noise Control Act of 1972, as amended (42 USC 4901 et seq.)
Pollution Prevention Act of 1990 (42 USC 13101 et seq.)
Reservoir Areas - Forest Cover (16 USC 580m)

TABLE 1-1
Federal Environmental Statutes and Executive Orders (EOs)
USACE Gwinnett County Diffuser/Pipeline EA

Resource Conservation and Recovery Act (42 USC 6901 et seq.)
Rivers and Harbors Act of 1899,Sections 9, 10, and 13 (33 USC 401, 403, 407)
Safe Drinking Water Act, as amended (42 USC 300f et seq.)
Toxic Substances Control Act of 1976 (15 USC 2601 et seq.)
Water Resource Development Acts of 1986, 1988, 1990, 1992 (33 USC 2201 et seq.)
Watershed Protection and Flood Prevention Act of 1954 (16 USC 1101, et seq.)
Wetlands Conservation Act (Public Law 101-233)
Wild and Scenic Rivers Act (16 USC 1271 et seq.)
Executive Orders
Protection and Enhancement of Environmental Quality (EO 11514, as amended by EO 11991)
Federal Compliance with Pollution Control Standards (EO 12088)
Flood Plain Management (EO 11988)
Indian Sacred Sites (EO 13007)
Preserve America (EO 13287)
Protection of Wetlands (EO 11990)
Leadership in Protection of Cultural Resources (EO 11593)
Recreational Fisheries (EO 12962)
Protection of Children (EO 13045)
Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (EO 12898, as amended by EO 12948)

1.3 Purpose and Need

Gwinnett County is experiencing rapid population growth and is projected to continue growing in the foreseeable future. As growth occurs, demands for wastewater treatment increase. Gwinnett County is expanding the FWHWRC to accommodate the projected future wastewater treatment capacity needs, as projected in the 2002 Draft Master Plan Update for Gwinnett County (Camp, Dresser, and McKee [CDM], 2003). Based on the projected wastewater needs in the Master Plan Update and the extended period of time required for permitting the new discharge to Lake Lanier, Gwinnett County obtained an interim permit for an additional 9 million gallons per day (mgd) of discharge to the Chattahoochee River. This discharge was permitted in January 31 2006 (Permit No. GA0026433) with the requirement that this 9 mgd discharge was to be removed once the new NPDES permit was issued for the 40 mgd discharge to Lake Lanier and the system became operational. Currently Gwinnett County has a total of 71.6 mgd of permitted wastewater treatment and discharge capacity (including 1 mgd of reuse) in 5 major and 2 minor water reclamation facilities throughout the county. In 2006, the actual volume of wastewater treated was 51.2 mgd annual average daily flow (AADF). Because 2006 was a relatively dry year with precipitation 12.6 inches below normal (Lawrenceville Weather, 2007), the total wastewater demand was below the normal anticipated flows. The wastewater needs in 2010 are projected to reach 82.6 mgd AADF and 102 mgd ADMMF (Table 1-2). The approved expansion of the FWHWRC will be able to accommodate growth projected through 2010.

The purpose and need of the proposed project is to establish a discharge structure and delivery pipeline for release of up to 40 mgd. Under the proposed project, USACE would grant an easement across USACE property to allow the routing of the pipe to reach the

specified discharge location. The easement includes crossing Gwinnett County Park as well as portions of the Lake Lanier bottom.

The Georgia EPD has evaluated discharge options and determined that the proposed discharge to Lake Lanier is preferable to the alternative of an additional discharge to the Chattahoochee River downstream of Buford Dam. Potential impacts to the trout fishery in the Chattahoochee River below Buford Dam made discharge to the river less desirable. Georgia EPD has issued a wasteload allocation for Gwinnett County to discharge up to 40 mgd of reclaimed water to Lake Lanier. Discharge to Lake Lanier also provides additional flexibility for water management in the lake. The additional 40 mgd in the lake would be available for retention to maintain lake levels, discharge for peak demand power production, or release to meet the downstream needs for water supply, minimum flows, or other project purposes.

TABLE 1-2
Projected Wastewater Treatment Capacity Needs
USACE Gwinnett County Diffuser/Pipeline EA

	Projected Wastewater Flow				
Year	**Projected AADF**	**Projected AADMF**	**AADMF w/ Capacity Margin**	**Permitted Treatment Capacity (ADMMF)**	**Additional Treatment Capacity Needed w/Capacity Margin (ADMMF)**
2010	82.6	95.8	106.3	102.0[a]	3.3
2015	97.8	113.5	124.2	102.0	21.2
2020	113.4	131.5	141.5	102.0	38.5
2025	126.9	147.2	155.0	102.0	52.0
2030	135.8	157.6	165.9	102.0	62.9
2035	141.9	164.6	173.3	102.0	70.3
2040	145.9	169.3	178.2	102.0	75.2
2045	149.8	173.7	182.9	102.0	79.9
2050	153.5	178.0	187.4	102.0	84.4

Source: Gwinnett County Department of Public Utilities Water and Wastewater Revised Master Plan, November 2003 (Camp, Dresser, and McKee [CDM], 2003)

[a] Includes existing capacity plus the 40-mgd permitted for discharge to Lake Lanier, less current land application and out-of-county discharges that would be discontinued.

AADF = annual average daily flow

AADMF = annual average daily maximum flow

ADMMF = average daily maximum month flow

1.4 Scope of EA

This EA has been developed to address the potential impacts of the Proposed Action and to meet NEPA documentation requirements for Section 10/404 permits and the easement for access across USACE property. The analysis in this EA will be considered in the decisions of whether to grant an easement through Gwinnett County Park and Lake Lanier and whether to issue Section 10/404 permits for construction of the Proposed Action. Gwinnett County has requested an easement from the Mobile District USACE and also has filed an

application for Section 10/404 permits with the Savannah District USCAE (Appendix C). That permit application will not be considered complete until the Savannah District includes this EA in the project record.

This EA analyzes the potential environmental and socioeconomic impacts of the following action:

> Building a pipeline from the FWHWRC through portions of Gwinnett County, across USACE property, and into Lake Lanier to a discharge point on the lake's bottom where as much as 40 mgd of reclaimed water would be diffused into the lake.

The impacts of constructing the pipeline and diffuser are analyzed in this document, along with the impacts of pipeline construction on the natural and human environment, including the potential uses of Lake Lanier. Impacts of discharging reclaimed water are analyzed for the potential water quality impacts to Lake Lanier, as well as the potential impacts on the authorized purposes and public uses of Lake Lanier, which include:

- Flood Control
- Hydroelectric Power Production
- Water Supply and Water Quality
- Navigation
- Recreation
- Fish and Wildlife Management

This EA does not address whether Gwinnett County wastewater treatment capacity should be expanded. However, it does examine the impacts of an easement across government fee lands, discharge of up to 40 mgd of reclaimed water into Lake Lanier, and the route of the discharge pipeline from FWHWRC to Lake Lanier, as well as possible alternatives to the Proposed Action.

2.0 Description of Proposed Action

The Proposed Action consists of the granting of an easement and the issuance of the necessary Section 10/404 permits for the following:

- Construction of a wastewater pipeline and outfall structure across portions of Gwinnett County and USACE property to a discharge point in Lake Lanier.
- Operation of the pipeline and diffuser, which includes a discharge of up to 40 million gallons per day (mgd) of reclaimed water to Lake Lanier as permitted by the Georgia EPD pursuant to the NPDES permit program as specified in NPDES Permit No. GA0038130.

This easement includes the crossing of Gwinnett County Park and the Lake Lanier bottom.

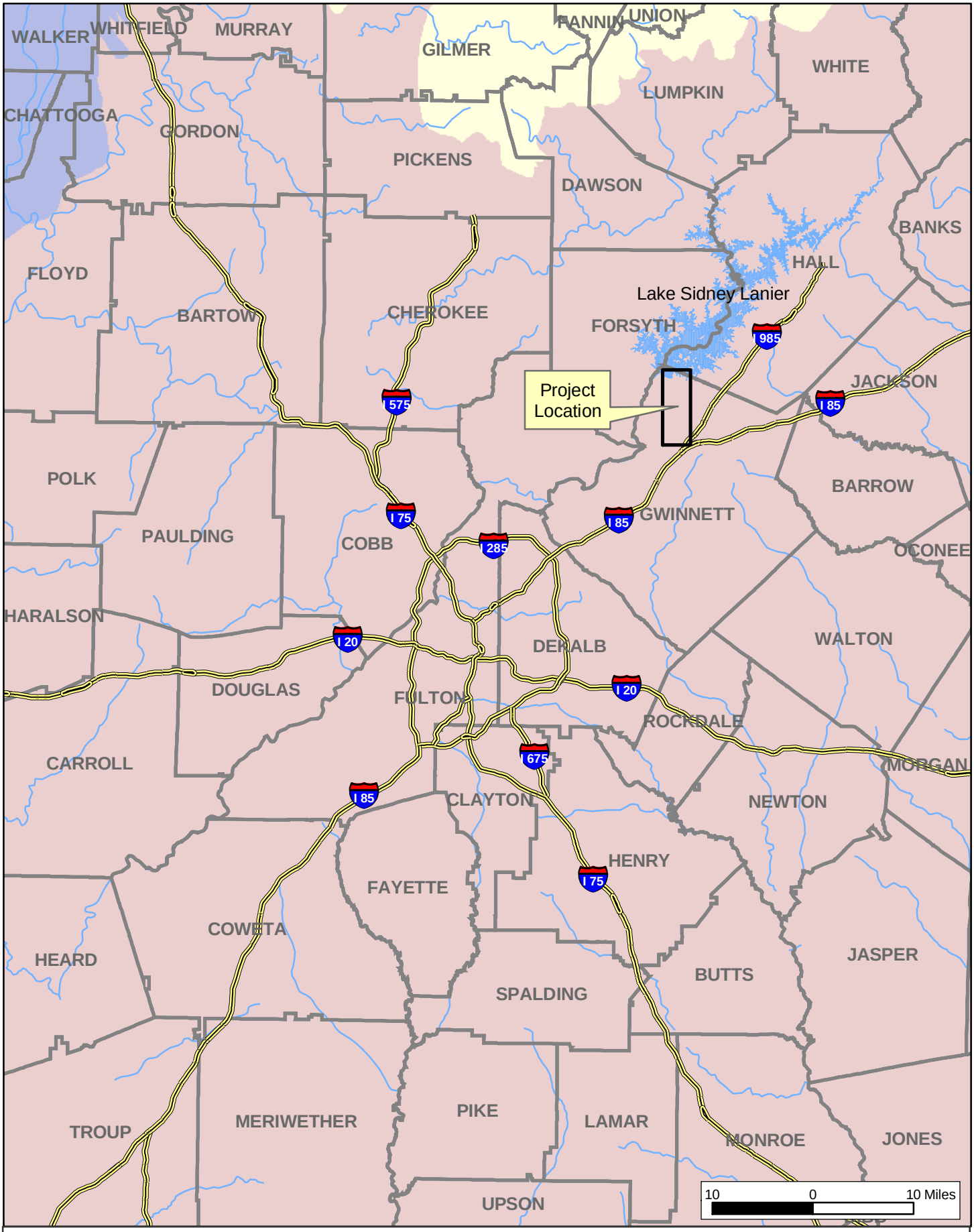
2.1 Location

The project study area lies in the Piedmont physiographic region of Georgia. Its location in relationship to Gwinnett County, Lake Lanier, and surrounding counties is shown on Figure 2-1. The project origination point at the F. Wayne Hill Water Resources Center (FWHWRC) is located approximately 25 miles northeast of the city of Atlanta, and the proposed termination point at Lake Lanier is approximately 35 miles northeast of Atlanta.

The proposed reclaimed water pipeline would be located in north Gwinnett County, Georgia. The pipeline would originate at the reclaimed water pumping station on the southern part of the FWHWRC and would extend in a northerly direction near Suwanee, north through Sugar Hill, generally west of Buford, to a discharge point in Lake Lanier. The route through the lake to the diffuser location is shown on Drawing G-03 in Appendix D. The pipe would be buried until reaching elevation 1,045 feet mean sea level (msl) and then would continue along the lake bottom. The route generally follows a submerged ridgeline extending just west of due north for approximately 4,640 feet before descending approximately 70 feet along a slope to the diffuser location. The crown of the diffuser would be located at approximately 965 feet msl, and the diffuser would extend for 610 feet.

2.2 Proposed Action

Gwinnett County has proposed to install a reclaimed water pipeline and outfall structure for highly treated reclaimed water from the FWHWRC into Lake Lanier, pursuant to the conditions and limitations specified in the NPDES discharge permit issued by the Georgia EPD. The pipeline, extending from FWHWRC to the Lake Lanier shoreline, and the outfall structure, consisting of pipe and a vented diffuser placed in Lake Lanier, are described below. Project construction through Gwinnett County Park and into Lake Lanier would be expected to last 16 to 19 months.



Major Hydrology
Interstate
Valley and Ridge
Blue Ridge
Piedmont

N

Figure 2-1
Location Map
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

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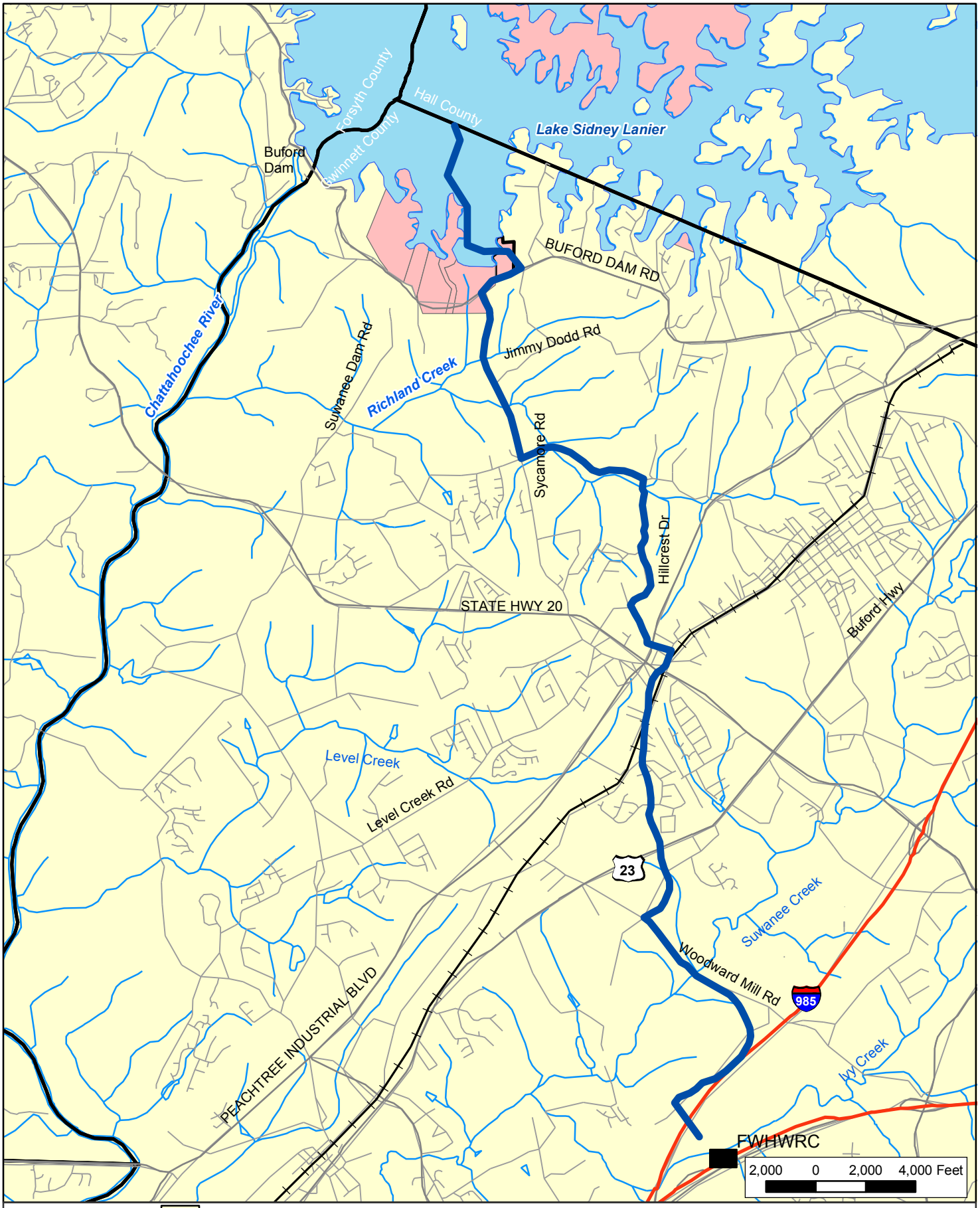
The FWHWRC is located between Interstates 85 and 985. The pipeline would extend approximately 9 miles, primarily through existing rights-of way (ROWs), to Lake Lanier (Figure 2-2). The pipeline would be installed beneath existing streets or utility easements, where possible. The reclaimed water pipeline would cross government fee property at Gwinnett County Park adjacent to Lake Lanier, along the same corridor as previously permitted for construction of the Gwinnett County water intake structure and pipeline (Figure 2-3). Preliminary engineering drawings of the route through Gwinnett County Park and Lake Lanier are provided as Drawings G-03, G-04, and C-02 through C-07 in Appendix D. Outside of Lake Lanier, construction of the pipeline consists of trenching and backfilling operations required for installation of a 72-inch-diameter steel pipe and tunneling operations to install the pipe beneath railroads and major road crossings. Road and railroad crossings will be done without surface disturbance by tunneling underneath the structures. All tunneling plans would be approved by the County, Georgia Department of Transportation, or railroad in advance of the activity. Open trenching will be used on the remainder of the pipeline. A trench will be excavated, with side-cast material placed beside the trench. Where the pipeline will lie parallel and beneath roadways, the trench will be excavated directly into the roadway. Stream and wetland crossings will comply with all conditions of the CWA Section 404 permit issued for construction of the pipeline. Following construction, surface contours would be returned as near as practicable to pre-construction conditions and excess excavated material would be used as clean fill on other projects or disposed of either in the inert landfill on Sycamore Road or in the Buford Landfill on Richland Creek Road. In upland areas, construction ROW widths would range from 40 to 90 feet across the pipeline corridor, depending on constraints and adjacent land uses. The average width would be 60 feet.

The reclaimed water pipeline ROW in Gwinnett County Park would overlay substantial portions of the intake pipeline ROW easement, which follows existing roads and drives within the park. The existing ROW would be used as a staging area for work in the lake. Once entering the park, the pipeline would proceed along park roads and existing ROWs for a distance of approximately 550 feet, and then continue at an approximately 45 degree angle through previously undisturbed park area for approximately 250 feet until reaching the shoreline of the lake. Figure 2-3 depicts an approximation of the proposed route through Gwinnett County Park. Engineering drawings in Appendix D provide more detailed depictions of this route. No aboveground structures that could interfere with or detract from recreational activities would be built at the lake shoreline. The temporary stormwater basin constructed for use on the water supply intake lines and pump station would be retained and used during construction of the Proposed Action.

Figure 1 in Appendix D shows the existing dual raw water intake lines in the Shoal Creek easement in Gwinnett County Park, as well as the proposed reclaimed water discharge pipeline. The discharge pipeline follows the existing Shoal Creek easement and then turns 45 degrees out of the existing easement to enter the lake and conform to the route required to reach the discharge location specified by the Georgia EPD (see Section 3.2). Figure 2 in Appendix D shows the relative orientation of the three 72-inch lines within the Shoal Creek easement. Figure 3 in Appendix D shows a cross section of the discharge pipeline as it diverges out of the Shoal Creek easement toward the lake.



ALT. C
Hydrology
Roads
Southern Railroad
Interstate
Counties
Lake Lanier
USACE Property
Gwinnett County Park

N

Figure 2-2
Proposed Action and Location Map
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

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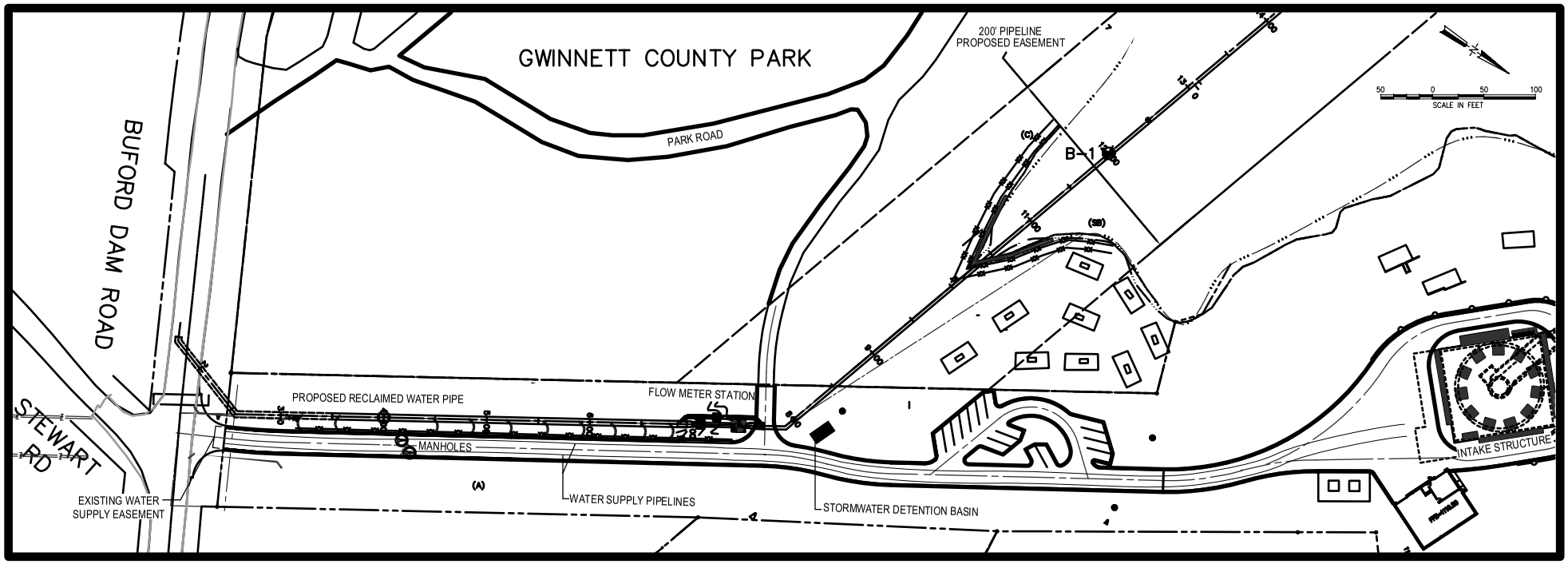

Figure 2-3
Proposed Alignment and Water Intake Easement through Gwinnett County Park
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

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Prior construction experience on the Shoal Creek Water Intake Facility indicated weathered bedrock in the easement off Buford Dam Road. Some of the deeper bedrock was removed using blasting. The construction of the proposed reclaimed water pipeline just off Buford Dam Road within this same easement will require similar blasting along approximately 100 feet of the easement in Gwinnett County Park to expand the pipeline trench (see the Blasting Plan in Appendix D). Blasting techniques that were used successfully for constructing the trench for the water supply lines will be used to construct the trench for the reclaimed water line.

An over-water geotechnical investigation indicated that weathered bedrock may be encountered in the nearshore areas of the lake. Based on visual observations, this bedrock may extend upgradient at the shoreline of Gwinnett County Park. Limited blasting also may be required in this transition from the park shoreline into the lake. Based on the geotechnical testing, after this section is passed, no additional blasting is anticipated to install the remainder of the pipeline. Blasting requirements will be specified and monitored to minimize noise and preclude impacts to nearby structures. A site-specific blasting plan will be submitted to USACE for approval prior to use of blasting in nearshore areas of Lake Lanier.

The route through Gwinnett County Park and construction of the outfall structure within Lake Lanier are described below. Engineering drawings and a survey map of the Gwinnett County Park area are provided in Appendix D. Drawing 1 in Appendix D shows the 130-foot-wide easement for the Shoal Creek Water Intake Facility lines through Gwinnett County Park. Appendix D Drawing C-02 shows the alignment of the proposed outfall easement as it veers from the intake line easement to enter the lake.

Appendix D Figure 1 shows how the 72-inch diameter reclaimed water pipeline will be coordinated with the two 72-inch diameter raw water lines within the easement. Appendix D Figure 2 shows a typical section of the 130-foot-wide intake line easement with the relative position of the three 72-inch lines. The minimum cover on the raw water lines is 5 feet. Appendix D Figure 3 shows a typical section of the proposed 200-foot-wide outfall easement through Gwinnett County Park to the lake, indicating the relative position of the outfall pipeline, with minimum cover of 4 feet over the pipe. Appendix D Drawing G-03 shows the existing intake line easement off Buford Dam Road and the new outfall easement required for the reclaimed water pipeline/outfall structure to enter Lake Lanier and extend to the proposed diffuser location. The easement shown in the lake is 200 feet wide. The profile shows the proposed project entering the lake at the shoreline. The selection of the route to reach the proposed diffuser location was influenced by the underwater topography and potential presence of obstacles such as standing trees. Remaining on the ridgeline minimizes the amount of tree clearing that must be done on the lake bottom, which also would reduce disturbance to the fish community.

Any part of the profile where the crown of the pipe is at or above elevation 1,045 feet msl must be buried within the existing bottom profile. Prior to descending to the diffuser location, the invert of the outfall pipe in the lake varies between elevations of approximately 998 and 1,034 feet msl, as shown in Drawing G-03. As the pipe descends to the diffuser location, the invert of the pipe goes from approximately 1, 034 feet msl to 958 feet msl. The invert of the diffuser would be placed at 958 feet msl at its origin and would increase in elevation along the length of the diffuser with the crown of the diffuser remaining at 965

feet msl. The diffuser would extend for 610 feet with vents placed just above the springline of the pipe. Vents would range from approximately 963 feet msl to approximately 964.5 feet msl as the diameter of the diffuser reduces from 72 inches to 36 inches along its length.

Construction of the proposed outfall structure in Lake Lanier has been organized into three sequential activities:

- Turbidity Curtain
- Offshore Clearing
- Offshore Earthwork, Bedding, and Outfall Structure Installation

It is important to note that construction techniques and sequencing presented in the contract documents are guidelines. The means and methods of construction proposed by the contractor would be submitted in a work plan format for review and approval by the Mobile District prior to commencement of construction activities.

Turbidity Curtain: A turbidity curtain would be deployed to isolate a portion of the lake work site and prevent mobilized sediments from leaving the work site. The curtain would extend from the lake surface and be weighted to the lake bottom. The curtain would be marked by lighted buoys as a warning to boaters and equipped with a gate to allow access to the work site. All work activities in the lake associated with the possible increase in turbidity would be conducted inside the turbidity curtain.

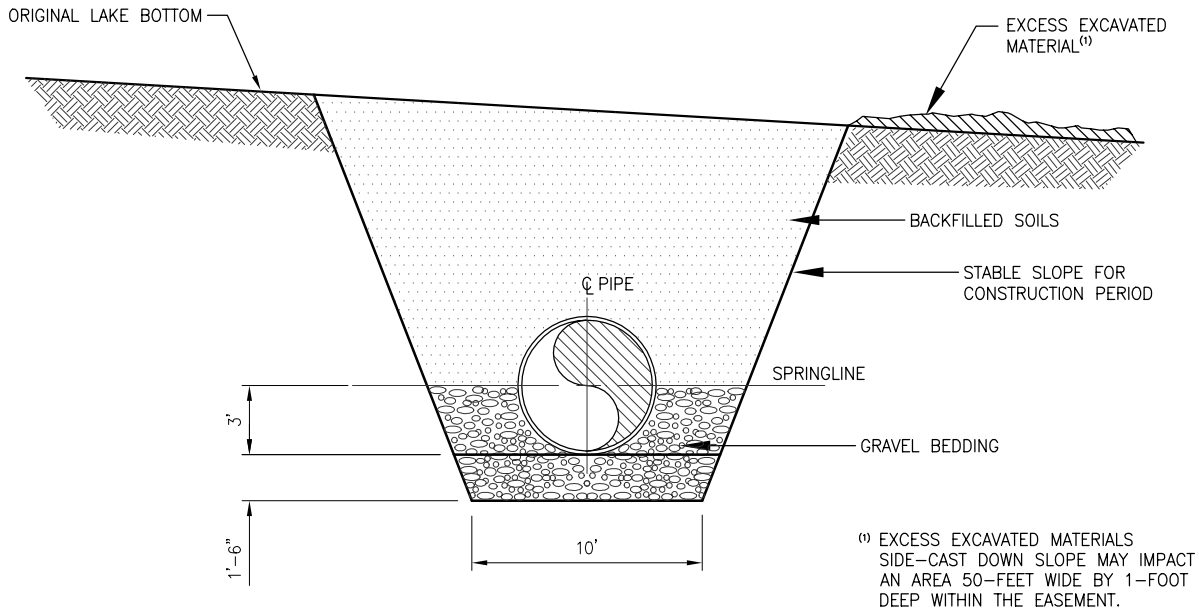
Offshore Clearing: Underwater reconnaissance using side-scan sonar indicated that there are scattered piles of debris and standing trees on the lake bottom within the pipeline path. The approximate extent of the scattered debris piles and trees is shown on Drawing G-04 in Appendix D, and note that the scattered debris piles would intercept the proposed easement between Stations 28+50 and 32+50. The trees would intercept the proposed easement between Stations 42+00 and 48+30 and again from 57+00 through the end of the diffuser. The contractor would move debris piles and trees using a clamshell or bucket and place the materials in a location so as not to interfere with the work. The materials would not be removed from the lake, but left within the easement to continue as potential aquatic habitat. Tree and debris removal activities would take place within a turbidity curtain to maintain water quality.

Offshore Earthwork, Bedding, and Outfall Structure Installation: To best describe the offshore earthwork, bedding, and outfall structure installation, four typical cross sections have been presented to illustrate the varied conditions to be encountered:

- Nearshore Trench and Fill Condition
- Daylight Condition Side–Hill Excavation
- Trench Condition Side–Hill Excavation
- Fill Condition

Cross sections would be provided at 50- to 100-foot intervals in the contract documents to identify the placement conditions for the contractor.

Figure 2-4 illustrates a nearshore trench and fill condition. One requirement of the project is to bury the outfall structure if the pipe crown is greater than elevation 1,045 feet msl. A total of 1,000 feet, or 16 percent of the total length of the outfall structure to be placed in the lake,



TRENCH AND FILL CONDITIONS WHERE PIPE CROWN EL. ≥ 1045
NOT TO SCALE

Figure Provided by Parsons Atlanta

Figure 2-4
Near Shore Trench and Fill Conditions
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, GA

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would be buried. Nearshore installation may be done with a combination of onshore and offshore equipment. A gravel bed would be placed in the trench to support the pipeline. Where the trench is buried, the gravel would typically be 1.5 feet thick. After the trench has been partially backfilled with stone, the remaining portion of the trench would be filled with the excavated material. The contractor would excavate the trench and side-cast the material, all within the turbidity curtain. Bedding gravel would be placed either by tremie pipe or clamshell to minimize turbulence. The pipeline segments would be welded together onshore into strings and floated to the site.

Figure 2-5 illustrates a daylight condition side-hill excavation. The contractor would bench into the side-hill to create a level surface to receive approximately 18 inches of bedding gravel. The material excavated to create the bench would be side-cast downslope by the contractor. Once the pipe is placed and adjusted to the proper line and grade, gravel would be placed around the pipe up to the springline. Thrust mounds of stone would be placed at most horizontal changes in direction to stabilize the joints and anchor the pipe. Figure 2-6 shows how a thrust mound would be formed and identifies the station locations where thrust mounds would be placed.

Figure 2-7 shows a typical trench condition for a side-hill excavation. Soils would be removed to create the trench and side-cast downslope. The slope of the trench walls would be selected to minimize the potential for slope failure, resulting in the hill slumping into the excavation. Bedding gravel would be placed as described above and the pipe string lowered into place. Gravel would be placed to the springline and the remainder of the trench backfilled with the excavated material. Additional filling adjacent to the trench could be done on steep side-hill slopes for stabilization to prevent the downslope trench wall from slumping.

The fill conditions shown on Figure 2-8 are typical for most of the route of the pipe. An approximately 30-foot-wide bed of gravel fill of varying height would be placed to the bottom of the proposed pipe and the pipe string lowered into place. Bedding gravel then would be placed to the springline. The gravel bedding would be placed along the lake bottom to cradle the pipeline and to accommodate fill areas. The footprint of the gravel bedding would occupy approximately 4.3 acres of the lake bottom. Table 2-1 identifies the pipeline stationing, average bedding dimensions, and incremental area between stations for the route through Lake Lanier. The installation would result in use of 35,350 cubic yards of gravel fill and 58,217 cubic yards of excess side-cast material (Table 2-1). How these materials would be handled is discussed in Section 2.3.

Diffuser Structure: The final component of the outfall structure is the diffuser. This structure would be 610 feet long, with the diameter decreasing distally (Figure 2-9). Installation of the diffuser on the lake bottom would utilize approximately 275.2 feet of fill condition (Figure 2-8) and 335 feet of side-hill condition (Figure 2-5). Discharge vents would be placed just above the springline of the diffuser pipe and only on the side away from the slope. Placement of the discharge ports would direct the discharge up and away from the pipe and the lake bottom. This design promotes mixing of the discharge with lake water and keeps the zone of disturbance away from bottom sediments.

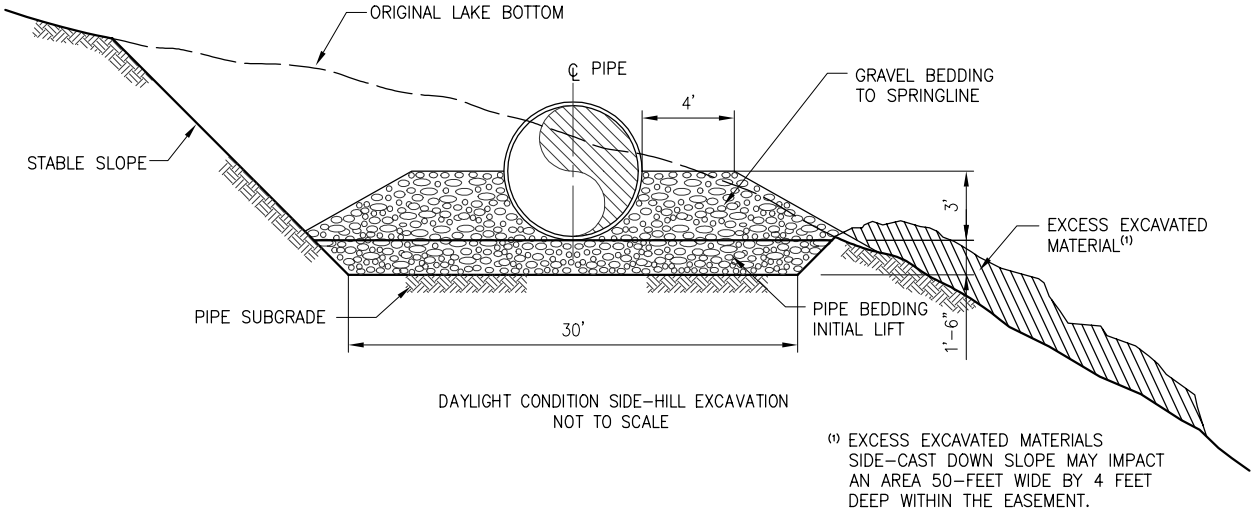

Figure Provided by Parsons Atlanta

Figure 2-5
Daylight Condition Side—Hill Excavation
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, GA

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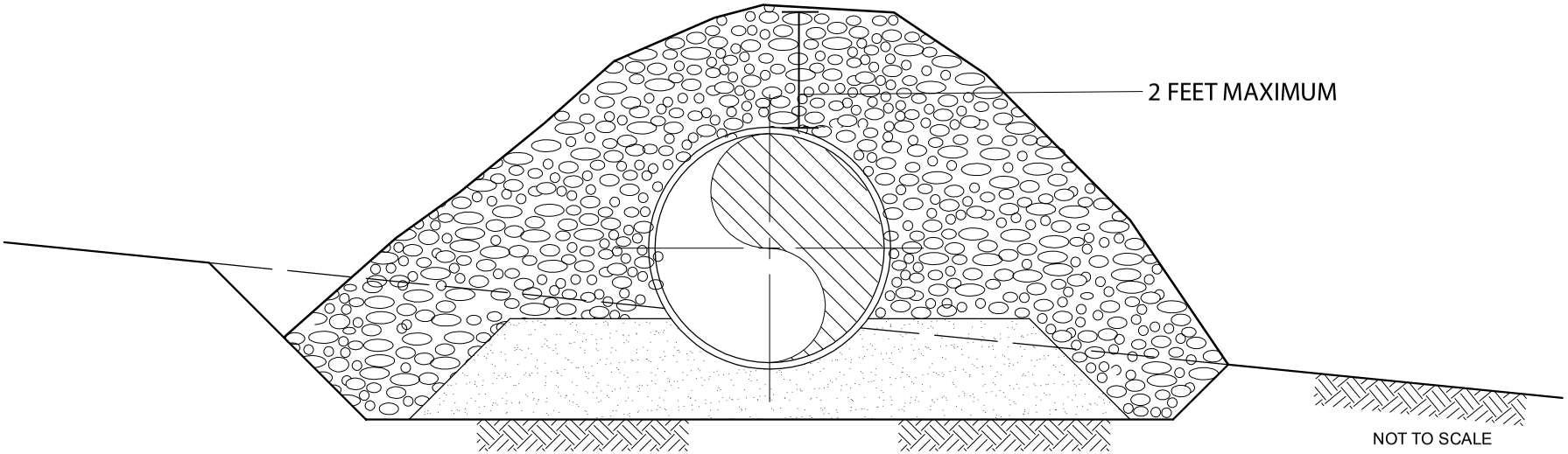

THRUST MOUND SCHEDULE

STATION	TONS (IN AIR)
15+52.28	60
18+54.47	50
26+07.28	110
42+21.00	30
58+16.36	50

Figure Provided by Parsons Atlanta

Figure 2-6
Thrust Mound Detail
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, GA

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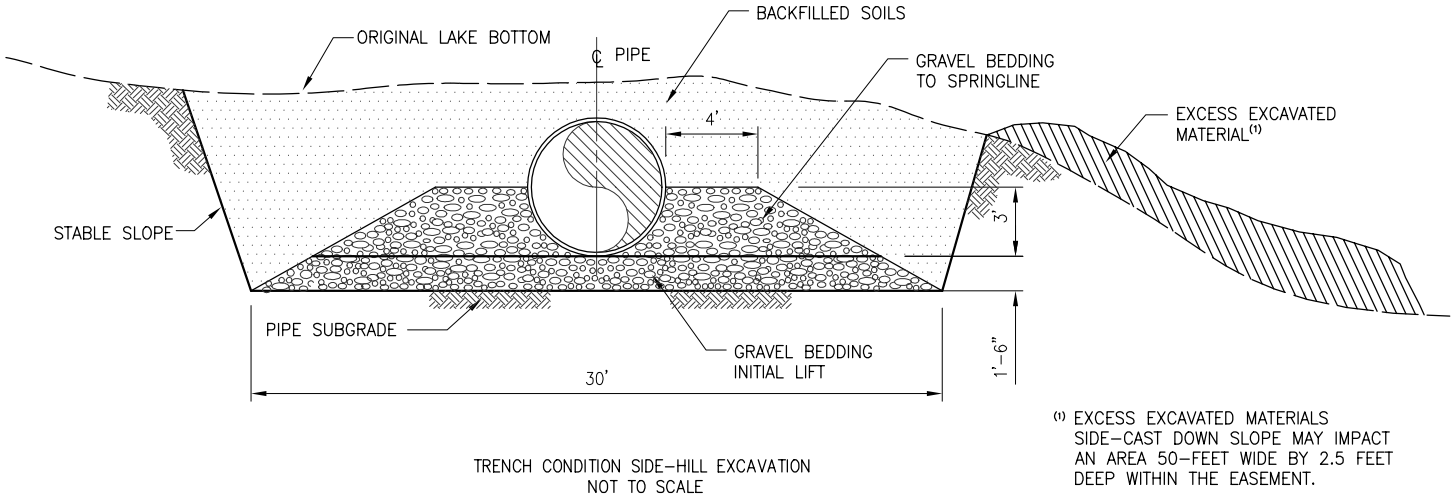

Figure Provided by Parsons Atlanta

Figure 2-7
Trench Condition Side—Hill Excavation
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, GA

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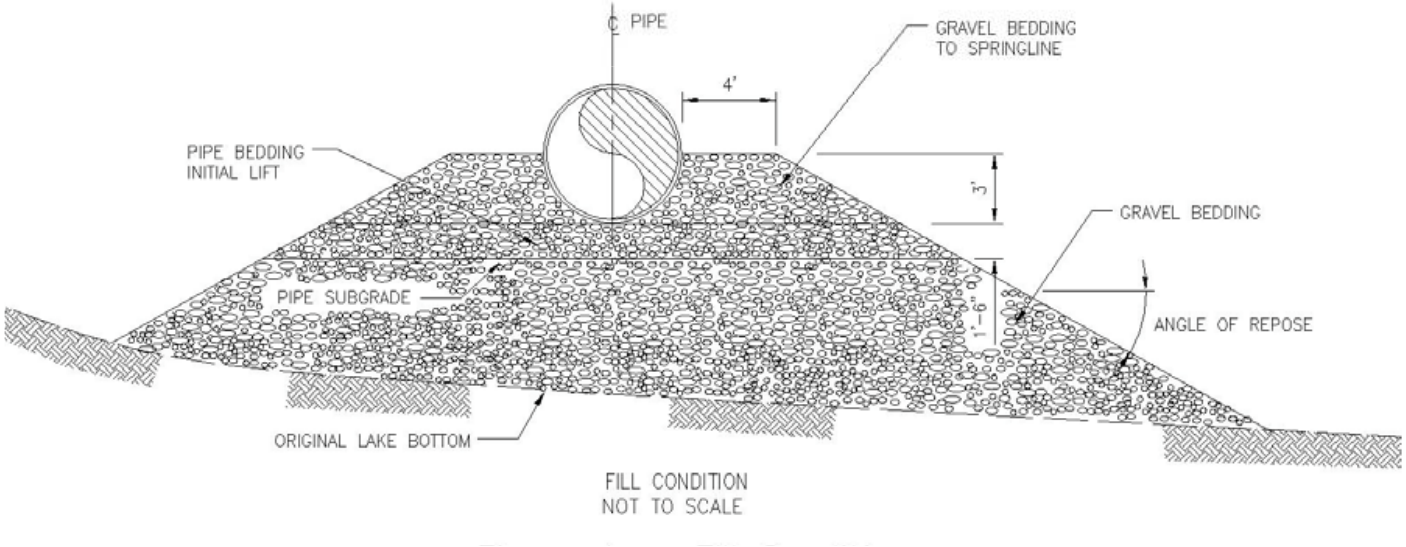

Figure Provided by Parsons Atlanta

Figure 2-8
Fill Condition
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, GA

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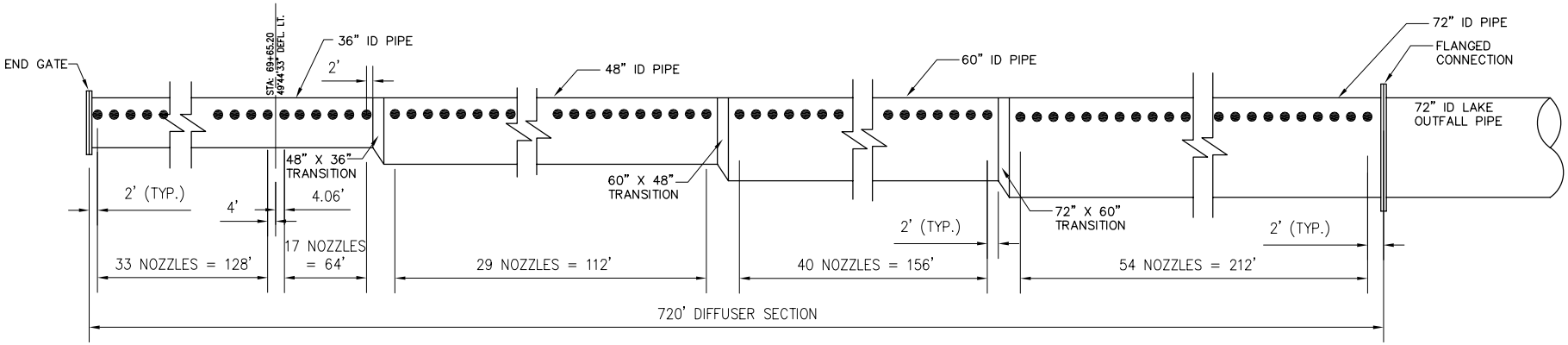
TABLE 2-1
Excavation Conditions and Footprint of Gravel Bedding Quantities Required for Installation of Pipeline and Diffuser in Lake Lanier
USACE Gwinnett County Diffuser/Pipeline EA

Pipeline Station Interval		Gravel Bedding				Lake Bottom Cut for Pipe Placement		
Start	End	Width (feet)	Length (feet)	Area (sf)	Volume (cy)	Volume Cut (cy)	Volume Permanently Side-cast (cy)	Excavation Condition Reference[a, b]
10+50	14+00	10	350	3,500	650	7,546	1,891	Nearshore Trench
14+00	34+00	30	2,000	60,000	11,110	25,735	25,735	Daylight Side-Hill
34+00	37+00	35	300	10,500	1,945	856	856	Fill
37+00	42+00	30	500	15,000	2,780	12,106	12,106	Daylight Side-Hill
42+00	43+00	40	100	4,000	740	695	695	Fill
43+00	45+00	30	200	6,000	1,110	2,627	2,627	Daylight Side-Hill
45+00	45+50	35	50	1,750	325	162	162	Fill
45+50	47+00	30	150	4,500	835	500	500	Daylight Side-Hill
47+00	47+50	35	50	1,750	325	129	129	Fill
47+50	49+00	30	150	4,500	835	719	719	Daylight Side-Hill
49+00	50+00	35	100	3,500	650	178	178	Fill
50+00	53+00	30	300	9,000	1,670	2,255	2,255	Daylight Side-Hill
53+00	54+00	35	100	3,500	650	721	721	Fill
54+00	70+50	30	1650	49,500	9,170	36,853[c]	8,331[c]	Daylight Side-Hill
70+50	72+50	35	200	7,000	1,300	860	860	Fill
72+50	73+50	30	100	3,000	555	273	273	Daylight Side-Hill
73+50	74+00	30	50	1,500	280	90	90	Fill
74+00	75+50	30	50	1,500	280	76	76	Daylight Side-Hill
75+50	75+75.2	30	25.2	756	140	13	13	Fill
			Total	187,256	35,350	92,394	58,217	
				4.3 acres				

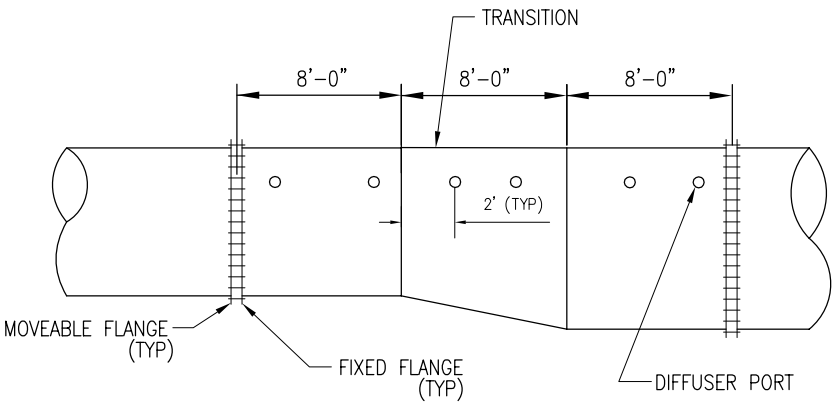
[a] Side Slope Excavation 3:1(V:V)
[b] Figure 2-4 depicts the nearshore trench condition, Figure 2-5 depicts the daylight condition side-hill excavation, Figure 2-6 depicts the thrust mound configuration, Figure 2-7 depicts the trench condition side-hill excavation, and Figure 2-8 depicts the fill condition.
[c] Pipe trench partially backfilled for slope stability.



NOTE: NOZZLE SPACING 4 FT, CTC.
EACH TRANSITION HAS 2 NOZZLES.

WEST ELEVATION VIEW – DIFFUSER SECTION

NOT TO SCALE



TRANSITION DETAIL

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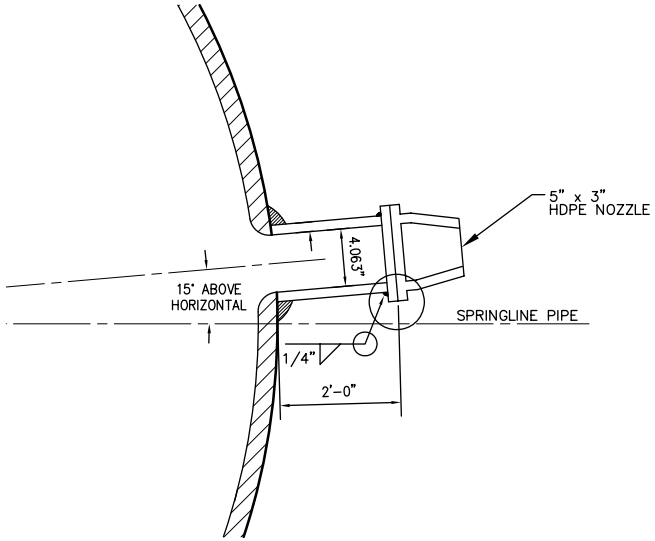


PORT/NOZZLE DETAILS

NOT TO SCALE

Drawings Provided by Parsons Atlanta

Figure 2-9
Detail of Proposed Diffuser
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, GA

2.3 Management of Excavated Material

The work described above would require excavation of the lake bottom to provide a trench or bench for the outfall pipeline. Excavated materials would be side-cast downslope to a width of approximately 50 feet. The areal extent of the excavated area would be approximately 10 acres, with an additional 7.5 acres potentially covered with side-cast material. To the maximum extent practicable, the trench or bench would be backfilled with the excavated material. Excess excavated materials below 1,060 feet msl not used for backfilling would be left in place on the lake bottom within the easement. Excess excavated materials at or above 1,060 feet msl would be removed from the lake and disposed in an appropriate upland location. In deeper water, removal of excess excavated material would result in increased water column turbidity that could be avoided by leaving the material on the lake bottom. The side-cast material would continue to gradually spread downslope and would be rapidly re-colonized by invertebrates. The slight increase in bottom elevation would not pose a future problem for recreational use of the lake. In order to minimize the potential for impacts to recreational boating activities in nearshore or shallow waters, all excavated material in areas above elevation 1,060 feet msl that could not be returned to the trench would be removed from the lake rather than sidecast to the lake bottom. This material would be disposed of either in the inert landfill on Sycamore Road or in the Buford Landfill on Richland Creek Road. Figures 2-4, 2-5, and 2-7 describe the approximate depth and width of the excess excavated material for each applicable cross section.

3.0 Alternatives Considered

This section provides background information on the development of the project and descriptions of the alternatives considered in the Environmental Assessment (EA).

3.1 Alternatives Analysis Process

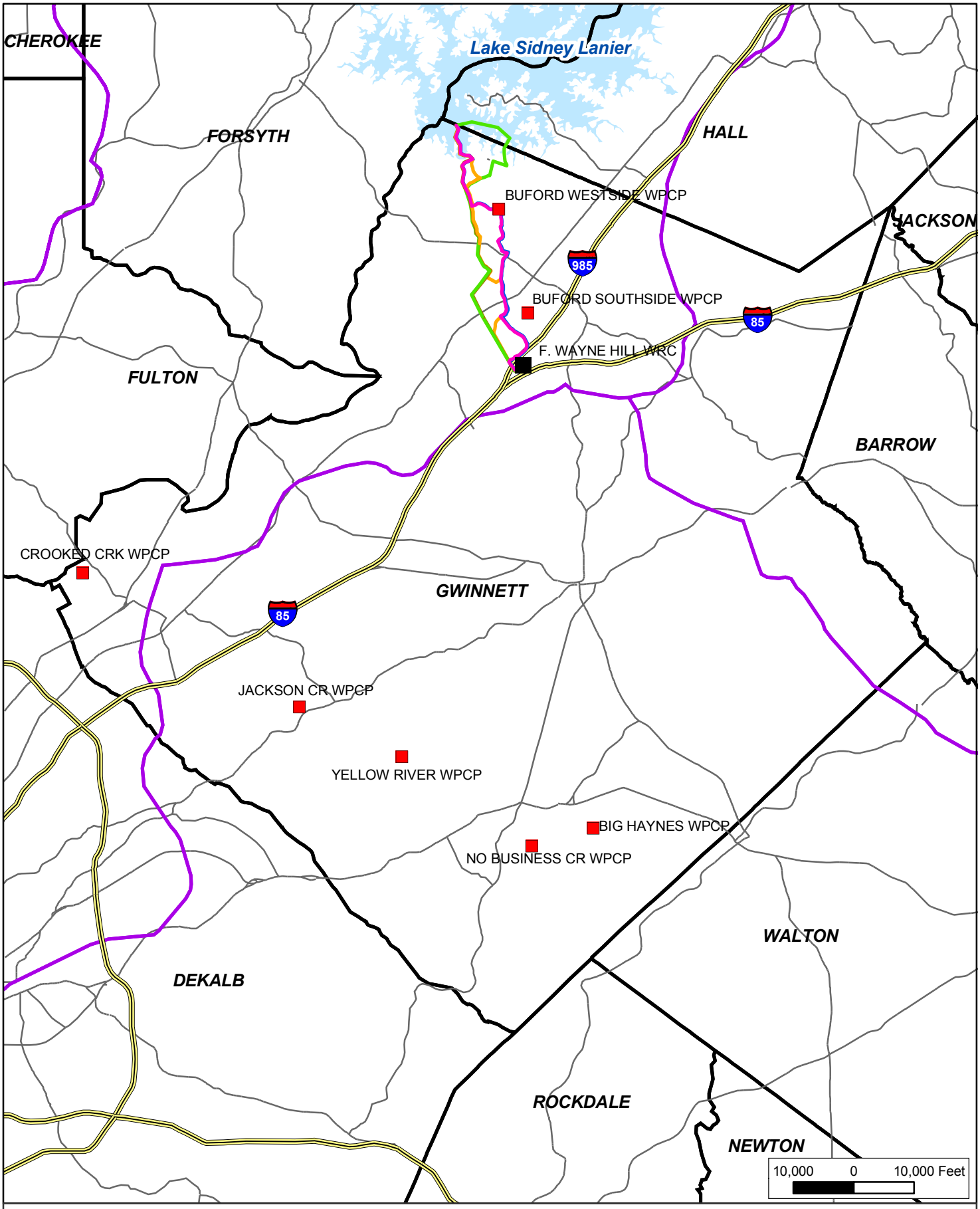
Prior to expansion of the F. Wayne Hill Water Resources Center (FWHWRC) and the Yellow Creek WRF, Gwinnett County owned and operated nine wastewater treatment plants (WWTPs) with a permitted capacity of 58.5 mgd average daily maximum month flow (ADMMF). In addition, Gwinnett County has an agreement with DeKalb County to send 5.0 mgd to the Polebridge Creek Water Pollution Control Plant (WPCP). Currently, Gwinnett County operates six facilities in addition to the DeKalb County agreement regarding the Polebridge WPCP and has a permitted capacity of 72.12 mgd ADMMF. Table 3-1 summarizes the existing WWTPs and their permitted capacities. Figure 3-1 shows the locations of the WWTPs in Gwinnett County and the river basins where the facilities are located.

TABLE 3-1
Wastewater Treatment Facilities and Capacities Serving Gwinnett County
USACE Gwinnett County Diffuser/Pipeline EA

Wastewater Treatment Facility	Permitted Capacity (mgd)
FWHWRC[a]	29.0
Crooked Creek Water Reclamation Facility (WRF)	16.0
Yellow River WRF	13.5
Beaver Ruin WRF	4.5
Jackson Creek WRF	3.0
Jacks Creek WRF	0.62
Sugar Hill Land Application System (LAS)	0.5
Polebridge Creek WPCP[b]	5.0
Total[d]	72.12

[a] Includes 9 mgd interim permitted discharge to Chattahoochee River; prior to the 40-mgd expansion
[b] Capacity provided through agreement with DeKalb County

Gwinnett County has also planned other modifications to its wastewater treatment system. Following expansion of the FWHWRC, the County terminated an agreement with the City of Buford and transferred 0.6 mgd of capacity to the FWHWRC. In the future, Gwinnett County will pursue options for reuse of reclaimed water to reduce demand on water supply for landscape irrigation.



WRC
Treatment Plants
Interstate
Major Roads
Lake Lanier

Major Basin
County

Routes
ALT. A
ALT. B
ALT. C
ALT. D
ALT. E

N

Figure 3-1
Gwinnett County Treatment Plants and Major Basins
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

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Five WRFs in the Yellow River Basin will be decommissioned and their capacity will be transferred to the Yellow River WRF after its expansion from 12.0 mgd to 22.0 mgd. This expansion will also provide improved technology that will result in an increase in the level of treatment for reclaimed water discharged into the Yellow River Basin. At present, two of these facilities have been decommissioned, and the permitted discharge capacity at the Yellow River WRF has increased from 12 mgd to 13.5 mgd.

Gwinnett County has been evaluating options for expansion of its wastewater treatment system for several years and has taken a proactive approach to meet anticipated future wastewater treatment capacity needs. Many detailed analyses of treatment options and discharge locations have been conducted prior to this study.

The following sections provide background information on the project history that was included in the Environmental Information Document (EID), as defined by Georgia's Rules and Regulations for Water Quality Control, Chapter 391-3-6-.02(1)(e):

> *"Environmental Information Document" means an assessment of environmental impact of any proposed construction, upgrading or expansion of a wastewater treatment facility. This evaluation may include, but is not limited to, the impact of the proposed construction, upgrading or expansion on air quality, flood plains, wetlands, noise pollution, water quality, cultural resources, and endangered or threatened species.*

The EID analyzed Gwinnett County's options for wastewater treatment and was submitted to the Georgia Environmental Protection Division (EPD). The EID, along with supplemental information, is provided as Appendix A. The EID was subject to public comment as required by Chapter 391-3-6-.02(3)(g)(2) of the Georgia Rules and Regulations for Water Quality Control.

3.2 Wastewater Discharge Options

The Gwinnett County Department of Public Utilities (DPU) completed a water and wastewater master plan in 1998. The purpose of that planning study was to determine future water and wastewater demands and to develop a plan to meet those needs. In 1999, the master plan was updated and a Water and Wastewater Master Plan Update Advisory Panel, consisting of a diverse group of stakeholders, was assembled to help evaluate water supply and wastewater treatment alternatives. Representatives from the following groups were included on the Advisory Panel:

- Homeowners Associations: Represented homeowners in Gwinnett County.
- Business Community: Represented business owners and operators in Gwinnett County.
- Development: Represented members of organizations related to development in Gwinnett County.
- Large Water Users: Represented schools, businesses, and industries in Gwinnett County that consume large quantities of water daily.
- Gwinnett County Cities: Represented the 15 incorporated municipalities within Gwinnett County.

- Environmental Organizations: Represented environmental groups that are interested in Gwinnett County.
- Citizens-at-Large: Represented residents of Gwinnett County who are not members of any of the other stakeholder groups (Camp, Dresser, and McKee [CDM], 1999).

The Advisory Panel identified potential sites for additional reclaimed water release and recycling options during a brainstorming session. The Advisory Panel identified potential reclaimed water release options without regard for technical feasibility or implementation costs. Fifteen potential options were identified:

1. Blended Reuse/Designated Single-Purpose Reservoir
2. Pipe-to-Pipe Direct Reuse
3. Blending Reuse without a Reservoir-Blended in Tank/Plant Site
4. Blending/Reuse using Lake Lanier
5. Discharge to Chattahoochee River Basin
6. Discharge to Yellow River Basin
7. Land Application-Traditional Systems/Irrigation
8. Consumptive Industrial or Irrigational Reuse
9. Regional Cooperation
10. Discharge to Mulberry Basin
11. Discharge to All Atlantic Slope Basins
12. Groundwater Injection
13. Hybrid Reuse Alternatives
14. Location of Discharges above Water Intake
15. Pollution Trading

Subsequently, the Advisory Panel combined several alternatives into a generalized short list. The short list, which was analyzed in detail, included the following:

- Blended Reuse
- Direct Reuse
- Discharge to Lake Lanier
- Discharge to Chattahoochee River
- Discharge to Yellow River
- Land Application
- Regional—Polebridge Creek to South River
- Other Atlantic Slope Discharge

Consumptive non-potable industrial or irrigational reuse and water conservation were included in all options. The panel completed several evaluation exercises. Initially, the panel evaluated the various reclaimed water release alternatives against four evaluation criteria groups:

- Group 1: Intrusion and disturbance; property values; condemnations
- Group 2: Inter-governmental cooperation; high/low growth flexibility; use of existing supply

- Group 3: Water quality impacts; interbasin transfer; use and reuse; recreation protection; use of existing infrastructure
- Group 4: Best available technology; reliability

In conducting the evaluations, the Advisory Panel assumed that each reclaimed water release alternative would be required to meet applicable state water quality standards and all other regulatory requirements, including public health protection. Costs were not considered in this analysis. The Advisory Panel assigned weight factors for each of the criteria groups and values for how well each alternative met each criterion. The weighted factors and values were used to calculate a numeric value for each alternative as a tool for decision-making. In general, results were not consistent with the Advisory Panel's perceptions or expectations.

The Advisory Panel then conducted a second evaluation to refine preferences for reclaimed water release alternatives. Each alternative was considered in terms of the evaluation criteria, the potential public and political feasibility of implementation, and the alternative's estimated present worth cost.

3.2.1 Wastewater Treatment Options

The wastewater treatment options are described here to provide a complete picture of the project history. However, one of the major considerations in the site selection process was the ability to expand the existing 20-mgd FWHWRC. In the initial site selection process, other treatment options were considered.

3.2.1.1 Expansion of F. Wayne Hill Water Resources Center

Alternative locations for the FWHWRC were evaluated and the results summarized in a siting study performed in 1994 (Metcalf & Eddy [M&E], 1994). The siting study evaluated three alternative locations for an advanced water reclamation facility (AWRF). These locations, in the northern portion of Gwinnett County, are as follows:

- Level Creek Site: 650-acre tract located west of Suwanee in the area between Level Creek, the Chattahoochee River, and Settles Bridge Road
- Suwanee Creek Site: 580-acre tract located east of Suwanee in the area between Suwanee Creek, Woodward Mill Road, and Interstate 985
- Ivy Creek Site: 760-acre tract located east of Suwanee between Interstate 985, a tributary to Ivy Creek, and Interstate 85

Each site was evaluated on the basis of physical, environmental, cultural, and other development factors. Key criteria in the site selection process were the size of the tract, raw sewage pumping requirements, wetland area potentially impacted, capital costs for construction of the facilities, general site topography (due to the potential impacts of site topography on site development costs), and potential for future expansion. The Ivy Creek site was selected as the site for the existing 20-mgd capacity FWHWRC.

This site also could be expanded in the future with minimal additional environmental impact within the area originally evaluated and cleared for construction of the 20-mgd facility. Siting evaluations indicated that future expansions to capacities ranging from 60

and 80 mgd would be possible at the FWHWRC site. Expansion of the FWHWRC would be less expensive and would also have fewer environmental impacts than constructing a new facility in a different area of the County, primarily because the land for the expansion would have been cleared and graded during construction of the FWHWRC.

3.2.1.2 Onsite Wastewater Treatment Systems

Gwinnett County currently has 80,000 to 90,000 individual onsite wastewater disposal systems (septic tanks). In addition, several independent entities within the County own and operate their own small package WWTPs and have discharge permits issued by the Georgia EPD (CDM, 1999). Private package plants typically cannot provide the level of treatment obtainable by municipal plants. In addition, septic systems require large land areas, have high failure rates, are incompatible with mixed-use zoning, and are very costly to retrofit to sewer systems. Septic systems do not provide the nutrient removal or disinfection that WRFs provide. Furthermore, the current goal of the County is to reduce the number of septic tank systems over the next 50 years to 10 percent of the total homes and businesses. Forcing future development to rely on package systems and/or septic systems would not be compatible with existing goals and objectives of the County's Master Plan. Therefore, onsite wastewater treatment systems were not considered practicable for meeting the future wastewater treatment and disposal needs of Gwinnett County.

3.2.2 Reclaimed Water Release Alternatives

Through its master planning process, Gwinnett County evaluated a number of potential release options. The County considered the following alternatives:

- Blended Reuse
- Direct Reuse
- Discharge to Lake Lanier
- Discharge to the Chattahoochee River
- Discharge to the Yellow River Basin
- Land Application
- Transfer to Polebridge Creek WPCP
- Other Atlantic Slope Discharge

The following sections provide a brief summary of each of the alternatives considered by the County.

3.2.2.1 Blended Reuse

Under the blended reuse alternative, reclaimed water would be piped to a large (1- to 1.5-billion gallon) raw water reservoir and blended (maximum blend ratio of 50 percent) with raw water from Lake Lanier. The blended water in the reservoir would then be filtered and treated at a water treatment facility for potable use. Several factors limit this alternative, including the lack of an existing regulatory framework for implementation, environmental impacts associated with construction of the blending reservoir, concern over public acceptance, and the lack of existing blended reuse systems online in the United States with a successful operating history. Blended reuse of reclaimed water is not recommended or promoted by most water treatment technologists and regulators. For the reasons presented

above, blended reuse was not considered a practicable alternative for disposal of the reclaimed water.

3.2.2.2 Direct Reuse

Under the direct reuse alternative, future reclaimed water would undergo additional treatment to achieve potable water quality. The reclaimed water would be transferred to the Lanier Filter Plant and mixed in the clear wells with treated Lake Lanier water before being distributed for use. Concerns with this alternative are similar to those related to blended reuse, including the lack of an existing regulatory framework for implementation, concern over public acceptance, and the lack of existing direct reuse systems online in the United States with a successful operating history. Currently regulators in other states recommend some period of storage in another water body (aquifer or large surface water reservoir) prior to reuse to provide some additional level of protection (Crook, 1998). The environmental impacts of constructing a suitable storage facility would be comparable to those of constructing a blending reservoir. For the reasons presented above, direct reuse was not considered a practicable alternative for disposal of the reclaimed water.

3.2.2.3 Discharge to Lake Lanier

Under this alternative, a new reclaimed water pump station and pipeline would be constructed to release future reclaimed water to Lake Lanier. This option would return the reclaimed water to Gwinnett County's water supply source (alleviating interbasin transfer). This option is consistent with the State's strategy of reducing net water loss in the Chattahoochee River Basin and retaining flow in the upper basin as part of the strategy for possible resolution of future water management allocations among the three states (Alabama, Georgia, and Florida) in the Apalachicola-Chattahoochee-Flint (ACF) Basin. This option also is consistent with the Metropolitan North Georgia Water Planning District (MNGWPD) *Final Plan for Water Supply and Water Conservation* (MNGWPD, 2003a) and the *Final Long-term Wastewater Management Plan* (MNGWPD, 2003b). This alternative was selected as the State's Preferred Alternative through the state National Pollutant Discharge Elimination System (NPDES) permit decision process.

3.2.2.4 Discharge to Chattahoochee River

Under this alternative, future reclaimed water would be released to the Chattahoochee River through the pipeline currently being constructed (with the initial 20-mgd FWHWRC). This option would return the reclaimed water to its basin of origin (although downstream of the lake water source), thus avoiding interbasin transfer. It is also consistent with the State's strategy of reducing net water loss in the Chattahoochee River Basin. Gwinnett County obtained an interim permit for an additional 9 mgd of discharge to the Chattahoochee River. This discharge was permitted in January 31 2006 (Permit No. GA0026433) with the requirement that this 9 mgd discharge would be removed once the NPDES permit was issued for the 40 mgd discharge to Lake Lanier and the pipeline and diffuser installed to transport reclaimed water to Lake Lanier.

The Georgia EPD determined that an additional 40-mgd discharge directly into the Chattahoochee River below Buford Dam would likely result in elevated water temperatures that could negatively impact the trout fishery in the Chattahoochee River downstream of the dam. Additionally, this alternative would not take advantage of the opportunity afforded by

the Lake Lanier option to retain flow as high in the basin as possible as part of the strategy for resolving the future water management needs in the ACF Basin. Therefore, this option was not considered preferable to discharge to Lake Lanier. The 20-mgd discharge currently permitted into the Chattahoochee River would continue under all options.

The Georgia EPD has determined that the proposed discharge of 40 mgd will not be allowed into the Chattahoochee River below Buford Dam. However, in the future, after other discharges to the Chattahoochee River are improved to meet more stringent discharge limits, additional discharges to the Chattahoochee River may be allowed incrementally. For example, the recommended reductions in Georgia Power Company's thermal discharges from Plant Bowen on the Chattahoochee River are underway and will reduce the existing oxygen demand in the river downstream from Atlanta. This reduction in heat load will result in additional assimilative capacity in the river and allow for the additional reclaimed water discharges. Future discharges to the Chattahoochee River under these conditions are consistent with the *Final Long-term Wastewater Management Plan* (MNGWPD, 2003b).

3.2.2.5 Discharge to Yellow River

Under this alternative, future reclaimed water would be released to the Yellow River through a new pipeline and pump station. Additional releases to the Yellow River by Gwinnett County are not supported by the Georgia EPD. Discharge to the Yellow River would constitute an interbasin transfer. As discussed more fully in Section 4.2.4.3, the Georgia EPD and the MNGWPD are opposed to interbasin transfers. For the reasons stated above, discharge to the Yellow River was not considered a practicable alternative for disposal of reclaimed water.

3.2.2.6 Land Application

Under the land application alternative, pump stations and force mains would be required to deliver the reclaimed water to potential land application sites. Several studies on the feasibility of land application for disposal of future reclaimed water have been completed for Gwinnett County. The *1993 Water and Wastewater Master Plan* (CH2M HILL, 1993) evaluated land application as an option for the southern portion of the County. The study determined that land application was not viable for Gwinnett County due to the low application rates; large land area requirements; steep topography and associated potential for erosion; high land cost; and limited availability of large tracts of land suitable for land application. A second study, completed in 1996, examined the potential for land application for the reclaimed water from the North AWRF (now known as the FWHWRC). This study found that land tracts available in the County could not support the 20-mgd initial phase design capacity of the plant, and that the present worth cost was significantly higher than the cost for release to the Chattahoochee River. Additionally, land application is not consistent with the Georgia EPD strategy for return flows to the Chattahoochee River Basin to meet the anticipated future water supply demands and to minimize interbasin transfers. Land application is a depletive disposal method and has effects similar to those of an interbasin transfer from the Chattahoochee River Basin. For the reasons stated above, land application was not considered a practicable alternative for disposal of reclaimed water.

3.2.2.7 Transfer to Polebridge Creek WPCP

Under this alternative, future wastewater flow would be transferred to the DeKalb County Polebridge Creek WPCP, and Gwinnett County would share costs for upgrading and expanding the facility. The Polebridge Creek facility discharges to the South River. A new pump station would be constructed within Gwinnett County along with a new force main to transfer the wastewater to the Polebridge Creek WPCP. This alternative would also require the development of other reclaimed water release alternatives in parallel to handle the projected build-out treatment needs. Regional cooperation would be critical to the development of such an alternative, as would cooperation with DeKalb County. This alternative would also increase interbasin transfer and not support the Georgia EPD strategy for return flows to the Chattahoochee River Basin to meet the anticipated future water supply demands in the basin. For the reasons stated above, transfer to the Polebridge Creek WPCP was not considered a practicable alternative for disposal of reclaimed water.

3.2.2.8 Other Atlantic Slope Discharge

Much of Gwinnett County drains into small headwater streams in the Alcovy, Apalachee, Big Haynes, and Mulberry Creek Basins, which flow to the Atlantic Slope. Because the streams in these basins in Gwinnett County are relatively small, releasing large quantities of reclaimed water could significantly increase average stream flow and negatively impact habitat and biota. It is impracticable to divide the wastewater discharge into multiple small discharges at widely separated locations to accommodate discharge into these headwater streams. Additionally, discharge to the Atlantic Slope would result in interbasin transfer. As discussed in Section 4.2.4.3, the Georgia EPD and the MNGWPD are opposed to interbasin transfers. For the reasons stated above, discharge along the Atlantic Slope to streams other than the Yellow River was not considered a practicable alternative for disposal of reclaimed water.

3.2.3 Conclusions of Wastewater Treatment and Release Selection Process

Based on the reviews discussed above, it was determined that building a new, expandable AWRF was preferable to onsite systems because of greater treatment efficiency and compatibility with long-term County planning. The FWHWRC site was selected initially because the site was sufficiently large to accommodate future expansion.

Gwinnett County receives all of its water supply from the Chattahoochee River Basin. All discharge options involving interbasin transfers of water were eliminated from further consideration in order to meet the need for return flows to address future water management requirements. Technologically unproven options were also eliminated from further consideration, as were options that could not practically be implemented due to physical constraints. This left two potentially feasible options: direct discharge to either Lake Lanier or the Chattahoochee River. Of these, discharge to Lake Lanier was preferred because it provided greater options for long-term water management in the basin (see Appendix A) and avoided potential impacts to the trout fishery in the Chattahoochee River downstream of Buford Dam.

Although direct reuse is not the selected option for disposal of the 40 mgd due to opportunity constraints, Gwinnett County intends to utilize direct reuse options that do not involve direct potable reuse as opportunities arise. The County will evaluate opportunities

for non-potable reuse as they are discovered and intends to incorporate any that are practicable into the County's reclaimed water system.

3.3 Diffuser Location Alternatives

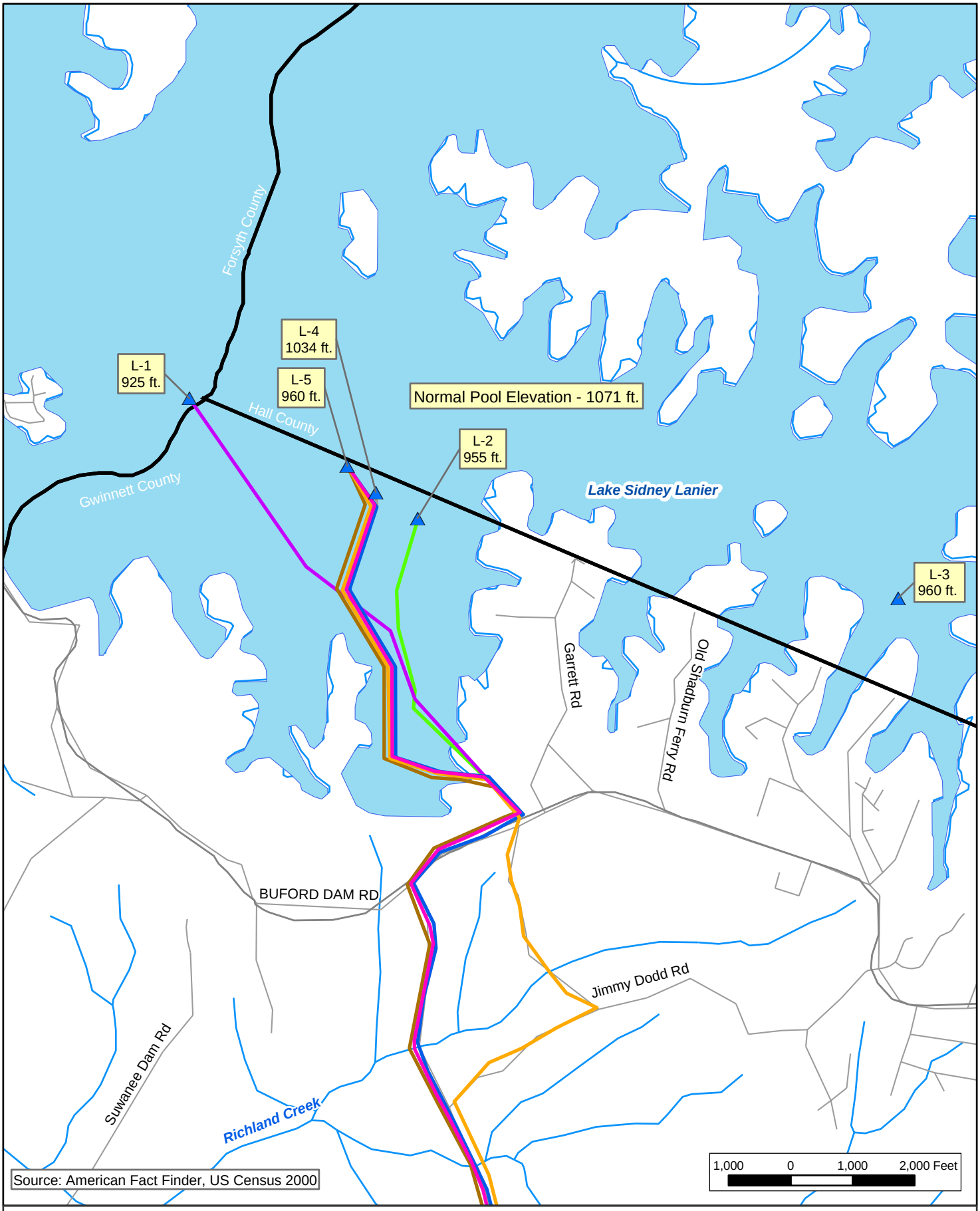
The Georgia EPD established the originally proposed location of the diffuser as a condition of NPDES Permit No. GA0038130 issued to Gwinnett County for the discharge of 40 mgd of treated wastewater to Lake Lanier. As a result of the resolution of litigation concerning the permit, the location of the proposed diffuser was changed. Prior to these actions, options for various discharge locations were evaluated in the EID, as described below.

Three locations were evaluated in the EID as possible discharge sites in Lake Lanier (Figure 3-2). Discharge Location L1 was near the submerged confluence of the Chattahoochee River and Shoal Creek in Forsyth County, at an elevation of 925 feet above mean sea level (msl). For this option, a diffuser assembly would be used to effectively disperse and mix the reclaimed water. Discharge Location L2 was in the general vicinity of Location L1 but closer to shore, at an elevation of 955 feet msl. This location was in Gwinnett County. Discharge Location L3, at an elevation of 960 feet msl, was in Hall County. Location L3 would be reached by entering the lake to the east of Gwinnett County Park instead of crossing the park. The pipeline routes in Lake Lanier followed inundated streambeds as much as possible to reach approximate diffuser elevations.

As a result of the selection process, Location L1 was designated as the preferred discharge point into Lake Lanier. This decision was based on (1) modeling results indicating that Location L1 would have greater dilution at the edge of the near-field zone and (2) characteristics of the routes leading to the potential discharge locations. Except for dilution effects, modeling indicated little difference among the considered locations.

Gwinnett County applied for a permit to discharge at Location L1. However, the Georgia Wildlife Resources Division (WRD) recommended a different location (L4, Figure 3-2) during the public comment period on the draft NPDES discharge permit for the lake discharge. Diffuser Location L4 was near Location L2 but at a higher elevation. According to the WRD, Location L4 would be less likely to increase the temperature in deeper waters in Lake Lanier and, consequently, the temperature of releases to the Chattahoochee River. Gwinnett County then applied for an NPDES permit to discharge at Location L4. As a result of litigation resolution over NPDES Permit No. GA0038130, a new diffuser location was established for the lake discharge (L5, Figure 3-2). L5 was relocated approximately 1,000 feet to the northwest of L4 and was 74 feet lower in the water column. This location was specified as the discharge point by Georgia EPD when NPDES Permit No. GA0038130 was reissued on November 6, 2006. The L5 diffuser would be located approximately one mile offshore, near the intersection of the Gwinnett and Hall County lines, and approximately 1.1 miles upstream of Buford Dam. The diffuser would be placed on the lake bottom an elevation of 960 feet msl.

When site L4 was established for the diffuser, Gwinnett County also developed a new alternative route through Gwinnett County Park and the lake to reach L4. This route was modified over approximately the last 1,000 feet and extended by approximately 350 feet to



Routes
- ALT. A
- ALT. B
- ALT. C
- ALT. E

Historic Routes
- ALT. L1
- ALT. L2
- ALT. L4

- Diffuser
- Roads
- Hydrology
- County

N

Figure 3-2
Diffuser Locations
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

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reach the L5 location. The changes from the routes considered in the EID are described in Section 3.4.

3.4 Pipeline Alternatives

As part of the FWHWRC expansion, a new reclaimed water pipeline would be constructed to convey reclaimed water from the facility to the discharge point. In the EID, three potential pipeline routes were evaluated, each leading to a specified diffuser location (diffuser Locations L1, L2 and L3 were described above). After EPD designated a new discharge location (L4), a fourth pipeline route was developed. This fourth route was modified slightly to reach the final proposed diffuser location, L5.

As part of the route to L5, Gwinnett County has requested a new onshore easement from USACE of approximately 260 feet to permit the outfall pipeline to proceed through the existing Shoal Creek easement in Gwinnett County Park and then turn approximately 45 degrees to access the lake (see Appendix D, Drawing G-03). This additional easement would require the removal of select vegetation in order to place the outfall pipeline.

The three routes considered in the EID remain unchanged until reaching Gwinnett County Park (routes to L1 and L2) or Lake Lanier (route to L3). However, the routes were changed in Gwinnett County Park and the lake to reach the EPD-specified diffuser location (L4). The route to L4 was modified slightly to reach L5. The considered routes (designated A, B, C, D, and E) are depicted on Figure 3-3 and can be compared with the original routes depicted on Figure 3-2. The portion of Route E within Gwinnett County Park and Lake Lanier is described in Section 3.4.1, and the overland routes are described in Section 3.4.2.

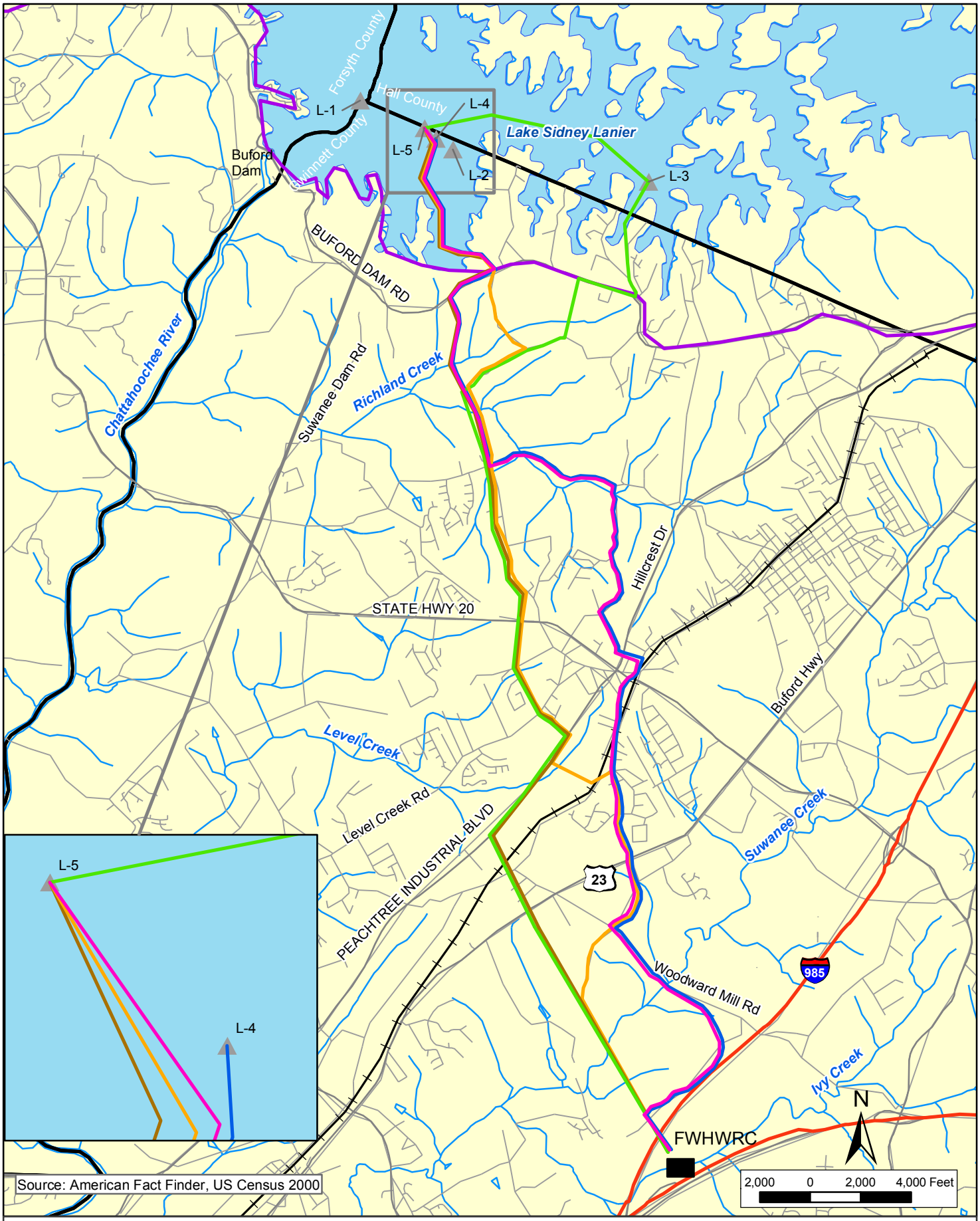
3.4.1 Pipeline Routes within Gwinnett County Park and Lake Lanier

3.4.1.1 Routes A, B, C, and E

A new alternative route to reach diffuser Location L5 was developed to address constructability concerns and to avoid or minimize impacts to an identified area of sub-merged forest on the Lake Lanier bottom. The previous routes to diffuser Locations L1 and L2 were aligned along the old Shoal Creek stream bottom in order to reach the diffuser locations at deeper elevations (925 feet and 955 feet, respectively). The L4/L5 pipeline route follows a higher contour line to reach the diffuser locations.

Upon entering Gwinnett County Park, the pipeline routes would coincide to reach diffuser Locations L4 and L5 (see Figure 3-3).Location L4 is along the east side of a ridgeline at an elevation of 1,035 feet msl. Approximately 1,000 feet before reaching L4, the proposed route to L5 crosses to the west side of that ridgeline before descending along the side of the ridge to where the diffuser would be placed with a crown elevation of 965 feet msl.

The route through Gwinnett County Park would overlay substantial portions of the existing Shoal Creek intake pipeline right-of-way (ROW) easement, along existing roads and drives within the park. The existing intake ROW would be used as a staging area for work in the lake. Once entering the park, the pipeline would proceed along park roads and existing ROWs coincident with the water intake ROW for a distance of approximately 550 feet, and then continue at an approximately 45 degree angle through previously undisturbed park



Diffuser Location

Routes

- ALT. A
- ALT. B
- ALT. C
- ALT. D
- ALT. E

- Interstate
- Southern Railroad
- Roads
- County
- Hydrology
- Lanier Basin

Figure 3-3
Reclaimed Water Pipeline Routes
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

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File Path: \\boomer\E\Projects\Gwinnett\apr_mxd\Figures\Figure 3-3 Pipeline.mxd, Date: June 24, 2005, User: BBODINSO

area for approximately 250 feet until reaching the shoreline of the lake (Figure 2-3). Figure 1 in Appendix D shows the existing dual raw water intake lines in the Shoal Creek easement in Gwinnett County Park, as well as the proposed reclaimed water discharge pipeline.

The pipe to Location L5 would extend from the shore in Gwinnett County Park for 5,186 feet northward to a diffuser located near the intersection of the Gwinnett and Hall County lines. The diffuser would be located approximately 1.1 miles upstream of Buford Dam near the mouth of Shoal Creek with a crown elevation of 965 feet msl. The route in Lake Lanier was changed from those analyzed in the EID primarily for constructability reasons, but this route would also reduce potential impacts associated with construction. Rather than follow an inundated streambed, the new route follows a submerged ridge to the extent possible. The proposed route would eliminate approximately 100 feet of vertical descent and subsequent ascent to reach L5, which would have been required with the original routes to L1 and L2. The depth of the underwater construction is reduced by approximately 100 feet for much of the route. The time to construct and the cost of construction would be reduced by conducting the work in shallower water. However, the alignment is situated closer to the Lanier Park shoreline and therefore would be more likely to temporarily disrupt recreational activities at this public use area. The reduction in installation time would reduce the potential for impacts to water in the lake and the magnitude of temporary impacts on recreation on the lake and at nearby parks or public use areas.

The routes to L1 and L2 considered in the EID also would require extensive clearing of submerged trees on the lake bottom to facilitate construction (Appendix D, Drawing G-04). This work would result in further increased time and associated impacts on recreation and a greater potential for water quality impacts from bottom disturbance.

The new route through the lake would also separate the construction from the Gwinnett County water intake line and intake structure by more than 800 feet, reducing the potential for construction activities to impact the raw water source.

For the reasons stated above, the initial routes through Lake Lanier for Routes A and B to reach diffuser Location L5 were not considered practicable. Therefore, Routes A, B, and C have been modified to follow the new route through Gwinnett County Park and Lake Lanier. Figures 3-2 and 3-3 show the route through the lake to Location L5, and Drawings C-02 through C-07 in Appendix D provide details of the route to reach diffuser Location L5.

3.4.1.2 Route D

Route D was originally planned to reach diffuser Location L3 (see Figure 3-2) and, therefore, enters the lake at a point distant from discharge Location L5. The point of entry into Lake Lanier would cross through light residential areas and undeveloped shoreline. Within Lake Lanier, the route parallels the ridgeline northeast to diffuser Location L3 and then turns generally northwest to go around three promontories to reach diffuser Location L5. This route would avoid construction in Gwinnett County Park and temporary disruption of recreational activity in Lanier Park. However, the length of the pipeline in the lake required to reach discharge Location L5 would be more than double those of the other alternatives (approximately 12,500 feet within the lake compared to approximately 6,000 feet in the lake). As a result of the greater traverse along the Lake Lanier bottom, the duration of temporary construction-related impacts to the lake and recreational users of the lake would be

increased. Additionally, this alignment was designed to accommodate access to the L3 diffuser location (approximate elevation 960 feet). Therefore, this route would require that the pipe be placed at a greater depth in the lake for a longer distance (approximately 7,500 feet), which would require extraordinary construction measures to install. The cost of construction in the lake would more than double, due to the greater length in the lake (increased materials such as bedding gravel) and the added costs of working at greater depth. The amount of fill material and excess side-cast material would likely double. Although no geotechnical investigation of the portion of Route D in and near the lake was conducted, this route is likely to require at least as much blasting as the other routes. Because Route D would have greater environmental impacts and a prohibitive cost to implement to reach diffuser Location L5, this route is not considered practicable or feasible and is eliminated from further consideration.

3.4.2 Pipeline Land Routes Considered

3.4.2.1 Route A

Reclaimed water pipeline Route A would originate within the FWHWRC and interconnect with the new and existing reclaimed water pumping stations (Figure 3-3). From there, the proposed route would cross under Interstate 985 and follow existing ROWs in a northerly direction through the Sugar Hill area, crossing Ridge Road, Sentry Ridge Crossing, Sentry View Trace, Streamwood Ivy, Hickory Haven Terrace, Summer Grove, and Old Suwanee Road. The route then follows Peavy Trail and crosses Buford Highway and North Price Road before turning northeast paralleling Peachtree Industrial Boulevard. From there, the route turns onto Spring Hill Drive and follows the ROW across Old Cumming Road to Sycamore Road. It then follows Sycamore Road to Buford Dam Road before turning into Gwinnett County Park, which is currently closed to the public.

Along this route, the pipeline would be placed in existing pipeline easements, Georgia Power transmission line easements, and local road ROWs. The easement for the proposed pipeline would be a maximum of 80 feet in uplands and reduced to 30 feet through wetlands and at stream crossings where practicable.

The permanent, maintained ROW would be 30 feet, with additional work areas allowed to revegetate. Small areas off Sycamore Road, where easements would be required from private property, contain tree cover that would require removal. It is estimated that a total of no more than 5 acres of trees throughout the entire corridor would have to be cleared to construct the proposed pipeline. The entire length of the proposed pipeline is approximately 51,000 feet, with approximately 28,000 feet located in road ROWs and 5,000 feet located under roadways.

As originally investigated, much of this proposed route would have passed through undeveloped areas within the County. However, delays in construction and rapid residential development in Gwinnett County have resulted in much of the undeveloped areas along portions of the route being replaced by residential development.

Upon entering government fee property at Gwinnett County Park, Route A deviates from the route analyzed in the EID as discussed above. The route was modified to reach diffuser location L4 rather than L1. The route would cross Gwinnett County Park adjacent to Lake Lanier along the same corridor as previously permitted for construction of the Gwinnett

County water intake structure and pipeline, until veering onto new ROW to enter the lake and proceed to diffuser Location L4 (see Figure 3-3). Location L4 is along the east side of a ridgeline at an elevation of 1,035 feet msl. The route modification to reach diffuser Location L5 deviates from the route to L4 approximately 1,000 feet before reaching L4. The proposed route to L5 would cross to the west side of the ridgeline before descending along that side of the ridge to where the diffuser would be placed with a crown elevation of 965 feet msl.

3.4.2.2 Route B

Route B follows an alignment similar to that of Route A until Old Suwanee Road (Figure 3-3), where it deviates by following Old Suwanee Road to North Price Road, across the Southern Railway and onto Pinecrest Drive, and then through Sugar Hill to Peachtree Industrial Boulevard. From there it follows the same path as Route A to Jimmy Dodd Road, but then follows Jimmy Dodd Road and Stewart Road before entering Gwinnett County Park and rejoining the corridor for Route A. Route B extends approximately 51,200 feet, with approximately 28,150 feet in road ROWs and 5,000 feet under roadways. ROW widths outside Lake Lanier would be the same as those described for Route A.

Upon entering government fee property at Gwinnett County Park, Route B deviates from the route analyzed in the EID as discussed above. The route was modified to reach diffuser Location L4 rather than L1. The portion of the route through Gwinnett County Park and Lake Lanier would be the same as described above for Route A.

As with Route A, a substantial amount of residential development has occurred along Route B since the route was originally considered.

3.4.2.3 Route C

Route C begins within the FWHWRC site and proceeds northeast along Ridge Drive (Figure 3-3). The route remains along roads, road ROWs and railroad ROWs to Gwinnett County Park. It parallels Satellite Boulevard Extension, Woodward Mill Road, Old Suwanee Road, Railroad Avenue, Lanier Avenue, R.H. Smith Boulevard, East Broad Street, Hillcrest Drive, South Richland Creek Road, Sycamore Road, Buford Dam Road, and the Shoal Creek Water Intake Facility driveway. It then enters Lake Lanier at Gwinnett County Park, off of the Shoal Creek Water Intake Facility driveway.

Upon entering government fee property at Gwinnett County Park, Route C deviates from the route analyzed in the EID as discussed above. Route C would cross Gwinnett County Park adjacent to Lake Lanier along the same corridor as previously permitted for construction of the Gwinnett County water intake structure and pipeline. Route C would veer onto new ROW to enter the lake and reach diffuser Location L4 rather than L1. The portion of the route through Gwinnett County Park and Lake Lanier would be the same as described above for Route A, except that Route C would not extend to diffuser Location L5.

The length of this alternative is approximately 49,500 feet, with about 43,150 feet located along roadways. ROW widths outside Lake Lanier would be the same as described for Route A. Under this alternative, the greatest amount of pipeline would be placed under roads, resulting in the least disturbance to unpaved areas. The route also impacts the shortest distance along Sycamore Road, a significant local traffic route to Lake Lanier.

3.4.2.4 Route D

Route D follows the same proposed alignment as Route A until the intersection of Sycamore Road and Jimmy Dodd Road (Figure 3-3). At this point, Route D follows Jimmy Dodd Road to the northeast until turning north onto a Georgia Power easement for approximately 2,500 feet to Buford Dam Road. Route D proceeds east on Buford Dam Road to Brown Road, then north on Brown Road until crossing land to enter Lake Lanier. The point of entry into Lake Lanier would cross through light residential areas and undeveloped shoreline.

The length of this route is approximately 51,800 feet, plus 12,500 feet in Lake Lanier, with approximately 33,000 feet located along road ROWs. ROW widths outside Lake Lanier would be the same as described for Route A. As discussed above, Route D is not considered a practicable alternative to reach diffuser Location L5, because of greater environmental impacts and a prohibitive implementation cost to reach diffuser Location L5. Therefore, Route D has been eliminated from further consideration.

3.4.2.5 Route E

Route E is identical to the modified Route C until diverging to reach diffuser Location L5 rather than L4. Route E begins within the FWHWRC site and proceeds northeast along Ridge Drive (Figure 3-3). The route remains along roads, road ROWs, and railroad ROWs to Gwinnett County Park. It parallels Satellite Boulevard Extension, Woodward Mill Road, Old Suwanee Road, Railroad Avenue, Lanier Avenue, R. H. Smith Boulevard, East Broad Street, Hillcrest Drive, South Richland Creek Road, Sycamore Road, Buford Dam Road, and the Shoal Creek Water Intake Facility driveway. It then enters Lake Lanier at Gwinnett County Park, off of the Shoal Creek Water Intake Facility driveway.

Upon entering government fee property at Gwinnett County Park, Route E would cross Gwinnett County Park adjacent to Lake Lanier along the same corridor as previously permitted for construction of the Gwinnett County water intake structure and pipeline. The portion of the route through Gwinnett County Park and Lake Lanier would be the same as described above for Route A to reach L4 and L5.

The length of this alternative is approximately 49,500 feet, with about 43,150 feet located along roadways. ROW widths outside Lake Lanier would be the same as described for Route A. Under this alternative, the greatest amount of pipeline would be placed under roads, resulting in the least disturbance to unpaved areas. The route would also impact the shortest distance along Sycamore Road, a significant local traffic route to Lake Lanier.

3.4.3 Pipeline Routes Carried Forward for Further Consideration

Four pipeline routes (designated A, B, C, and E on Figure 3-3) are evaluated in detail in this document to the point of entry at Gwinnett County Park. All four routes would then follow the same route through Gwinnett County Park and Lake Lanier to reach diffuser Location L5. As discussed above, this route minimizes potential environmental impacts within Gwinnett County Park and Lake Lanier and costs of construction. The considered route through Gwinnett County Park and Lake Lanier parallels the existing Gwinnett County water intake pipeline ROW for much of the distance in Gwinnett County Park. Drawing G-03 in Appendix D shows the pipeline route through Gwinnett County Park and through the lake to the diffuser location. By placing the second line in the same easement for as great a

distance as practicable, much of the disturbance from pipeline construction within Gwinnett County Park would be confined to the previously disturbed area and potential impacts would be minimized. Use of the existing easement would have less environmental and socioeconomic impacts than establishing an entirely new pipeline corridor to reach the lake. A new corridor would disturb a previously undisturbed area within the public use area with associated potential environmental impacts or would pass through residential areas with associated socioeconomic impacts and potential environmental impacts.

3.5 No Action

As discussed above, this document does not consider whether the FWHWRC should be expanded, only where reclaimed water would be discharged. For the purposes of this analysis, the No Action Alternative represents no new easement or Section 10/404 permits issued for construction of the pipeline and diffuser to Lake Lanier. Any access to or structures in Lake Lanier would require an easement. Therefore, under the No Action Alternative, up to 40 mgd of reclaimed water would be discharged from FWHWRC to an unspecified location other than Lake Lanier.

Discharge would be to unspecified surface water and would require a pipeline along an undetermined route. Because of the unknown discharge location and pipeline route, impacts must be estimated on the basis of typical pipeline construction and possible receiving waters.

A pipeline constructed under the No Action Alternative would likely require similar techniques and occur across a route of approximately the same length as the considered routes for reaching Lake Lanier. Therefore, it is expected that construction of a pipeline to a discharge point that would not cross USACE fee lands would have impacts similar to those of the alternatives considered. Potential impacts of operation of the discharge could be different due to different and/or unique characteristics of the alternate receiving waters.

3.6 Identification of the Preferred Alternative

Based upon anticipated project impacts and the ability to meet project goals, the applicant/lessee Preferred Alternative combines pipeline Route E and the diffuser location (L5) specified in the NPDES discharge permit litigation resolution (Figures 2-2, 2-3). This alternative would meet the long-term management goals for returning flows to the basin of origin. Inside Gwinnett County Park, the pipeline would stay within the existing Shoal Creek easement until it branched off at a 45-degree angle to enter the lake. This route minimizes the length of pipe that crosses Gwinnett County Park and minimizes the under-water trenching and filling required to install the pipe adequately. Outside Gwinnett County Park, Route E lies entirely along road and railroad easements and would have fewer impacts to residential areas and natural habitats than the other considered routes.

4.0 Affected Environment

This section provides descriptions of existing conditions for environmental and socioeconomic resources in the project area. The information was used to assess potential impacts resulting from implementation of the various alternatives carried forward for consideration. The comparative assessment of environmental consequences is provided in Section 5.0.

4.1 Site Description

The project area encompasses portions of urban and residential development, forest/open space, the Gwinnett County Park public use area, and Lake Lanier. Within urban and residential areas, the project is primarily confined to roads or existing rights-of-way (ROWs). Implementation of the pipeline alternatives would result in placement of the pipeline either beneath roadways or in adjacent roadway, railroad, or utility ROWs for much of the route. Each alternative would cross Gwinnett County Park, a U.S. Army Corps of Engineers (USACE) recreational area that is not currently open to the public.

The pipeline would cross the lake bottom and terminate at a subsurface diffuser that would disperse and mix the reclaimed water with water in Lake Lanier. Within the lake, the pipeline would be placed in a trench beneath the lake bottom from the shore (elevation 1,071 feet above mean sea level [msl] to an elevation of 1,045 feet msl). Upon reaching 1,045 feet msl, the pipe would extend along the lake bottom to the diffuser location; the elevation of the bottom of the pipe would range between 960 feet msl and 1,034 feet msl. The elevation of the crown of the pipe laid on the lake bottom would be no greater than 1,045 feet msl. The maximum height of the crown of the diffuser would not exceed 965 feet msl.

4.2 Affected Environment

The project area is described in this section with regard to aspects of the socioeconomic and natural environment that could be affected by the Proposed Action. Discussions of probable impacts resulting from implementation of the considered alternatives are provided in Section 5.0.

4.2.1 Land Use

4.2.1.1 Developed Land and Forest/Open Space

The Lake Lanier drainage area in Hall and Forsyth Counties is rural and largely undeveloped. Much of the landscape includes immature deciduous and evergreen forest, with interspersed pastures for livestock and other agricultural uses. The predominant land uses are agriculture, forest lands, and low-density residential. Agriculture in this area includes some confined animal feeding operations, primarily poultry.

Forested areas in the northern Piedmont typically include oak-hickory-pine forests and mixed deciduous forests. The dominant trees are oaks, hickories, short-leaf pine, and loblolly pine. Pines occur in the less favorable or disturbed areas and in areas where pine plantation production is practiced. Mixed deciduous forests of hardwood trees, such as sweetgum, beech, red maple, elms, and birches, are found in river valleys (McNab and Avers, 1994; Wharton, 1978).

In Gwinnett County, land use is predominantly low-, medium-, and high-density residential and commercial, with some agricultural and forest/open land. Clusters of transitional land are located throughout the County. The greatest urbanization is occurring in the southern and western portions of Gwinnett County and along major transportation corridors (e.g., Interstate 85 and Georgia 400) in Gwinnett and Forsyth Counties.

The predominant land use around Lake Lanier in Gwinnett, Hall, and Forsyth Counties is low- and medium-density residential. As a result of steep topography around the lake, this residential land is interspersed with areas of tree cover. Lands along the immediate Lake Lanier shoreline are designated by the USACE Lake Lanier Shoreline Management Plan as prohibited access, protected lakeshore, public recreation, and limited development (Figure 4-1). Each considered pipeline route alternative crosses Gwinnett County Park along the same route, which is the existing Gwinnett County easement for their water supply line. Although this park is closed at present, the area is classified for public recreation (USACE, 2003). Other public use areas in the project vicinity are described in Section 4.2.2.5.

The considered routes cross areas that are transitioning from woodland to residential and commercial development. The routes typically follow utility and transportation corridors. The pipeline route for the Preferred Alternative is located primarily on commercial and residential streets, with the pipeline to be placed beneath the roadways.

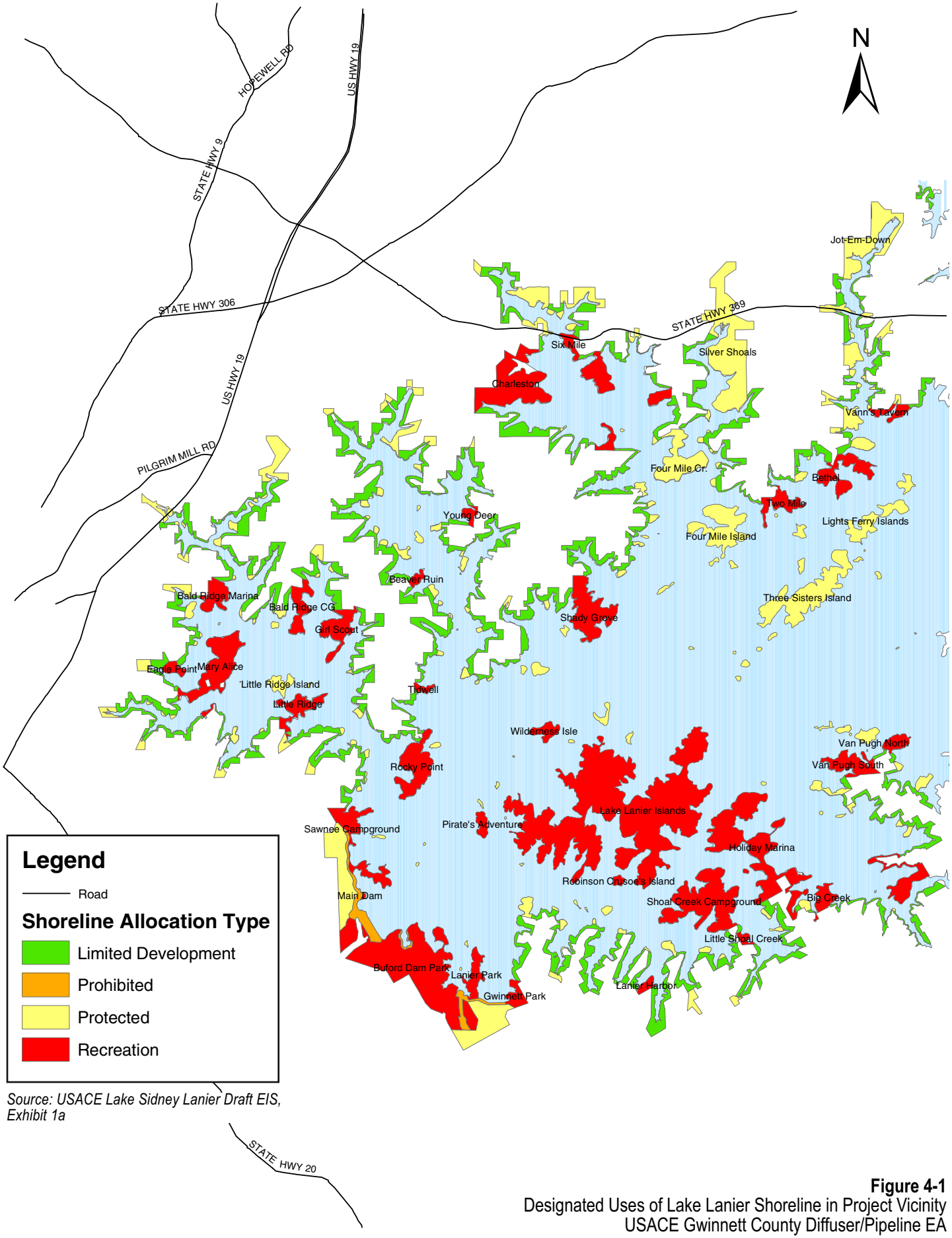
4.2.1.2 Agricultural and Silvicultural Lands

Agricultural uses are limited in Gwinnett County, southern Hall County, and much of Forsyth County. The pipeline routes currently are not farmed and no agricultural lands occur on USACE lands surrounding Lake Lanier. Agricultural land uses are common in northern Hall and parts of Forsyth Counties. Dairy and poultry operations and agriculture/ farming are the predominant land uses in those areas, which lie outside the area of potential impacts.

There are extensive silvicultural operations in northern Hall County. However, there is no land suitable for silviculture practices in the immediate project area. The route selection process concentrated on placing the reclaimed water line beneath existing roads wherever possible, as the County already has the land and does not need to acquire ROW. Where this was not possible, the routes were placed in existing transportation and utility ROWs, where trees are excluded to maintain access for regular maintenance.

4.2.1.3 Solid Waste Landfills

There are no landfills in the project area. However, Gwinnett County includes five inert landfills (accepting yard waste, asphalt, and concrete), four sanitary landfills, and one construction and demolition debris landfill. All are privately owned (U.S. Environmental Protection Agency [EPA], 2003). Hall County operates its own sanitary landfill and, for



Source: USACE Lake Sidney Lanier Draft EIS, Exhibit 1a

Figure 4-1
Designated Uses of Lake Lanier Shoreline in Project Vicinity
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

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collection, has 13 compactor sites located throughout the County. Forsyth County operates two transfer stations to handle solid waste (Hall County, 2003; Forsyth County, 2003).

4.2.1.4 Hazardous Waste Sites

Numerous commercial and industrial facilities in Gwinnett County manufacture, store, or handle toxic chemicals and are regulated by one or more EPA permit programs. Most of the facilities in northern Gwinnett County are located along Buford Highway (State Route 23) and Peachtree Industrial Boulevard. Within the three zip codes in and near the considered pipeline routes (30518, 30519, and 30024), 9 facilities have had reportable toxic releases and 95 have reportable hazardous waste activities, including two large quantity generators. One potential Superfund site exists on Shadburn Avenue in Buford (EPA, 2003). That site is near the City of Sugar Hill to the northeast of all three route alternatives.

Countywide, 57 facilities have reported toxic releases, and 858 engage in hazardous waste activities (including 21 large quantity generators). The County includes 10 potential Superfund sites and 2 National Priorities List (NPL) sites. In Hall County, 42 facilities have toxic releases, and 183 engage in hazardous waste activities (including 7 large quantity generators). The County includes four potential Superfund sites and three NPL sites. In Forsyth County, 5 facilities have reported toxic releases, and 75 engage in hazardous waste activities (including 2 large quantity generators). The County includes three potential Superfund sites (EPA, 2003).

4.2.1.5 Special Purpose Areas

There are several special purpose areas immediately around and near the project area. These areas are used primarily for recreation and natural resource conservation and are discussed more fully in Section 4.2.2.5. Special purpose areas in the project vicinity include Lake Lanier and USACE lands surrounding the lake and the Chattahoochee National Recreation Area (NRA) located downstream from Buford Dam. Lake Lanier is a federally authorized project managed by the USACE for its authorized and operating project purposes, which include hydropower generation, flood control, navigation, water quality, water supply, recreation, and fish and wildlife conservation. Gwinnett County Park, while currently closed to the public, is USACE property formerly managed as a public use area that would be crossed by the proposed project, as is a portion of Lake Lanier. The Gwinnett County water supply intake structure was constructed through Gwinnett County Park and into Lake Lanier and is operated in the general vicinity of the proposed outfall. Because of security concerns over the new Gwinnett County water intake and pumping station, Gwinnett County Park will remain closed to public recreation. Several other public use areas are located on Lake Lanier in the immediate or general vicinity of the proposed project area. Below Buford Dam, the National Park Service operates the Chattahoochee River NRA on several parcels along the Chattahoochee River, but outside the immediate project area. The Chattahoochee River downstream of Buford Dam is a secondary trout stream and the Georgia Department of Natural Resources (DNR) operates Buford State Trout Hatchery below the dam. This segment of the river is stocked periodically and is used by recreational anglers.

4.2.2 Socioeconomic Environment

This section addresses the socioeconomic issues associated with the proposed project. The socioeconomic indicators used include demographic characteristics, economic sectors and employment, labor force, wages, and housing costs. Recreation and community facilities, as well as environmental justice and protection of children, are also described in this section.

4.2.2.1 Geographic Areas of Analysis

The Region of Influence (ROI) is a geographic area selected as a basis on which social and economic impacts of project alternatives are analyzed (USACE, 2003). The criteria used to determine the ROI for this Environmental Assessment (EA) are the geographic location of Lake Lanier and the location of businesses providing goods and services to the residents around the lake and recreational users of the lake. The ROI for the social and economic environment is defined as the areas adjacent to the lake in Gwinnett, Forsyth, and Hall Counties, as well as the pipeline easement and adjacent areas. Socioeconomic data for 2000 are provided where possible; when 2000 data are not available, the most recent data available are presented. The ROI for environmental justice and protection of children includes block groups that are crossed by or adjacent to the proposed project (Figure 4-2).

4.2.2.2 Demographic Characteristics of Local Area

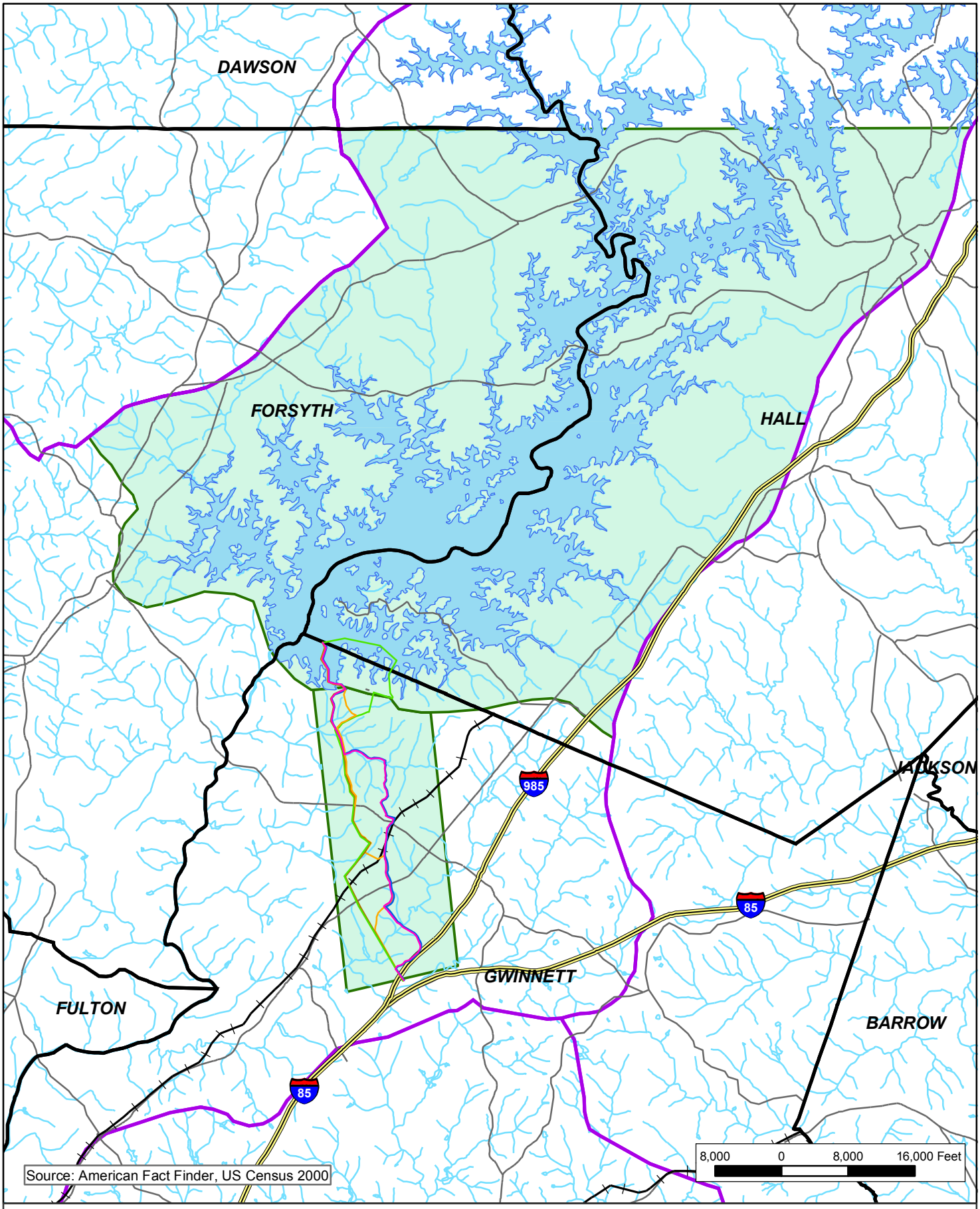
Table 4-1 presents population trends in the ROI from 1980 to 2000, with comparative data for Georgia. According to the U.S. Census, each county in the ROI experienced a high rate of growth between 1990 and 2000, compared to the entire state. Forsyth County experienced the highest growth rate at 123 percent, more than doubling its population. The average percent change in population for the ROI as a whole was almost 68 percent (USACE, 1998a).

TABLE 4-1
Population Change for the ROI and Georgia
USACE Gwinnett County Diffuser/Pipeline EA

Location	Population 1980[1]	Population 1990[a]	Population 2000[b]	Percent Change 1990-2000
Forsyth County	27,958	44,083	98,407	123.2
Gwinnett County	166,903	352,910	588,448	66.7
Hall County	75,649	95,428	139,277	45.9
ROI	270,510	492,421	826,132	67.8
Georgia	5,463,105	6,478,216	8,186,453	26.4

[a] U.S. Department of Commerce (USDOC), Census, 1990 as cited in USACE, 1998a
[b] USDOC, Census, 2001 as cited in USACE, 1998a

Selected housing characteristics are presented in Table 4-2. According to the 2000 Census, there are approximately 297,233 housing units in the ROI. Approximately 95 percent of these units are occupied. The homeowner vacancy rate in the three counties ranges from 1.2 to 2.5 percent, compared to a 1.9 percent rate for Georgia. All three counties have a lower rental vacancy rate compared to the state rate of 8.2 percent. However, approximately 20 percent of the vacant housing units in the ROI are for seasonal and recreational use (USACE, 2003).



Routes

- ALT. A
- ALT. B
- ALT. C
- ALT. D
- ALT. E
- Major Basin
- County
- ROI
- Hydrology
- Interstate
- Major Road
- Railroad

N

Figure 4-2
Region of Influence
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

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TABLE 4-2
Selected Housing Characteristics for the ROI[a]
USACE Gwinnett County Diffuser/Pipeline EA

Location	Total Housing Units	Occupied Housing Units		Vacant Housing Units[b]		Homeowner Vacancy Rate (Percent)	Rental Vacancy Rate (Percent)
		No.	Percent	No.	Percent		
Forsyth County	36,505	34,565	94.7	1,940	5.3	1.6	4.1
Gwinnett County	209,682	202,317	96.5	7,365	3.5	1.2	5.7
Hall County	51,046	47,381	92.8	3,665	7.2	2.5	5.6
ROI	297,233	284,263	94.6	12,970	5.3	1.8	5.1
Georgia	3,281,737	3,006,369	91.6	275,368	8.4	1.9	8.2

[a] Source: USDOC, Census, 2001b as cited in USACE, 1998a
[b] Approximately 20 percent of the vacant housing units in the ROI are for seasonal and recreational use.

4.2.2.3 Employment

Labor Force and Unemployment

Approximately 186,000 persons, primarily in the metropolitan Atlanta area, were added to the workforce during the 1990s (Table 4-3). This economic growth has resulted in part from the presence of several nationally and internationally known companies, including Coca-Cola, Delta Air Lines, Home Depot, Lucent Technologies, and United Parcel Service (UPS), with headquarters in the Atlanta metropolitan area. The unemployment rates in Forsyth, Gwinnett, and Hall Counties have all decreased over the past decade. In 1990, the unemployment rate in each county in the ROI was about the same as or below the national and state unemployment rates. In 2000, the unemployment rate for each county in the ROI was below both the national and state unemployment rates.

TABLE 4-3
Labor Force and Unemployment Rates
USACE Gwinnett County Diffuser/Pipeline EA

Location	1990			2000		
	Civilian Labor Force	Persons Unemployed	Rate (percent)	Civilian Labor Force	Persons Unemployed	Rate (percent)
Forsyth County	24,871	1,143	4.6	56,053	860	1.5
Gwinnett County	215,421	9,009	4.2	347,985	7,870	2.3
Hall County	52,773	2,951	5.6	75,560	1,736	2.3
ROI	293,065	13,103	4.5%	490,682	10,466	2.1
Georgia	3,300,380	182,127	5.5	4,173,274	154,398	3.7
United States	125,840,000	7,047,000	5.6	140,863,000	5,655,000	4.0

Source: Georgia Department of Labor, 2002, as cited in USACE, 1998a

Lake Lanier has considerable economic impact on the Atlanta area because of the lake's location and the recreation and tourism opportunities it affords. Estimates of that economic impact vary. One study estimated that the lake has a $5.5 billion annual direct and indirect impact on Atlanta and the north Georgia area (10 counties were included in that study area), using a multiplier of 2.5 (Hughes, 2001, as cited in USACE, 1998a). The USACE Recreation Economic Assessment System (REAS) estimates the economic impact of the lake to be $155 million annually (USACE, 2001c, as cited in USACE, 1998a). The REAS study uses a

smaller, more conservative effective spending multiplier of 1.08. It also uses a smaller study area, which is a 30-mile radius from the lake and includes all of Forsyth, Gwinnett, and Hall Counties (USACE, 1998a).

4.2.2.4 Wages

Population characteristics for the ROI, including per capita income, persons per household, and median household income for 2000, are presented in Table 4-4. ROI per capita income was about $1,500 more than that of Georgia as a whole. The number of persons per household was slightly higher in the ROI compared to the state, and the median household income for the ROI was about $15,000 more than the state level. Forsyth and Gwinnett Counties, in particular, have significantly higher median household incomes than the state.

TABLE 4-4
Selected Population Characteristics for the ROI
USACE Gwinnett County Diffuser/Pipeline EA

Location	Per Capita Income 2000[a]	Persons per Household, 2000[b]	Median Household Income, 2000[b]
Forsyth County	31,576	2.83	60,250
Gwinnett County	31,893	2.88	56,082
Hall County	25,631	2.89	38,435
ROI	29,700	2.82	51,589
Georgia	27,324	2.62	36,372

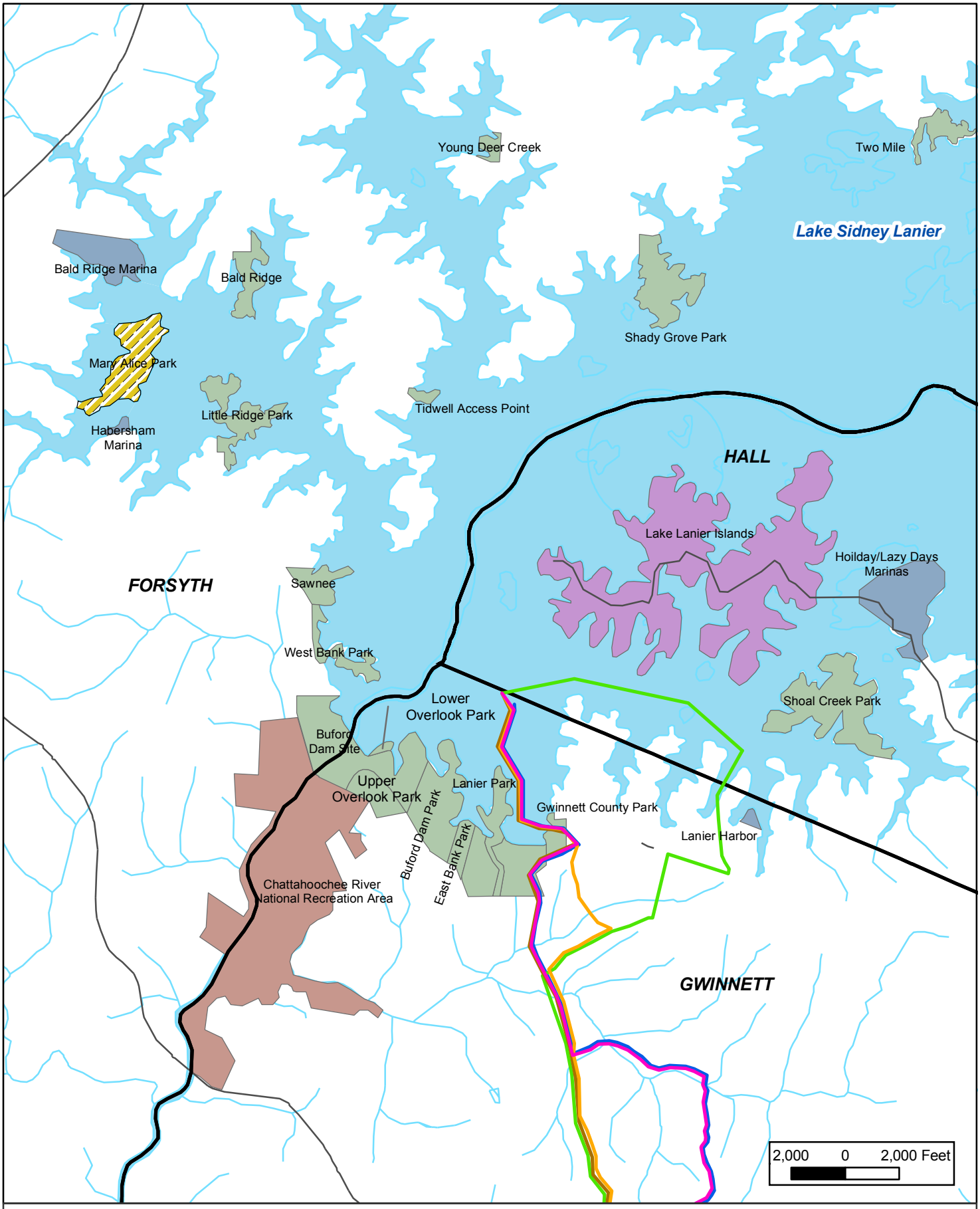
[a] Source: USDOC, Bureau of Economic Analysis (BEA), 2001
[b] Source: USDOC, Census, 2001a

4.2.2.5 Recreation

Under state water quality standards developed by the DNR, Lake Lanier has a "recreational" use designation. The lake experiences the highest annual recreational visitation of all USACE lakes in the Apalachicola-Chattahoochee-Flint (ACF) Basin (USACE, 2003). The shoreline is heavily developed and includes approximately 9,000 boat dock permits with an average annual increase of 175 over the 1993 - 2001 period. (USACE, 2003). Maximum capacity would be up to 10,615 dock permits, which would cover portions of 350 miles (47 percent) of the lake's shoreline known as Limited Development Areas. Additionally, there are more than 50 boat launching lanes, 10 public marinas, 10 campgrounds, and 43 day-use parks. Weekend peak watercraft use is estimated at 6,600 for fishing and boating activities (USACE, 2003).

The Lake Lanier area includes a total of 62 recreational sites (USACE, 2003), such as campgrounds, day-use parks, primitive or natural areas, lands leased to public groups and other local, state, or federal agencies for recreational use or development, and commercial marina services. Many of these recreational and public use facilities are in the general project area, as shown on Figure 4-3 and summarized in Table 4-5.

Permits must be obtained for shoreline use facilities and no private shoreline use facilities are allowed in public recreational areas. Commercial recreational facilities include the lake's 10 marinas. In addition, the Lake Lanier Islands complex has been outgranted to the State of Georgia as a Public Park and Recreation Lease. The State of Georgia has in turn subleased



Routes
- ALT. A
- ALT. B
- ALT. C
- ALT. D
- ALT. E

- Interstate
- Major Road
- Hydrology
- County

Public Use Areas
- City
- State
- Marina
- National Park Service
- USACE

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Figure 4-3
Public Use Areas
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

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TABLE 4-5
Existing Facilities and Proposed Uses of Public Use Areas in the Project Vicinity
USACE Gwinnett County Diffuser/Pipeline EA

Use Area	Management	Public Use Facilities	Proposed Uses	Public Boat Ramps
Gwinnett County Park	USACE, (Gwinnett County holds water intake easement from USACE in a portion of the park)	None. Closed facilities to be reestablished in Lanier Park or East Bank Park.	Currently closed to public recreation.	None operational
Lanier Park	USACE	Boat ramp, picnic tables and shelters, swimming area, trails	Day-use with boating and hiking	Yes
Shoal Creek Park	USACE	Camp sites, laundry, restrooms and showers, swimming area, playground	Campground with swimming and boat ramp access	Yes
East Bank Park	USACE	Boat ramps, restrooms	Day-use with picnicking and boat ramp access	Yes
Buford Dam Park	USACE	Restrooms, picnic shelters, swimming area, trails	Major Day-use Facility	No
Upper Overlook Park	USACE	Picnic shelters, playground, hiking, horseshoes, and restrooms	Day-use area	No
Lower Overlook Park	USACE	Picnic tables, hiking, restrooms	Day-use area	No
West Bank Park	USACE	Picnic shelters, restrooms, swimming area, trails	Major Day-use Facility	No
Sawnee Park	USACE	Camp sites, laundry, restrooms and showers, swimming area, playground	Campground with swimming and boat ramp access	Yes
Little Ridge Park	USACE	Trails, boat ramp	Day-use with hiking and boat ramp access	Yes
Mary Alice Park	City of Cumming, GA Park Lease from USACE	Restrooms, picnic shelters, boat ramp	Day-use with picnicking and boat ramp access	Yes
Bald Ridge Campground	USACE	Camp sites, laundry, restrooms and showers, swimming area, playground	Campground, with swimming and boat ramp access	Yes
Tidwell Access Point	USACE	Picnic tables, boat ramp	Day-use area	Yes
Young Deer Creek	USACE	Picnic tables and shelters, boat ramp, swimming area, playground	Day-use facility	Yes
Shady Grove Campground	USACE	Camping sites, laundry, restrooms and showers, boat ramp, trails, playground	Campground with swimming and boat ramp access	Yes
Two Mile Park	USACE	Restrooms, picnic tables, boat ramp	Day-use with picnicking, swimming, and boat ramp access	Yes
Bald Ridge Marina	Commercial Lease from USACE	Showers and restrooms, courtesy docks, marina, boat storage, boat store with food items, repair shop, and picnic pavilions, gas service and boat pump-out facilities	N/A	Yes
Holiday/Lazy Day Marina	Commercial Lease from USACE	Showers and restrooms, courtesy docks, marina, boat storage, boat store with food items, repair shop, and picnic pavilions, gas service, and boat pump-out facilities	N/A	No
Habersham Marina	Commercial Lease from USACE	Boat storage, gas service, boat store	N/A	No

TABLE 4-5
Existing Facilities and Proposed Uses of Public Use Areas in the Project Vicinity
USACE Gwinnett County Diffuser/Pipeline EA

Use Area	Management	Public Use Facilities	Proposed Uses	Public Boat Ramps
Lanier Harbor Marina	Commercial Lease from USACE	Boat storage, gas service; boat store	N/A	Yes
Lake Lanier Islands	State of Georgia Park Lease from USACE	Camping and lodging facilities, conference centers and restaurants, swimming pools, , water park, boat rentals, horseback riding, walking trails, golf and tennis	Multi-use resort area and recreation complex.	Yes
Chattahoochee River NRA	National Park Service	Restrooms, trails; boat ramps; also boat rentals[a]	Hiking, water activities	No

[a] Commercial activity that may or may not be active at any given time

this area to a private concessionaire for operation of the multi-use resort area and recreation complex. No new commercial sites are available for leasing, and the USACE development is restricted to existing sites designated by the Lake Lanier Master Plan (USACE, 1998a). Public recreational areas constitute 20.8 percent (156.6 miles) of the shoreline and 30 percent (5,329.5 acres) of the acreage along Lake Lanier above elevation 1,071 feet msl.

All of the considered routes for the outfall pipeline and diffuser would cross through Gwinnett County Park, which is a 23-acre park designated in the Lake Lanier Master Plan as a day-use area suitable for low-intensity recreational use, with Gwinnett County designated as the park operator/lessee. The Master Plan shows approximately 12 acres of usable/ developable land within the park, with one boat ramp and 42 existing and 6 proposed picnic sites within the park boundaries. However, since termination of the Park Lease to Gwinnett County in early 1996, the park has not been maintained for recreational use and is currently closed to the public. In May of 2000, Gwinnett County received an easement from USACE to construct and maintain two buried 72-inch water supply intake pipelines and a drinking water intake facility in Lake Lanier and Gwinnett County Park and to place the lines from the intake facility to the water treatment plant across Gwinnett County Park. This project was designed to cross Gwinnett County Park without the need to relocate or remove any of the existing recreational facilities, and no long-term impacts on recreation in the park were anticipated. As originally designed, construction of the proposed outfall pipeline would also have no long-term impacts on recreation at Gwinnett County Park. The considered routes for the pipeline corridor would cross through Gwinnett County Park, which was not planned to be reopened for operation during the construction period. Additionally, any existing recreational facilities within the park impacted by construction activities would be restored following the completion of construction. However, as a result of concerns for increased security at the public water intake facility, the USACE and Gwinnett County agreed to close public access to Gwinnett County Park on a permanent basis. As mitigation for this impact on recreation access to the public use facilities, Gwinnett County has agreed to remove all existing recreational facilities in Gwinnett County Park and construct new recreational facilities in other public use areas to provide equivalent recreation opportunities. Other public use areas located within Gwinnett County include Lanier Park, East Bank Park, Buford Dam Park, Upper Overlook and Lower Overlook, and Buford Dam Site. Lanier

Park and East Bank Park are considered the most desirable of these for relocation of the Gwinnett County Park facilities. Thereafter, Gwinnett County Park would remain closed to recreational users.

The Shoal Creek Water Intake Facility located within Gwinnett County Park encompasses a fenced area of approximately 1.1 acres of the 23-acre park. The fenced area was strategically selected in the corner of the park property so as not to interfere with its usage or limit public access to other portions of the park. The 17,000-square-foot low profile pumping station is designed to be 2 to 3 feet above the surrounding ground surface. The mechanical equipment was selected to minimize the noise to surrounding neighbors and park users. The 3,300-square-foot service building is located adjacent to a ridge so as to minimize its visibility from the water side as well as the park side (see Figure 1 in Appendix D).

Other major public use areas in the immediate vicinity of Gwinnett County Park include the Buford Dam Site, Lower Overlook Park, Upper Overlook Park, Buford Dam Park, East Bank Park, and Lanier Park. Recreational facilities at these day-use areas accommodate picnicking, boat launching, hiking, and swimming. The Shoal Creek Campground and Lake Lanier Islands are also located along the east bank embayment just above the dam. The Shoal Creek Campground includes overnight camping, boat launching and swim beach facilities. Lake Lanier Islands is a public park, leased from the USACE by the State of Georgia and intensively developed as a public resort to provide for overnight camping and lodging facilities, conference centers and restaurants, boat launching and swimming beaches, a water park, rental boats, horseback riding, walking trails, golf, and tennis. Other public use areas and other major recreational facilities toward the lower end of Lake Lanier are summarized in Table 4-5, which lists the type of recreational activities supported by these recreational facilities.

In addition to water sports and fishing, other recreational activities include canoeing, kayaking, and rafting. In addition, each county has parks, which contain some or all of the following: playgrounds, community athletic fields, (softball, baseball, soccer), tennis courts, swimming pools, jogging and walking trails, and community centers that are open to the public.

4.2.2.6 Environmental Justice

On February 11, 1994, President Clinton issued Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority and Low Income Populations." The purpose of this EO is to avoid the disproportionate placement of any adverse environmental, economic, social, or health impacts from federal actions and policies on minority and low-income populations. The President directed the EPA to ensure that agencies analyze the environmental effects on minority and low-income communities, including human, health, social, and economic effects.

A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population of the larger surrounding area. The phrase "minority population" includes persons who identify themselves as black, Asian or Pacific Islander, Native American or Alaskan Native, or Hispanic. "Race" refers to Census respondents' self identification of racial background.

"Hispanic origin" refers to ethnicity and language, not race, and may include persons whose heritage is Puerto Rican, Cuban, Mexican, and Central or South American.

The U.S. Bureau of the Census defines a "poverty area" as a census tract where 20 percent or more of the residents have incomes below the poverty threshold and an "extreme poverty area" as one with 40 percent or more below the poverty level (U.S. Bureau of Census, 1995). The "census poverty level" refers to income levels, based on family size, age of householder, and number of children under 18 years of age, that are considered too low to meet essential living requirements. The criteria for determining poverty level are applied nationally (except in Alaska and Hawaii), without regard to the local cost of living. At the 2000 Census, the poverty threshold for a family of four was $17,603 annual income (U.S. Bureau of the Census, 2000).

The proposed project is located within census tracts and block groups shown on Figures 4-4 and 4-5. Table 4-6 indicates census tracts and block groups crossed by the considered pipeline route alternatives and census tracts and block groups that are directly adjacent to any part of the considered alternatives.

Minority Populations

Tables 4-6 and 4-7 summarize demographic information on race and ethnicity from the year 2000 Census and U.S. Bureau of the Census definitions cited above. Census tracts 501.03 Block Group 3 (11.7 percent) and 501.05 Block Group 4 (9.3 percent) have higher concentrations of black populations than the other census tracts intersected by the route, although both tracts are below the average concentration for Gwinnett County (13.3 percent) and the Georgia average (28.7 percent). The population of Census Tract 502.02 Block Group 1 is approximately 8 percent Asian. This is a higher Asian population than surrounding census tracts; however, it is just slightly above the average for Gwinnett County (7.2 percent).

Two census tracts with high minority populations (Census Tract 501.05 Block Group 1 [75.1 percent black] and Census Tract 501.10 Block Group 1 [15.5 percent black]) are located adjacent to the tracts intersected by the three routes (Figure 4-4).

Low Income Populations

Table 4-8 summarizes poverty status for the 2000 census reporting areas containing and adjacent to the project area to provide a baseline against which potential impacts can be identified and analyzed. According to the U.S. Bureau of the Census definitions cited above and the 2000 Census, the poverty rate for the State of Georgia was approximately 12.9 percent and for the City of Sugar Hill it was 3.2 percent.

One of the census tracts within the project area is considered a poverty area (Census Tract 501.03 Block Group 3), with a 28 percent poverty rate. Two census tracts adjacent to the project area have poverty levels above the state average (12.9 percent). These tracts are Census Tract 501.05 Block Group 1 (15.1 percent) and Census Tract 501.05 Block Group 2 (13.5 percent) (Figure 4-5).

4.2.2.7 Protection of Children

On April 21, 1997, President Clinton issued EO 13045, "Protection of Children from Environmental Health Risks and Safety Risks," which recognizes that a growing body of scientific knowledge demonstrates that children may suffer disproportionately from

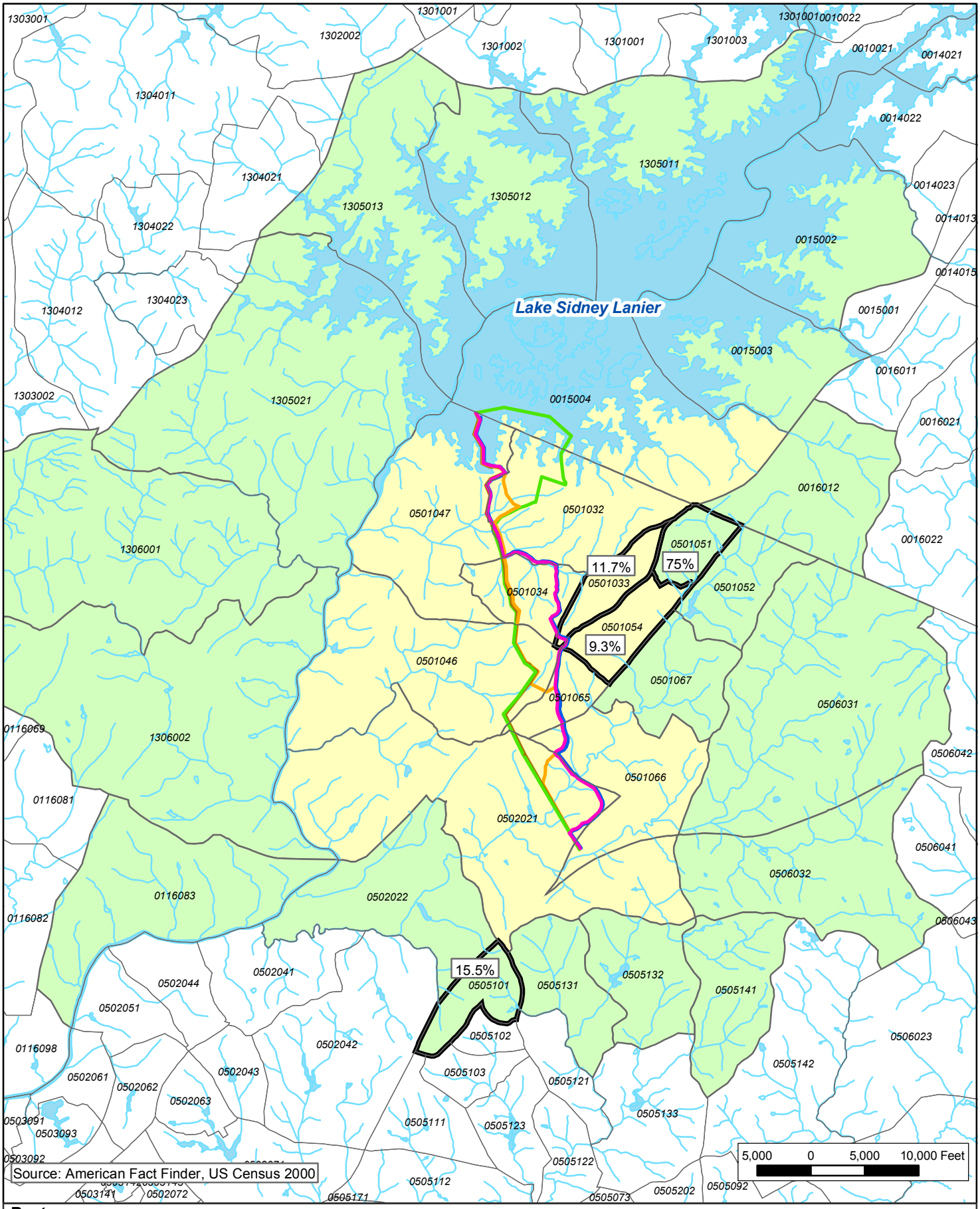

Figure 4-4
ROI - Minority Population
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

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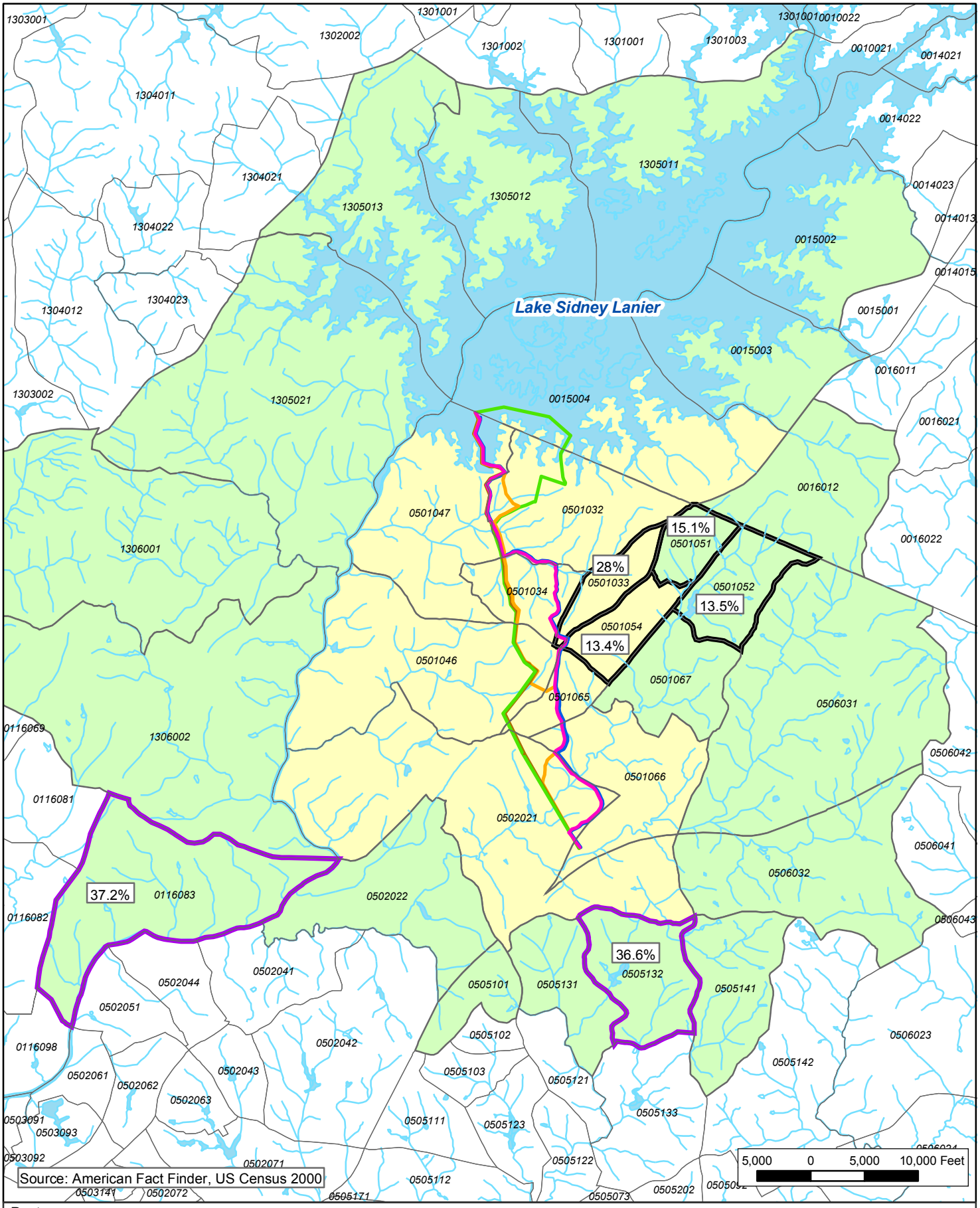

Routes

- ALT. A
- ALT. B
- ALT. C
- ALT. D
- ALT. E
- Hydrology
- Tracts Intersected by Proposed Routes
- Tracts Adjacent to Proposed Routes
- All Other Tracts
- Poverty Areas Greater than Surrounding Areas
- Children Under the Age of 17

N

Figure 4-5

ROI - Poverty Rates and Children Under the Age of 17

USACE Gwinnett County Diffuser/Pipeline EA

Gwinnett County, Georgia

CH2MHILL

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TABLE 4-6
Census Tracts Crossed by the Project–Year 2000 ROI Race and Ethnicity Breakdown
USACE Gwinnett County Diffuser/Pipeline EA

Census Tracts Crossed by Project	Total Population	One Race	White	Black	American Indian	Asian	Hawaiian/ Pacific Islander	Some Other Race	Two or More Races	Hispanic[a]	% Black	% Asian	% Some Other Race	Percent Hispanic
CT 15, BG 4	1,550	1,530	1,513	2	2	5	1	7	20	20	0.1%	0.3%	0.5%	1.3
CT 501.04, BG 7	2,327	2,314	2,163	72	4	27	1	47	13	102	3.1%	1.2%	2.0%	0.6
CT 501.03, BG 2	2,240	2,217	2,099	63	0	5	6	44	23	71	2.8%	0.2%	2.0%	1.0
CT 501.03, BG 3	1,964	1,929	1,452	229	6	8	4	230	35	444	11.7%	0.4%	11.7%	1.8
CT 501.03, BG 4	2,729	2,662	2,245	214	1	61	0	141	67	287	7.8%	2.2%	5.2%	2.5
CT 501.04, BG 6	8,422	8,270	7,470	335	20	175	6	264	152	603	4.0%	2.1%	3.1%	1.8
CT 501.05, BG 4	1,929	1,884	1,563	179	6	3	0	133	45	260	9.3%	0.2%	6.9%	2.3
CT 501.06, BG 5	1,829	1,826	1,744	52	1	5	0	24	3	82	2.8%	0.3%	1.3%	0.2
CT 502.02, BG 1	13,403	13,202	11,076	889	13	1,077	4	143	201	500	6.6%	8.0%	1.1%	1.5
CT 501.06, BG 6	1,793	1,774	1,598	86	7	20	2	61	19	188	4.8%	1.1%	3.4%	1.1
Sugar Hill	11,399	11,202	9,988	533	19	189	2	461	197	1,039	4.7%	1.7%	4.0%	1.7%
Gwinnett County	588,448	575,775	427,883	78,224	1,638	42,360	263	25,407	12,673	64,137	13.3%	7.2%	4.3%	2.2%
Georgia	8,186,453	8,072,265	5,327,281	2,349,542	21,737	173,170	4,246	196,289	114,188	435,227	28.7%	2.1%	2.4%	1.4%

[a] Hispanic is of any race

TABLE 4-7
Census Tracts Adjacent to the Project Area Year 2000 ROI Race and Ethnicity Breakdown (Numbers)
USACE Gwinnett County Diffuser/Pipeline EA

Census Tracts Adjacent to Project Area	Total Population	One Race	White	Black	American Indian	Asian	Hawaiian/ Pacific Islander	Some Other Race	Two or More Races	Hispanic (of any race)	%Hispanic[a]	% Black	% Asian	% Some Other Race
CT 501.05, BG 1	778	772	161	584	2	4	0	21	6	36	0.8	75.1	0.5	2.7
CT 501.05, BG 2	1,341	1,305	938	148	3	14	0	202	36	314	2.7	11.0	1.0	15.1
CT 501.06, BG 7	3,078	3,015	2,524	211	12	53	1	214	63	724	2.0	6.9	1.7	7.0
CT 502.02, BG 2	5,190	5,109	4,168	496	8	384	6	47	81	199	1.6	9.6	7.4	0.9
CT 505.10, BG 1	2,631	2,570	1,877	409	6	227	0	51	61	206	2.3	15.5	8.6	1.9
CT 505.13, BG 1	5,832	5,754	4,838	395	5	391	4	121	78	316	1.3	6.8	6.7	2.1
CT 505.13, BG 2	8,250	8,122	6,994	625	26	382	10	85	128	324	1.6	7.6	4.6	1.0
CT 505.14, BG 1	5,568	5,497	4,904	332	16	160	0	85	71	242	1.3	6.0	2.9	1.5
CT 506.03, BG 1	7,734	7,665	7,135	289	9	115	0	117	69	281	0.9	3.7	1.5	1.5
CT 506.03, BG 2	6,854	6,762	6,200	296	14	123	1	128	92	344	1.3	4.3	1.8	1.9
CT 15, BG 2	1,914	1,899	1,857	21	3	7	0	11	15	23	0.8	1.1	0.4	0.6
CT 15, BG 3	1,798	1,788	1,718	34	5	25	0	6	10	40	0.6	1.9	1.4	0.3
CT 16.01, BG 2	3,169	3,136	2,982	101	4	24	4	21	33	132	1.0	3.2	0.8	0.7
CT 1305.01, BG 1	1,430	1,423	1,406	4	4	3	0	6	7	15	0.5	0.3	0.2	0.4
CT 1305.01, BG 2	2,139	2,129	2,108	6	3	7	0	5	10	43	0.5	0.3	0.3	0.2
CT 1305.01, BG 3	5,112	5,037	4,908	10	14	10	0	95	75	265	1.5	0.2	0.2	1.9
CT 1305.02, BG 1	10,465	10,364	10,013	49	23	47	2	230	101	475	1.0	0.5	0.4	2.2
CT 1306, BG 1	10,412	10,295	9,496	87	35	107	0	570	117	1,222	1.1	0.8	1.0	5.5
CT 1306, BG 2	16,653	16,538	15,849	166	38	399	0	86	115	371	0.7	1.0	2.4	0.5
CT 116.08, BG 3	9,069	8,963	7,087	464	16	1,308	10	78	106	215	1.2	5.1	14.4	0.9
Sugar Hill	11,399	11,202	9,988	533	19	189	2	461	197	1,039	1.7	4.7	1.7	4.0
Gwinnett County	588,448	575,775	427,883	78,224	1,638	42,360	263	25,407	12,673	64,137	2.2	13.3	7.2	4.3
Georgia	8,186,453	8,072,265	5,327,281	2,349,542	21,737	173,170	4,246	196,289	114,188	435,227	1.4	28.7	2.1	2.4

[a] Hispanic is of any race

Source: U.S. Bureau of the Census, Census 2000 Redistricting Data (Public Law 94-171) Summary File.

TABLE 4-8
Census Tracts Crossed by the Project and Poverty Levels of Children by Census Tract
USACE Gwinnett County Diffuser/Pipeline EA

Census Tract	Children Under 17		Poverty Status[a]
	Children	Percent	Percent
CT 15 BG 4	291	18.8	5.9
CT 501.04, BG 7	641	27.5	6.6
CT 501.03, BG 2	496	22.1	3.3
CT 501.03, BG 3	475	24.2	28
CT 501.03, BG 4	762	27.9	2.7
CT 501.04, BG 6	2509	29.8	1.6
CT 501.05, BG 4	531	27.5	13.4
CT 501.06, BG 5	498	27.2	3.9
CT 502.02, BG 1	4,469	33.3	1.6
CT 501.06, BG 6	546	30.5	3.0
City (of Sugar Hill)	3,327	29.2	3.2
Gwinnett County	165,993	28.2	5.7
Hall County	37,517	26.9	12.4
Georgia	2,169,234	26.5	12.9

Source: http://venus.census.gov/cdrom/lookup/990540991, 2000 Census.
[a] 2000 U.S. Census defines poverty status as $8,974 of annual income, or less, for an individual and $17,603 of annual income, or less, for a family of four, as cited in USACE, 2003

environmental health and safety risks. This EO requires federal agencies, to the extent permitted by law and mission, to identify and assess environmental health and safety risks. EO 13045 does not provide guidance on the ages of children to be protected. However, the federal Interagency Forum on Child and Family Statistics, which was founded in 1994 and formally established by the EO, focuses on those aged 17 and under.

As presented in Tables 4-8 and 4-9 and as shown on Figure 4-5, the 2000 U.S. Bureau of the Census estimated that 28.2 percent of the population in Georgia included children under 17 years of age. In comparison, children under the age of 17 account for approximately 26.5 percent of the population in Gwinnett County and 29.2 percent in the City of Sugar Hill. The percentage of children living within the project area is relatively high in two census tracts in comparison to the State and County. Census tracts 505.13 BG 2 (36.6 percent) and 116.08 (37.2 percent) have more children under the age of 17 than the State, County, or City of Sugar Hill. However, both tracts are adjacent to the considered routes and are not directly impacted by the project.

"The EO seeks to protect children from disproportionately incurring environmental health or safety risks that might arise as a result of USACE policies, programs, activities, and standards." Children are frequent users of Lake Lanier as residents and visitors, and USACE has taken precautions for their safety at the lake and the dam. Warning signs are posted above and below the dam instructing individuals to stay out of the restricted area near the dam. Prior to water being discharged from the dam, AM radio broadcasts a warning message and four warning sirens are located downstream from the dam. Other safety

TABLE 4-9
Census Tracts Adjacent to the Project and Poverty Levels of Children by Census Tract
USACE Gwinnett County Diffuser/Pipeline EA

Census Tract	Children Under 17		Poverty Status[1a]
Adjacent Tracts	**Children**	**Percent**	**Percent**
CT 501.05, BG 1	195	25.1	15.1
CT 501.05, BG 2	443	33.0	13.5
CT 501.06, BG 7	786	25.5	6.9
CT 502.02, BG 2	1,467	28.3	2.3
CT 505.10, BG 1	835	31.7	4.1
CT 505.13, BG 1	1,197	34.2	0.6
CT 505.13, BG 2	3,020	36.6	1.6
CT 505.14, BG 1	1,788	32.1	1.6
CT 506.03, BG 1	2,260	29.2	1.6
CT 506.03, BG 2	2,090	30.5	2.9
CT 15, BG 2	445	23.3	11.1
CT 15, BG 3	456	25.4	3.5
CT 16.01, BG 2	805	25.4	6.8
CT 1305.01, BG 1	270	18.9	5.8
CT 1305.01, BG 2	462	21.6	4.3
CT 1305.01, BG 3	1,258	24.6	5.0
CT 1305.02, BG 1	2,859	27.3	2.8
CT 1306, BG 1	2,925	28.1	7.2
CT 1306, BG 2	5,285	31.7	2.4
CT 116.08, BG 3	3,374	37.2	1.3
City (of Sugar Hill)	3,327	29.2	3.2
Gwinnett County	165,993	28.2	5.7
Hall County	37,517	26.9	12.4
Georgia	2,169,234	26.5	12.9

Source: http://venus.census.gov/cdrom/lookup/990540991, 1990 Census.
[a] 2000 U.S. Census defines poverty status as $8,974 of annual income, or less, for an individual and $17,603 of annual income, or less, for a family of four, as cited in USACE, 2003

measures for visitors to the lake are described in the Lake Lanier Lakeshore Management Plan (USACE, 1998a) and include the following:

- Water Samples for Fecal Coliform Bacteria
- Lanier Water Safety Task Force
- Hazardous Incidents and Disasters Training
- Boating Accident Analysis
- Safe Swimming Areas
- Drought and Flood Public Safety Controls
- Low Water Safety Plan
- Summer Safety Patrols

4.2.3 Community Infrastructure and Municipal Services

This section describes existing community infrastructure and services in the project area.

4.2.3.1 Roadways

Roadways along the considered pipeline routes are listed in Table 4-10.

TABLE 4-10
Roads on Pipeline Routes
USACE Gwinnett County Diffuser/Pipeline EA

Alternative Route A	Alternative Route B	Alternative Route C
Ridge Road*	Ridge Road*	Ridge Drive
Sentry Ridge Crossing*	Sentry Ridge Crossing*	Satellite Boulevard Extension
Sentry View Trace*	Sentry View Trace*	Woodward Mill Road
Streamwood Ivy*	Streamwood Ivy*	Old Suwanee Road
Hickory Haven Terrace*	Hickory Haven Terrace*	Lanier Avenue
Summer Grove*	Summer Grove*	East Broad Street
Old Suwanee Road*	Old Suwanee Road	R.H. Smith Blvd
Peavy Trail	North Price Road	Hillcrest Drive
Buford Hwy. (23)*	Pinecrest Drive.	South Richland Creek Road
North Price Rd*	Peachtree Industrial Blvd	Sycamore Road
Peachtree Industrial Blvd.	Spring Hill Drive	Jimmy Dodd Road *
Spring Hill Drive	Old Cumming Drive	Stewart Road *
Old Cumming Drive*	Sycamore Road	Buford Dam Road
Sycamore Rd.	Jimmy Dodd Road	Shoal Creek Water Intake Facility driveway
Buford Dam Road	Buford Dam Road*	
Shoal Creek Road	Stewart Road	
	Shoal Creek Road	

* Road crossed by route. The pipeline will parallel other roads.

During the off-season, generally from October through March, traffic on U.S. highways, state highways, and local roads in the vicinity of Lake Lanier is typical of rural areas. Traffic during this period is lighter than during the boating season (April through September), and roads are not used at or near their design capacities. Traffic on area roads can be very heavy during the boating season, especially at the more popular parks (Big Creek, Buford Dam, Burton Mill, East Bank, Lanier Park, Lower Overlook, Lower Pool, Old Federal Day Use, Shoal Creek Day Use, Upper Overlook, Van Pugh North, Van Pugh South, and West Bank) at the southern end of the lake near Buford Dam (USACE, 2003). Within the project area, roads that experience the heaviest boat-transport traffic include Peachtree Industrial Boulevard, Sycamore Road, and Buford Dam Road.

4.2.3.2 Railroads

Commercial railroad activity occurs in the project area. All pipeline route options would cross beneath Southern Railway tracks using tunnel installation techniques.

4.2.3.3 Water Supply and Wastewater Treatment

The State of Georgia Board of Natural Resources developed a *Water Issues White Paper* in May 2001. This document identified population growth and increased agricultural demand as major stressors on the water supply within the State. The Georgia General Assembly established the Metropolitan North Georgia Water Planning District (MNGWPD) in 2001 to address the need for comprehensive water resource management planning for the 16-county area of metropolitan north Georgia, which includes Gwinnett County. The MNGWPD relies primarily on surface water from rivers and storage reservoirs as its main source of water supply. Surface water provides 99 percent of the water supplies in the MNGWPD. The

water sources for the region are located in five major river systems within or adjacent to the MNGWPD: the Chattahoochee (Lake Lanier), Etowah (Lake Allatoona), Flint, Ocmulgee, and Oconee River Basins. Currently, the MNGWPD uses 652 million gallons per day (mgd) of water on an annual average daily basis (MNGWPD, 2003a).

Water supply demands could increase to more than 1,200 mgd in the next 30 years. While water demand in the MNGWPD is projected to equal the available supply in 2030, implementation of an aggressive water conservation program could reduce projected demands. Even so, the MNGWPD will need additional supplies, including new reservoirs, additional allocations of supply from Lakes Allatoona and Lanier, and use of the small amount of groundwater in the MNGWPD to meet demands beyond 2030.

Therefore, the MNGWPD developed a comprehensive *Water Supply and Water Conservation Plan* (MNGWPD, 2003a) that calls for a regional approach to sharing water resources across the MNGWPD. The recommended solution consists of the following elements to meet the MNGWPD's water supply needs:

- Primary water supply sources (Lake Allatoona, Lake Lanier, and the Chattahoochee River) to provide 76 percent of the MNGWPD's water supply needs.
- Aggressive water conservation to reduce 2030 demand by an estimated 19 percent.
- More significant role for reuse focusing on indirect potable reuse.
- Reallocation of Lakes Lanier and Allatoona for water supply.
- Completion of new reservoirs.
- Development of additional infrastructure.
- Water system interconnections.

MNGWPD goals also include consideration of the resolution of water allocation disputes in the ACF Basin and the Alabama-Coosa-Tallapoosa (ACT) Basin, which would result in reallocation of water in the major reservoirs in the MNGWPD. However, with the dissolution of the ACF compact, the resolution of water allocations in this basin will likely be decided in court. The *Water Issues White Paper* identifies the intent to restrict interbasin transfer and proposes new state legislation to codify these restrictions (Georgia State Board of Natural Resources, 2001). Additionally, O.C.G.A. 12-5-570 does not allow planning efforts in the MNGWPD to include any interbasin transfers of water from outside the of the MNGWPD area. Most importantly, the MNGWPD emphasizes the need for reuse of highly treated reclaimed water through future discharges to Lake Lanier (MNGWPD, 2003a; MNGWPD, 2003b).

Gwinnett County withdraws its entire water supply from Lake Lanier and treats it at the Lake Lanier Filter Plant. The current Georgia Environmental Protection Division (EPD)-permitted withdrawal is 150 mgd as a monthly average, and average annual use is 85.4 mgd. The County maintains 17 storage tanks. A new Shoal Creek Filter Plant and associated raw water intake/pump station with a capacity of 75 mgd were finished in spring 2004 (Gwinnett County, 2003).

The location of the Shoal Creek Water Intake Facility is shown on Drawing G-03 in Appendix D. The water intake structure is located about 400 feet from shore. Water from the

intake structure enters a 14-foot diameter bedrock tunnel that flows to the bottom of the pump station onshore from where it is pumped to the new Shoal Creek Filter Plant.

Gwinnett County accounts for 70 percent of the water supply withdrawals from Lake Lanier. Other water supply withdrawals from Lake Lanier include City of Cumming (18 mgd), Forsyth County Board of Commissioners (14 mgd), City of Buford (2 mgd), and City of Gainesville (30 mgd). The Gwinnett water supply is the closest intake to the proposed discharge location.

All previous water supply contracts for water withdrawals from Lake Lanier expired in the late 1980s and have not been renewed or reissued by Mobile District due to litigation orders. However, water supply users with previous contracts have continued to withdraw water for water supply, including reasonable increases in their withdrawals over time, in accordance with previous memoranda of understanding (MOUs). The USACE must also complete a Lake Lanier reallocation study prior to any permanent allocation of any reservoir storage to water supply.

There are 11 National Pollutant Discharge Elimination System (NPDES)-permitted treatment facilities with a daily permitted flow exceeding 0.1 mgd in the Lake Lanier watershed (Table 4-11). These facilities have a combined permitted flow of 17.17 mgd.

TABLE 4-11
NPDES-Permitted Facilities Discharging Greater Than 0.1 mgd in Lake Lanier Watershed in 2003
USACE Gwinnett County Diffuser/Pipeline EA

NPDES Permit Number	Facility Name	County	Permitted Discharge Flow (mgd)
GA0032514	Clarkesville Water Pollution Control Plant (WPCP)	Habersham	0.75
GA0032506	Demorest WPCP	Habersham	0.40
GA0021504	Cornelia WPCP	Habersham	3.00
GA0033243	Baldwin WPCP	Habersham	0.30
GA0036820	Cleveland WPCP	White	0.75
GA0026077	Dahlonega WPCP	Lumpkin	0.72
GA0020168	Gainesville #2 Linwood Drive WPCP	Hall	3.00
GA0021156	Gainesville #1 WPCP	Hall	10.20
GA0031933	Flowery Branch WPCP	Hall	0.20
GA0030261	Lanier Habersham Utility Corporation	Forsyth	0.50
GA0024767	Lake Lanier Islands WPCP	Hall	0.35

Source: USACE, 2003 and personal communications with Gainesville Public Utilities Department.

Gwinnett County operates seven water reclamation facilities (WRFs) to provide a combined capacity of 71.62 mgd (Lynn Smarr, Gwinnett County Personal Communication, February 5, 2007). These plants treat wastewater for 49 percent of the citizens in Gwinnett County. In northern Gwinnett County, the City of Buford and Lake Lanier Islands also operate sewerage systems.

The F. Wayne Hill Water Resources Center (FWHWRC) is an advanced water reclamation facility (AWRF) with a capacity of 20 mgd that is operated by Gwinnett County and is permitted for discharge of up to 20 mgd to the Chattahoochee River. Gwinnett County obtained an interim permit for an additional 9 mgd of discharge to the Chattahoochee River.

This discharge was permitted in January 31, 2006 (Permit No. GA0026433) with the requirement that this 9 mgd discharge would be removed once the NPDES permit was issued for the 40 mgd discharge to Lake Lanier and the pipeline and diffuser installed to transport reclaimed water to Lake Lanier. The existing discharge point is located downstream of potable water intakes for Fulton and DeKalb Counties. The intakes for Cobb-Marietta Water Authority and the City of Atlanta are located on the Chattahoochee River farther downstream of the existing discharge location. The pipeline and new outfall location in Lake Lanier described in this document are part of a planned 40-mgd expansion of this plant that would be provided in addition to the current 20-mgd capacity (CH2M HILL, 1999a; Gwinnett County, 2003).

Hall County has two primary water service areas. The City of Gainesville Public Utilities Department service area includes the city limits of Gainesville and many subdivisions and streets in unincorporated areas of Hall County. The Hall County service area encompasses the north and east sections of the County. Water lines for the Hall County service area are being installed by the White County Water Authority under contract with Hall County (Hall County, 2003).

Hall County has five WPCPs: Flowery Branch, Lake Lanier Islands, Gainesville No. 2 (Linwood WPCP), Gainesville Flat Creek, and Lula WPCPs. The City Gainesville Public Utilities Department is currently upgrading the Flat Creek facility from 10.2 to 12.0 mgd of treatment capacity with nutrient removal. Permitting for this upgrade is still in progress and the final discharge permit has not been issued. However, the proposed treatment processes will meet the nutrient limitations (TP of 0.13 micrograms per liter [µg/L] in the effluent) for Lake Lanier. In addition, several facilities hold permits for land application systems in the County.

Water in Forsyth County is provided at the Forsyth County Water Treatment Facility and through wholesale water purchases from the City of Cumming. Water is supplied to the county treatment facility through the City of Cumming water intake system. Forsyth County completed construction of a new, state-of-the-art wastewater treatment facility, which became operational in 2004. In addition, the County recently completed the purchase of the Georgia Water Services, Inc.'s Dick's Creek WRF. Wholesale wastewater treatment capacity also has been purchased from the City of Cumming, Fulton County, and private providers.

4.2.3.4 Stormwater Management

Gwinnett County has a stormwater management division engaged in stormwater control and education. This division reviews and enforces construction site controls and post-construction management, conducts water quality monitoring, engages in operation and maintenance of existing control structures, and conducts public education/involvement activities (Gwinnett County, 2003).

Forsyth County has a stormwater division responsible for inspection of detention facilities and drainage systems, enforcement of the Georgia Erosion and Sedimentation Act, and administration of the County's Adopt-a-Stream Program (Forsyth County, 2003). In Hall County, stormwater is handled by the Public Works and Utilities Department (Hall County, 2003).

4.2.3.5 Fire, Police, and Emergency Services

Gwinnett County Fire Services operates 23 stations located throughout the County and has 610 employees. Hall County Fire Services provides staff for 13 stations located throughout the County. Forsyth County employs 78 full-time and 100 volunteer firefighters and operates 15 stations. Each county provides 24-hour-a-day, 7-day-a-week service in the following areas: fire suppression, emergency medical services (ambulances), rescue, emergency management, and fire prevention/education (Gwinnett County, 2003). Forsyth County and Hall County have Emergency Management Agencies responsible for the coordination of local, state, and federal assistance where needed to protect people and their property. Evacuation plans, medical assistance, temporary housing, food, and clothing are all part of the plans that are coordinated through this office (Forsyth County, 2003; Hall County, 2003).

Gwinnett County's police force includes 486 officers involved in criminal investigations, uniformed patrols, animal control, support operations, and training (Gwinnett County, 2003). The Hall County Sheriff's office employs 143 officers in criminal investigations and uniform patrols (Hall County, 2003). Law enforcement in unincorporated Forsyth County is provided by the Forsyth County Sheriff's Department (Forsyth County, 2003).

4.2.3.6 Electric, Gas, and Telephone

Electricity in Gwinnett County is available from a number of suppliers, including Sawnee Electric Membership Corporation (EMC), Georgia Power, Jackson EMC, and Walton EMC.

Several companies provide natural gas in Gwinnett County, including Atlanta Gas Light Company, ACN Energy, Columbia Energy Services Corporation, Energy America, GasKey, Georgia Natural Gas Services, Infinite Energy Inc., Reliant Energy Retail, Inc., SCANA Energy Marketing, Shell Energy Services, Southern Company Gas, Buford Gas Company, and Lawrenceville Gas Company.

BellSouth is among the largest providers of telephone service to Forsyth, Gwinnett, and Hall Counties.

One of the project purposes of Lake Lanier is hydropower generation. Buford Dam contains three electric power generating units, two 40-megawatt (MW) units and one 6-MW unit, which are capable of providing 86 MW of electricity under optimum operating conditions. (USACE Mobile District, 1998b). The electric power generating units at Buford Dam are not used continuously, but generate power in response to peak demand needs. If more power is generated than is needed, the surplus is used and generation from non-hydroelectric sources is reduced to compensate. The amount of power generated by the units is a function of the amount of water passed through the generating units and the head height of the water (reservoir pool level). For a given amount of water passed through the generating units, more power can be generated when the reservoir is at high pool levels than when reservoir levels are low.

Work is underway to rehabilitate the turbines in the electricity-generating units in Buford Dam. This work will result in increased dissolved oxygen (DO) levels in water discharged for generation of electrical power and higher DO levels in the Chattahoochee River downstream of Buford Dam.

Typically, peak demands are greater in summer and winter, due to increased heating and air conditioning demands when temperatures are at extremes. Usually, peak demand electricity production at Buford Dam is for 2 to 8 hours per day on weekdays and not on weekends (USACE, 1998b).

4.2.4 Navigation and Recreational Boat Traffic

The commercial navigation channel on the ACF system extends from the Gulf Intracoastal Waterway up the Apalachicola and Chattahoochee Rivers to Columbus, Georgia, and up the Flint River to Bainbridge, Georgia. In the lower Chattahoochee and Flint Rivers and on the Apalachicola River, a navigation channel 9 feet deep and 100 feet wide is required to provide the full authorized navigation channel (USACE, 1998b). Limited commercial navigation can be conducted at channel depths of 7.5 feet and users indicate that commercial activities can be conducted if the channel depth is 8.0 feet (USACE, 1998b). From 1976 through 1993, the 9-foot channel depth could only be maintained 55 percent of the time, and under low flow conditions, the 7.5-foot channel depth could not be maintained at all times (USACE, 1998b).

Although navigation remains an authorized project purpose on the ACF system, the State of Florida has denied a Section 401 water quality certification and certification of consistency with the State Coastal Zone Management Program for dredging on the Apalachicola River portion of the navigation project. Therefore, navigation on the lower portions of the navigation system is dependent upon augmentation flow support. During dry periods or drought conditions, any navigation support is restricted to seasonal high water periods. Due to deteriorating channel conditions and sustained low flows on the system, commercial navigation traffic is virtually limited to occasional shipments coordinated on a case-by-case basis during typically wetter winter to spring months.

One of the authorized project purposes of Lake Lanier is to provide augmentation flows in support of the ACF navigation project located downstream. In the 1990s, the USACE instituted periodic navigation window operations during extended low flow conditions to establish regular, predictable periods of sufficient flow to sustain commercial navigation on the lower Chattahoochee River and on the Apalachicola River (USACE, 1998b). Lake Lanier (50 percent of basin storage capacity) and West Point Lake (24 percent of basin storage capacity) are the two principal storage reservoirs on the Chattahoochee River upstream of the commercial navigation limit (USACE, 1998b). During previous navigation windows in the 1990s, water stored in West Point Lake and Walter F. George Lake was used during navigation window periods, and water stored in Lake Lanier was used to refill the downstream reservoirs following completion of the navigation window. Controversy over the use of navigation windows has restricted their use during extended drought periods, due to competing uses for the limited water stored in the reservoirs. No navigation windows have been conducted on the ACF system since the spring of 2000, although limited releases in support of scheduled critical shipments have been provided on a case-by-case basis in conjunction with a determination that only minimal fluctuations in lake levels of river stages would result.

Navigation on Lake Lanier is limited to recreational boat traffic, as there is no commercial navigation channel through the lake. As discussed in Section 4.2.2.5, a substantial number of recreational boaters visit Lake Lanier on an annual basis. Boating activity occurs throughout

the project area, and numerous marinas are located east of the project area toward Lake Lanier Islands. Hazards to recreational navigation are of concern on Lake Lanier. Many locations are considered dangerous to boating and are identified on the navigation maps presented on the USACE Lake Lanier Web page (http://lanier.sam.usace.army.mil/). These hazards result from a variety of conditions, including shallow water and submerged obstacles.

A large zone of submerged trees in the project area was mapped during a special survey for this project. A geophysical survey was conducted over 246 acres in the project area to describe the bottom conditions of Lake Lanier, including the sediments and submerged obstacles (Appendix E). The survey applied both sub-bottom profiling and side-scan sonar. The results of the survey identified extensive stands of trees that were left in place when Lake Lanier was filled. The tree stands cover approximately 500 feet near the center of the proposed route in Lake Lanier and approximately the last 1,500 feet of the route, including the diffuser area. In the deeper portions of the project area, the trees extended 40 to 50 feet above the bottom of the lake. During the geophysical survey, information was collected that indicates the lake was filled to an elevation of approximately 1,030 feet msl; the tops of the trees extending above the water line were then cut off. Trees in the elevations from 1030 to 1,071 feet msl were completely removed.

4.2.5 Historic and Archeological Resources

Pursuant to National Environmental Policy Act of 1969 (NEPA) requirements, the USACE Mobile District will determine if the Proposed Action will have an effect on historic properties that are listed on or eligible for listing on the National Register of Historic Places (NRHP). The USACE staff archeologist has consulted with the Georgia State Historic Preservation Office (SHPO) under Section 106 of the National Historic Preservation Act for input on the proposed project and the effects, if any, it may have on historic properties located in or near the proposed project area. The USACE will meet with the SHPO as part of the continuing consultation. Information associated with this consultation will become part of the USACE Mobile District's record for the Proposed Action.

The National Historic Preservation Act of 1966, including the 1992 amendments, and other pertinent authorizations were provided by Congress to protect cultural resources and establish required coordination and consultation procedures if a potential effect on cultural resources is anticipated.

Gwinnett County conducted a literature review and two cultural resources field surveys of the proposed reuse water pipeline corridors over a 4-year period. The literature review for the project area was first conducted in June 1998 and updated in February 2001. The first field survey was conducted in February 2001 and included Routes A and B. The second field survey was conducted in July 2002, with an update in November 2002, which included Route C.

During the literature review, state and county records, maps, and documents were examined to determine if previously recorded archeological sites and historic structures were located within or adjacent to the project area. Using surface and subsurface techniques, the field surveys were conducted to identify and record cultural resources within the study

area. Visual inspection of the "area of potential effects" (APE) for historic standing structures complemented the intensive archeological survey.

4.2.5.1 Cultural Resources Survey Effort I

The study area/APE associated with the first field survey effort (Routes A and B) was 7.8 miles in length and 244 feet wide. The actual corridor ROW is 80 feet wide. The study area starts south of Interstate 985, extends north to Peachtree Industrial Boulevard where it continues in a northeasterly direction to Sugar Hill. The route then turns north, paralleling Sycamore Road until it reaches Buford Dam Road (see Figure 3-3).

The literature review found no previously recorded archeological sites or historic structures located in the considered pipeline routes. The nearest recorded archeological sites were approximately 0.62 mile west of the northern end of the project area, and the nearest recorded historic structures were 1.34 miles east of the corridor in Buford. Twentieth century maps documented 11 structures and 1 railroad in proximity to the study area. Historic documentation reported at least eight gold mines and two iron prospects in the project vicinity.

Three archeological sites and two isolated finds were recorded during the first field survey. Two of the three sites, 9GW510 and 9GW511, and the two isolated finds (IF-1 and IF-2) are low-density, prehistoric lithic scatters with unknown temporal affiliation. The third site, 9GW512, is a possible 19th century/early 20th century mining site. Additionally, eight historic structures/features were recorded (GW-1 through GW-8). GW-1 is a stone culvert at the base of GW-2, a late 19th century raised railroad bed. The corridor intersects these two resources. GW-3 through GW-8 are historic houses dating from the late 19th century and mid-20th century. These houses are in the APE, but not within the ROW. Portions of sites 9GW510, 9GW 511, and 9GW 512 are within the APE, but are not considered significant resources because of low artifact density, lack of intact subsurface deposits, and severe disturbance from previous construction and erosion. These archeological resources have little potential to yield significant archeological data. However, the condition and extent of the three sites beyond the corridor are unknown, and the sites have been assigned an unknown NHRP eligibility status. Isolated finds 1 and 2 are also considered ineligible for the NHRP. No further work is warranted at the five archeological resource locations as defined within the corridor (R.S. Webb & Associates, 2001).

Historic houses GW-3, GW-4, GW-7, and GW-8 are considered ineligible for the NHRP. These houses have been significantly modified through additions and/or neglect. No further work is required for these structures. Houses designated GW-5 and GW-6 are recommended as potentially eligible for the NRHP. The structures are good examples of bungalows, an architectural type that is rapidly vanishing from the area due to development. The stone culvert (GW-1) and the railroad bed (GW-2) are also considered eligible for the NRHP. The culvert is intact and in use. The railroad bed has been repaired and upgraded through the years but still follows the route established in the late 19th century. The railroad continues to serve the communities of Buford, Sugar Hill, and Suwanee.

4.2.5.2 Cultural Resources Survey Effort II

The study area/APE associated with the second field survey effort (Route C) was 10.5 miles in length and 90 feet wide. The corridor is within and adjacent to existing road ROWs for

the majority of the proposed route. The study area starts south of Interstate 985 and extends along Ridge Road/Satellite Boulevard Extension until it intersects with Woodward Mill Road. The route then follows Woodward Mill Road, Old Suwanee Road, Lanier Avenue, and R.H. Smith Boulevard. At that point, the route leaves the existing ROW and extends northwest where it intersects Hillcrest Drive. The route parallels the ROW of Hillcrest Drive and South Richland Creek Road. The northern section follows Sycamore Road until its termination at Buford Dam Road (see Figures 3-2 and 3-3).

In the areas where the pipeline is planned within the existing ROW, the APE is confined to the boundaries of the existing ROW. For areas outside the road ROW, the APE is 0.31 mile beyond the limits of the proposed route and is based upon field evaluation of topography, vegetation, and modern intrusions.

The literature review found no previously recorded archeological sites or historic structures located in the proposed pipeline corridor. The nearest recorded archeological sites (GW-512 and GW-514) were approximately 0.02 mile west of the project corridor along the northern portion of Sycamore Road. Another site (GW-395) is located above the flood plain of Suwanee Creek approximately 1,500 feet southwest of the corridor. One historic bridge is reported within the project route on South Richland Creek Road, but it was determined to be ineligible for the NRHP (R.S. Webb & Associates, 2001). The nearest recorded historic structures are located 1.24 miles east in Buford.

No archeological resources were located during the second field effort. The historic bridge recorded by the Georgia Department of Transportation had been removed, leaving no observable remains. Most of the intensively tested portion of the route consisted of areas with a greater than 20 percent slope or areas that had been previously disturbed by development. One historic resource was located within the APE, a portion of the Southern Railroad (a historic railroad bed with two tracks dating to the late 19th century). The tracks and bed have been periodically upgraded. No other historic structures were reported within the proposed project APE. However, several older structures were noted along paved roads, which are common to the project corridor. These structures are located outside the APE and would not be impacted by the construction.

4.2.5.3 Corridor Access to Lake Lanier and Underwater Portion of the Proposed Pipeline Corridor

Potential effects on cultural resources were evaluated at two points in and near Lake Lanier. The first is the portion of land where the reclaimed water pipeline enters Lake Lanier. The second is the underwater portion of land where the pipeline would be placed prior to connecting with the diffuser.

The pipeline would cross USACE fee property in Gwinnett County Park east of Saddle Dike No. 3. No previously recorded archeological sites have been identified along the government fee property. The two nearest archeological sites, recorded during the 1950s, are located along Lanier Park Road, west of the saddle dike (R.S. Webb & Associates, 2001). One of the sites was a historic site dating to the mid- to late-19th century, and the other was a single quartz flake. Neither site is eligible for the NRHP. Additional information provided by the USACE Mobile District staff archeologist indicated that archeological sites previously

found (prior to impoundment) along ridge tops were eroded and extremely deflated, with little to no context remaining.

The elevation of the discharge structure and the route associated with the construction of the underwater portion of the proposed pipeline have been shown previously (see Figure 3-2 and Appendix D). The submerged portion of the pipeline would lie in a steeply sloped section of Lake Lanier. Given the current ridge slope (1,034-foot contour interval), the USACE Mobile District stated that it was unlikely that structures or other cultural features would have been constructed in this area. The USACE Mobile District staff archeologist visited the Alabama State Archives in Moundville, Alabama, to review archived USACE real estate tract records for the area. Those documents typically can be used to help determine the presence or absence of structures or other cultural resource features that might remain on the affected tracts prior to and after the lake was impounded. However, those records were not available or could not be located for review. Bathymetric data collected by Gwinnett County for this area document some standing timber and several tree and vegetation debris piles that were associated with clearing the shoreline. No other structures or features were identified within the proposed underwater corridor. According to the USACE, additional surveys (i.e., an underwater archeological survey) would not be required.

A technical assistance meeting was held March 3, 2003, between the consultant archeologist and the Georgia SHPO to discuss the proposed project. The Project Review Coordinator and the State Archeologist concurred that it was unlikely that structures or cultural resources remained along the proposed underwater pipeline corridor. The Georgia SHPO was informed by the applicant of the change in diffuser location and expressed no concern with regard to potential impacts to structures or cultural resources as a result of the route alteration (Personal Communication, Elizabeth Shirk, Georgia SHPO, August 8, 2005).

4.2.6 Climate

The climate of the Chattahoochee River Basin is temperate, with warm, humid summers and mild, wet winters (Georgia DNR, 1997; USACE Mobile District, 1987). Summer temperatures are moderated because Lake Lanier is at an altitude of 1,000 feet msl at the foot of the Blue Ridge Mountains, while breezes from the Atlantic Ocean and Gulf of Mexico moderate winter temperatures. January is the coldest month, with an average temperature of 45 degrees Fahrenheit (°F, 7.2 degrees Celsius [°C]); July is the warmest month, with an average temperature of 77.9°F (25.5°C). The average growing season in the area is 233 days. The first killing frost occurs in November, and the last occurs in March (USACE Mobile District, 1987).

The historical average monthly rainfalls in both Hall and Forsyth Counties are approximately 4.6 inches (CH2M HILL, 2000a; CH2M HILL, 2000b). The highest rainfalls occur during July and March, and October has the lowest rainfall. Although snow is not uncommon in the area, its accumulation is slight and it remains on the ground for only short periods. Dry periods typically occur in autumn, when long stretches of mild temperatures are common (USACE Mobile District, 1997). From 1998 until 2003, Georgia experienced severe to extreme drought conditions. Average statewide precipitation deficits range from 20 to 30 inches below normal, and some gauges indicate rainfall shortages close to 50 inches (Georgia DNR, 2001). Severe droughts have occurred in the basin several times since the construction of the Lake Lanier project began in the 1950s. The most notable droughts

occurred from 1950 through 1957, 1980 through 1982, and 1985 through 1989 (U.S. Geological Survey [USGS], 2000), as well as the recent 1998 through 2002 drought.

Average annual precipitation for the region ranges from 49 to 60 inches per year. The City of Gainesville Public Utilities Department has recorded an average of 55 inches per year near the proposed project site. Evapotranspiration ranges from about 32 to 42 inches of water per year. Average annual runoff ranges from 15 to 40 inches, depending on land cover. Although rainfall is distributed throughout the year, typically, early spring is the wettest time of the year. Monthly rainfall decreases in mid- to late summer, and fall is the driest season. Heavy, intense rainfall events from thunderstorms are common throughout the summer months. Tropical depressions that normally form during late summer and early fall can also, on occasion, affect the area with several inches of rain during short periods of time (DeKalb County Water and Sewer Division [DCWSD] and CH2M HILL, 2001).

Wind direction during the winter is usually from the northwest; however, during periods of cold, wet weather, winds originate from the east and northeast (USACE Mobile District, 1987). During the summer, winds are mostly from the south.

4.2.7 Soils, Sediments, and Geology

4.2.7.1 Geology

The physiography of the Lake Lanier region reflects a geologic history of mountain building, most recently during the Appalachian orogeny. Lake Lanier is located primarily in the Piedmont Province; a segment of the northern shoreline of the lake is in the Blue Ridge Province. Elevation in the Southern Piedmont ranges from 500 to 1,500 feet msl, and topography is gently rolling to steep. The Blue Ridge ranges in elevation from 700 to 4,800 feet msl and is characterized by steep mountain slopes with narrow valleys. Precambrian and Paleozoic crystalline rocks underlie both the Blue Ridge and the Piedmont Provinces. Surface lithologies are predominantly ancient, highly deformed metamorphic granite gneisses, schists, and amphibolites. Younger igneous, intrusive rocks include granite, diorite, syenite, diabase, and coarse-grained pegmatites. Less extensive outcrops of quartzites also are present.

The project area is located in the Piedmont Physiographic province. Underlying layers consist of Precambrian and Paleozoic crystalline rocks that include mica schist, felsic gneiss and schist, and granite and granite gneiss. Limited quartzite outcrops are present.

Northeast-trending ridges control the course of the Chattahoochee River and its tributaries. The Piedmont contains major fault zones that generally trend northeast-southwest and form boundaries between major rock groups. Highly fractured fault zones around Gainesville force the Chattahoochee River and its tributaries into a rectangular drainage pattern. A unique geologic feature that follows the same course as the Chattahoochee River is the Brevard Fault Zone. Rocks along this fault zone are profoundly sheared and fractured. They include mylonites and button schists (University of Georgia, 2002).

4.2.7.2 Upland Soils

Soils in the Lake Lanier area are derived from in-place weathering of underlying rock strata, except in the active flood plain of the lake, where soils consist of alluvial silts and sands. All

the soils in the Lake Lanier area are susceptible to erosion, with the degree of susceptibility dependent on erosion hazard, frequency and intensity of rainfall, steepness and length of slopes, and the kind and amount of ground cover.

The soils that overlie the Piedmont rocks are generally sandy loams and clays called saprolite. Saprolitic soils are formed by the chemical breakdown or decomposition of parent crystalline rocks. The saprolite can vary in thickness by as much as 50 feet. The red color of the soil is the result of weathering of underlying feldspar-rich igneous and metamorphic rocks (University of Georgia, 2002).

Soils in the project area belong to the Madison, Congaree, Louisberg, Pacolet, Gwinnett Clay Loam, and Davidson series, as indicated on soil survey maps compiled by the Natural Resource Conservation Service (NRCS). The soils are relatively stable, with the exception of the alluvial soils of the Congaree Series (CH2M HILL, 1996a; CH2M HILL, 1996b; Soil Conservation Service [SCS], 1988).

4.2.7.3 Prime or Unique Farmland

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and that is available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner, if it is treated and managed according to accepted farming methods (NRCS, 2003).

In Gwinnett County, several soil types meet the definition of prime farmland. Prime soil types are Altavista Fine Sandy Loam (zero to 2 percent slopes), Appling Sandy Loam (2 to 6 percent slopes, eroded), Congaree Loam, Cecil Sandy Loam (2 to 6 percent slopes, eroded) Davidson Loam (2 to 6 percent slopes, eroded), Durham Sandy Loam (2 to 6 percent slopes), Gwinnett Loam (2 to 6 percent slopes, eroded), Helena Sandy Loam (2 to 6 percent slopes), Madison Gravelly Sandy Loam (2 to 6 percent slopes, eroded), Pacolet Sandy Loam (2 to 6 percent slopes, eroded), Red Bay Sandy Loam (2 to 6 percent slopes), and Wickham Sandy Loam (2 to 6 percent slopes, eroded) (NRCS, 2003). No prime farmland has been identified or mapped in the project area.

4.2.7.4 Gwinnett County Park Bedrock

During the previous construction of the dual 72-inch raw water pipelines in the Shoal Creek easement, bedrock was encountered just north of Buford Dam Road within the easement. The top 3 to 6 feet of this weathered bedrock was rippable and could be removed with a backhoe. However, blasting was required to remove the deeper bedrock to accommodate the pipeline trench.

4.2.7.5 Lake Lanier Bottom

The lake bottom in the project area is primarily composed of native soils. The proposed pipeline route and diffuser location are on areas that would have been ridgeline or ridge sideslope prior to inundation and slope downward relatively sharply beyond the proposed pipeline route. Limited deposition would have occurred in this area because of the topography of the side slopes. A sub-bottom profile survey was conducted to evaluate the sediment layers present in the project area (Appendix E). The outfall pipeline and diffuser plan (Appendix D, Drawing G-03) shows the location of eight overwater borings installed to

determine sediment depth, as well as bedrock depth and competency. Seven of the eight borings did not encounter bedrock, and Boring No. 1 encountered partially weathered rock at elevation 1,048 feet msl in 10 feet of water near the shoreline.

4.2.8 Air Quality

4.2.8.1 Regulations and Standards

The primary air quality regulation is the Clean Air Act (CAA), a federal law covering the entire country, although responsibility for implementation of much of the CAA has been delegated to the states. Under this law, EPA sets limits on how much of a pollutant can be present in an area anywhere in the United States, thus promoting uniformity in basic health and environmental protections. The law recognizes that it is appropriate for States to take the lead in implementing the CAA because pollution control problems often require special understanding of local industries, geography, housing patterns, and so forth (MMS, 1999). National ambient air quality standards exist for seven criteria pollutants: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead, particulate matter less than or equal to 2.5 microns in diameter, and particulate matter less than or equal to 10 microns in diameter.

States must develop State Implementation Plans (SIPs) that explain how each state will do its job under the CAA. A SIP is a collection of the regulations a State will use to clean up polluted areas. The CAA will have minimal bearing on the Proposed Action.

4.2.8.2 Existing Regional Conditions

The Atlanta metropolitan area, extending up to Lake Lanier, has been declared a serious non-attainment area for ground-level ozone, indicating the region failed to meet ambient standards by an EPA-specified date. An area violates the standard if its fourth highest daily maximum 8-hour ozone average in a year, averaged over three consecutive years, is 0.08 parts per million or higher. The project area is in attainment on the other six criteria air pollutants. According to the State of Georgia, (GA DNR, 2001), the three main contributors to high levels of ozone are emissions from:

- Cars and trucks on Georgia's roads
- Georgia Power electricity-generating plants
- Large industrial sources located both inside and outside the non-attainment area

Georgia has prepared a SIP for compliance with the 8-hour ozone standard. Implementation of the SIP can influence how federal monies may be allocated for use in the region. For instance, the Atlanta Regional Commission, as the designated metropolitan planning organization for the Atlanta region, must prepare a Transportation Improvement Program (TIP) at least every 2 years for federal agencies to authorize the award of federal transportation grants in the region. The TIP includes a set of priority transportation projects drawn from the long-range regional Transportation Plan. Because the Atlanta region fails to meet federal air quality standards for ground-level ozone, the CAA requires the TIP to conform to the SIP's steps to meet air quality standards in the Atlanta non-attainment area. In the past, the TIP did not always conform to the vehicle emissions portion of the SIP. This transportation program therefore did not receive federal approval, resulting in restrictions on the use of some federal highway funding in metropolitan Atlanta.

4.2.9 Hydrology and Water Quality

Construction began on Buford Dam in 1950, and the gates were closed on February 1, 1956, allowing the reservoir to begin filling. Three years later in June 1959, the pool reached a height of 1,070 feet msl. Although not officially open to the public in 1957, it is estimated that approximately 255,000 people had already visited Lake Lanier. Over the years, the recreation level at the reservoir has grown to more than 7 million visitors annually. Numerous recreational areas have been developed, including 49 parks operated directly by the USACE, 10 marinas, and Lake Lanier Islands. The drainage area of the Chattahoochee River at Buford Dam is 1,040 square miles. At the winter conservation pool of 1,070 feet msl, the volume of the reservoir is 1,917,000 acre-feet, and the surface area is 38,024 acres.

4.2.9.1 Hydrology

Buford Dam and Lake Lanier are operated for several purposes, including hydropower, navigation, water quality and water supply, flood control, fish and wildlife, and recreation. Depending on the operating conditions for Lake Lanier at any specific time, the conservation pool elevation may range from 1,035 to 1,071 feet msl and the flood control pool extends up to 1,085 feet msl. Under normal conditions, the rule curve established at Buford Dam by USACE calls for a pool elevation of 1,071 feet msl from May through September, and a pool elevation of 1,070 feet msl from December through March, with transitions between the two elevations occurring in April, October, and November. However, since Lake Lanier began filling in 1956, pool levels have diverged from the rule curve during unusually wet and dry years, and, on average, pool elevations have ranged from approximately 1,065 to 1,070 feet msl throughout the year.

Figure 4-6 shows that pool elevations for March through December 2002, an extreme drought year, ranged from 5 to 11 feet lower than the rule curve; in March 2003, upon return to conditions wetter than normal, pool elevations exceeded the rule curve by 1 to 2 feet. Historically, the water surface elevation of Lake Lanier has ranged from a maximum of 1,077 feet msl in 1964 to a minimum of 1,054 feet msl in 1986 (Figure 4-6). The invert of the diffuser for the reclaimed water outfall is fixed at an elevation of 960 feet msl, 75 feet below the designed minimum conservation pool of the reservoir (1,035 feet msl). The top of the diffuser would be at 965 feet msl, 70 feet below the minimum conservation pool. Immediately prior to descending to the diffuser, approximately 240 feet of pipe crown is at or above 1,035 feet msl, with a maximum elevation of the pipe crown at 1,040 feet msl.

4.2.9.2 Water Quality Standards

The Clean Water Act (CWA) authorizes the EPA to regulate activities resulting in a discharge to navigable waters. Section 402 (33 USC 1342) of the CWA established the NPDES program, which regulates discharges into waters of the United States.

In Georgia, EPA has delegated authority for implementation of the CWA to the Georgia EPD. Georgia's water quality standards are listed in Section 391-3-6-.03 of the revised code (Georgia EPD, 2002). These rules provide the narrative and chemical-specific concentrations for the protection of designated uses in the State's water bodies. The NPDES permit program and other discharge programs set acceptable discharge limits at levels that maintain water quality standards to protect designated uses.

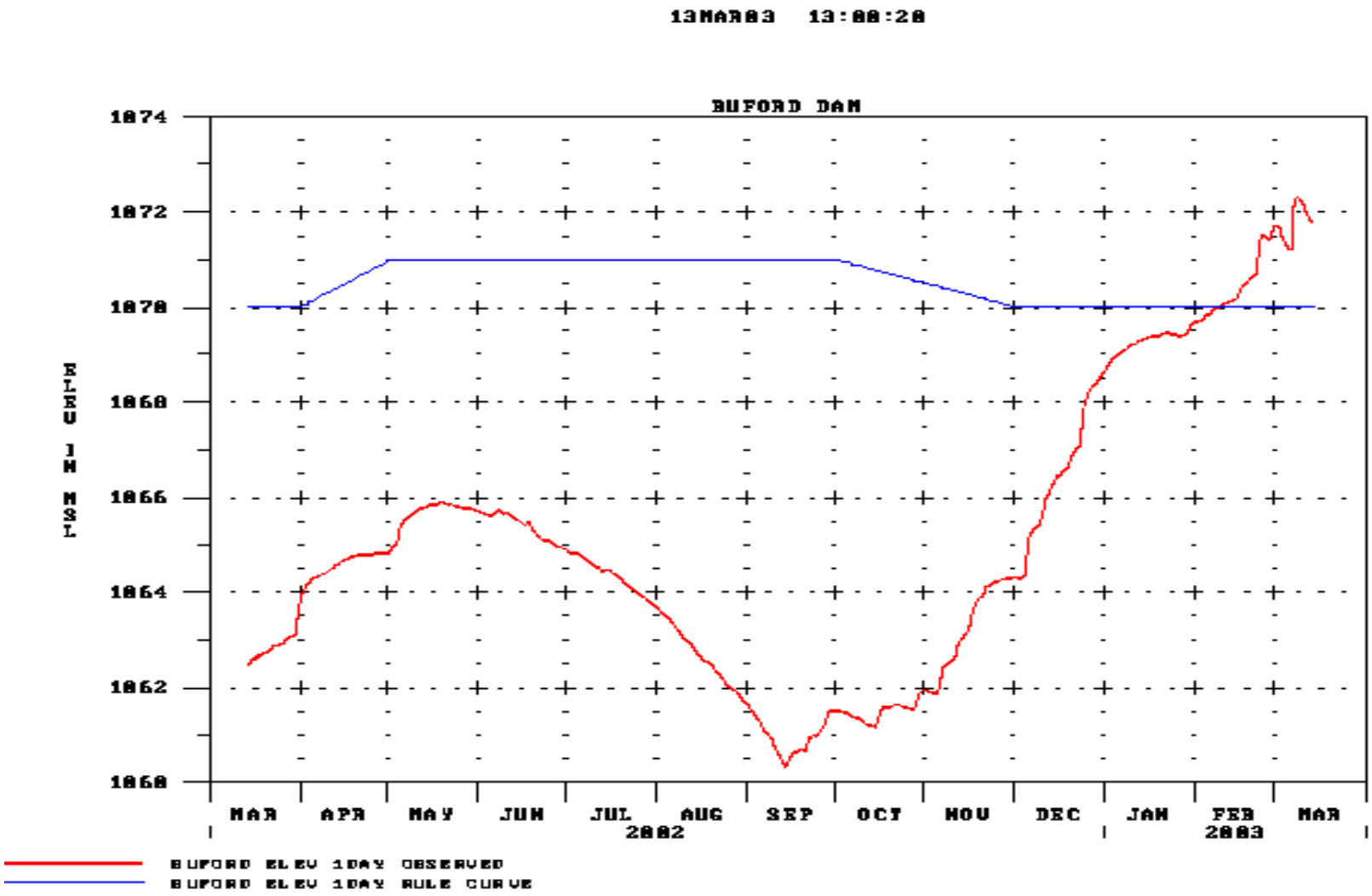


FIGURE 4-6
Comparison of the Lake Lanier Rule Curve and Recent Pool Elevations
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

The lake-specific criteria for Lake Lanier (Rules and Regulations for Water Quality Control, 391-3-6-.03 (16)(e)) were developed by the Georgia EPD following extensive analysis, modeling, and a lengthy public process. The Georgia Board of Natural Resources subsequently adopted these lake-specific criteria in January 2000. The lake is assigned the beneficial water use designation of "recreation" (as designated in Chapter 391-3-6-.03 (14)). The resulting water quality standards for Lake Lanier are summarized in Table 4-12.

TABLE 4-12
Water Quality Standards for Lake Lanier
USACE Gwinnett County Diffuser/Pipeline EA

Parameter	Units	Criterion	Notes
Chlorophyll *a*	µg/L		For April – October, the average mid-channel photic zone composite samples shall not exceed the concentrations listed:
		5[1]	1. Upstream from the Buford Dam forebay Upstream from the Flowery Branch confluence At Browns Bridge Road (State Road 369)
		10[2]	2. At Bolling Bridge (State Road 53) on the Chestatee River At Lanier Bridge (State Road 53) on the Chattahoochee River
Total Phosphorus	lb/ac-ft/yr	0.25	Total annual lake loading
Total Phosphorus	lb/yr		Tributary loadings shall not exceed:
		178,000[1]	1. Chattahoochee River at Belton Bridge Rd
		118,000[2]	2. Chestatee River at GA Hwy 400
		14,400[3]	3. Flat Creek at McEver Road
Temperature	°C	32	Recreation criterion per 391-3-6-.03(6)(b)(iv)
Dissolved Oxygen	mg/L	5[1]	1. Daily average at depth specified in 391-3-6-.03(5)(g)
		4[2]	2. Minimum at all times at depth specified in 391-3-6-.03(5)(g)
pH	SU	6.0≤pH≤9.5	
Total Nitrogen	mg/L	4	Not to exceed (as nitrogen) in the photic zone
Fecal coliform bacteria	CFU/ 100 mL	200	Not to exceed a geometric mean of 200 per 100 milliliters (mL) based on at least four samples collected from a given sampling site over a 30-day period at intervals of not less than 24 hours. Should water quality and sanitary studies show natural fecal coliform levels exceeding 200 per 100 mL (geometric mean) occasionally in high-quality recreational waters, then the allowable mean fecal coliform level shall not exceed 300 per 100 mL in lakes and reservoirs

Note: The remaining applicable criteria are outlined in detail in 391-3-6-.03(5) *General Criteria for All Waters*
mL milliliter; µg/L micrograms per liter; mg/L milligrams per liter ;CFU - colony forming units

Lake Lanier is considered by the Georgia EPD to be fully supporting its designated use of "recreation" by virtue of meeting its lake-specific water quality standards. The Georgia EPD has issued fish consumption guidance for Lake Lanier due to mercury levels in fish tissue. Fish consumption advisories are issued based on the observed tissue concentrations of mercury listed in Table 4-13. Fish consumption advisories for Lake Lanier are listed in Table 4-14. The advisory for largemouth bass also extends to fish caught below Buford Dam in the Chattahoochee River. Additionally, Lake Lanier is in violation of the alkalinity standard (USACE, 2003), but this does not affect the lake's designated use.

4.2.9.3 Surface Waters

Surface waters may include streams, rivers, ponds, and lakes. The following sections discuss these features within the project vicinity. Lake Lanier is the only impoundment crossed by the considered routes and is discussed as a separate entity from other surface waters.

TABLE 4-13
Fish Consumption Advisory Thresholds Based on Tissue Concentrations of Mercury
USACE Gwinnett County Diffuser/Pipeline EA

Mercury Concentration Threshold in Fish Tissue (mg/kg)	Recommended Maximum Consumption Frequency
< 0.23	No Restrictions
0.23 to <0.70	1 Meal per Week
0.70 to < 2.3	1 Meal per Month
2.3 and greater	Do Not Eat

Source: Guidelines for Eating Fish from Georgia Waters: 2003 Update. Georgia DNR.

TABLE 4-14
Lake Lanier Fish Consumption Advisories Based on Tissue Concentrations of Mercury
USACE Gwinnett County Diffuser/Pipeline EA

Species	Less than 12 inches in length	12 – 16 inches in length	Over 16 inches in length
Striped Bass	Not applicable	No Restrictions	1 Meal per Week
Spotted Bass	Not applicable	1 Meal per Week	
Largemouth Bass	Not applicable	1 Meal per Week	1 Meal per Week
White Catfish	No Restrictions	1 Meal per Week	
Channel Catfish	No Restrictions	No Restrictions	1 Meal per Week
Carp	No Restrictions	No Restrictions	1 Meal per Week
Bluegill Sunfish	No Restrictions	Not applicable	Not applicable
Black Crappie	No Restrictions	Not applicable	Not applicable

Note: only largemouth and spotted bass greater than or equal to 14 inches in length may be retained legally.
Source: Guidelines for Eating Fish from Georgia Waters: 2003 Update. Georgia DNR.

Lake Lanier

As noted above, Lake Lanier is considered by the Georgia EPD to be fully supporting its designated use of "recreation" by virtue of meeting its lake-specific water quality standards.

The *Diagnostic Feasibility Study of Lake Sidney Lanier, Georgia* (Kundell, 1998), commonly called the Lanier Clean Lakes Study, includes an extensive report of the water quality conditions in Lake Lanier. The report also includes a comprehensive review of the literature data referenced in the following discussions.

The *Final EIS for Operation and Maintenance of Lake Sidney Lanier, Georgia* (USACE, 2003) contains water quality information that is referenced in this section. In summary, this EIS states that "the overall water quality of Lake Lanier is good." The main body of the lake, near the proposed discharge, has the greatest transparency and the lowest fecal coliform counts and nutrient concentrations. As is typical of most lakes, the tributary arms have the

highest levels of turbidity, total suspended solids, chlorophyll *a*, and nutrient concentrations, generally resulting from upstream impacts to water quality associated with nonpoint sources of runoff (Kundell, 1998).

Pollutant loads to the lake are dominated by nonpoint sources (CH2M HILL, 1999a). Nonpoint sources contribute over 90 percent of the total phosphorus (TP) load and over 95 percent of the nitrogen load to Lake Lanier (USACE, 2003). The majority of overall loading is from the two primary tributaries (Chattahoochee River and Chestatee River) to Lake Lanier, and the load from upstream tributary areas of the lake is greater than from the area immediately adjacent to the lake (USACE, 2003).

Nutrients, Chlorophyll *a*, and DO: Phosphorus and nitrogen are important nutrients affecting the trophic status of lake systems. Trophic status refers to the level of productivity or ability of the lake to support the growth of aquatic plants (both phytoplankton and rooted plants). Excessive plant growth, or eutrophic status, is typically considered undesirable. Oligotrophic status (low productivity) is indicative of clear lakes, but may also be undesirable, resulting in fewer or smaller fish.

Phosphorus is considered a limiting (critical) nutrient for algal growth and an essential parameter for determining water quality in Lake Lanier. A related parameter is chlorophyll *a*, an indicator of phytoplankton growth. Increasing inputs of phosphorus, along with other factors such as water clarity and water temperature, can affect the growth of phytoplankton in the water. If the growth of phytoplankton becomes excessive, low levels of DO in the water can occur at night when the phytoplankton release carbon dioxide and take up oxygen. The reverse is true during the day, when phytoplankton take up carbon dioxide and release oxygen as part of photosynthesis. Finally, dying phytoplankton and other plants fall to the bottom and decompose. This creates food for some organisms to use in aerobic decomposition of the organic material on the bottom. However, in some cases this sediment oxygen demand results in depressed DO levels at the bottom of the lake.

The levels of DO in the lake are relatively consistent with depth in the colder months. However, in the warmer months the lake stratifies (like most deep southern lakes), with the warmer water rising to the surface and the colder water trapped below. The wind and waves do not reaerate the lower, colder layer of water. The DO levels in the lower layer can drop to very low levels. The warmer, upper layers maintain higher levels of DO. Figure 4-7 shows DO versus depth profiles and Figure 4-8 shows temperature versus depth profiles for both a winter and summer day in 1996. Most deep lakes develop vertical stratification—warmer waters form a layer at the surface (epilimnion) and do not continually mix with the colder water layer at the lake bottom (hypolimnion) (see Figure 4-9). A zone of rapid temperature decrease (thermocline) lies between the epilimnion and hypolimnion. Because warmer water is less dense, it forms a layer at the surface of the lake. This layering of water based on temperature and density deters mixing within the lake. In southern reservoirs, the thermocline is typically 12-15 feet below the lake surface (Figure 4-8) and remains at approximately this depth as the lake elevation changes. Lake Lanier, like many lakes in the Southeast, does not stratify year-round and the epilimnion and hypolimnion are intermixed during a period called "turnover," which typically occurs in the late fall or winter months as lake temperatures decline.

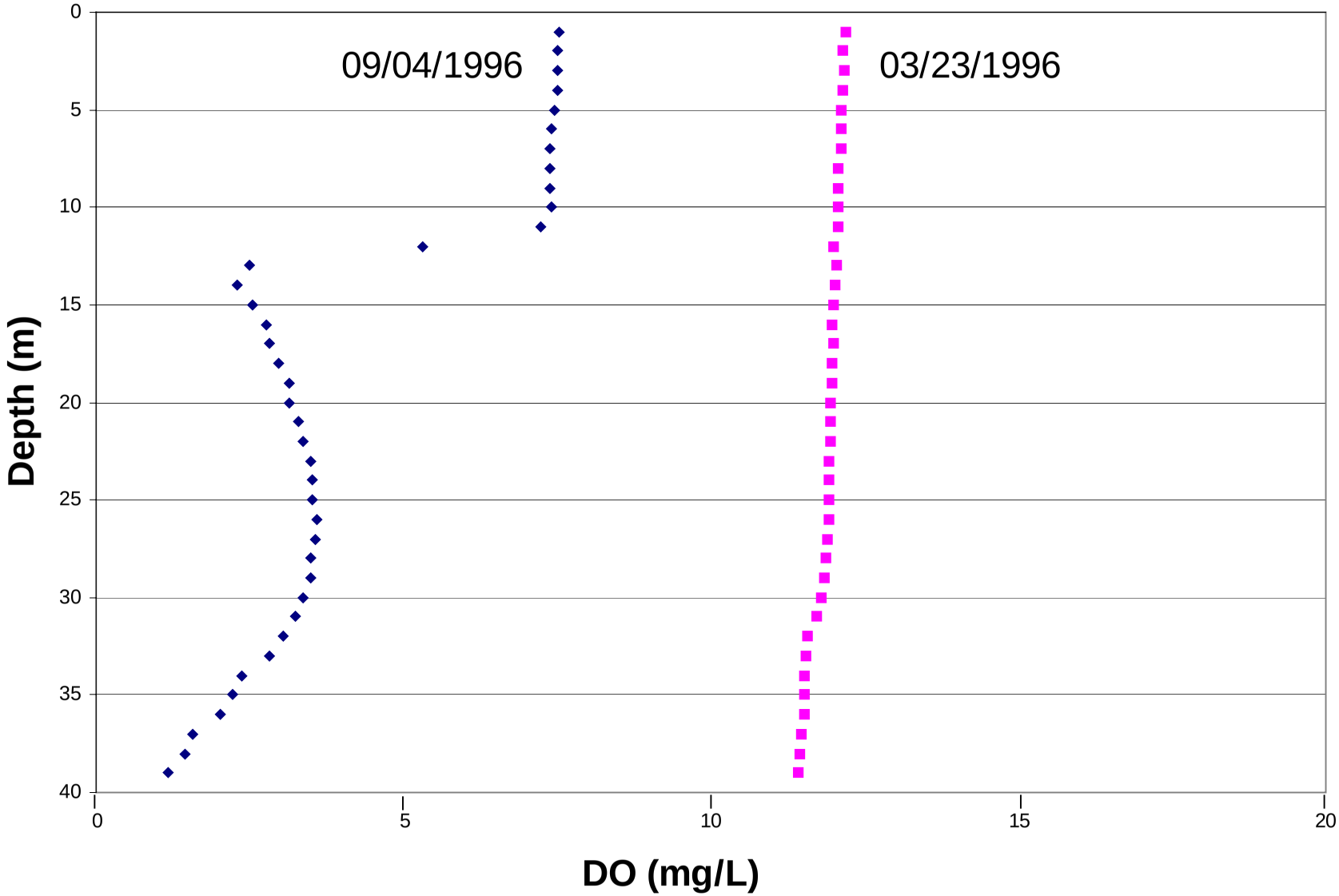
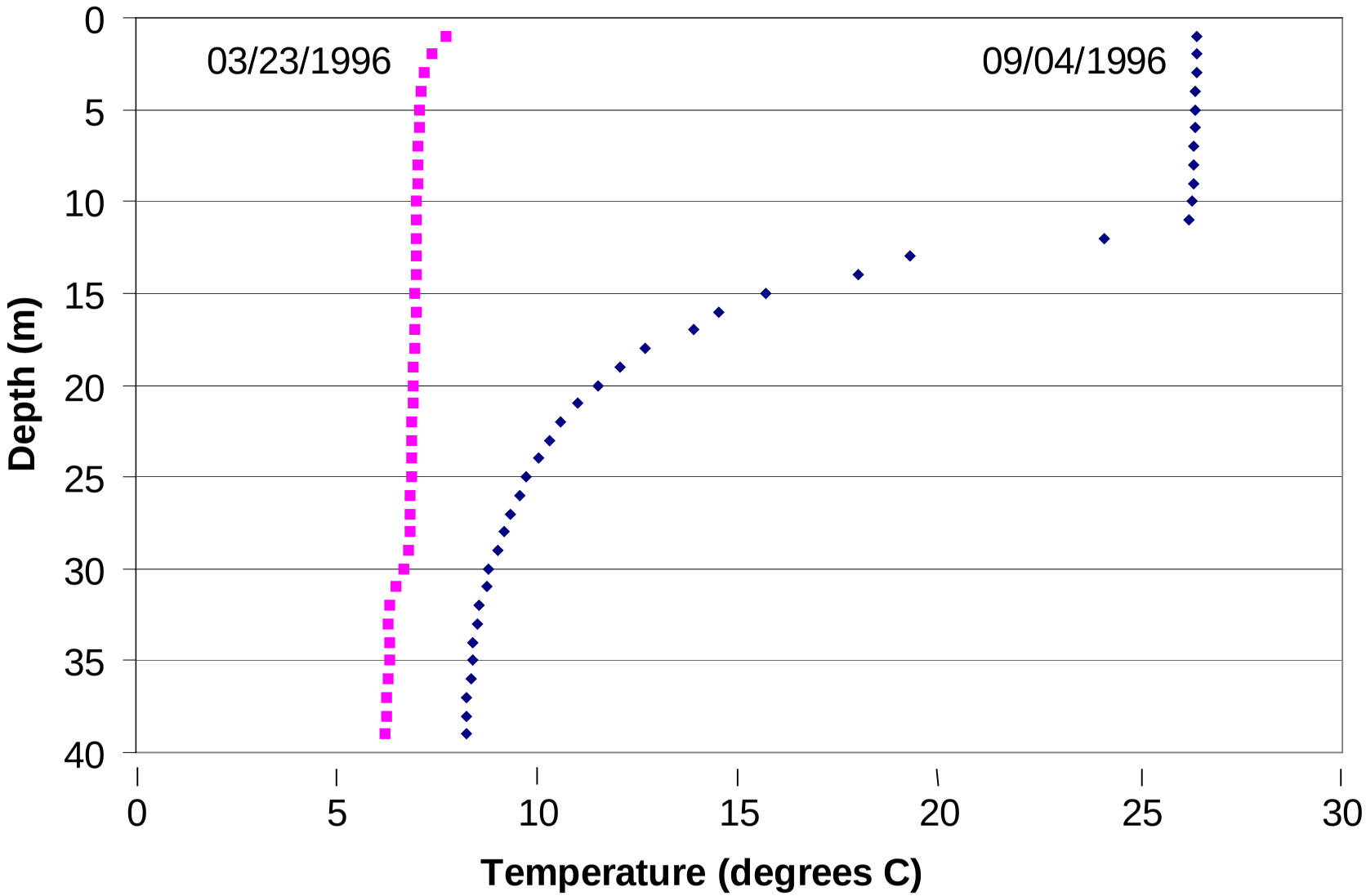


FIGURE 4-7
Dissolved Oxygen (DO) versus Depth for Typical Summer and Winter Day for Lake Lanier Segment 19 (Near the Dam)
Source: LTI Calibration Data, 1998
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia



PFIGURE 4-8
Temperature versus Depth for Typical Summer and Winter Day for Lake Lanier Segment 19 (Near the Dam).
Source: LTI Calibration Data, 1998
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

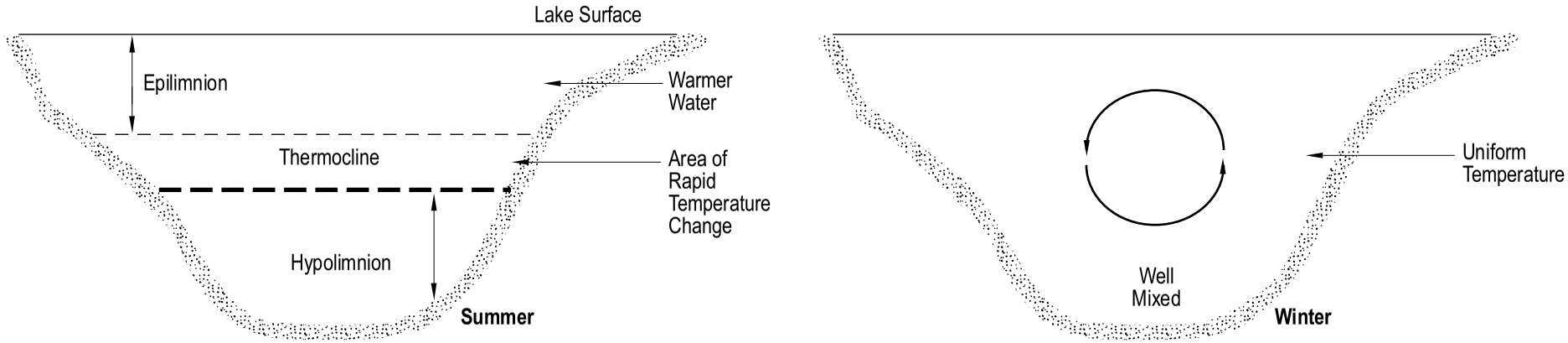


Figure 4-9
Example Lake Stratipication
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

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Phosphorus: Nutrient data collected for the Lanier Clean Lakes Study (Kundell, 1998) showed that the annual average TP concentration in the main lake near Buford Dam was 0.03 mg/L, with values ranging as high as 0.06 mg/L. The TP was slightly higher in the open water embayments, ranging from 0.03 mg/L to 0.11 mg/L and reflecting the contributions from the tributaries.

Additional data collected through June 1998 for the Lanier Clean Lakes Study (Kundell, 1998) also show that TP concentrations in the lake range from 0.01 mg/L to 0.03 mg/L, with an average of 0.02 mg/L. Based on phosphorus values alone, the lake is mesotrophic (a trophic state between oligotrophic and eutrophic). This is a moderate productivity rating and indicates that from a nutrient standpoint, water quality in the lake is good. Many of the tributaries to Lake Lanier are primary contributors of nutrients (Kundell, 1998). The tributary TP data collected indicate that phosphorus levels in the tributaries are higher than those in the main lake body, with the highest average concentrations in Flat Creek (0.19 mg/L TP).

Although desorption and regeneration of particulate phosphorus may occur, most of the phosphorus load into a lake is permanently stored in sediment, and thus sediments are the ultimate sink for phosphorus in fresh waters (Sonzogni et al., 1982; Welch, 1992). This is particularly true for Georgia Piedmont lakes such as Lake Lanier, where the phosphorus is tightly adsorbed to clay particles and typically does not reenter the water column.

"Total phosphorus" refers to all forms of phosphorus (i.e., organic and inorganic) in dissolved and particulate phases. Only a small portion of this TP is in a form readily bio-available, or able to promote algal growth. It is widely recognized that the dissolved inorganic phosphate (dissolved orthophosphate) fraction in natural waters is the most bio-available form of phosphorus and is the usual cause of excessive algal growth (Krenkel and Novotny, 1980). The common measures for phosphorus (TP and total orthophosphate) overestimate the bio-available fraction of phosphorus. Therefore, concentration measures and regulatory limits on TP are very conservative with respect to preventing unacceptable levels of algal growth.

According to state statute, the TP standards for Georgia lakes are in the form of total annual load by major tributary (pounds per year) and total lake loading per unit surface area (pounds per acre-foot per year). There are no concentration-based phosphorus criteria, because the long-term total lake loading is more important for controlling the eutrophication process than a concentration reading at any location at any point in time. Data supporting the 2000 lake standards for nutrient loading to the lake indicate that most nutrients are from nonpoint sources, as discussed above.

Monitoring and associated modeling performed as part of the Lake Lanier water quality standards setting process showed that TP loading to the lake was below the standards shown in Table 4-12.

Nitrogen: Nitrogen typically is not a limiting nutrient for algal growth in Piedmont lakes, but excessive levels of nitrogen can be toxic to aquatic life. Nitrogen concentrations in the lake are low, with total nitrogen concentrations in the lower lake below 1 mg/L on an annual average basis. In fact, the observed maximums at the lower lake stations are below

0.5 mg/L. Therefore, the levels observed are well below the total nitrogen criterion of 4 mg/L shown in Table 4-12.

Chlorophyll *a*: Chlorophyll *a* is used as an indicator of phytoplankton levels in the lake. As discussed above, high phytoplankton levels can reduce water clarity, discolor the water, and reduce DO concentrations.

Lake Lanier chlorophyll *a* levels are moderate to low (mesotrophic), indicating a low level of eutrophication in the lake (Kundell, 1998). During 1991, the median chlorophyll *a* concentrations in the main lake were less than 5 µg/L, indicating a low (mesotrophic) level of eutrophication in the lake for 1991. Both historically and in recent (1992-2000) sampling, the chlorophyll *a* levels near Buford Dam averaged below 2 µg/L, with the maximum samples below 5 µg/L (USACE, 2003). The levels observed meet the water quality standards shown in Table 4-12.

Dissolved Oxygen (DO): Like most deep lakes in the Southeast, Lake Lanier stratifies during the summer, with a layer of water warmed by solar radiation nearer the surface (epilimnion) and a much colder layer of water deeper in the lake (hypolimnion). The zone separating the two layers is called the thermocline. Also like many lakes in the Southeast, Lake Lanier stratifies in the warmer late spring, summer, and early fall months and mixes during the late fall and winter.

The levels of DO in the lake are relatively consistent with depth in the colder months. However, in the warmer months the wind and waves do not reaerate the lower, colder layer of water. The DO in the hypolimnion can drop to low levels, and the epilimnion maintains higher levels of DO. The data presented in the Lanier Clean Lakes Study showed that DO levels in the upper strata of the lake consistently meet water quality standards (see Figure 4-7 for typical day data).

Temperature: Limited historical data are available regarding surface water temperatures (1-meter [3.3-foot] depth) near Buford Dam (station 12040001). From 1992 to 2000 only three measurements were recorded in this part of the lake and none were during cold periods. The measured temperatures were 21.8°C (71.2°F), 22.6°C (72.3°F), and 28.6°C (83.5°F) (USACE, 2003). One additional warm weather sample is available from the historic record, a reading of 27°C (80.6°F) (USACE, 2003). All of these readings are below the temperature standard of 32°C (89.6°F) for the lake.

As discussed above, the water temperature profile with depth varies by season (Figure 4-8). In the winter, water temperature is relatively constant with depth. In the summer, when the lake is stratified, the bottom layer (hypolimnion) is much colder than the upper layer (epilimnion). Measurements during the 1992 to 2000 period indicate that the temperature of the hypolimnion, where discharges from Buford Dam are drawn, varies, but not by as much as the surface temperatures (Table 4-15).

Fecal Coliform: A summary of the fecal coliform levels in Lake Lanier and the surrounding tributaries is provided in the Lanier Clean Lakes Study (Kundell, 1998). A review of historical data since 1973 by the Clean Lakes Group to evaluate long-term trends of fecal coliform in the main lake body showed no significant seasonal variations, no significant trends, and low annual mean concentrations (i.e., <50 CFUs/100 mL). As noted in the *Final EIS for Operation and Maintenance of Lake Sidney Lanier, Georgia* (USACE, 2003), "fecal

TABLE 4-15
Lake Lanier Water Temperature Measured at Discharge from Buford Dam
USACE Gwinnett County Diffuser/Pipeline EA

	Temperature °C (1992-2000)	Temperature °F (1992-2000)
Average	11.78	53.20
Minimum	10.10	50.18
Maximum	13.60	56.48

n = 54
Data from USACE, 2003

coliform bacteria were reported only rarely in the Category I (main lake body) stations." The primary contributing sources are associated with the tributaries. Primary sources of potential pathogens (of which fecal coliform is an indicator parameter) include agricultural operations (poultry, manure fertilizers, livestock), failing septage systems, urban runoff, and spills from wastewater collection and treatment systems. The levels observed are below the water quality standards shown in Table 4-12.

Fecal coliform bacteria levels have been monitored at Lake Lanier during the summer swimming season (April through August) at 24 beaches, including beaches nearest the proposed diffuser location, since 1991. During this time, there have been 24 instances of fecal coliform levels in excess of the state standard of 200 CFU/100mL (data provided by Mark Williams, Chief Park Ranger – USACE Lake Lanier). When it was possible to retest these areas on the following day, all second-day results were below the state standard. The highest single value was 2,875 CFU recorded at Young Deer Beach on August 11, 1992. The August 12 retest had only 10 CFU. The other approximately 2,500 samples were below the state standard for fecal coliforms.

Hardness, Alkalinity, and pH: According to the *Final EIS for Operation and Maintenance of Lake Sidney Lanier, Georgia* (USACE, 2003), hardness and alkalinity in the main lake body were within the levels expected, based on the geology of the Lake Lanier watershed.

Both surface and composite pH levels were highest when chlorophyll *a* levels were highest. At station 12040001 (Lake Lanier upstream from Buford Dam), the average pH (for 1992-2000) was about 7.2 standard units, with a minimum of 6.8 and a maximum of 8.1. The levels observed are within the pH standards (from 6 to 9.5) shown in Table 4-12.

Other Surface Waters

The proposed pipeline would cross additional surface waters along all three considered routes, including numerous perennial and intermittent streams. Richland Creek, Suwanee Creek, and Level Creek are the main perennial streams crossed by one or more of the routes. Other streams crossed include perennial and intermittent tributaries of these major perennial streams. One intermittent tributary of Lake Lanier is in the vicinity, but is not crossed by the route or the proposed work corridor. Streams in the project area are typical of small to intermediate-sized streams in urbanizing areas of the upper Piedmont region.

4.2.9.4 Flood Plains

Gwinnett County Flood Insurance Rate Maps (FIRM) indicate that portions of the pipeline routes are located in Zone A5 of Suwanee Creek (a regulatory floodway), Zone A of Level Creek and Richland Creek, and Zone A of Lake Lanier. Zone A5 designates areas that are within the 100-year flood plain, with base flood elevations and flood hazard factors determined. Zone A designates areas that are within the 100-year flood plain, with base flood elevations and flood hazard factors not determined. None of the three streams is designated as a state-protected river corridor (CH2M HILL, 1999a).

The Lake Lanier flood control pool extends around the lake to an elevation of 1,085 feet msl.

4.2.9.5 Groundwater

Groundwater in the northern Piedmont is found in the pore spaces of the overburden, as well as the joints, fractures, and other secondary openings in the bedrock. Primary porosity is virtually nonexistent in the rock. The igneous intrusions, although coarser grained, also typically have very low primary porosity. Groundwater in the fractured crystalline bedrock is stored in secondary porosity fractures (e.g., openings along foliation planes, joints, stress-relief fractures, and brittle fractures related to faulting) (USGS, 1999). As a result of these geologic conditions, groundwater availability is limited and does not provide a significant source of potable supply for area residents.

There are no significant local groundwater recharge zones in the project area. The project area is not designated as a Significant Recharge Area as mapped by the Georgia DNR in Hydrologic Atlas 18 (Georgia Geologic Survey, 1989). Also, based on maps of the relative susceptibility of shallow unconfined aquifers to pollution from man-made surface sources, Hydrologic Atlas 20 rates the site in the “least susceptible” category (Georgia Geologic Survey, 1992).

4.2.10 Biological Communities

4.2.10.1 Upland Communities

The considered routes contain woodlands that are being replaced by residential and commercial development. The alignments also include pockets of undeveloped land with tree cover. Small areas off Sycamore Road, where easements would be required from private property, also contain tree cover. Approximately 5 acres of trees exist throughout the entire corridor that would have to be cleared to construct the proposed pipeline.

4.2.10.2 Wetlands and Aquatic Communities

Releases from Lake Lanier feed the Chattahoochee River downstream of Buford Dam. This reach of the Chattahoochee River has been designated as a Secondary Trout Stream under Georgia Rules and Regulations for Water Quality Control, Chapter 391-3-6-03. There is no designated Essential Fish Habitat in Lake Lanier.

Studies conducted along the considered routes for the reclaimed water pipeline identified the presence of streams (Figure 4-10) and jurisdictional wetlands (Figure 4-11). Streams were classified as perennial or intermittent, and wetlands were classified as palustrine forested, palustrine scrub/shrub, or palustrine emergent systems.

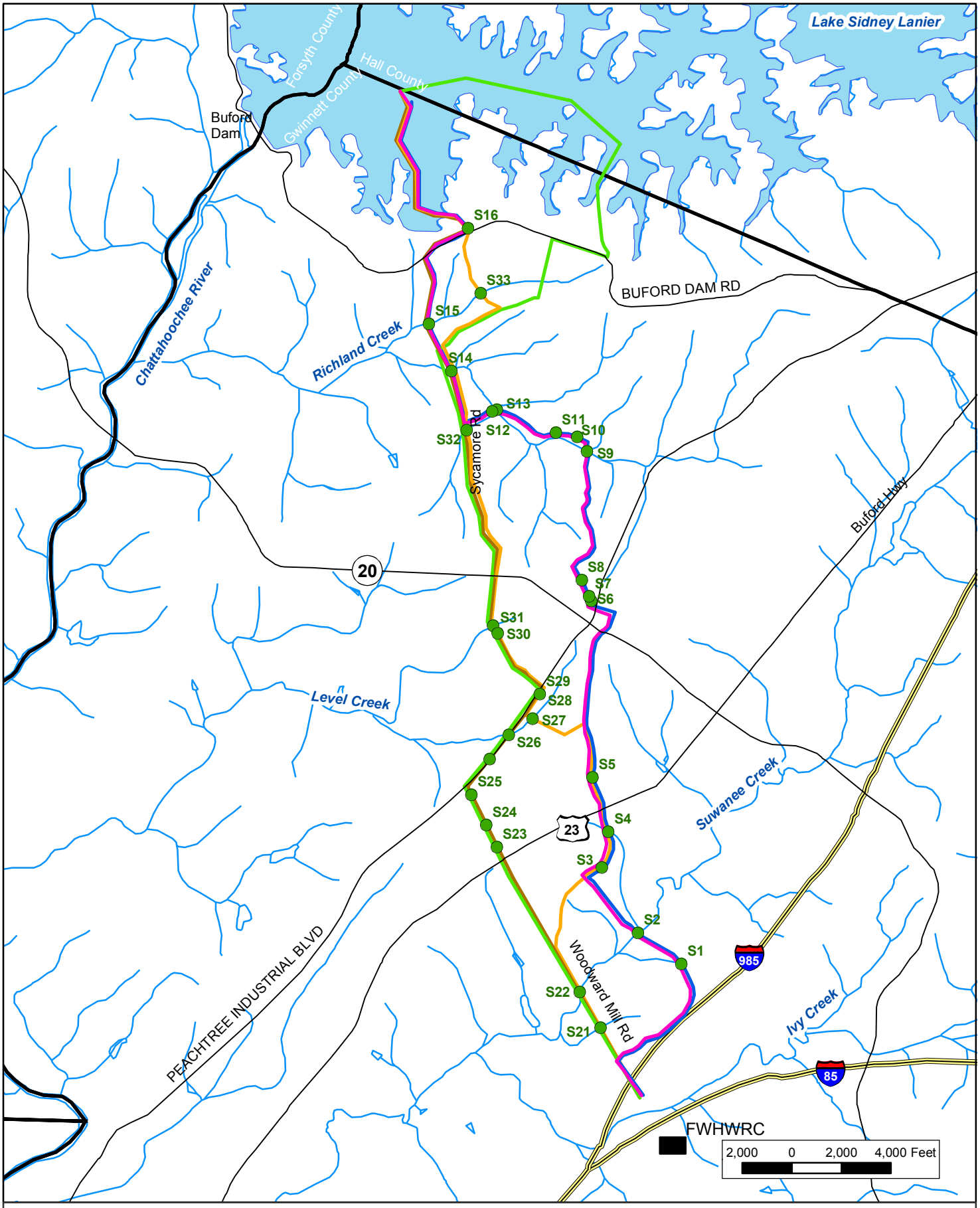

Figure 4-10
Streams Identified Along Considered Pipeline Route
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

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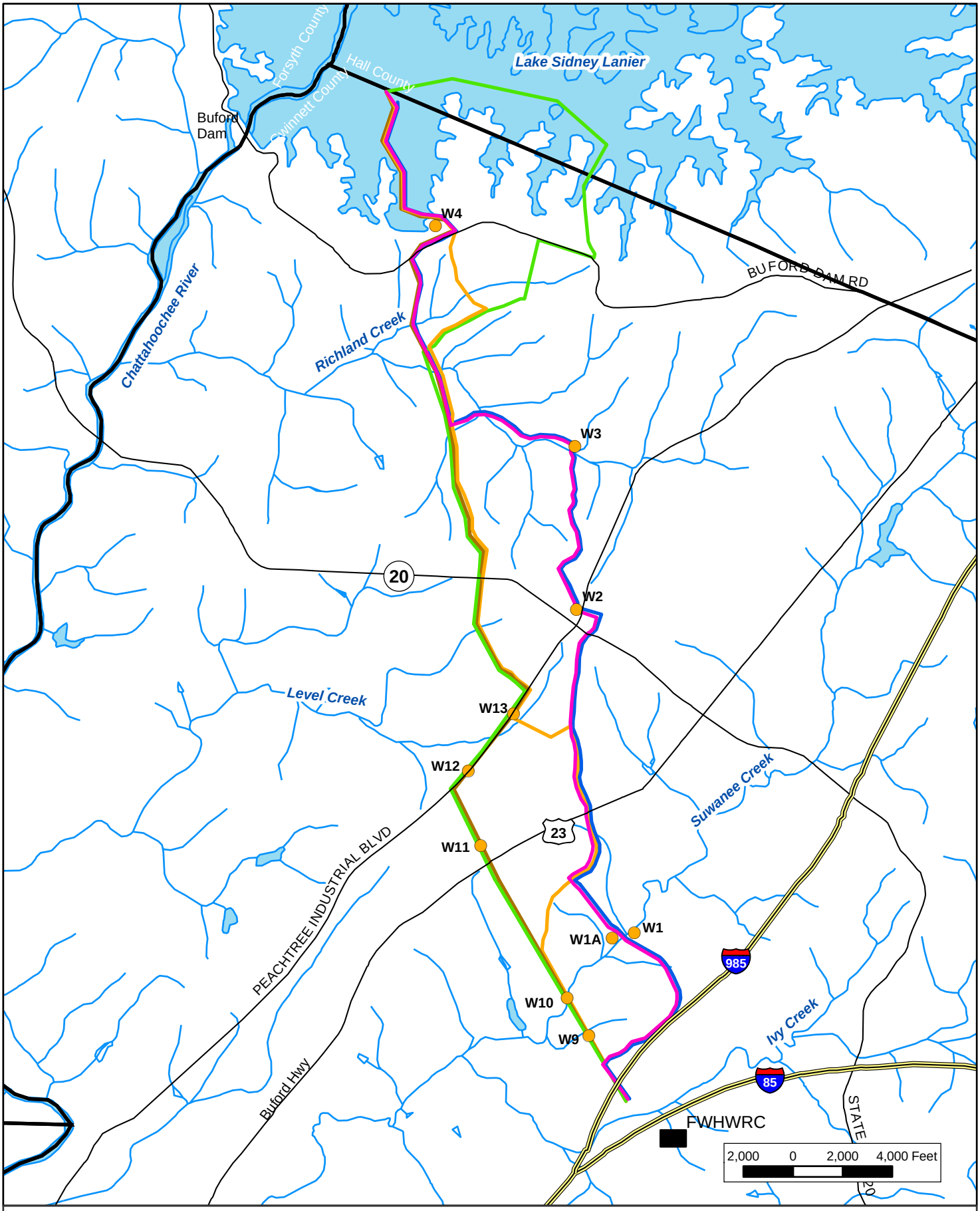

Routes

- Wetland Avoided
- Wetland Crossing
- Hydrology
- Interstate
- County
- Road
- ALT. A
- ALT. B
- ALT. C
- ALT. D
- ALT. E

N

Figure 4-11
Wetlands Identified Along Considered Pipeline Route
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

CH2MHILL

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The fisheries resources found in Lake Lanier are mainly the result of Georgia DNR stocking programs. The cold water fish that are stocked downstream, such as rainbow trout (*Oncorhynchus mykiss*), are not self-sustaining because spawning habitat is not available (USACE, 2003). A wide variety of sport fish are found, including largemouth bass (*Micropterus salmoides*), spotted bass (*M. punctulatus*), striped bass (*Morone saxatilis*), white bass (*M. chrysops*), crappie (*Pomoxis spp.*), yellow perch (*Perca flavescens*), white catfish (*Ameiurus catus*), channel catfish (*Ictalurus punctatus*), and bluegill sunfish (*Lepomis macrochirus*). These species are typical of warm water lake fisheries.

These species consume a variety of prey items, including aquatic insects, benthic macroinvertebrates, and other species of fish. Habitats that support these food webs are widespread, and the species are ubiquitous in Lake Lanier. Special reservoir operations at Lake Lanier are implemented during the spring months to facilitate spawning activities by largemouth bass and other warm water species. These operations attempt to provide a stable or rising lake elevation during a designated spawning period in order to prevent dewatering of spawning beds during the peak spawning period.

4.2.11 Endangered, Threatened, and Other Listed Species

No state or federal endangered or threatened species or their potentially suitable habitats were observed within the proposed pipeline corridor. A Protected Species Survey was conducted in 1996, including a literature review and field survey (CH2M HILL, 1996b). The Georgia DNR and the U.S. Fish and Wildlife Service (USFWS) list 5 protected animal species and 16 protected plant species that could occur in Gwinnett County (Table 4-16). No areas within or adjacent to the project vicinity have been designated as critical habitat for threatened or endangered species by the USFWS.

TABLE 4-16
State and Federal Protected Species Known to Occur in Gwinnett County
USACE Gwinnett County Diffuser/Pipeline EA

Species	Common Name	Legal Status	Habitat	Comment
Amphianthus pusillus	Little amphianthus	LT, ST	Shallow pools on granite outcrops	No suitable habitat for this species occurs within the project area
Amsonia ludoviciana	Louisiana blue star	SC	Open woods near granite outcrops	No suitable habitat for this species occurs within the project area
Aster avitus	Alexander rock aster	SC	Ecotone of granite outcrops	No suitable habitat for this species occurs within the project area
Cypripedium acaule	Pink ladyslipper	SU	Piney woods and upland oak-hickory-pine forests	Species observed in the project area and other potentially suitable habitat exists in the project area
Cypripedium calceolus pubescens	Large-flowered yellow ladyslipper	SU	Upland oak-hickory-pine woods and mixed hardwood forests	Potentially suitable habitat for this species exists in the project area
Eriocaulon koernickianum	Small-headed pipewort	SC	Granite outcrops and upland sandhill acidic seeps	No suitable habitat for this species occurs within the project area
Fimbristylis brevivaginata	Flatrock fimbry	SC	Granite outcrops	No suitable habitat for this species occurs within the project area
Hexastylis shuttleworthii harperi	Harper's heartleaf	SU	Low terrace flood plain forests, edges of bogs	No suitable habitat for this species occurs within the project area

TABLE 4-16
State and Federal Protected Species Known to Occur in Gwinnett County
USACE Gwinnett County Diffuser/Pipeline EA

Species	Common Name	Legal Status	Habitat	Comment
Hydrastis canadensis	Goldenseal	SE	Rich woods and cove forests in mountains	No suitable habitat for this species occurs within the project area
Isoetes melanospora	Black-spored quillwort	LE, SE	Shallow pools on granite outcrops	No suitable habitat for this species occurs within the project area
Melanthium woodii	Ozark bunchflower	SR	Mesic hardwood forests over basic soils	No suitable habitat for this species occurs within the project area
Panax quinquefolius	American ginseng	SU	Mesic hardwood forests, cove hardwood forests	Potentially suitable habitat for this species exists in the project area
Rhus michauxii	Michaux's sumac	LE, SE	Sandy or rocky open woods with disturbance history	Previously recorded population known to be extirpated, no suitable habitat occurs in the project area
Schisandra glabra	Bay star-vine	ST	Rich alluvial woods	Marginally suitable habitat occurs at FWHWRC site
Sedum pusillum	Granite rock stonecrop	ST	Granite outcrops among moss under cedars	No suitable habitat for this species occurs within the project area
Waldsteinia lobata	Piedmont barren strawberry	ST	Stream terraces, rocky acidic woods along streams	Marginally suitable habitat occurs at FWHWRC site
Haliaeetus leucocephalus	Bald eagle	LT, SE	Inland waterways	Potentially suitable habitat for this species exists in the project area
Cyprinella callitaenia	Bluestripe shiner	ST	Brownwater streams	No suitable habitat for this species occurs within the project area
Pituophis melanoleucus melanoleucus	Northern pine snake	SC	Dry pine or pine-hardwood forests	No suitable habitat for this species occurs within the project area
Picoides borealis	Red-cockaded woodpecker	LE, SE	Nest in mature pine with low understory, forage in pine and pine-hardwood stands more than 30 years old	No suitable habitat for this species occurs within the project area
Thryomanes bewickii	Bewick's Wren	SR	Thickets, brushy areas, open woods	No suitable habitat for this species occurs within the project area

Explanation of legal status:
LT: listed threatened under the Endangered Species Act
LE : listed endangered under the Endangered Species Act
SC: Georgia state species of concern
ST: listed as threatened by the State of Georgia
SE: listed as endangered by the State of Georgia
SU: listed as unusual by the State of Georgia

4.2.11.1 Plants

Numerous species endemic to granite outcrops were identified as occurring in Gwinnett County. However, no granite outcrops occur in the project area and none of these species will occur in the project area.

Michaux's sumac was known historically from the project area, but this population was extirpated. No other populations of this plant are known in Gwinnett County, and suitable habitat for this species does not occur in the project area. Michaux's sumac is unlikely to occur in the project area.

No potentially suitable habitat for Ozark bunchflower was identified along the considered routes. Ozark bunchflower is unlikely to occur in the project area.

No potentially suitable habitat for American ginseng was identified along the considered routes. American ginseng is unlikely to occur in the project area.

No potentially suitable habitat for pink ladyslipper was identified along the considered routes. Pink ladyslipper is unlikely to occur in the project area.

No potentially suitable habitat for large-flowered yellow ladyslipper was identified along the considered routes. Large-flowered yellow ladyslipper is unlikely to occur in the project area.

No potentially suitable habitat for Harper's heartleaf was identified along the considered routes. Harper's heartleaf is unlikely to occur in the project area.

No potentially suitable habitat for goldenseal was identified along the considered routes. Goldenseal is unlikely to occur in the project area.

No potentially suitable habitat for Piedmont barren strawberry was identified along the considered routes. Piedmont barren strawberry is unlikely to occur in the project area.

No potentially suitable habitat for bay star-vine was identified along the considered routes. Bay star-vine is unlikely to occur in the project area.

4.2.11.2 Animals

The only aquatic species listed in the area is the bluestripe shiner, which occurs in brownwater streams. There are no brownwater streams in the project area and this species will not occur in the project area.

Red-cockaded woodpeckers are unlikely to use any area that could be impacted by the project. No mature pine forest exists along any of the considered routes. No evidence of red-cockaded woodpecker foraging was observed along considered pipeline routes. Red cockaded woodpeckers are unlikely to occur in the project area.

Potentially suitable habitat for the northern pine snake does not occur along the considered pipeline routes. It is unlikely that this species occurs in the project area.

Potentially suitable habitat was observed for the bald eagle along pipeline Route A. However, literature review for bald eagle locations did not identify any known nests in the surrounding area. Yearly, bald eagle surveys have not identified any nests in the vicinity of Lake Lanier or the Gwinnett County area (Personal Communication, Lake Lanier Ranger Jerry Fulton, August 19, 2003). While bald eagles have been seen in the Lake Lanier area, sightings are of transient birds and related to the bald eagle's seasonal migratory patterns (Personal Communication, Lake Lanier Ranger Jerry Fulton, August 19, 2003).

Recreational boating activity and pedestrian human activity are frequent on Lake Lanier and the surrounding lands near the proposed outfall structure and pipeline. Bald eagles are very sensitive to boat and foot traffic (Rommé and Reaves, 1999) and the volume of these activities in the general project vicinity makes it unlikely that bald eagles would use the area

near the proposed outfall. Bald eagles are unlikely to occur in the project area except as incidental foragers.

No potentially suitable habitat for the Bewick's wren was identified along any of the considered routes. This species is unlikely to occur in the project area.

4.2.12 Noise

Noise levels in the environment typically are expressed in terms of hourly equivalent sound pressure levels (L_{eq}) expressed in terms of decibels (dB). Where human receptors are of primary concern, the A-weighted decibel sound levels (dBA) is used because this scale more closely approximates the response of the human ear by filtering out noises in high and low frequency ranges that are not detected by the human ear. Most local standards and ordinances use the A-weighted scale.

The hourly L_{eq} averages noise levels on an energy basis for the expressed exposure period. A day-night noise level (L_{dn}) may be used because people usually find a given noise level more annoying during nighttime hours. When an L_{dn} is used, noise levels occurring at nighttime are increased by a weighting factor prior to calculation of the 24-hour L_{dn}.

The project area consists of urban and urban/residential areas and the residences surrounding and adjacent to Lake Lanier. All of the pipeline routes follow transportation corridors, where traffic noise will be relatively constant through the day. Noise levels in typical urban residential areas range from 58 dB to 72 dB (USACE, 1998b). Much of the residential population in the project area lives on or adjacent to Lake Lanier and is subject to an additional source of noise from boats and personal watercraft. Boats may be used for fishing, leisure, or active recreation such as water-skiing. Personal watercraft are almost always used for active recreation. Personal watercraft and larger boats produce noise levels in the range of 75-85 dB (Noise Unlimited, Inc., 1995; USACE, 2003). It is likely that noise levels in the project area would be near the upper end of the urban residential range.

5.0 Environmental Consequences

This section presents the results of the analysis of the direct, indirect, and cumulative environmental and socioeconomic effects that would likely occur with the pipeline route alternatives, the crossing of U.S. Army Corps of Engineers (USACE) property, and the discharge of reclaimed water into Lake Lanier. This section identifies any adverse environmental effects that cannot be avoided; the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity; and any irreversible or irretrievable commitments of resources that would be involved in implementing the Proposed Action. Impacts are addressed for all considered action alternatives and the No Action Alternative.

5.1 Basis for Analyses

The scope of analysis was addressed in Sections 1.0 through 4.0. Analyses are provided for the jurisdictional waters crossed by the considered pipeline route alternatives, construction impacts to Lake Lanier, the easement across USACE property, and discharge of reclaimed water into Lake Lanier. Impacts also are considered in relation to the authorized project purposes and public uses of Lake Lanier:

1. Flood Control
2. Hydroelectric Power Production
3. Water Supply and Water Quality
4. Navigation
5. Recreation
6. Fish and Wildlife Management

Potential impacts to these authorized uses are discussed under various resource areas in the following sections. Impacts of the No Action Alternative are discussed for each resource area, as appropriate.

5.1.1 Direct, Indirect, and Cumulative Impacts

5.1.1.1 Direct versus Indirect Effects

The terms "effect" and "impact" are synonymous as used in this Environmental Assessment (EA). Effects may be beneficial or adverse and may apply to the full range of natural, aesthetic, historic, cultural, and economic resources of Lake Lanier, the upper Chattahoochee River Basin, and the surrounding area. Definitions and examples of direct and indirect impacts as used in this document are as follows:

- ***Direct Impac*t.** A direct impact is one that would be caused directly by implementing an alternative and that would occur at the same time and place.
- ***Indirect Impac*t.** An indirect impact is one that would be caused by implementing an alternative that would occur later in time or farther removed in distance but would still be a reasonably foreseeable outcome of the action. Indirect impacts may include induced changes in the pattern of land use, population density, or growth rate, and indirect effects to air, water, and other natural resources and social systems.

- ***Relationship between Direct versus Indirect Impacts.*** For direct impacts to occur, a resource must be present. For example, if highly erodible soils were disturbed as a direct result of the use of heavy equipment during construction of a home, there could be a direct effect on soils resulting from erosion. This could indirectly affect water quality if stormwater runoff containing sediment from the construction site were to enter the lake.

5.1.1.2 Short-Term versus Long-Term Effects

Effects are also expressed in terms of duration. The duration of short-term impacts is considered to be 1 year or less. For example, the construction of a building would likely expose soil in the immediate area of construction. However, this effect would be considered short-term because it would be expected that vegetation would re-establish on the disturbed area within a year of the disturbance. Long-term impacts are described as lasting beyond 1 year. Long-term impacts can potentially continue in perpetuity, in which case they would also be described as permanent.

5.1.1.3 Cumulative Effects

The most severe environmental degradation may not result from the direct effects of any particular action, but from the combination of effects of multiple, independent actions over time. As defined in 40 *Code of Federal Regulations* (CFR) 1508.7 (Council on Environmental Quality [CEQ] Regulations), a cumulative effect is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." Some authorities contend that most environmental effects can be seen as cumulative because almost all systems have already been modified. Principles of cumulative effects analysis are described in the CEQ guide *Considering Cumulative Effects under the National Environmental Policy Act*. For this analysis, cumulative impacts are examined in terms of how the various alternatives would affect future operation and uses of Lake Lanier, as well as other actions that would occur along the pipeline route.

CEQ guidance on cumulative impacts analysis states:

> For cumulative effects analysis to help the decision-maker and inform interested parties, it must be limited through scoping to effects that can be evaluated meaningfully. The boundaries for evaluating cumulative effects should be expanded to the point at which the resource is no longer affected significantly or the effects are no longer of interest to affected parties. (CEQ, 2003)

In instances where cumulative impacts are the same regardless of the alternative, they are not analyzed in detail, as they would not influence the decision.

5.1.2 Mitigation

The alternatives considered in this EA would have environmental and socioeconomic impacts resulting from implementation, and mitigation would be required. Where potentially significant adverse impacts are identified, measures that could be used to mitigate these effects are discussed, such as the following:

- Avoiding an impact altogether by stopping or modifying an action.
- Minimizing an impact by limiting the degree or magnitude of the action and the activities associated with its implementation.
- Rectifying an impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating an impact over time by preservation and maintenance operations during the life of the action.
- Compensating for an impact by replacing or providing substitute resources or environments.

Suitable mitigation measures are described below for each considered resource area where appropriate.

5.1.3 Significance Criteria

In accordance with CEQ regulations and implementing guidance, impacts are evaluated in terms of their being significant. The term "significant," as defined in 40 CFR 1508.27, which is part of the CEQ regulations for implementing National Environmental Policy Act of 1969 (NEPA), requires consideration of both context and intensity. "Context" means that the significance of an action must be analyzed in several settings, such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the Proposed Action. For instance, in the case of a site-specific action, significance would usually depend on the effects on the locale rather than on the world as a whole. Both short- and long-term effects are relevant to the consideration of the significance of an impact.

"Intensity" refers to the severity of impact. Factors contributing to the evaluation of the intensity of an impact include, but are not limited to, the following:

- Balance of beneficial and adverse impacts in a situation where an activity has both.
- Degree to which the action affects public health or safety.
- Unique characteristics of the geographic area where the action is proposed.
- Degree to which the effects on the quality of the human environment are likely to be controversial.
- Degree to which the effects of the action on the quality of the human environment are likely to be highly uncertain or involve unique or unknown risks.
- Degree to which the action might establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration.
- Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.
- Degree to which the action might adversely affect districts, sites, highways, structures, or objects listed in, or eligible for listing in, the National Register of Historic Places (NRHP) or might cause loss or destruction of significant scientific, cultural, or historical resources.

- Degree to which the action might adversely affect endangered or threatened species or habitat that has been determined to be critical under the Endangered Species Act of 1973.
- Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment.

5.2 Summary of Impacts

This section provides a summary of potential impacts resulting from the various alternatives considered. Table 5-1 provides a summary of potential impacts from discharge at the specified diffuser location. Table 5-2 provides a comparative matrix for potential impacts from construction for all alternatives considered. Direct and indirect impacts are discussed in Section 5.3, and potential cumulative impacts are discussed in Section 5.4.

5.3 Potential Impacts on Specific Resource Areas

This section provides a discussion of the potential impacts of each pipeline route alternative considered and impacts to resource areas that may result from the construction and operation of the pipeline and diffuser for discharge of reclaimed water to Lake Lanier, as well as the No Action Alternative. Where alternatives would have similar impacts, the alternatives are discussed together.

5.3.1 Land Use

5.3.1.1 Developed Land and Open Space

No Action Alternative

Under the No Action Alternative reclaimed water would be discharged in a location other than Lake Lanier. Impacts to land use will depend on the pipeline route and discharge point selected. However, it is likely that any other pipeline routes would utilize existing transportation/utility corridors as much as possible to minimize impacts to developed land and open space. Access from these existing corridors to an alternate stream or river discharge point may require disturbance of existing open space and could involve blasting. It is likely that the No Action Alternative would have impacts to developed land and open space similar to those of the pipeline route alternatives described below.

Potential Impacts from Discharge to Lake Lanier

Placement of the diffuser below the surface of Lake Lanier would not change any current land uses. Therefore, land use would not be impacted by discharge of reclaimed water to Lake Lanier.

TABLE 5-1
Summary of Impacts from Discharge of Reclaimed Water at the Specified Diffuser Location
USACE/Gwinnett County Diffuser and Pipeline EA

Resource Area	Impacts from Discharge of Reclaimed Water	
	Preferred Alternative	No Action Alternative
Land Use		
Developed Land and Open Space	N	UN
Agricultural Land	N	N
Landfills	P1-	0
Hazardous Waste Sites	N	UN
Special Purpose Areas	N	UN
Socioeconomic Environment		
Demography	N	N
Employment	N	N
Wages	N	N
Recreational Facilities	N	UN
Environmental Justice	N	UN
Protection of Children	N	UN
Community Infrastructure		
Roadways	N	N
Railroads	N	N
Water Supply	P1+	U1-
Wastewater Treatment	+	+
Stormwater Management	N	UN
Fire, Police, Emergency Services	N	UN
Electric, Gas, Telephone	N	UN
Recreational Boat Traffic	N	US1-
Historic/Archeological Resources	N	N
Climate	N	N
Soils, Sediments, Geology		
Geology	N	N
Upland Soils	N	N
Prime Farmland	N	UN
Lake Lanier Bottom	0	N
Air Quality	N	N
Hydrology	P1+	UP2-
Flood plains	0	UP1-
Water Quality	0	0
Biological Communities		
Upland Communities	N	N
Wetlands and Aquatic Communities	N	UP2-
Protected Species	0	U0
Noise	N	N

S indicates short-term
L indicates long-term
P indicates permanent
U indicates uncertain but likely

N indicates no impact
+ indicates positive impact
- indicates negative impact

0 indicates insignificant impact or change
1 indicates potential for minor impact
2 indicates potential for major impact

TABLE 5-2
Summary of Construction Impacts for Considered Alternatives
USACE/Gwinnett County Diffuser and Pipeline EA

Resource Area	Pipeline Route Alternative			
	A	B	C/E[a]	No Action Alternative
Land Use				
Developed Land and Open Space	N	N	N	UN
Agricultural Land	N	N	N	UN
Solid Waste Landfills	0	0	0	0
Hazardous Waste Sites	N	N	N	N
Special Purpose Areas	S1-	S1-	S1-	UN
Socioeconomic Environment				
Demography	N	N	N	N
Employment	S0+	S0+	S0+	S0+
Wages	N	N	N	N
Recreational Facilities	S1-	S1-	S1-	UN
Environmental Justice	N	N	N	UN
Protection of Children	N	N	N	UN
Community Infrastructure				
Roadways	S1-	S1-	S1-	S1-
Railroads	N	N	N	UN
Water Supply	N	N	N	UN
Wastewater Treatment	+	+	+	+
Stormwater Management	0	0	0	0
Fire, Police, Emergency Services	S0-	S0-	S0-	S0-
Electric, Gas, Telephone	0	0	0	0
Recreational Boat Traffic	S1-	S1-	S1-	0
Historic/Archeological Resources	P1-	P1-	0	UN
Climate	N	N	N	N
Soils, Sediments, Geology				
Geology	0	0	0	0
Upland Soils	0	0	0	0
Prime Farmland	N	N	N	UN
Lake Lanier Bottom	S1-, P1-	S1-, P1-	S1-, P1-	N
Air Quality	S1-	S1-	S1-	S1-
Hydrology	S1-	S1-	S1-	S1-
Flood plains	S1-	S1-	S1-	S1-
Water Quality	0	0	0	0
Biological Communities				
Upland Communities	S1-	S1-	S1-	S1-
Wetlands and Aquatic Communities	S1-	S1-	S1-	S1-
Protected Species	0	0	0	0
Noise	S1-	S1-	S1-	S1-

S indicates short-term
L indicates long-term
P indicates permanent
U indicates uncertain but likely

N indicates no impact
+ indicates positive impact
- indicates negative impact

0 indicates insignificant impact or change
1 indicates potential for minor impact
2 indicates potential for major impact

[a] Route E is the applicant-preferred route.

Potential Impacts from Construction

Approximately 1.1 acres of Gwinnett County Park have recently been converted from public recreational use to provide for construction and maintenance of a water supply intake structure and pumphouse facility. The reclaimed water pipeline will follow the alignment of the intake pipeline corridor through portions of Gwinnett County Park and continue under the land surface until reaching the lake (Appendix D, Drawing C-02). While Gwinnett County Park has been permanently closed to public recreation, the remaining portions of Gwinnett County Park (21.9 acres) would be available for picnicking and low-intensity day-use activities, should the park be opened to the public in the future. Roadway access and parking to provide access to the existing picnicking facilities will be restored following construction activities.

Installation of the proposed outfall pipeline through Gwinnett County Park may require blasting through rock outcrops in portions of the right-of-way (ROW) easement both near Buford Dam Road and at the shoreline as the pipeline enters the lake. Since Gwinnett County Park is closed, blasting will not impact low-intensity daily usage. Blasting could impact nearby residences with noise or vibration, which could cause structural damage to nearby houses. To protect nearby residences, the contractor will be required to monitor nearby residences for blasting noise and vibration. A general blasting plan (see Appendix D) will be prepared and submitted for review and approval to the USACE Mobile District. The noise and blasting procedures to be employed are the same as those utilized for the Shoal Creek Water Intake Facility, which resulted in no noise or structural damage complaints.

Construction of any of the reclaimed water pipeline route alternatives would have minimal impacts on land use. These routes utilize existing transportation/utility corridors to the maximum extent practicable to avoid disturbance and potential change to other land use types.

5.3.1.2 Agricultural and Silvicultural Lands

No Action Alternative

If the No Action Alternative is implemented, it is unknown whether the pipeline would cross agricultural or silvicultural lands. However, if this were to occur, the proposed pipeline would be buried beneath any agricultural lands and most agricultural practices could resume following construction. There would be temporary loss of use during construction, but no significant impacts to agricultural lands would result from implementation of the No Action Alternative.

If silvicultural lands are cleared for pipeline construction, re-forestation of the permanent easement could not occur due to maintenance access requirements. Therefore, any silvicultural lands within the permanent easement would likely be converted to some other type of open use, most likely agriculture or grassed utility corridor.

Potential Impacts from Discharge to Lake Lanier

No agricultural or silvicultural lands would be impacted by discharge of reclaimed water to Lake Lanier.

Potential Impacts from Construction

The route selection process ensured that none of the considered routes cross agricultural or silvicultural lands. The routes are under roadways and in transportation/utility ROWs,

where silvicultural practices are excluded by requirements for maintenance access. Therefore, no agricultural and silvicultural lands would be impacted by implementation of any of the considered action alternatives.

5.3.1.3 Solid Waste Landfills

Regardless of whether an action alternative or the No Action Alternative is implemented, operation of the treatment plant will generate biosolids. The quantity of biosolids generated will increase with time as the treatment capacity increases. At present, these materials are sent to waste disposal facilities with low bid contracts awarded on a yearly basis. The biosolids may be disposed of in landfills or processed and sold as soil amendments, at the discretion of the waste management company winning the contract. At present, the Gwinnett County contract is with OMI and the biosolids are disposed of at the Oakgrove Landfill in Barrow County. There would be no change in the biosolids disposal process, regardless of the alternative selected. Because of the process used to secure disposal contracts and the capability of the waste management company to use biosolids as a revenue-generating resource, no significant impacts to solid waste landfills are anticipated.

Potential impacts to solid waste landfills specific to each alternative are discussed below.

No Action Alternative

There would be no significant impact on local landfills from implementation of the No Action Alternative. Typical construction-related debris would be generated and disposed of in local landfills, regardless of where the No Action Alternative is sited. The quantity of debris generated would be similar to the quantities from other general construction projects and would not unduly burden local landfills.

Potential Impacts from Discharge to Lake Lanier

Landfills would not be impacted by discharge of reclaimed water to Lake Lanier. Construction of the outfall structure would generate typical construction-related debris that would be disposed of in local landfills. The quantity of debris generated would be similar to the quantities from other general construction projects and would not unduly burden local landfills.

Potential Impacts from Construction

There would be no significant impact to landfills resulting from implementation of any of the considered action alternatives. Installation of the pipeline would generate typical construction-related debris, regardless of the route chosen. Construction debris would be disposed of in local landfills. The quantity of debris generated would be similar to quantities from other general construction projects and would not unduly burden local landfills. Woody debris from clearing the ROW would be chipped and recycled as landscape mulch. Trees on the lake bottom that currently are in the construction corridor would be disposed of on the lake bottom within the easement boundaries to provide habitat structure for fish and other aquatic organisms.

The portion of the outfall structure in Lake Lanier above elevation 1,060 msl would generate excess material from the trench that would be disposed of in either of two local landfills. This work would take place between stations 10+50 and 12+00 and would generate less than 2,000 cy of excess rock that would be placed into landfills (Table 2-1). This would be a minor impact on local landfill capacity.

5.3.1.4 Hazardous Waste Sites

No Action Alternative

No impacts to hazardous waste sites would be expected to result from implementation of the No Action Alternative. While the pipeline route under the No Action Alternative is unknown, the route selection process would avoid any hazardous waste sites.

No hazardous materials would be generated from construction. However, pipeline construction may involve the use of substances (e.g., paint, epoxy resins) that must be handled and disposed of properly to avoid creating environmental or health hazards. In addition, fuels and lubricants for equipment may constitute an environmental hazard if not properly handled. Contractors would be required to store, handle, and dispose of all potentially harmful materials in a manner consistent with all applicable local, state, and federal laws and regulations and any applicable permit conditions. In addition, contractors would be required to conduct equipment maintenance and refueling in accordance with all applicable laws and regulations and any applicable permit conditions. A spill response plan for fuels and lubricants would be required.

Potential Impacts from Discharge to Lake Lanier

There are no hazardous waste sites in Lake Lanier in the area of the proposed diffuser. Therefore, discharge of reclaimed water to Lake Lanier would not impact any hazardous waste sites.

No hazardous materials would be generated by discharge of reclaimed water into Lake Lanier.

Potential Impacts from Construction

None of the considered pipeline routes cross hazardous waste sites. Therefore, no impacts to hazardous waste sites would result from implementation of any of the considered route alternatives.

Construction of the pipeline and outfall structure in Lake Lanier would have the same potential for generation and use of hazardous materials as the No Action Alternative. Similar control measures would be employed to ensure that all such materials are handled appropriately and to minimize the risk from accidental release.

5.3.1.5 Special Purpose Areas

No Action Alternative

Impacts to special purpose areas would depend on the pipeline route and discharge point selected and cannot be determined with certainty. However, route selection would likely preclude construction impacts to any special purpose areas. Other discharge locations could result in impacts to special use areas. For instance, direct discharge to the Chattahoochee River downstream of Buford Dam could negatively impact the trout fishery in the river. However, with regard to parks, including the Chattahoochee River National Recreation Area (NRA), the route selection process would likely avoid these areas and any impacts.

Future maintenance activities may result in short-term access restriction and construction-related impacts. Any impacts would be confined to the immediate maintenance area and would be temporary and minor, with access restored following completion of the

maintenance activity. No significant impacts would be expected to result from these maintenance activities.

The decision to close Gwinnett County Park to public recreation was made independent of the Proposed Action. This closure would occur under the No Action Alternative.

Potential Impacts from Discharge to Lake Lanier

The diffuser at Location L5 has been designed to have its crown at 965 feet msl with the invert elevation ranging from of 958.5 feet msl to 961.5 feet msl, well below the bottom of the conservation pool for operation of the lake. Should the lake be operated at extremely low levels near the bottom of the conservation pool, use of the lake would not be impacted by operation of the diffuser. However, other natural obstructions in the surrounding areas (e.g., topographic rises, trees) could result in restrictions on public use of the area at these low lake levels that would be unrelated to the diffuser.

Approximately 240 feet of the pipe leading to the diffuser would have a pipe crown elevation at or above 1,035 feet msl (see Drawing G-03 in Appendix D), with crown elevations ranging from 1,035 feet msl to 1,040 feet msl in this area. This section of pipe would be located at and immediately preceding the point where the pipe turns to descend to the diffuser. The ridgeline that the pipe would lie against along this portion of the route extends to 1,041 feet msl. Because the pipe abuts the higher ridgeline, the presence of the pipe crown above 1,035 feet msl would not result in restrictions on public use of the area at low lake levels. The natural obstruction at a higher elevation would be the greater causative factor for any use restrictions.

It should be noted that diffuser Location L4 would result in the diffuser extending above the conservation pool elevation at extremely low lake levels. This location would likely have resulted in restrictions on activities in the vicinity of the diffuser, and the discharge to the lake might be visible and generate roils or bubbles on the surface. The top of the diffuser would be at 1,041.5 feet msl and the diffuser ports would be at approximately 1,038.5 feet msl. At pool elevations very near the bottom of the conservation pool, the diffuser would project from the surface of the lake. Should the vents be exposed at low lake levels, the effluent discharge from the diffuser would fall about 5 feet from the diffuser. The diffuser and adjacent pipe could be considered a navigation hazard at these low lake levels. Locations L1, L2, and L3 are at depths well below the bottom of the conservation pool and would not place constraints on lake use at extremely low lake operation levels.

The Georgia Environmental Protection Division (EPD) has determined that compliance with all National Pollutant Discharge Elimination System (NPDES) permit limits would prevent significant changes in water quality in Lake Lanier (see Section 5.3.9) and in the Chattahoochee River downstream of the lake (see Section 5.3.9.3 below). Potential temperature changes in the hypolimnion (lower depths of the lake) as a result of the discharge could result in minor increases in the discharge at Buford Dam directly upstream of the GA DNR trout hatchery and secondary trout waters in the Chattahoochee River. Analysis of the modeling data (Section 5.3.9.3) indicates that the slight increases would occur in late summer and fall, outside of the spawning period for rainbow and brown trout and that the increases would not exceed the lethal level for these species (see Section 5.3.12.2).

Operation of the reclaimed water discharge diffuser would not impact operation of the Shoal Creek drinking water intake, as the discharge point is remote (approximately 4,300 feet) from the intake point.

Potential Impacts from Construction

Installation of the section of pipe along the bottom of Lake Lanier would limit use of that portion of the lake and nearby areas during construction. This limitation would end following construction and would not constitute a significant impact. Impacts would be in proportion to the length of the route in the lake. All considered route alternatives to reach diffuser Location L5 are identical in the lake and have the same impacts, except Route D, which was eliminated from consideration. (Route D would have doubled the length of construction in Lake Lanier.)

Compared to the routes considered in the Environmental Information Document (EID), the proposed route would have impacts similar to those of the route leading to diffuser Location L2 (approximately 6,000 feet in the lake compared to approximately 5,000 feet in the lake), and it is very similar to the route to L4. The route to Location L1 (the State-preferred route in the EID) would have greater potential impact, with approximately 9,000 feet in the lake. The route to Location L3 would not have crossed Gwinnett County Park, but construction would have been proximate to residential areas and private boat docks would have been denied recreational access to the lake during construction. The impacts of the Preferred Alternative on the use of Lake Lanier would be comparable to those of the alternatives considered in the EID; however, the level of impact to special purpose areas from any of the routes would not be significant.

A portion of the in-lake construction would occur within 200 feet of Lanier Park, with the edge of the easement approximately 100 feet from the park shore. Construction of the reclaimed water pipeline near Lanier Park would occur during normal weekday working hours and not during evenings and weekends when use of Lanier Park would be highest. Recreational boat use would still be possible from Lanier Park, but temporary operating rules may be necessary during the nearshore construction. Weekday use of Lanier Park may increase during construction as additional people come to view the construction. Swimming at Lanier Park would be possible during construction, except during periods of blasting.

Gwinnett County Park has not been open to the public in recent years, due to the lack of a management/maintenance agreement with Gwinnett County or an alternate concessionaire. Because of security concerns over the Gwinnett County drinking water supply intake and pumping station, Gwinnett County Park will now remain closed to public recreation. However, the 21.9 acres of Gwinnett County Park outside the water intake and pumping station area could be available for recreational use should conditions change in the future and the park be reopened to public recreation. Therefore, no significant impacts to Gwinnett County Park would result from any of the considered route alternatives.

Construction activities associated with the reclaimed water pipeline will be located a minimum of 800 feet from the new water supply intake structure. Impacts to operation of the water supply intake during pipeline construction will be avoided and minimized by planning of staging locations to avoid the area of the intake structure and use of turbidity curtains to minimize sedimentation and turbidity impacts. Therefore, impacts to operation of the drinking water supply intake structure will be avoided during construction activities.

Future maintenance activities also would utilize similar mitigative measures to avoid an impact to operation of the drinking water supply intake structure.

Outside of Lake Lanier, none of the considered routes would cross designated special use areas except for Gwinnett County Park. Therefore, installation of the pipeline outside the lake would not result in significant impacts to special use areas, regardless of the route selected. Future maintenance activities along the pipeline routes may result in short-term impacts due to restricted access to public use areas, but these impacts would be confined to the immediate maintenance area and would be temporary and minor. Access would be restored after maintenance activity is completed. No significant impacts would result from these maintenance activities.

5.3.2 Socioeconomic Environment

5.3.2.1 Demography

No Action Alternative

Under the No Action Alternative, reclaimed water would be discharged in a location other than Lake Lanier and would follow a pipeline route that is unspecified at this time. Direct impacts to demography would be similar to those discussed for the discharge to Lake Lanier and the pipeline route alternatives below. Long-term changes in demographics that may result from growth in Gwinnett County and the Lake Lanier area cannot be accurately predicted. However, no significant impacts on demographics in the local area are expected to result from implementation of the No Action Alternative.

Potential Impacts from Discharge to Lake Lanier

The proposed discharge is not expected to significantly degrade water quality or result in reduced property values in the immediate area. The location of the discharge would not cause people to move into or out of the region. Therefore, discharge of reclaimed water to Lake Lanier would have no impacts on demographics. Long-term impacts on demographics through interaction with other projects or through indirect impacts would be similar to those discussed for the No Action Alternative.

Potential Impacts from Construction

Regardless of the route selected, construction of the pipeline would result in temporary disturbance of roadways and utility corridors during construction. These activities would be temporary and would not cause people to move into or out of the region. Therefore, installation of the pipeline would not cause changes in demographics. Long-term impacts on demographics through interaction with other projects or through indirect impacts would be similar to those discussed for the No Action Alternative.

5.3.2.2 Employment

No Action Alternative

Implementation of the No Action Alternative would have direct impacts on employment similar to those discussed for the discharge to Lake Lanier and the pipeline route alternatives below. No significant direct impacts are expected.

Gwinnett County is projected to experience growth and development through at least the next 30 years, regardless of the discharge location for the reclaimed water or whether onsite

systems are used for wastewater treatment. Additionally, growth and development are expected in the Lake Lanier Basin and the surrounding areas, regardless of whether reclaimed water is discharged into Lake Lanier. This growth would result in increased employment in the project region. However, the incremental impact of the No Action Alternative on future employment in Gwinnett County or the Lake Lanier Basin would be minor.

Future maintenance activities would be of a smaller magnitude than the initial construction and would have no significant impacts on employment in the area.

Potential Impacts from Discharge to Lake Lanier

Discharge of reclaimed water to Lake Lanier would neither create nor eliminate jobs. Therefore, discharge of reclaimed water to Lake Lanier would have no direct impacts on employment. Long-term impacts on employment through interaction with other projects or through indirect impacts would be similar to those discussed for the No Action Alternative. Future growth will occur, but the incremental impact of discharge of reclaimed water into Lake Lanier on future employment in Gwinnett County or the Lake Lanier Basin would be minor.

Potential Impacts from Construction

No long-term employment would result from the project, and no jobs would be lost as a result of the project. Regardless of the alternative implemented, there would be direct short-term construction-related employment resulting from installation of the pipeline and outfall structure. The employment of 100 to 150 people for 16 to 19 months in a region of more than 4 million people would not constitute a significant impact to regional employment. Long-term impacts on employment through interaction with other projects or through indirect impacts would be similar to those discussed for the No Action Alternative. Future growth will occur, but the incremental impact of selection of any of the considered pipeline route alternatives on future employment in Gwinnett County or the Lake Lanier Basin would be minor.

5.3.2.3 Wages

No Action Alternative

Implementation of the No Action Alternative would have direct impacts on wages similar to those discussed for the discharge to Lake Lanier and the pipeline route alternatives below. No significant direct impacts are expected.

Future growth and development will occur in Gwinnett County and in the Lake Lanier Basin, regardless of whether the No Action Alternative or any of the considered action alternatives are implemented. This growth will result in increased additional wages in the project region. However, the incremental impact of the No Action Alternative on future additional wages in Gwinnett County or the Lake Lanier Basin would be minor.

Future maintenance activities would be of a smaller magnitude than the initial construction and would have no significant impacts on wages in the area.

Potential Impacts from Discharge to Lake Lanier

Discharge of reclaimed water to Lake Lanier would neither create nor eliminate jobs, nor would it influence wage levels. Discharge of reclaimed water to Lake Lanier would have no

direct impacts on wages. Long-term impacts on wages through interaction with other projects or through indirect impacts would be similar to those discussed for the No Action Alternative. Future growth will occur, but the incremental impact of discharge of reclaimed water into Lake Lanier on future additional wages in Gwinnett County or the Lake Lanier Basin would be minor.

Potential Impacts from Construction

Regardless of the alternative implemented, there would be direct short-term construction-related employment resulting from installation of the pipeline and outfall structure. However, these temporary construction jobs are not anticipated to significantly impact wage factors such as per capita income, persons per household, or median income. The employment of 100 to 150 people for 16 to 19 months in a region of more than 4 million people would not constitute a significant direct impact on wages in the region. Long-term impacts on wages through interaction with other projects or through indirect impacts would be similar to those discussed for the No Action Alternative. Future growth will occur, but the incremental impact of selection of any of the considered route alternatives on future additional wages in Gwinnett County or the Lake Lanier Basin would be minor.

Future maintenance activities would be of a smaller magnitude than the initial construction and would have no significant impacts on wages in the area.

5.3.2.4 Recreation

There are three potential ways the proposed project could impact recreational activities: physical disruption during construction, physical interference by structures after installation, and changes in water quality that would make certain recreational activities impossible. Potential interference with recreational boat traffic is discussed in Section 5.3.4.

No Action Alternative

Impacts to recreational facilities would depend on the pipeline route and discharge point selected and cannot be predicted at this time. It is likely that the No Action Alternative would have impacts similar to those described for the pipeline route alternatives below, except that the No Action Alternative would not cross USACE lands or Lake Lanier and would not impact recreational facilities at the lake. Discharge to the Chattahoochee River Basin below Buford Dam could have negative impacts to the trout fishery there. Recreational fishing in other streams that may be selected to receive the discharge also could be negatively impacted by changes in water volume or temperature. As noted under the discussion of Special Purpose Areas (Section 5.3.1.5), the route selection process would be expected to avoid impacts to the Chattahoochee River NRA.

The decision to close Gwinnett County Park to public recreation and relocate replacement recreational facilities to other adjacent public use areas in Gwinnett County was made independent of the Proposed Action. This closure would continue under the No Action Alternative.

Potential Impacts from Discharge to Lake Lanier

Discharge of reclaimed water to Lake Lanier is not expected to result in impacts on recreation or recreational facilities during normal lake operations. The diffuser would be located more than 3,000 feet from the shoreline and at a depth greater than 100 feet below the normal pool elevation of 1,071 feet msl. The Georgia EPD has determined, through

issuance of an NPDES discharge permit, that the designated use for Lake Lanier (recreation) would not be impacted by discharge of reclaimed water to the lake, provided the NPDES permit limits are met.

Potential impacts on water quality are discussed in Section 5.3.9, which demonstrates that there would be no significant adverse changes to water quality in the lake and no change in designated uses of the lake. Water quality modeling of the reclaimed water discharge to Lake Lanier predicts no significant adverse impacts to water quality that would affect swimming, fishing, or other lake recreational activities. Modeling was based on lake operation guidelines that assume worst-case period of record drought conditions, mandated releases for maintenance of instream flow uses of the Chattahoochee River downstream of the lake, and projected future water withdrawal levels to meet additional needs resulting from growth and development in the area served by Lake Lanier. Additional modeling used an artificial scenario to create conditions where the conservation pool would reach the minimum elevation (1,035 feet msl).

Under extreme climatological and operating conditions, including the artificial conditions used to simulate a lake level of 1,035 feet msl, Lake Lanier is projected to maintain a pool elevation of 1,034.7 feet msl and fecal coliform concentrations of 23 colony forming units (CFUs) per 100 milliliters (mL). This lake elevation is more than 65 feet above the top of the outfall structure and would allow safe passage of personal watercraft and most recreational boats. The standard for fecal coliforms for contact recreational use is 200 CFUs per 100 mL, well above the predicted levels in the lake. Under less extreme climatological and operating conditions, the lake surface elevation would be higher and fecal coliform concentrations lower. As there would be no significant adverse changes to water quality that would impact recreational use of the surrounding waters or nearby public use areas, there would be no significant adverse impacts on recreation or recreational facilities resulting from operation of the proposed project.

As noted in the discussion on impacts to recreational boating, Location L4 could result in physical restrictions to use of the immediate diffuser area during extremely low lake operation levels near the bottom of the conservation pool elevation of 1,035 feet msl.

It should be noted that the diffuser Locations L1, L2, L3, and L5 would be at a substantially greater depth than at Location L4. Because of the greater depth, diffuser Locations L1, L2, L3, and L5 would not impact recreational access to the immediate portions of the lake at extremely low operating levels.

Potential spills at the F. Wayne Hill Water Resources Center (FWHWRC) cannot reach the lake because the treatment facilities are several miles away and lower in elevation than Lake Lanier. Reclaimed water must be pumped to reach the diffuser and cannot flow by gravity into the lake. The topography would convey an uncontained spill at the facility to the Chattahoochee River below Buford Dam (see Section 5.3.9.2 for features that protect the river). Additionally, the FWHWRC is designed with multiple backup processes to prevent untreated or partially treated reclaimed water from being released to the lake. Therefore, no recreational impacts on Lake Lanier are anticipated from accidental spills at the FWHWRC.

Potential Impacts from Construction

Gwinnett County previously received an easement from USACE to construct a drinking water intake facility in Lake Lanier and Gwinnett County Park and to place the line from the intake facility to the water treatment plant across Gwinnett County Park. This project was designed to cross Gwinnett County Park without the need to relocate or remove any of the existing recreational facilities and would have had no long-term impacts on recreation in the park. As originally designed, construction of the proposed outfall pipeline would also have no long-term impacts to recreation at Gwinnett County Park. The considered routes for the pipeline corridor cross through Gwinnett County Park, which is closed at this time and was not planned to be reopened for operation during the construction period. Additionally, any existing recreational facilities within the park impacted by construction activities would be restored following the completion of construction. However, as a result of concerns for increased security at the public water intake facility, the USACE and Gwinnett County agreed to close public access to Gwinnett County Park on a permanent basis. As mitigation for this impact on recreation access to the public use facilities, Gwinnett County has agreed to remove all existing recreational facilities in Gwinnett County Park and construct new recreational facilities in Lanier Park and/or Buford Dam Park. These public use areas are also located in Gwinnett County, and would provide equivalent recreational opportunities. Thereafter, Gwinnett County Park would remain closed to recreational users.

At the time the Proposed Action would be implemented, Gwinnett County Park will no longer be available for recreational use and contain no recreational facilities. The enhanced security measures implemented to protect the drinking water intake will fully constrain future potential recreational use of this area. Therefore, the Proposed Action will not impact recreational use of Gwinnett County Park.

All of the pipeline route options would include construction in Lake Lanier. There would be temporary use restrictions during construction that would prevent recreational use of the project area. A total of 14 acres of the lake surface would be restricted at some time during construction, but the entire 14 acres would not be restricted at any one time. Fourteen acres constitutes less than 0.04 percent of Lake Lanier's surface, and temporary use restrictions in a portion of the 14 acres would not constitute a significant impact on recreational use of the lake. No docks or currently open boat ramps would be obstructed, so boat use would not be unduly constrained. Future maintenance activities may result in short-term impacts, but these impacts would be confined to the immediate maintenance area and would be temporary and minor.

As noted in the discussion of special use areas, a portion of the in-lake construction would occur near Lanier Park. The turbidity curtain would be erected approximately 100 feet from the east shoreline of Lanier Park at its closest point and would be expected to contain suspended solids resulting from construction and prevent excess turbidity adjacent to the park. Construction would occur within 200 feet of the park. Potential impacts to recreational use of Lanier Park would be minimized by timing construction to occur during normal weekday working hours rather than during the times when recreational use of Lanier Park is highest (weekends and evenings). The presence of construction equipment may cause a temporary reduction in aesthetic qualities offered on the east side of Lanier Park. Noise of construction would not be appreciably above the normal noise generated by recreational uses of Lake Lanier, including personal watercraft and recreational boating. Park visitation could

increase during construction as people come to watch the construction. Boat access to Lake Lanier at Lanier Park would not be blocked by construction since the public boat ramp is on the west shoreline of the park peninsula. Recreational boat use in the area would be possible during the nearshore construction but temporary special operating rules may be necessary. Swimming at Lanier Park would be possible during construction, except during periods of blasting.

None of the considered pipeline routes would cross or impact existing recreational facilities away from Lake Lanier. Therefore, no impacts to recreation away from the lake would occur.

5.3.2.5 Environmental Justice

No Action Alternative

Under the No Action Alternative, reclaimed water would be discharged at a location other than Lake Lanier. The discharge point and pipeline route to reach the discharge point cannot be determined specifically. However, it is likely that project design and the route selection processes would avoid disproportional impacts to minority and low-income populations.

Potential Impacts from Discharge to Lake Lanier

The diffuser would be located more than 3,000 feet from the shoreline and at a depth of more than 30 feet below normal pool elevation of 1,071 feet msl. No minority or low-income populations live adjacent to Lake Lanier in the vicinity of the diffuser. Therefore, no disproportionate impacts to minority or low-income populations would occur from discharge of reclaimed water to Lake Lanier.

Potential Impacts from Construction

Routes A and B

No portions of these routes pass through any census block groups designated as minority or low income. Therefore, no disproportionate impacts would result to minority or low-income populations as a result of implementation of these alternatives.

Route C/E

A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than the general population of the larger surrounding area. Census Tract 501.03 Block Group 3 (11.7 percent) and Census Tract 501.05 Block Group 4 (9.3 percent) have higher concentrations of black populations than the other census tracts intersected by Route C/E. However, only a small portion (less than 2 percent of the total length) of Route C/E is located in these census tracts. All impacts of Route C/E would be temporary and minor as a result of construction. There would be no additional impacts after construction. Therefore, Route C/E does not represent a disproportionate impact on minority populations.

Two census tracts with high minority populations (Census Tract 501.05 Block Group 1 [75.1 percent black] and Census Tract 501.10 Block Group 1 [15.5 percent black]) are located adjacent to the tracts intersected by the considered routes. However, Route C/E does not cross these tracts and would not result in adverse impact to these minority populations.

Low-income populations can be identified using the Bureau of the Census' statistical poverty threshold, which is based on income and family size. At the 2000 Census, the poverty threshold for a family of four was an annual income of $17,603 or $8,974 for an individual (U.S. Bureau of Census, 2000). The U.S. Bureau of the Census defines a "poverty area" as a census tract where 20 percent or more of the residents have incomes below the poverty threshold and an "extreme poverty area" as one with 40 percent or more below the poverty level (U.S. Bureau of Census, 1995).

One census tract within the project area is considered a poverty area (Census Tract 501.03 Block Group 3); this tract has a 28 percent poverty rate. However, only a small portion of Route C/E (less than 2 percent of the total length) crosses this area. Additionally, Census Tract 501.05 Block Group 4 has a 13.4 percent poverty rate, which is just slightly above the state average of 12.9 percent but is not considered a poverty area. Route C/E follows the boundary between Census Tract 501.05 Block Group 4 and Census Tract 501.03 Block Group 3 for less than 1 percent of the total length of Route C/E. All impacts from construction of Route C/E would be temporary and minor. There would be no additional adverse impacts after construction. Therefore, Route C/E does not represent a disproportionate impact on low-income populations.

Two other census tracts adjacent to census tracts crossed by the route have poverty levels above the state average; these tracts are Census Tract 501.05 Block Group 1 (15.1 percent) and Census Tract 501.05 Block Group 2 (13.5 percent). However, Route C/E does not cross and would not impact these tracts.

5.3.2.6 Protection of Children

No Action Alternative

Under the No Action Alternative, reclaimed water would be discharged at a location other than Lake Lanier. Potential impacts to children under 17 years of age would depend on the pipeline route and discharge point selected and cannot be predicted accurately at this time. However, project design and route selection should avoid creation of environmental health or safety risks to children under 17 years of age.

Potential Impacts from Discharge to Lake Lanier

The diffuser would be located more than 3,000 feet from the shoreline and at a depth of at least 30 feet below normal pool elevation of 1,071 feet. Discharge through the diffuser would not affect people living on the shore in the vicinity of the diffuser. Therefore, no impacts to children under the age of 17 would result from discharge of reclaimed water to Lake Lanier.

Potential Impacts from Construction

As presented in Table 4-8, the 1990 U.S. Bureau of the Census estimated that 26.5 percent of the population in Georgia included children under 17 years of age. In comparison, children under the age of 17 account for approximately 28.2 percent of the population in Gwinnett County and 29.2 percent in the City of Sugar Hill. The percentage of children living within the project area is relatively high in two census tracts in comparison to the State and County. Census Tract 505.13 Block Group 2 (36.6 percent) and Census Tract 116.08 (37.2 percent) (refer to Table 4-8 and Figure 4-5) have more children (per capita) under the age of 17 than the State, County, or City of Sugar Hill. However, these tracts are adjacent to the proposed route, not crossed by any of the considered routes, and would not be impacted by construc-

tion. Regardless of the pipeline route constructed, there would be no environmental health or safety risks to children under the age of 17.

5.3.3 Community Infrastructure and Municipal Services

5.3.3.1 Roadways

No Action Alternative

Impacts to roadways would depend on the pipeline route and discharge point selected and cannot be determined with certainty. However, route selection would take into account traffic patterns, construction constraints, and available ROW. It is anticipated that impacts to roadways from implementation of the No Action Alternative would be similar to those described for the pipeline route alternatives below and that no significant impacts would result.

Future maintenance activities may result in short-term impacts, but these impacts would be confined to the immediate maintenance area and would be temporary and minor. No significant impacts would result from these maintenance activities.

Potential Impacts from Discharge to Lake Lanier

The proposed discharge would be greater than 3,000 feet from the shoreline, and there are no roadways in the vicinity of the proposed diffuser outfall. Therefore, no impact to roadways would result from discharge of reclaimed water to Lake Lanier.

Potential Impacts from Construction

Construction of the pipeline would have temporary impacts on roads in northern Gwinnett County. It is anticipated that construction of the pipeline would take 16 to 19 months to complete from the FWHWRC through Gwinnett County Park. A single construction crew would do the construction. During construction, potential disruption of local traffic would be limited to the active construction area and normal traffic flow would continue in other areas. During construction beneath roads, traffic would have to be routed around the active construction areas. Effective detours around the active construction would be established and clearly signed to minimize disruption to local traffic.

Portions of the pipeline routes considered are adjacent to roads that typically experience heavy traffic related to the transport of boats to and from Lake Lanier. It is estimated that the construction project will last from late 2007 to mid-2008. Based on this schedule, a portion of one boating season and all of a second could be impacted by construction. The contractor will be required to schedule construction such that the maximum amount of construction in and along high boat traffic roadways would be accomplished during the non-boating season (October to May). This timing of construction would minimize potential traffic problems associated with boat transport. The amount of roadway affected depends on the alternative selected. Estimates of the total length of pipeline to be used in each alternative and the estimated impacts of construction activities on roads and traffic for each route alternative are discussed below.

Future maintenance activities may result in short-term impacts, but these impacts would be confined to the immediate maintenance area and would be temporary and minor. No significant impacts would result from these maintenance activities.

Route A

The entire length of Route A is approximately 51,000 feet, with approximately 28,000 feet in road ROWs and 5,000 feet under roadways. During construction, there would be temporary disturbance to roadways where the pipeline would be placed beneath them. However, the roadways would be repaired to pre-construction condition following construction and no significant impacts would result.

This route has the greatest potential for significant traffic disruption during the heavy recreational boating season. Route A traverses the greatest length of Peachtree Industrial Boulevard, Sycamore Road, and Buford Dam Road. These three roads are all primary routes for boat access to Lake Lanier.

As stated above, effective detours would be established to route traffic around areas where construction would be in roadways. Localized manual traffic control would be used, as necessary, to facilitate the flow of traffic in areas where partial road obstructions would occur.

Route B

The length of this alternative is approximately 51,200 feet, with approximately 28,150 feet in road ROWs and 5,000 feet under roadways. Impacts to roadways would be the same as described for Route A.

This route has an intermediate potential for significant traffic disruption during the heavy recreational boating season compared with the other alternative routes. Route B traverses a shorter length of Peachtree Industrial Boulevard than Route A and comparable lengths along Sycamore Road and Buford Dam Road.

Mitigation measures as described for Route A and for general traffic/roadway situations would be employed to minimize impacts on local traffic flow.

Route C/E

The length of this alternative is approximately 49,500 feet, with about 43,150 feet along road ROWs. Under this alternative, 7,000 feet of pipeline would be placed under roads. Impacts to roadways would be the same as described for Route A.

This route has the least potential for significant traffic disruption during the heavy recreational boating season. While Route C/E has the greatest portion of its length along roadways, it traverses the least distance along roads that serve as main boat transport routes. Route C/E does not follow Peachtree Industrial Boulevard and has the least distance along Sycamore Road and Buford Dam Road.

Mitigation measures as described for Route A and for general traffic/roadway situations would be employed to minimize impacts on local traffic flow.

5.3.3.2 Railroads

No Action Alternative

The pipeline route for the No Action Alternative is unknown. However, should one or more railroad crossings be required, tunnel techniques would be used to avoid impacts to the railroad infrastructure and railroad service.

Future maintenance activity occurring at or adjacent to railroad crossings would be coordinated with the rail company to avoid impacts to railroads.

Potential Impacts from Discharge to Lake Lanier

There are no railroads through Lake Lanier at or near the proposed diffuser location. There would be no impact on railroads or railroad service from discharge of reclaimed water to Lake Lanier.

Potential Impacts from Construction

Each pipeline route alternative crosses under the Norfolk Southern Railway line in or near the City of Sugar Hill. The pipeline would be installed under the railroad using tunnel techniques, and no impacts to the railroad infrastructure or to rail service would result from any of the action alternatives.

Future maintenance activity occurring at or adjacent to railroad crossings would be coordinated with the rail company to avoid impacts to railroads.

5.3.3.3 Water Supply

No Action Alternative

Implementation of the No Action Alternative would have no short-term impacts on water supply. However, implementation of the No Action Alternative could result in future restrictions on water supplies from Lake Lanier in times of extreme drought because the lake would not receive the approximately 44,800 acre-feet of water per year that would be discharged to the lake under the Proposed Action. This could result in greater and more frequent withdrawal restrictions. Furthermore, the No Action Alternative would potentially set a precedent that would restrict future indirect reuse in the region. Such reuse is a key element of the long-term water resource management strategy for North Georgia developed by the Metropolitan North Georgia Water Planning District (MNGWPD) and approved by the Georgia EPD (MNGWPD, 2003a; MNGWPD, 2003b).

Potential Impacts from Discharge to Lake Lanier

Discharge of reclaimed water to Lake Lanier would result in a long-term benefit to water supply. During times of extreme drought, the reclaimed water returned to the lake would provide additional volume in the lake and allow additional water to be withdrawn or released from Lake Lanier for water supply. At the full FWHWRC permitted discharge of 40 million gallons per day (mgd), Lake Lanier would receive an approximately 44,800 acre-feet of additional water per year, which would equate to over 2 feet in lake level during extreme meteorological and operating conditions based on the predictive modeling. Moreover, according the MNGWPD, returning flow to the original water supply watershed is essential to long-term water supply needs of the region (MNGWPD, 2003a; MNGWPD, 2003b).

Because Gwinnett County takes its water supply from Lake Lanier, discharge through the diffuser would increase the release of highly treated reclaimed water into the Chattahoochee River Basin through Lake Lanier and would not constitute an interbasin transfer. As a result, additional water could be maintained in Lake Lanier and released during dry weather periods to supplement the water supply for Chattahoochee River Basin water users downstream or to fulfill other project requirements.

Potential Impacts from Construction

The pipeline route would not transfer water to or from a water supply or water supply customers. Construction of the proposed project would not impact the Gwinnett County water supply intake. The construction and blasting plans have been developed to avoid impacts to the existing water supply pipes where the proposed project pipe would be adjacent to the water supply pipes. The proposed discharge line parallels the intake line in Lake Lanier past the location of the Shoal Creek Water Intake Facility. Along the parallel section, the proposed discharge line is more than 800 feet from the intake line, with more than 600 feet between the location of the turbidity curtain and the intake line. By containing construction activities within the turbidity curtain, no impacts to the water intake would be expected to result. Therefore, the pipeline route selected would have no impact on water supply.

5.3.3.4 Wastewater Treatment

No Action Alternative

Implementation of the No Action Alternative would result in discharge to a receiving water other than Lake Lanier. There would be no direct impact on wastewater treatment capacity resulting from the location of the discharge. However, implementation of the No Action Alternative could have a negative impact on wastewater treatment in surrounding areas. Gwinnett County may not be able to terminate current agreements that result in discharge of Gwinnett County wastewater through facilities in other jurisdictions. These agreements may constrain wastewater treatment options at these other facilities.

Potential Impacts from Discharge to Lake Lanier

Discharge of reclaimed water in Lake Lanier would have no direct impact on wastewater treatment in Gwinnett County. However, discharge in Lake Lanier would have positive impacts on wastewater treatment in surrounding jurisdictions. This discharge would allow Gwinnett County to terminate agreements that result in disposal of some Gwinnett County wastewater at facilities in other jurisdictions. Termination of these agreements would result in increased treatment capacity at these facilities for wastewater produced within each respective jurisdiction and could alleviate the need for capital investment and expansion of facilities in neighboring jurisdictions.

Potential Impacts from Construction

The route selected to deliver reclaimed water to the diffuser would have no direct impact on wastewater treatment. The route selected could result in some potential future reuse options becoming more or less attractive because of the proximity to or distance from the reclaimed water line. However, these options are unknown at this time.

5.3.3.5 Stormwater Management

No Action Alternative

Implementation of the No Action Alternative would have no impact on stormwater management. All construction activities would have to comply with the Georgia Erosion and Sedimentation Act and the Gwinnett County Soil Erosion and Sediment Control Ordinance, as amended November 28, 1995, for stormwater management. Installation, use, and maintenance of appropriate stormwater control best management practices (BMPs) for runoff control and treatment and for site stabilization (see Table 5-3 for representative

examples), as appropriate for specific areas along the route, would prevent impacts from construction-related stormwater. Construction would be done in accordance with the Georgia Rules and Regulations for Water Quality Control, 391-3-6-18. Route selection would avoid impacting any existing stormwater management facilities or BMPs.

Potential Impacts from Discharge to Lake Lanier

Discharge of reclaimed water to Lake Lanier would have no stormwater impacts and no potential to compromise any existing stormwater management facilities or BMPs during implementation.

TABLE 5-3
Representative Best Management Practices and Mitigation Measures
USACE Gwinnett County Diffuser/Pipeline EA

Construction Activity	Potential BMPs and Mitigation Measures[a]
Pipeline Corridor	Sediment barriers (silt fence or straw bales), grade stabilization with seed and mulch, geotextile slope stabilization.
Perennial Stream Crossings	Live stakes, riprap, coir fiber mats, geotextile slope stabilization.
Intermittent Streams Crossings	Riprap, geotextile ground stabilization.
Wetland Areas	Silt Fences, topsoil segregation and replacement, stabilization with seed and mulch; clay plugs, fiber mats for controlling erosion.

[a] BMPs listed in this table are not exclusive; other BMPs that may be more appropriate as determined by site-specific conditions would be used if warranted.

Potential Impacts from Construction

Implementation of any of the pipeline route alternatives would have no significant impact on stormwater management. Construction activities would have to comply with the Georgia Erosion and Sedimentation Act of 1975, as amended, and the Gwinnett County Soil Erosion and Sediment Control Ordinance, as amended November 28, 1995, for stormwater management. Installation, use, and maintenance of appropriate stormwater control BMPs would prevent impacts from construction site stormwater (see Table 5-3 for representative examples). Construction would be done in accordance with the Georgia Rules and Regulations for Water Quality Control, 391-3-6-18. None of the considered action alternatives would compromise any existing stormwater management facilities or BMPs during implementation.

5.3.3.6 Fire, Police, and Emergency Services

No Action Alternative

Impacts to fire, police, and emergency services from implementation of the No Action Alternative are expected to be similar to those described below for the pipeline route alternatives and the same avoidance measures would be used. No significant impacts would result.

Potential Impacts from Discharge to Lake Lanier

Discharge of reclaimed water to Lake Lanier would not obstruct the surface of the lake and would have no impact on fire, police, and emergency services.

Potential Impacts from Construction

During construction of the pipeline, response time for fire, police, or other emergency services may be increased as a result of construction in and along roadways, regardless of the alternative implemented. Potential impacts would be avoided by providing a construction schedule and alternate routes to local fire and police prior to beginning construction activities and by timing construction activities to avoid high traffic periods. Any impacts would be temporary and minor. No significant impacts to fire, police, and emergency services would result from implementation of any of the action alternatives. An emergency response plan would be developed and implemented to facilitate response to any construction site emergencies in the lake.

5.3.3.7 Electric, Gas, and Telephone

No Action Alternative

While the route and discharge point for the No Action Alternative are not known, it is unlikely that impacts to electric, gas, and telephone services would result from implementation of this alternative. Route selection would minimize potential exposure to these resources, and construction techniques would avoid direct impacts to these services by installing the pipeline beneath any existing infrastructure. Verification through One-Call systems would occur prior to any digging. The No Action Alternative would not have the potential for minor positive impacts on hydropower generation that would result under the Proposed Action, as described below, and implementation of the No Action Alternative could result in minor negative impacts on hydropower generation at low lake levels.

Potential Impacts from Discharge to Lake Lanier

Discharge of reclaimed water to Lake Lanier does not involve these utility services and would have no potential to impact electric, gas, and telephone services.

Discharge of reclaimed water to Lake Lanier could have a minor positive impact on hydroelectric power production. Up to an additional 40 mgd would be available for use in meeting peak power demands through hydroelectric power production at Buford Dam. The amount of additional power that could be generated would vary depending on when power was generated, climatological conditions leading up to the time of generation, and whether any of the previously discharged reclaimed water had been retained for a peak release. However, under operating conditions near the conservation pool elevations of 1,070 and 1,071 feet msl, the discharge could generate approximately 10 megawatts (MWs), approximately 1.5 percent of a typical release for electric power production (USACE, 1998b). The minor positive benefit would result from flexibility in addressing all lake operation needs and having the additional water available. Any power produced at Buford Dam would be available to meet needs anywhere in the region because of the interconnected power grid.

Potential Impacts from Construction

During construction of the pipeline, impacts to electric, gas, and telephone services would be avoided. Route selection would minimize potential exposure to these resources, and construction techniques would avoid direct impacts to these services by installing the pipeline beneath any existing infrastructure. Verification through One-Call systems would occur prior to any digging.

5.3.4 Navigation and Recreational Boat Traffic

No Action Alternative

Commercial barge navigation on the lower reaches of the Chattahoochee River and on the Apalachicola River would be less likely to benefit from the No Action Alternative than from discharge of reclaimed water into Lake Lanier. During recent extended periods of drought, releases of water from Lake Lanier to augment commercial barge navigation flows on the Apalachicola River and the Chattahoochee River up to Columbus, Georgia, were curtailed. Under the No Action Alternative, Lake Lanier would not receive the approximately 44,800-acre-feet of water that would be returned to the lake under the Proposed Action. Absent this input, the flexibility to meet other project purposes such as augmentation of flows in support of navigation during low flow periods would likely continue to be limited. Under the No Action Alternative, the reclaimed water may not be discharged into the Chattahoochee River Basin, which would eliminate any potential use of the water to augment navigation flows on the Chattahoochee River and Apalachicola River downstream. Lake Lanier provides 50 percent of the reservoir storage capacity along the Chattahoochee River, with West Point Lake being the only other significant source of water storage (USACE, 1998b). Under the No Action Alternative, if reclaimed water were discharged into the Chattahoochee River Basin, it could be retained only in the downstream reservoirs of West Point Lake and Walter F. George Lake, which would limit the flexibility to augment flows in support of navigation downstream.

There would be no significant impacts to recreational boat traffic on Lake Lanier resulting from implementation of the No Action Alternative. Disruption or delays in recreational boat-transport traffic to and from Lake Lanier may result during installation of the pipeline. As the route is unknown, any impacts to this recreational traffic cannot be determined with accuracy. However, effective detours could be established and clearly identified to route this recreational traffic around construction areas.

There may be impacts to recreational boat traffic on whatever water receives the discharge of reclaimed water, similar to those discussed for the Proposed Action. Such impacts are expected to be limited to the immediate vicinity of the outfall. As the discharge location under the No Action Alternative is unknown, the level and extent of any impacts cannot be specifically determined.

No significant impacts to recreational boat use would be expected to result from implementation of the No Action Alternative.

Potential Impacts from Discharge to Lake Lanier

Discharge of reclaimed water into Lake Lanier is not anticipated to result in any impacts on recreational boat traffic during normal operation levels for Lake Lanier. When there are extremely low water levels, the presence of the outfall structure could constitute a hazard to recreational boat use. However, this threat would be minor. The diffuser and a portion of the outfall pipeline are located on the west side of an underwater ridge line that parallels the shoreline. The diffuser would be located in an area where current bottom elevations range from 1,028 to 1,045 feet msl, with much of the ridgeline above the elevation of the top of the proposed diffuser. Establishing the diffuser bedding will eliminate the currently uneven topography in the immediate area. At the conservation pool minimum (1,035 feet msl), portions of the pipeline and the natural ridgeline would extend above the pool surface, with

the crown of the pipe extending as high as 1,040. feet msl along a section of the route approximately 240 feet long prior to the descent to the diffuser. Bottom features near the exposed pipe extend to 1,041 feet msl, comparable to the height of the pipe. The presence of the pipe among the extant topographic features would not appreciably increase the potential hazard to recreational boat traffic. The diffuser would be almost 70 feet below the lake surface and neither the structure of the diffuser nor the effluent discharge would pose a problem for recreational boat traffic.

Furthermore, the presence of the pipeline, diffuser, and discharge from the diffuser would not constitute a recreational boating hazard during normal operating levels for Lake Lanier. As discussed in Section 5.3.9.1, modeling of the most severe operating conditions under future increased demands for water supply indicates that the pool elevation would remain more than 70 feet above the diffuser, with no potential for impacts to recreational boat traffic.

The presence of the pipe where it is exposed on the lake bottom could interfere with some boating activities. However, the presence of the ridgeline extending to a higher elevation near the pipe would constitute a similar physical hazard to recreational boat traffic as the pipe during extremely low lake levels and this potential impact would exist regardless of whether the pipe is there. Such extremely low lake levels, are unlikely to occur unless significant changes to Lake Lanier operation conditions result from judicial action or other decisions related to resolution of the Apalachicola-Chattahoochee-Flint (ACF) dispute. Any potential impacts from the pipe on the lake bottom would be minimized by appropriate navigation hazard signage for boat safety, and the reduced boat traffic during the low lake levels due to lack of access resulting from dewatered boat ramps.

It should be noted that the diffuser locations evaluated in the EID (L1, L2, and L3) were at depths comparable to that of the proposed location (L5). Because of the comparable depths, these locations would similarly have little or no potential to interfere with recreational boat traffic when the lake is operated at extremely low levels.

For Location L4, some or all of the diffuser vents could be exposed at lake surface elevations near or at the bottom of the conservation pool elevation of 1,035 feet msl. This would result in discharge onto the lake surface (diffuser vents would be at elevation 1,038.5feet msl.). At surface elevation 1,035 feet msl, the flow from the diffuser vents would spray outward and fall on the lake surface approximately 5 feet (1.5 meters) from the diffuser. This spray and the diffuser above the vents would be visible to recreational boaters, allowing them to avoid the area. At higher lake elevations, the spray from exposed vents would travel less than 5 feet (1.5 meters). With vents at or just below the surface, limited surface disturbance in the form of an uneven or broken surface and water movement may be visible within 10 meters (33 feet) of the pipe on the discharge side. As discussed below, the turbulence generated by discharge from the diffuser at maximum discharge velocity would be minimal (see Section 5.3.7.4). Therefore, only minimal surface disturbance would be anticipated from discharge at Location L4 at low lake levels. Because topographic features of the lake bottom in the general vicinity of L4 extend to elevations above the top of the diffuser, and because the amount of recreational boating would be curtailed under extremely low lake levels, this minor surface disturbance would not be expected to constitute a significant impact to recreational boating.

Discharge of reclaimed water into Lake Lanier would have the potential for positive impacts on commercial barge navigation in lower reaches of the Chattahoochee River and on the Apalachicola River. Lake Lanier provides 50 percent of the reservoir storage capacity along the Chattahoochee River, with West Point Lake being the only other significant source of water storage (USACE, 1998b). With discharge of reclaimed water into Lake Lanier, the additional stored water could be available for release through Buford Dam to augment downstream navigation flows. Additionally, reclaimed water released through Buford Dam for purposes other than navigation flow augmentation would still have the potential to be retained in West Point Lake or Walter F. George Lake downstream for later use as downstream flow augmentation.

Potential Impacts from Construction

Installation of the pipeline in any of the alternative locations would have minor short-term impacts on recreational boat traffic. The turbidity curtain would be deployed to isolate the active portion of the lake work site for the duration of construction activities in that area. This would result in temporary use restrictions at the work site as construction proceeds. It is estimated that this restricted area would be approximately 5 acres at a time (less than 0.02 percent of the lake's surface) and any impacts would be temporary and minor. Any impacts that would result from construction activities would end once construction is completed.

Following placement of the pipe, excavated material not used for backfill would be distributed within the pipeline easement. Initial placement of excess material would parallel the pipe and extend away from the pipeline corridor for a width of approximately 50 feet. After this initial placement, the excess excavated material would be allowed to spread downslope across the easement. The depth of this material would vary from a few inches to 4 feet (see Figures 2-4 through 2-7), as placed, with most areas receiving less than 1 foot of cover. Even with localized areas of increased depth, the thickness of the excess excavated material left on the lake bottom would not produce noticeable impacts on recreational boat traffic.

It is possible that some of the excess material would migrate outside the easement. However, the easement boundary would be located approximately 35 feet beyond the end of the area where excess material would be placed. Most migration of the excess excavated material would be confined within that area. Any of this material that may migrate beyond the easement boundary would likely be minor in volume and the migration would be downslope of and at greater depth than the outfall structure. Therefore, this material would not constitute a significant impact on recreational boating.

As discussed above, special operating rules for recreational boaters at Lanier Park may be required when construction is occurring within 200 feet of the shore of Lanier Park. However, construction in this area would not stop recreational boat use by Lanier Park visitors.

Disruption or delays in recreational boat traffic to and from Lake Lanier may result during installation of the pipeline. Effective detours would be established and clearly signed to route this recreational traffic around construction areas. No significant impacts to recreational boat use would be expected to result from this activity.

Construction activities would not cause water to be retained in or discharged from Lake Lanier. Therefore, construction would have no impacts on commercial navigation in the lower reaches of the Chattahoochee River or on the Apalachicola River.

5.3.5 Historic and Archaeological Resources

No Action Alternative

Impacts to historic and archaeological resources would depend on the pipeline route and discharge point selected and cannot be predicted at this time. It is likely that the project area would be surveyed and would be designed to avoid significant historic or archaeological resources.

Potential Impacts from Discharge to Lake Lanier

There would be no impacts to historic and archeological resources resulting from discharge of reclaimed water into Lake Lanier.

Potential Impacts from Construction

Routes A and B: One house potentially eligible for the NRHP is located at 5414 Sycamore Road. The house is considered a good example of what was once a common architectural type in the area and for this reason is considered potentially eligible for the NRHP. There are many tall trees located on the property, and three trees border the road ROW. The structure is located along Routes A and B. The pipeline corridor could follow a route along the west side of Sycamore Road that would necessitate the removal of the three trees located in the front yard. Since the construction of the pipeline would be limited to the previously disturbed Sycamore Road ROW and the line would be underground, there would be no adverse effect to the house itself. Removal of the trees, however, could result in an adverse effect on the resource by impacting its viewshed. This impact could be avoided by placing the pipeline on the opposite side of the street, thereby avoiding the trees and property entirely. Discussions with the SHPO would be required to determine the eligibility of the property and the level of any potential impact if Route A or B were selected. If the impact cannot be avoided, a Section 106 compliance document would have to be prepared.

Route C/E: There would be no impact on the ineligible resources (GW-3, -4, -7, and -8) and no adverse effect on the potentially eligible resources (GW-5 and GW-6) because the pipeline would be buried within the existing ROW of Sycamore Road. To prevent impact to the eligible resources GW-1 and GW-2, avoidance is recommended. Project plans indicate that GW-2 would be avoided by tunneling the pipeline under the railroad bed. GW-1 is within the ROW of the proposed pipeline corridor and could be affected by construction of the line. If project plans change and GW-1 and -2 cannot be avoided, mitigation of the impacts to these resources would be required.

Areas surveyed fall predominantly within locations that have been previously developed or otherwise disturbed. In the portion of the corridor that was considered undisturbed, no archeological sites, isolated finds, or historic structures were found. The portion of the Southern Railroad crossed by the route and parallel to the project corridor would not be impacted under current plans for pipeline construction. Based on the results of this survey, clearance is recommended for this route. Route C/E is the route of the Proposed Action.

5.3.6 Climate

None of the activities proposed under any of the action alternatives or the No Action Alternative have the potential to significantly impact climate. The temporary increases in air emissions from construction equipment during installation of the effluent pipeline and outfall diffusion should not result in any significant contribution to global climate change. Therefore, no impacts to climate would result from discharge to Lake Lanier or implementation of any of the considered action alternatives or the No Action Alternative.

5.3.7 Soils, Sediments, and Geology

5.3.7.1 Geology

All work to install the pipeline would be done without deep intrusion into geologic formations. Only minor blasting of rock is projected to occur within isolated portions of the pipeline corridor trench. No significant impacts to geology would result from implementation of any of the considered action alternatives or the No Action Alternative.

5.3.7.2 Upland Soils

No Action Alternative

Short-term impacts to upland soils would result from implementation of the No Action Alternative. Soil disturbance could result in temporary impacts to water quality due to erosion and sedimentation. However, potential impacts would be controlled and avoided through the use of appropriate BMPs (see "4.2.3.4 Stormwater Management" above) and soil stabilization/revegetation techniques following construction. Appropriate BMPs would be selected based on site-specific conditions. Representative BMPs are listed in Table 5-3 and include, but would not be limited to, sediment barriers (silt fence or straw bales), grade stabilization with seed and mulch, and geotextile slope stabilization.

Potential Impacts from Discharge to Lake Lanier

There are no upland soils in the vicinity of the proposed diffuser. Therefore, discharge of reclaimed water to Lake Lanier would have no impact on upland soils.

Potential Impacts from Construction

Construction of the proposed pipeline would result in the temporary displacement of soils under any of the considered alternatives. Soil disturbance could result in temporary impacts to water quality due to erosion and sedimentation. However, potential impacts would be controlled or avoided through the use of appropriate BMPs, as discussed in relation to stormwater management, and soil stabilization/revegetation techniques following construction. Appropriate BMPs would be selected based on site-specific conditions. Representative BMPs were listed in Table 5-3 and include, but would not be limited to, sediment barriers (silt fence or straw bales), grade stabilization with seed and mulch, and geotextile slope stabilization.

5.3.7.3 Prime or Unique Farmland

No Action Alternative

Impacts to prime farmland cannot be fully predicted but are unlikely, regardless of pipeline route or discharge location, as the route selection process would likely avoid these areas.

Additionally, any prime or unique farmland crossed by the pipeline could continue to be farmed after installation of the pipeline.

Potential Impacts from Discharge to Lake Lanier

There is no prime farmland in Lake Lanier at the proposed diffuser location or on adjacent shoreline areas. Therefore, no impacts to prime farmland would result from discharge of reclaimed water into Lake Lanier.

Potential Impacts from Construction

No prime farmlands have been mapped along any of the pipeline routes. Therefore, no impacts to prime farmland would occur from construction.

5.3.7.4 Lake Lanier Bottom

No Action Alternative

The No Action Alternative would avoid Lake Lanier. Therefore, no impacts to the Lake Lanier bottom would result from implementation of the No Action Alternative.

Potential Impacts from Discharge to Lake Lanier

The diffuser pipe would rest on gravel pipe bedding extending approximately 12 feet from the diffuser pipe on each side. The diffuser ports would be a minimum of 3 feet above the bedding. The diffuser will be placed along the downslope side of an underwater ridgeline. Discharge ports will be placed only on the side of the diffuser away from the ridge and be directed up and away from the lake bottom. The lake bottom slopes down and away from the discharge. This design promotes mixing within the water column while keeping the zone of mixing away from the lake bottom.

Even at the maximum permitted discharge of 40 mgd (61.8 cubic feet per second [cfs]), turbulence generated along the 610-foot diffuser would be minimal under normal operating conditions and would not significantly disturb the surrounding sediments. To test this, the model was run under the most extreme conditions foreseeable with maximum discharge velocity, maximum density of the discharge compared with the lake (during late summer), and location of the diffuser closest to the lake bottom.

- Maximum discharge velocity of 5.34 m/sec (17.5 feet/sec).
- Greatest temperature differential between effluent (colder) and the lake (warmer), so that the plume has the tendency to sink) at the location of the diffuser on August 13, 2002.
- Location on the diffuser where the port is closest to the lake bottom. The initial elevation of the centerline of the plume above the lake bottom varies along the diffuser since the diffuser pipe changes in diameter sequentially from 72 inches to 36 inches along its length. The lowest height above the bottom of the plume is associated with the discharge from a port in the side of the 36-inch diameter diffuser. There, the centerline of the jet is 1.2 m (47.25 inches) above the lake bottom. However, the lake bottom also has an average 16 percent slope in the direction of the discharge. The downward bottom slope causes the depth separation between the discharge plume and the lake bottom to increase with increasing distance away from the port.

The UMERGE3 model simulation demonstrates that the plume is nearest the bottom approximately 9.3 meters (30.6 feet) from the discharge port, and at this point the plume

remains 0.51 meter (1.67 feet) above of the top of the sediments. Furthermore, the diameter of the plume at that point is about 3.6 meters (11.8 feet) and the dilution is 33 to 1, with turbulence confined to the mixing within the plume. Therefore, the minimal turbulence in the immediate vicinity of the diffuser would not disturb the surrounding sediments, even under the most extreme conditions foreseeable.

Modeling of sediment quality parameters (nutrients, sediment oxygen demand, particulate organic matter, and metals) determined that impacts of the discharge to sediment habitats would be minor and insignificant (LimnoTech, Inc., and Edinger Associates, 1998). Therefore, no significant impacts to the Lake Lanier bottom would result from discharge of reclaimed water through the diffuser.

Potential Impacts from Construction

The pipeline would be constructed using three methods depending upon lake bottom contours:

- Trenching into the sediments and burying the pipeline at both nearshore and at other locations.
- Benching into side-hills.
- Placing the pipeline directly on gravel fill on the lake bottom.

Trenching activities would be employed in nearshore areas above bottom elevation of 1,045 feet msl and at other locations along the pipeline, as required. Trenching would result in resuspension of some solids during construction. These impacts would be controlled through the use of sediment curtains placed around the pipeline trench during installation. In areas where the pipe is benched into a side-hill or placed on the lake bottom, there also would be some resuspension of solids as the pipe bed is prepared. For these activities also, sediment curtains would be used to control movement of sediments into the lake. Following installation, bottom contours would be returned as near as practicable to pre-installation conditions. Any impacts would be temporary and minor; no significant impacts to the lake bottom would result from installation of the pipe.

During the trenching operation, excavated material will be side-cast downslope. After the pipe is installed, most of the excavated material will be returned to the trench (see Figures 2-3 and 2-5. When benching into a side-hill, the excavated material will be side-cast downslope and left within the easement (see Figure 2-4). The areal extent of the excavated area would be approximately 10 acres, with an additional 7.5 acres minimally impacted with side-cast material. Any excavated material that could not be returned to the trench would remain within the easement and be allowed to spread downslope within the easement. The initial placement and likely migration of this material was described in Section 5.3.4.

The thickness of the excess excavated material left on the lake bottom is not expected to constitute a significant impact to the lake bottom and, with time, this material will resemble other bottom features. It is possible that some excess material would migrate outside the easement, as described in Section 5.3.4. However, any amount that would extend past the easement is expected to be minor and not constitute a significant impact on the lake bottom.

TABLE 5-4
Excavation Conditions and Footprint of Gravel Bedding Quantities for Installation of Pipeline and Diffuser in Lake Lanier
USACE Gwinnett County Diffuser/Pipeline EA

Pipeline Station Interval		Gravel Bedding				Lake Bottom Cut for Pipe Placement		
Start	End	Width (feet)	Length (feet)	Area (sf)	Volume (cy)	Volume Cut (cy)	Volume Permanently Side-cast (cy)	Excavation Condition Reference[a, b]
10+50	14+00	10	350	3,500	650	7,546	1,891	Nearshore Trench
14+00	34+00	30	2,000	60,000	11,110	25,735	25,735	Daylight Side-Hill
34+00	37+00	35	300	10,500	1,945	856	856	Fill
37+00	42+00	30	500	15,000	2,780	12,106	12,106	Daylight Side-Hill
42+00	43+00	40	100	4,000	740	695	695	Fill
43+00	45+00	30	200	6,000	1,110	2,627	2,627	Daylight Side-Hill
45+00	45+50	35	50	1,750	325	162	162	Fill
45+50	47+00	30	150	4,500	835	500	500	Daylight Side-Hill
47+00	47+50	35	50	1,750	325	129	129	Fill
47+50	49+00	30	150	4,500	835	719	719	Daylight Side-Hill
49+00	50+00	35	100	3,500	650	178	178	Fill
50+00	53+00	30	300	9,000	1,670	2,255	2,255	Daylight Side-Hill
53+00	54+00	35	100	3,500	650	721	721	Fill
54+00	70+50	30	1650	49,500	9,170	36,853[c]	8,331[c]	Daylight Side-Hill
70+50	72+50	35	200	7,000	1,300	860	860	Fill
72+50	73+50	30	100	3,000	555	273	273	Daylight Side-Hill
73+50	74+00	30	50	1,500	280	90	90	Fill
74+00	75+50	30	50	1,500	280	76	76	Daylight Side-Hill
75+50	75+75.2	30	25.2	756	140	13	13	Fill
			Total	187,256	35,350	92,394	58,217	
				4.3 acres				

[a] Side Slope Excavation 3:1(V:V)
[b] Figure 2-4 depicts the nearshore trench condition, Figure 2-5 depicts the daylight condition side-hill excavation, Figure 2-6 depicts the thrust mound configuration, Figure 2-7 depicts the trench condition side-hill excavation, and Figure 2-8 depicts the fill condition.
[c] Pipe trench partially backfilled for slope stability.

In fill areas, gravel bedding is placed directly on the lake bottom. The footprint of the gravel bedding will occupy approximately 4.3 acres. Table 5-4 indicates the areal extent of gravel bedding that will be required to place the pipe. Thickness of the gravel bedding will vary from 1.5 feet in most side-hill daylight applications to up to 6 feet, with most areas requiring less than 2 feet. Impacts to wetlands and other aquatic communities from trenching and side-casting for construction of the pipeline away from the lake are discussed in Section 5.3.10.2.

It may be necessary to use blasting to create the trench near the point where the pipeline enters Lake Lanier. Should blasting be required in this area, the contract documents that will be prepared for this project will address blasting in areas proposed for trenching and burial of the reclaimed water and/or outfall pipeline. Provisions will be made to require the contractor to prepare a general blasting plan that describes all proposed blasting. From the general blasting plan, a detailed blasting plan will be developed to address:

- Location, number, diameter, and depth of blast holes
- Explosives used
- Delay sequencing
- Type and manufacturer of all explosive materials
- Safety
- Communications; and
- Any other pertinent or required information.

Both plans will meet the general requirements of the USACE blasting specifications and be submitted to the USACE for approval prior to use of blasting on the project. The blasting procedures employed will be similar to those used on the Shoal Creek Water Intake Facility, also located in the Gwinnett County Park easement, which was developed in cooperation with USACE and resulted in no noise and structural damage complaints. BMPs for underwater blasting include the following:

- Notification of the USACE 24 hours before each underwater blast.
- Peak water overpressure pulse shall not exceed 50 pounds per square inch (psi) at 100 feet from the blast.
- If the pulse exceeds 50 psi, the contractor will conduct blasting inside a bubble curtain containing two rows of bubbler pipes.

After blasting and installation of the pipe, the bottom surface would be restored, as near as practicable, to pre-installation contours. Blasting should not be required in other areas where the pipeline would be installed.

During construction, temporarily side-cast excavated material would be piled as high as elevation 1,064 feet msl inside the turbidity curtain. After construction, any excess excavated material from the lake bottom remaining after backfilling the trench that extends above elevation 1,060 feet msl will be transported to local landfills for disposal or relocated to deeper parts of the lake and allowed to spread downslope to minimize impacts to recreational boating or fish spawning. Any excess excavated rock materials will either be left in the easement, used as pipe bedding, or (if near the shore), hauled offsite or relocated to a location within the easement below an elevation of 1,035 feet msl so as not to impede boat

travel or present a navigation hazard to recreational boaters. Other excess excavated material will be placed in the easement and allowed to spread below 1,060 feet msl.

Some limited disturbance may result from future pipe maintenance, but any such disturbances would be confined to the area where maintenance is performed. Any impacts would be temporary and minor and would not constitute significant impacts to the lake bottom.

5.3.8 Air Quality

No Action Alternative

Implementation of the No Action Alternative would have impacts to air quality similar to those discussed for the pipeline route alternatives discussed below. No significant impacts to air quality would be expected to result.

Potential Impacts from Discharge to Lake Lanier

Discharge from the diffuser under normal lake operating conditions would be subsurface and not interact with the atmosphere. Therefore, no impacts to air quality would result from discharge of reclaimed water to Lake Lanier. Locations L1, L2, and L3 are at similar depths and also would not impact air quality.

If Location L4 were used for the diffuser, the diffuser would discharge into the air at a low trajectory at extremely low lake levels near the bottom of the conservation pool (elevation 1,035 feet msl). Particle size would be sufficiently large to prevent atomization of the discharge and the discharged water would mix with the lake water. This would not constitute an impact to air quality.

Potential Impacts from Construction

Construction of any of the pipeline route alternatives would be similar to other moderate-sized construction projects in terms of impacts to air quality. Short-term discharges would result, but no significant increases in vehicle emissions or associated air quality impacts are anticipated. Construction activities could generate fugitive dust, but impacts would be limited through the use of appropriate BMPs to minimize fugitive dust production.

Emissions from heavy equipment during dry land construction would generate sulfur oxides (SO_x), nitrogen oxides (NO_x), and particulate matter greater than 10 microns (PM_{10}) emissions. However, these discharges would be temporary and not result in significant impacts in or near the project area. No cumulative or long-term impacts would occur under these alternatives.

Emissions from dredges, barges, and other equipment during lake construction would generate SO_x, NO_x, and, PM_{10}. This would result in short-term discharges in and near the project area. Significant impacts would be avoided through timing of construction activities to avoid any severe air quality alert days. No cumulative or long-term impacts would occur under these alternatives.

Mitigation measures for short-term impacts include properly maintaining equipment, reducing the amount of equipment involved to the extent possible, so that (where applicable) equipment is not left idling for prolonged periods, and using dust control BMPs.

5.3.9 Surface Water Hydrology and Water Quality

The following sections provide a detailed evaluation of the proposed project alternatives on the hydrologic and water quality conditions in Lake Lanier. This section includes a discussion of the water quality modeling conducted at diffuser Locations L4 and L5, with results followed by discussions of potential impacts on water quality.

5.3.9.1 Modeling Results

Modeling was done to simulate potential future conditions in Lake Lanier as a basis for comparison of alternatives considered in this EA. Modeling is a necessary component to this study effort. It is an invaluable tool that allows for the determination and analysis of impacts resulting from proposed changes or hypothetical situations. Modeling provides an estimate of possible conditions and is not intended as an exact predictor. To provide an estimate of future conditions reflecting projected future water demands, a hypothetical operational condition was simulated that provides for increasing the release of water through the hydropower generation turbines to meet anticipated water quality requirements and projected downstream increases in water supply demand. The simulated operating conditions do not purport to represent any particular proposed change in reservoir operations. Further detailed study and public coordination would be required before any actual changes in lake operating conditions or reallocations for future water supply could be implemented. The same modeling scenarios were used to predict potential changes in hydrology and water quality.

The Lake Lanier Management Tool (the watershed model GWLF and the water quality model CE-QUAL-W2 bundled into an integrated system) was used to model the effect of the proposed 40-mgd discharge on Lake Lanier hydrology and water quality. The model was applied using the 1984 to 1988 meteorological period (following a comparative analysis which determined that this drought period was more severe than the 1998 to 2002 drought period). The following scenarios were modeled.

- **Baseline –** 1984-1988 extreme conditions meteorology, current water withdrawal rates, and existing discharges only.
- **Scenario A –** 1984-1988 extreme conditions meteorology, current water withdrawal rates, and existing discharges plus 40 mgd additional discharge at Location L5. The discharge temperature is assumed to be 26°C during summer months, and existing dam operation rules that ensure a minimum discharge of 600 cfs are used. In addition, the total phosphorus (TP) loading at the Gainesville #2 Wastewater Treatment Plant (WWTP) was decreased to offset the load from the proposed discharge and maintain a constant TP load to the lake.
- **Scenario B –** Increased withdrawal. Same as Scenario A, except that drinking water withdrawals from Lake Lanier are increased to match the Georgia EPD's forecast for 2030 withdrawal for the Chattahoochee River from headwaters to Buford Dam. Note that the incorporation of increased water withdrawal is conservative in that the forecast withdrawals are all being modeled as taken from the lake, when in fact some of these withdrawals occur above the lake in tributaries.

- **Scenario C –** Increased withdrawals and hypothetical revised dam rules. Same as Scenario B except that revised conceptual operating rules for Buford Dam were incorporated in the model. These rules are estimates of potential operating guidelines and generally call for increased releases to meet downstream water quality and withdrawal needs, especially in times of drought. In the model, the increased releases for downstream needs are passed through the hydropower turbines and therefore result in increases in the hydropower generation schedule. So for modeling purposes, only the hydropower requirement was changed to meet the downstream water quality and water supply demands. The lake elevation is divided into five zones for modeling purposes: Flood Zone above 1,071.0 feet msl; Zone 1 from 1,071.0 feet msl to 1,068.0 feet msl; Zone 2 from 1,068.0 feet msl to 1067.0 feet msl; Zone 3 from 1,067.0 feet msl to 1,065.0 feet msl; and Zone 4 below 1,065.0 feet msl. Each zone has different operating rules for releases and hydropower generation. Zones 2 through 4 are considered drought mode for modeling purposes.
- **Scenario D –** No Action. Same conditions as Scenario C, except no Gwinnett discharge to Lake Lanier (point source loads revert to the permitted point source loads to the lake prior to the issuance date for Gwinnett County's NPDES discharge permit).
- **Scenario E –** Minimum lake elevation. This scenario is the same as Scenario C, except that drinking water withdrawals from Lake Lanier are increased to bring simulated lake levels down to 1,035 feet msl. This provides a representation of critical conditions corresponding to drought or other extremes that deplete the store of water in the reservoir.

The potential water quality impacts of the discharge on Lake Lanier were evaluated using two advanced water quality models: CE-QUAL-W2 and UMERGE. The model CE-QUAL-W2, originally developed by the USACE and customized for simulation of Lake Lanier, uses complex mathematical relationships to project the water quality of the entire lake, with results available for various segments of the lake. The model uses historical information including rainfall, temperature, inflow, sunlight days, and inflow water quality. The model is then run both with and without the discharge using a historical period (in this case 1984-1988) when the lake was under the stress of extreme drought conditions (or critical drought period). The model calculates the interaction of many variables to estimate parameters in the lake such as temperature, dissolved oxygen (DO), algae growth (represented by chlorophyll *a*), phosphorus, nitrogen, and pH.

The UMERGE model, developed by the U.S. Environmental Protection Agency (EPA), was used to simulate how the water from the discharge moves near the diffuser as it releases into the lake. Two versions of the model were used in the analysis: TSMERGE for the diffuser temperature simulation, and UMERGE3 for the sensitivity analysis. Both use information such as water temperature, water depth, velocity and direction of currents, and temperature of the reclaimed water. They then use complex mathematical formulas to simulate how the water would move, disperse, and mix with the surrounding lake water. The results include the dilution at various distances from the diffuser and the temperature. The model is used both to project the effect of the discharge on the lake in the immediate vicinity of the diffuser and to design the diffuser efficiently.

Surface Water Hydrology Modeling

Modeling results for lake elevation (average elevation and range of elevations, in feet msl) for the Baseline Scenario and Scenarios A, B, C, D, and E are discussed in the following sections and summarized as follows:

- Baseline: 1,063.6 (range 1,048.8 – 1,072.9)
- Scenario A: 1,068.3 (range: 1,061.7 – 1,073.4)
- Scenario B: 1,067.0 (range: 1,058.2 – 1,073.3)
- Scenario C: 1,063.8 (range: 1,047.9 – 1,074.9)
- Scenario D: 1,063.2 (range: 1,045.8 – 1,075.3)
- Scenario E: 1,056.8 (range: 1,034.7 – 1,074.9)

The addition of the proposed 40-mgd discharge to Lake Lanier would raise the mean lake level over the simulation period by 4.7 feet (compare Baseline to Scenario A). Minimum lake levels show a more pronounced effect, rising by 12.9 feet from Baseline to Scenario A. Maximum lake levels for Scenario A increase only slightly, by 0.5 foot. This comparison shows the immediate impact of implementation of the Proposed Action (Scenario C) under current water supply demands and current operation conditions. However, the additional returns to Lake Lanier would be accompanied by increased water supply demands from the lake, as well as increased releases over time to meet downstream water withdrawal needs, which are not measured by Scenario A.

Scenario B attempts to measure the impact of the additional future water supply demands from Lake Lanier on lake elevations. Increased water withdrawal at the EPD-projected 2030 demand is predicted to lower mean lake elevation by about 1 foot for the simulated conditions (compare Scenario B to Scenario A). Minimum lake levels show a more pronounced effect, dropping by 3.5 feet from Scenario A to Scenario B.

The hypothetical revised dam rules included in Scenario C, which result in increased releases from the lake to meet projected downstream water supply and water quality needs, further lower predicted water levels. Scenario C represents the Proposed Action under these projected future water supply demands and hypothetical operation conditions. The mean lake level over the simulation period drops by 3.2 feet (compare Scenario B to Scenario C). Minimum lake levels show a more pronounced effect, dropping by 10.3 feet from Scenario B to Scenario C.

Scenario D (without the discharge, but with projected 2030 withdrawals and hypothetical dam operating rules used in Scenario C) results in a mean lake level 0.6 foot less than the Proposed Action (Scenario C). Scenario D represents the No Action Alternative for comparison with Scenario C under future water supply demands and hypothetical future operation conditions. The minimum predicted lake level for the No Action Alternative (Scenario D) is 2.1 feet lower than that for the Scenario C. The maximum lake level for the Scenario D is 0.4 foot higher than Scenario C.

Scenario E (artificial conditions to force the lake to the minimum conservation pool elevation) results in a mean lake level 7 feet lower than Scenario C under the climatological conditions modeled. The minimum lake level is just below the conservation pool minimum (1,034.7 feet msl compared to 1,035 feet msl). The maximum lake level under these artificial conditions is the same as for the Proposed Action.

The simulated lake levels shown in Scenarios C, D and E have not occurred in the available historical record. Since filling of the pool in 1956-1959, the lowest May-October lake levels were 1,054.85 (1986 to 1987) and 1,055.61 (2000 to 2001). The lowest Lake Lanier pool level recorded in the 1998-2002 drought was 1,055.6 feet msl.

5.3.9.2 Potential Hydrology Impacts of Considered Alternatives

No Action Alternative

Implementation of the No Action Alternative would have less potential benefit to hydrology than the considered action alternatives. Under the No Action Alternative, additional input of reclaimed water would not be retained within Lake Lanier to augment lake levels, and may not be discharged into the Chattahoochee River Basin. Nor would the additional water within Lake Lanier be available for releases through Buford Dam for downstream water supply or to augment river flows for other purposes, such as navigation, downstream hydropower generation, or riverine fish and wildlife conservation purposes. The resulting minimum lake levels during drought were 3.3 feet lower for the No Action Alternative than the Baseline Scenario, with the mean lake level being 0.4 foot lower than the Baseline Scenario. Water would be less available for reuse within the region under the No Action Alternative.

In the event the discharge of treated wastewater is returned to the Chattahoochee River Basin below Buford Dam, the returned water would potentially still be available for downstream water supply needs, and could still be retained in lower reaches within the Chattahoochee River Basin (i.e., West Point Lake and Walter F. George Lake). However, the water could not be stored in the upper Chattahoochee River Basin; this would be inconsistent with the MNGWPD plans and would have less water resources value because its use or release for use could not be timed when it would be most needed for beneficial use, hydropower, or water supply needs.

Depending on the receiving water for an alternative outfall location, there could be negative impacts to hydrology resulting from too much water passing through a small stream channel.

Potential Impacts from Discharge to Lake Lanier

The contribution of 40 mgd (61.8 cfs) of reclaimed water to Lake Lanier would have a positive impact on the volume of water in the reservoir. At the full permitted discharge of 40 mgd, Lake Lanier would receive an additional 44,800 acre-feet of water per year. The potential impact of this discharge on lake hydrology was modeled, and the impacts of discharging 40 mgd to Lake Lanier were compared to the No Action Alternative (no discharge to Lake Lanier under conceptual operations to meet future increased water supply demands) and to Baseline (current operations and water demand conditions and no discharge to Lanier).

The modeling predicted that the minimum lake elevation under the No Action Alternative due to anticipated future increases in demands for water supply from the lake (Scenario D) would be 1045.8 feet msl. This can be compared to a predicted minimum lake elevation of 1047.9 feet msl for the proposed discharge of 40 mgd to Lake Lanier under future increased demands for water supply from the lake (Scenario C). This would equate to the benefit of increased lake levels of over 2 feet during extreme dry meteorological conditions and

associated drought operations for projected future demand conditions (i.e., increased water supply demands for the year 2030).

The modeling predicted that the minimum lake elevation under the Baseline Scenario due to current demands for water supply from the lake and current operations rules to meet project purposes would be 1048.8 feet msl. This can be compared to a predicted minimum lake elevation of 1061.7 feet msl for the proposed discharge of 40 mgd to Lake Lanier (Scenario A). This equates to increased lake levels of almost 13 feet during extreme dry meteorological conditions if withdrawals and dam operations rules remain static.

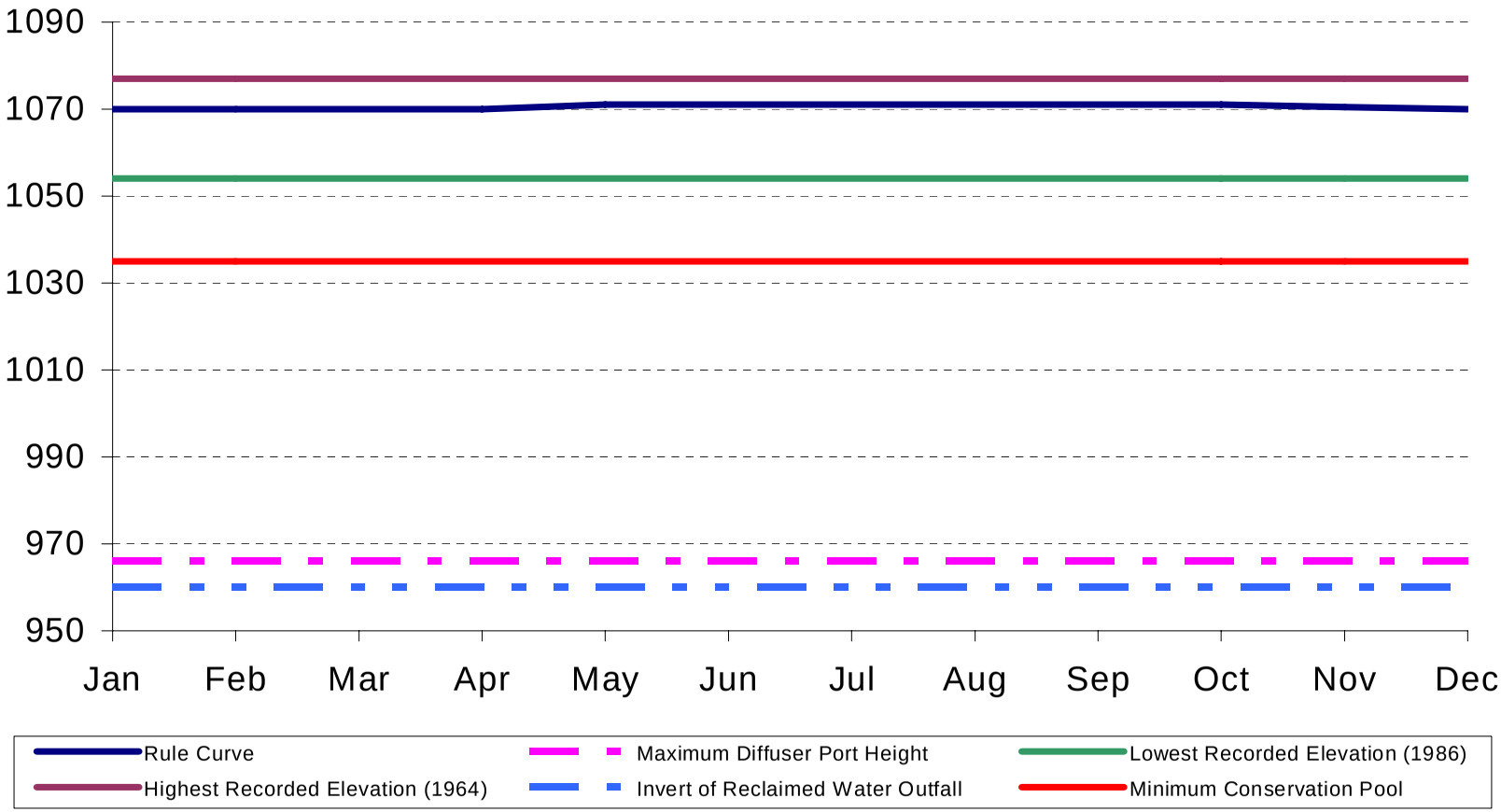
Modeling under the artificial conditions to force a lake elevation equal to the minimum conservation pool produced minimum lake levels more than 14 feet below the Baseline Scenario and more than 13 feet below the Proposed Action (Scenario C). Average lake levels also were greatly reduced. However, it must be remembered that these results were forced rather than the results of modeling likely water use and drought conditions. The lowest recorded pool elevation for Lake Lanier after the lake was first full in 1959 was 1,052 ft msl in 1988 (Figure 5-1). Therefore, conditions that would result in the lake reaching minimum pool elevation are unlikely to occur and should be considered the worst-case scenario for potential lake levels.

Details of the modeling conducted for the proposed discharge of 40 mgd and the No Action Alternative, considering both existing and future water supply demands from the lake, and the modeled results are included in the Technical Memoranda (TM) in Appendix F.

The lowest recorded mean annual stream flow for the Chattahoochee River below Buford Dam (U.S. Geological Survey [USGS] Gage No. 02334430), after the lake was first full in 1959, was 757cfs in 2002. The addition of 61.8 cfs of reclaimed water in Lake Lanier during a drought year, such as 1988, would potentially be available for release to augment flows on the Chattahoochee River below Buford Dam, potentially providing up to 8.2 percent more flow. The average mean annual flow (1959 to 2000) for the Chattahoochee River at Buford Dam is 2,031 cfs, a flow that could increase by up to 3 percent with the addition of the Proposed Action. Storage of the additional reclaimed water in Lake Lanier would also allow for retention of this amount of storage to provide for the timing of downstream releases when most needed for downstream water supply or other beneficial use needs.

Although the additional water would be beneficial for the water resource, it would not necessarily pose a risk for flooding. During flood conditions, the contribution of the reclaimed water would be negligible in comparison to flood flows. For example, the addition of 61.8 cfs of reclaimed water to the high daily inflow to Lake Lanier in 1989 (18,639 cfs on June 20, 1989), 1994 (22,151 cfs on August 17, 1994), and 2003 (20,969 cfs on March 6, 2003) corresponds to insignificant increases in inflow of 0.33 percent, 0.28 percent, and 0.29 percent, respectively. The additional 61.8 cfs would not significantly constrain flood control options at Lake Lanier, as it would not appreciably increase the elevation of the lake in the flood control pool extending to elevation 1,085 feet msl.

Discharge of reclaimed water could have a positive impact on navigation downstream of Buford Dam. This water potentially could be available for release during low flow periods to augment flows in support of downstream navigation on the Apalachicola River or the lower Chattahoochee River.



Note: The maximum elevation of the crown of the diffuser would be 965 feet msl.

FIGURE 5-1

Lake Lanier Conservation and Historic Pool Elevations

USACE Gwinnett County Diffuser/Pipeline EA

Gwinnett County, Georgia

Within the reservoir, the whole-lake modeling performed did not show any significant change in the stratification characteristics of the reservoir. This indicates that the proposed discharge would have minimal, if any, impact on local circulation within the lake and would not significantly impact lake stratification.

Potential Impacts from Construction

No significant change in the hydrology of Lake Lanier would result from construction of the pipeline and side-casting of excess material. The characteristics of the lake bottom sediments are such that the excess excavated material will flow downslope after deposition within the easement and will tend to have a low profile and conform to the lake bottom contours. Any change in bottom contours within the lake would be minimal and should result in only minor, localized changes in water circulation patterns due to the physical structure of side-cast material or those portions of the outfall structure laid on the bottom.

Implementation of any of the considered routes would have minimal impacts on the hydrology of other surface waters outside of Lake Lanier. Contours above the pipeline trench would be returned, as near as practicable, to pre-construction conditions to avoid impacts to surface drainage patterns that could result in hydrologic changes in smaller streams. All excess excavated material will be removed and disposed of in accordance with conditions of the Section 10/404 permits that will be required for construction through these waters. Clean Water Act (CWA) Section 404 permit conditions for installation of the pipeline through streams and wetland areas also require that flows not be obstructed and that no waters of the United States be drained from installation activities. All construction would comply with these permit conditions through appropriate site-specific measures, including placement of the pipe below the bottom of the water body, anti-seep collars, and clay plugs. These measures provide a barrier to water movement along the pipeline.

Anti-seep collars are water-impermeable structures that surround the pipe and occlude the entire construction trench. These structures may be used where the trench crosses a stream along a slope, such that water may flow downslope through the trench. An anti-seep collar is affixed to the pipe with a gasket to prevent water from moving between the pipe and the collar and is then anchored into the soil outside the trench to prevent water movement along the trench, where disturbed soils may have greater porosity. Clay plugs are described in Section 5.3.10.2, as these structures typically are used at wetland crossings.

5.3.9.3 Potential Impacts to Lake Lanier Water Quality and Temperature

Modeling was used to evaluate potential impacts on lake levels of TP, total nitrogen (TN), chlorophyll *a*, DO, and temperature. These parameters are discussed under the Water Quality and Temperature Modeling subsection. Following that, the potential effects of NPS loading on Lake Lanier are considered.

Water Quality and Temperature Modeling

The analysis of water quality impacts includes separate evaluations of potential impacts on water quality parameters and temperature. The same modeling scenarios used to predict potential changes in hydrology were used to predict water quality. The results of water quality modeling using the Lake Lanier Management Tool for TP, TN, chlorophyll *a*, and DO are summarized in Table 5-5 for the Baseline Scenario and all five alternative scenarios.

TABLE 5-5
Nutrient, Chlorophyll *a*, and DO Model Results for Extreme Meteorological Period (1984-1988)
USACE Gwinnett County Diffuser/Pipeline EA

Parameter and Segment	Modeled Scenario					
	Baseline	A	B	C	D	E
Whole Lake Photic Zone						
Mean TP in micrograms per liter (µg/L) (range)	14.4 (13.3-15.9)	14.0 (12.8-15.6)	14.2 (12.9-15.7)	14.6 (13.7-15.8)	15.4 (14.5-16.5)	15.5 (14.5 – 16.4)
Mean Chlorophyll *a* in µg/L (range)	5.0 (4.5-5.6)	4.8 (4.3-5.4)	4.9 (4.3-5.4)	5.0 (4.5-5.5)	5.3 (4.8-5.6)	5.2 (4.8 - 5.5)
Mean TN in mg/L	1.28	1.05	1.05	1.06	1.31	1.07
Segment 19 (near dam) Photic Zone						
Mean TP in µg/L (range)	6.5 (4.9-8.1)	6.3 (4.8-8.0)	6.4 (4.9-8.0)	6.6 (4.9-8.1)	7.0 (5.2-8.3)	7.1 (5.6 – 8.1)
Mean Chlorophyll *a* in µg/L (range)	3.0 (2.4-3.5)	3.0 (2.4-3.5)	3.0 (2.4-3.5)	3.0 (2.4-3.4)	3.2 (2.5-3.6)	3.1 (2.6 – 3.5)
Mean TN in mg/L (Max)	0.92 (1.3)	0.92 (1.3)	0.93 (1.3)	0.93 (1.3)	0.93 (1.3)	0.94 (1.3)
Minimum DO in mg/L	5.72	5.70	5.88	5.95	5.74	5.90

µg/L micrograms per liter
mg/L milligrams per liter

These modeling results are discussed in the following sections. The Proposed Action (Scenario C) can be compared to the No Action Alternative (Scenario D) and to the Baseline Scenario (Table 5-5). Model results can also be compared to current lake conditions that were presented in Section 4.2.9.3. The temperature modeling was completed using the UMERGE model for near-field impacts and the CE-QUAL-W2 model for far-field impacts as described above (Section 5.3.9.1). The models were applied under a worst-case scenario, which is summer stratification. Stratification prevents the discharge from mixing with upper layers of the lake. Modeling results are discussed in the following sections.

Point Source Loads of Nutrients and Fecal Coliform Bacteria:

No Action Alternative: Under the modeled future water supply demands, TP in the lake would reach an average of 15.4 µg/L under the No Action Alternative (Scenario D), as shown in Table 5-5. At present, Lake Lanier TP levels range from 10 to 30 µg/L and were modeled at 14.4 µg/L for the Baseline Scenario, with current demands and operating rules. Therefore, the hypothetical future operating conditions modeled showed a slight change from current conditions.

Predicted chlorophyll *a* levels in lake Segment 19, containing the location of the proposed discharge, averaged 3.2 µg/L (range: 2.5 µg/L to 3.6 µg/L) under the No Action Alternative (Scenario D). Under the Baseline Scenario, the predicted chlorophyll *a* levels in lake Segment 19 averaged 3.0 µg/L (range: 2.4 µg/L to 3.5 µg/L). Both the Baseline Scenario and the No Action Alternative (Scenario D) predict chlorophyll *a* levels below the lake standard for this location (5.0 µg/L).

Under the No Action Alternative, levels of DO and TN would be comparable to those of the Baseline Scenario (Table 5-5).

However, the lack of additional inflow into the lake from the proposed discharge would result in slightly higher lake-wide average concentrations of TP and chlorophyll *a* under the No Action Alternative (Scenario D) than under the Baseline Scenario. Lake-wide mean TP levels for the No Action Alternative would be 1.0 μg/L higher than Baseline; and lake-wide mean chlorophyll *a* levels would be 0.3 μg/L higher than Baseline.

Potential Impacts from Discharge to Lake Lanier: There would be no significant increase in point source nutrient loadings to Lake Lanier. The NPDES discharge permit requires reductions in the nutrient loads of existing discharges (point sources) that would offset the mass load of TP to Lake Lanier prior to discharge from the FWHWRC. As noted above, the permitted discharge would not result in net increases in phosphorus loading to Lake Lanier.

Modeling of the alternative scenarios was conducted to predict the impacts on nutrient loadings and resultant chlorophyll *a* concentrations and DO levels in Lake Lanier. The Proposed Action is represented by Scenario C, which includes the impacts of the proposed discharge of 40 mgd in conjunction with increased water supply demands from Lake Lanier and hypothetical modified operation conditions necessary to meet downstream water supply demands. Impacts of the Proposed Action can be predicted by comparing the model results of Scenario D to the Baseline Scenario and to the No Action Alternative (Scenario D). Results of comparing Scenario C (with the discharge) with Scenario D (no discharge) are presented in Table 5-5 and Appendix F.

Note that the data in Table 5-5 were presented for "Whole Lake Photic Zone" and "Segment 19 (near dam) Photic Zone" sections. The Whole Lake Photic Zone allows for a useful comparison among the scenarios for the lake as a whole, providing a picture of what is expected for the levels of TP, chlorophyll *a*, and TN across the entire lake for each scenario. This information is for use in comparing the alternatives only. The Lake Lanier water quality standards are not directly comparable to the whole lake modeling results. For example, most of the lake has a 10-μg/L chlorophyll *a* standard, but Segment 19 where the discharge is located near the dam has a 5-μg/L chlorophyll *a* standard. There is a whole lake standard for TP; however, the standard is in total pounds of TP contributed to the lake per acre-foot of lake volume per year, rather than as a concentration in mg/L.

The Segment 19 (near dam) Photic Zone section of Table 5-5 focuses on the specific portion of the lake near the discharge and the dam. Focusing on this segment allows predictions of how water between the proposed discharge and Buford Dam would respond to the proposed discharge, as represented by the levels of TP, chlorophyll *a*, TN, and DO in Segment 19 for each scenario. Once again, the TP values are shown for comparison, as there is no TP concentration standard for a specific lake segment. However, chlorophyll *a* (5 μg/L), TN (4 mg/L), and DO (5 mg/L daily average, 4 mg/L minimum at any time) do have specific standards for comparison within Segment 19.

Model results show that Scenario C would result in a slight increase in whole lake average TP of 0.2 μg/L over levels predicted for the Baseline Scenario (14.6 μg/L versus 14.4 μg/L) and 0.8 μg/L less than that predicted for the No Action Alternative (Scenario D). In Segment 19, TP would be slightly higher for Scenario C than in the Baseline Scenario (6.6 μg/L versus 6.5 μg/L) but would be lower than under the No Action Alternative (6.6 μg/L versus 7.0 μg/L).

Lake-wide chlorophyll *a* concentrations predicted for the Proposed Action are the same as for the Baseline Scenario. Scenario D (No Action Alternative) would result in an increase of 0.3 μg/L in lake-wide chlorophyll *a* concentration (5.3 μg/L versus 5.0 μg/L) over lake-wide chlorophyll *a* concentrations predicted for Scenario C (Proposed Action).

Model results show that nitrogen and DO levels in Segment 19 comply with Georgia standards (4 mg/L TN; 5 mg/L average, 4 mg/L minimum for DO), even when lake levels are considerably lowered by drought conditions accompanied by 2030 increased withdrawal and other demands both above and below Buford Dam (Scenarios C and D). Minimum DO levels for the Proposed Action (Scenario C) are predicted to be higher (5.95 mg/L compared to 5.72 mg/L and 5.74 mg/L) than for the Baseline Scenario and the No Action Alternative (Scenario D). However, the difference is slight and is unlikely to result in changes in lake biota or the lake environment.

In Segment 19, chlorophyll *a* results also comply with the Lake Lanier standard (5 μg/L) in all years simulated under the Proposed Action (Scenario C). Of interest in the whole lake results, the No Action Alternative (Scenario D) would result in slightly higher lake-wide average concentrations of TP and chlorophyll *a* versus the Proposed Action (5.3 μg/L versus 5.0 μg/L chlorophyll *a*; 15.4 μg/L versus 14.6 μg/L TP). This result is presumably due to the fact that discharge would occur beneath the photic zone and that current dischargers in the upper portions of the lake would not reduce their loads under the No Action Alternative.

It should be noted that diffuser Locations L1, L2, and L3 are also below the photic zone and discharge at Locations L1, L2 and L3 would be similar to the Proposed Action in terms of potential to impact nutrients, chlorophyll *a*, and DO in surface waters of the lake. Interaction with surface waters (epilimnion) would be restricted to times of turnover. At location L4, which would be in the photic zone at low lake levels, concentrations of nutrients would be expected to be higher than for the proposed location.

Point source phosphorus loading to Lake Lanier has been characterized as of secondary importance because point sources are estimated to contribute only 8 percent of the phosphorus load to the lake. Stormwater runoff contributes 76 percent of the lake's phosphorus load and 16 percent of the TP in Lake Lanier comes from groundwater and septic systems (USACE, 2003). There would be no increase in point source loadings of phosphorus to Lake Lanier from discharge of reclaimed water to the lake. Following the standards-setting process for the lake, the Georgia EPD developed a permitting strategy for Lake Lanier that maintains or reduces point source loads of phosphorus. The permitted total annual phosphorus load to the lake is 38,910 pounds (Georgia DNR Memorandum September 28, 1999). Future discharges, including the Proposed Action, permitted through the NPDES permit program would not be allowed to increase the TP load to the lake. Therefore, the proposed incremental discharges would have to comply with established permit conditions that have been determined by the Georgia EPD not to be detrimental to the lake.

Georgia EPD specified that Gwinnett County may discharge 10 mgd to Lake Lanier initially. Georgia EPD must provide written concurrence for further increases (in 10-mgd increments up to a total of 40 mgd) based on required reductions in loads to the lake by other dischargers, as described below. Prior to Gwinnett County discharging any reclaimed water to the lake, there must be a reduction of 5,000 pounds of phosphorus per year from other

point source discharges to the lake. A total of 16,000 pounds of phosphorus must be eliminated from other point sources before the full permitted volume (40 mgd) could be discharged. These reductions in other point sources equal or exceed the total amount of phosphorus that would be added to the lake from the discharge of 40 mgd from the diffuser. Reductions in phosphorus loadings from other sources that discharge to Lake Lanier would be accomplished through upgrades at each facility.

The point source loads for other parameters of concern, such as nitrogen, ammonia, biochemical oxygen demand (BOD), and fecal coliform also were evaluated as part of the EPD permitting process. In each case, the limits established for an NPDES discharge permit would not result in adverse impacts to water quality or exceedances of water quality standards in Lake Lanier.

The discharge of reclaimed water to Lake Lanier would not be a significant source of fecal coliform bacteria. The discharge is limited by the NPDES discharge permit to 23 CFU per 100 mL, well below the Georgia water quality standard of 200 CFU per 100 mL for reservoirs (Table 4-12). The processes at the FWHWRC contain multiple barriers to pathogens and one of the most effective disinfection methods available (ozonation). The facility also is designed with multiple redundancies in its processes, further limiting the potential for release of pathogens in reclaimed water discharged from FWHWRC.

There would be no significant impacts to hardness, alkalinity, or pH of the lake. The discharge would be required to have a pH from 6.0 to 9.5, which is the same range specified in the water quality standard and would not result in significant changes in these parameters in the lake.

No significant impacts to Lake Lanier water quality are anticipated to result from the proposed discharge of reclaimed water. Gwinnett County received an NPDES discharge permit after the Georgia EPD confirmed that the lake's water quality standards would be met by compliance with the permit and that no degradation of water quality would result. The permit limits have been developed by the Georgia EPD to ensure that water quality standards are met. Modeling of the proposed discharge at the proposed location and depth within the lake predicts that the discharge would meet applicable water quality standards for all but the most extreme climatologic years, as shown in Table 5-5.

During such extreme years, the facility would be operated in a manner to minimize the potential for water quality standard violations. This would be accomplished by diverting flow to other facilities, enhancing processes (chemical addition, membrane treatment, etc.) to reduce nutrient concentrations in the reclaimed water, and maximizing diversion of reclaimed water for irrigation purposes.

Potential Impacts from Construction: Construction would not generate or eliminate any new point source loadings to Lake Lanier. Therefore, construction would not impact point source loads to Lake Lanier.

Temperature

No Action Alternative: There is a potential for long-term impacts resulting from elevated temperatures and increased baseflow in any receiving water. Streams and rivers are more sensitive to temperature changes due to their smaller water mass than large reservoirs and, consequently, are less able to assimilate the temperature associated with a discharge.

Increases in baseflow can cause changes in water depth and pool/riffle/run complexes within the stream channel. However, because the discharge would comply with NPDES permit conditions for nutrients and solids, there is little probability of a violation of water quality standards for these parameters or of a change in designated use for the receiving waters.

The Georgia EPD has indicated that the proposed discharge of 40 mgd will not be allowed into the Chattahoochee River below Buford Dam due to current waste load allocations and the potential increases in water temperature that could affect the trout fishery located below Buford Dam. Therefore, it is unlikely that the Chattahoochee River would receive the discharge under the No Action Alternative. However, Gwinnett County obtained an interim permit for an additional 9 mgd of discharge to the Chattahoochee River. This discharge was permitted in January 31, 2006 (Permit No. GA0026433) with the requirement that this 9 mgd discharge would be removed once the NPDES permit was issued for the 40 mgd discharge to Lake Lanier and the pipeline and diffuser installed to transport reclaimed water to Lake Lanier. In the future, after Georgia Power has removed its thermal loading to the river and other discharges to the Chattahoochee River are improved to meet more stringent discharge limits, additional discharges to the Chattahoochee River may be allowed incrementally. For any such discharges, the Georgia EPD permitting process would ensure protection of water quality and aquatic life in the river. Future discharges to the Chattahoochee River under these conditions would be consistent with the MNGWPD *Final Long-term Wastewater Management Plan* (MNGWPD, 2003b).

Potential Impacts from Discharge to Lake Lanier: The evaluation of the potential impacts of the discharge on temperatures in Lake Lanier addresses both near-field and far-field effects. The near-field evaluation addresses the potential effects on the temperature standards in the immediate vicinity of the outfall and diffuser in Lake Lanier. The far-field evaluation addresses the potential to impact temperature standards downstream of Buford Dam in the Chattahoochee River. The changes in temperature in Lake Lanier were compared to the existing State standard (Chapter 391-3-6 of the Georgia Rules and Regulations for Water Quality Control), which limits temperature increases to a maximum of 5°F above ambient conditions. Specifically, the NPDES permit (GA Permit No. GA0038130) states that the temperature not exceed 90°F (32.2°C) within 3 meters (10 feet) of the diffuser or increase the lake ambient temperature more than 5°F. For the far-field analysis and potential impacts on the Chattahoochee River below Buford Dam, the changes in temperature were compared to the State standard for secondary trout waters of a maximum 2°F (1.1°C) increase above ambient conditions.

Near-Field Temperature Impacts. The diffuser was designed and dilution characteristics evaluated by Parsons Engineering (Appendix F, TM 6). Specific diffuser locations and depths were modeled using UMERGE (Appendix F, TM 10 and TM 10A), a dilution simulation model developed by the EPA. The initial dilution modeling was completed for diffuser Location L4 (Appendix F, TM 10) at a depth of 1,035 feet msl. A second TM (Appendix F, TM 10A) was prepared to summarize the results of the dilution modeling for diffuser Location L5 at a depth of 960 feet msl. Results of the modeling for the L4 and L5 diffuser locations are summarized below. Dilution modeling was not completed for the L1 and L2 diffuser locations because they were not considered viable by Georgia EPD in the permitting process.

Discharges from the diffuser at Location L4 would meet the lake water quality standards for temperature. The diffuser design yields a predicted dilution ratio of 16.8 to 1 at 3 meters (10 feet) from the diffuser. This dilution, combined with the temperature of the reclaimed water and the ambient temperature of Lake Lanier at the proposed depth of the diffuser, demonstrates that water quality standards would be met. UMERGE modeling using monitored annual in-situ data showed that the maximum temperature at the compliance point was 82.5°F (28.06°C). The median modeled temperature rise was 0.6°F (0.33°C), while the maximum rise was 1.1°F (0.61°C); see Table 5-6 and Appendix F. Additional modeling using a 5-year time series of ambient temperature data generated by CH2M HILL/ LimnoTech as part of their water quality modeling of Lake Lanier was consistent with the initial modeling. Results based on the 5-year time series indicated that maximum temperature at the compliance point was 85.3°F (29.61°C), the median temperature rise was 0.5°F (0.28°C), and the maximum rise was 1.3°F (0.72°C); see Table 5-6 and Appendix F.

TABLE 5-6
Temperature Model Results for Diffuser Location L4 and L5 (with 16.8:1 Dilution Ratio at 3 Meters from Diffuser)
USACE Gwinnett County Diffuser/Pipeline EA

Plume Temperature Condition	Annual In-Situ Data	5-Year Time Series Data
Median temperature rise	0.6°F (0.33°C)	0.5°F (0.28°C)
Maximum temperature rise	1.1°F (0.61°C)	1.3°F (0.72°C)
Plume temperature range	47.7 to 82.5°F (8.72 to 28.06°C)	41.8 to 85.3°F (5.44 to 29.61°C)

Dilution modeling for the diffuser at the L5 location (Appendix F, TM 10A) followed the same basic methodology and included an evaluation of potential effects with the lake pool elevation at 1,070 feet msl (normal pool elevation) and 1,035 feet msl (a worst-case drought condition).

Results of the UMERGE modeling for the L5 location also demonstrated compliance with the temperature standard (under both lake level conditions). At the 3-meter distance from the diffuser, the maximum increase in temperature was only 1.96°F (1.09°C) at a pool elevation of 1,070 feet msl and 1.75°F (0.97°C) at 1,035 feet msl (Table 5-7 and Appendix F). The greatest temperature increases coincide with the greatest differences between the discharged reclaimed water temperature and the ambient temperature of the lake. At both pool elevations, the maximum temperature was 79.3°F (26.28°C), which is well below the standard maximum temperature of 90°F (32.22°C).

An evaluation of the point of terminal initial dilution (TID), the point at which the plume reaches stagnation and ceases to move, was also completed for diffuser Location L5 to help assess the potential impacts on lake temperatures (Appendix F, TM 10A). This analysis provides the point of TID and the estimated increase in temperature at that point. The same

TABLE 5-7
Temperature Model Results for Diffuser Location L5 (with 16.8:1 Dilution Ratio at 3 Meters from Diffuser)
USACE Gwinnett County Diffuser/Pipeline EA

Plume Temperature* Condition	Lake Pool Elevation 1,070 ft	Lake Pool Elevation 1,035 ft
Median temperature rise	1.37°F (0.76°C)	1.05°F (0.58°C)
Maximum temperature rise	1.96°F (1.09°C)	1.75°F (0.97°C)
Plume temperature range	0.62-1.96°F (0.34-1.09°C)	0.10-1.75°F (0.34–0.97°C)

*Using 5-year time series data

5-year period temperature data that were used in the dilution modeling (discussed above) were used in the TID evaluation. Based on this analysis, the average change in temperature (Table 5-8) at 40 meters (131 feet) would be 0.2°F (0.11°C). The maximum change in temperature at 132.8 meters (435 feet) would be 0.4°F (0.22°C).

TABLE 5-8
Characteristics of Terminal Initial Dilution
USACE Gwinnett County Diffuser/Pipeline EA

	Dilution Ratio	Distance from Diffuser (m)	Change in Temperature (°F)
Maximum	109.6 to 1	132.8	0.40
Minimum	30.8 to 1	13.6	0.04
Average	58.7 to 1	39.9	0.2
Median	53.8 to 1	34.9	0.2

Additional conclusions of the near-field temperature and dilution modeling are as follows:

1. Dilutions achieved at 3 meters (10 feet) from a discharge port are virtually independent of variations in the thermocline.
2. For a normal pool (1,070 feet msl) and extremely low (drought) pool (1,035 feet msl) elevation for Lake Lanier, the reclaimed water discharge would not exceed the State standard for maximum temperature change of 5°F within 3 meters (10 feet) of the diffuser.
3. The maximum temperature of the lake within 3 meters of the diffuser never exceeds the State maximum of 90°F.
4. TID is achieved within a range of 44.6 to 435.7 feet (13.6 to 131 meters), and the average increase in temperature at TID is 0.2°F (0.11°C).

Far-field Temperature Modeling. The far-field temperature modeling was based on the CE-QUAL-W2 model for Lake Lanier (see Section 5.3.9.1). Potential effects on temperature were modeled for both the L4 and L5 diffuser locations.

The modeling results confirm that discharges at the L4 location would not significantly increase the temperature of water released from Buford Dam (LTI, 1998a). Because of the greater distance from the dam and greater volume of water available for mixing at the higher position in the water column, the lake waters are able to assimilate the temperature of the discharge before reaching Buford Dam. If there is no increase in temperature from Buford Dam releases, the discharge from the diffuser should not impact the Chattahoochee River downstream of Buford Dam and would meet the State standard of a 2°F (1.1°C) increase in temperature above ambient. CE-QUAL-W2 model results both with and without the additional discharge indicate negligible increase in the temperature of the water released through the dam.

For example, the average dam release temperature during the simulation period is 10.05°C (50.1°F) under the Baseline Scenario and 10.11°C (50.2°F) under the Baseline Scenario with the proposed 40-mgd discharge at L4. The corresponding maximum dam release temperature during the simulation period is 20.04°C (68.1°F) under the Baseline Scenario and 20.12°C (68.2°F) under the Baseline Scenario with the proposed 40-mgd discharge. The 0.06°C (0.1°F) difference in each case is below the expected accuracy of the lake model.

The L5 diffuser location is at a greater depth (960 feet msl) than the L4 location (1,035 feet msl) and is approximately 1.1 miles from the Buford Dam. Based on the potential concerns for impacts to the downstream secondary trout stream classification, a more detailed analysis of the far-field modeling data is presented in Table 5-9. Because the language on the temperature standards is ambiguous, the potential change in temperature was evaluated on a monthly and "worst 7-day average" basis for comparison with the standard (an increase in temperature of 2°F) for secondary trout streams. Monthly average temperatures for baseline conditions ranged from a low of 6.16°C (43.09°F) in February to a high of 14.58°C (58.24°F) in November. The low monthly average temperature for releases from Buford Dam with the discharge at L5 also occurred in February (6.21°C/43.18°F), and the high temperature occurred in November (15.00°C/59.00°F). Differences in the monthly averages between the baseline conditions and those with the discharge at L5 do not exceed 0.5°C and, therefore, do not exceed the State standard. Comparing the baseline and L5 alternatives using the worst 7-day average, the differences in temperatures are slightly greater—ranging from a low of 0.13°C (0.23°F) in February to a high of 1.92°C (3.46°F) in September. Based on the worst 7-day average, the temperature differences in both September (1.92°C/3.46°F) and October (1.15°C/2.07°F) could exceed the 1.1°C (2°F) requirement.

TABLE 5-9
Modeled Temperature Releases from Buford Dam under Baseline and the 40-mgd Discharge at Diffuser Location L5
USACE Gwinnett County Diffuser/Pipeline EA

	Monthly Average (°C)			Worst 7-day Average (°C)		
	Baseline	**Alternative**	**Difference**	**Baseline**	**Alternative**	**Difference**
Jan	7.84	7.90	0.06	10.27	10.52	0.25
Feb	6.16	6.21	0.05	4.92	5.05	0.13
Mar	6.95	6.99	0.04	6.99	7.18	0,19
Apr	8.09	8.16	0.07	6.89	7.14	0.25

TABLE 5-9
Modeled Temperature Releases from Buford Dam under Baseline and the 40-mgd Discharge at Diffuser Location L5
USACE Gwinnett County Diffuser/Pipeline EA

May	8.64	8.73	0.09	7.58	8.04	0.46
Jun	8.79	8.97	0.18	9.94	10.44	0.50
Jul	10.38	10.59	0.21	8.84	9.31	0.47
Aug	11.34	11.63	0.29	10.78	11.45	0.66
Sep	11.79	12.25	0.46	9.26	11.18	1.92
Oct	13.82	14.06	0.24	10.27	11.42	1.15
Nov	14.84	15.00	0.16	10.71	11.63	0.92
Dec	11.78	11.89	0.11	14.04	14.38	0.34

These results do not completely agree with the near-field modeling results, which indicated that the temperature differences within 450 feet of the diffuser would average less than 0.5°C (see above). Considering that the diffuser is over 6,000 feet from the dam, it seems unlikely that the worst 7-day average temperature at the outlet from Buford Dam would be increased by up to 1.9°C. While the CE-QUAL-W2 for Lake Lanier has been carefully calibrated, there remains some level of uncertainty about the accuracy of the temperature predictions at the dam outlet. While the model results showed that there may be exceedances of the State temperature standard below the dam, it could not be determined whether these exceedances were due to the proposed 40-mgd discharge or to numerical artifacts of the model.

Consequently, the Georgia EPD requested that the original CE-QUAL-W2 model be refined to further evaluate the potential for temperature impacts downstream of Buford Dam from the proposed discharge at the L5 diffuser location. The original model was re-segmented to focus primarily on the area directly upstream of the dam (segment 19) that would be influenced by the discharge at the L5 location. Details of the re-segmentation process are summarized in a report prepared by LTI in June 2006 (Appendix F). The re-segmented model was run for four additional scenarios:

1. Baseline without discharge using the new refined segmentation
2. Baseline with the proposed 40-mgd discharge using the new refined segmentation
3. Baseline including the proposed 40-mgd discharge with an unspecified 40-mgd withdrawal from the main pool for water balance using the new refined segmentation
4. Baseline including the proposed 40-mgd discharge with discharge temperatures approximately equal to the ambient receiving water using the new refined segmentation

Results for the first scenario indicated that the refined model temperatures were consistently higher than the original model, which is consistent with the reduced mixing volume associated with the focus solely on the re-segmented lower portion of the lake rather than the whole lake. The second scenario, with the proposed discharge, showed an increase in

temperature over baseline conditions of 0.061°C (0.109°F) based on hourly average temperatures. An hour-by-hour comparison still indicated that there were short duration exceedances of the 1.1°C (2°F) temperature standard below the dam, which was consistent with the original modeling and attributed to the timing of dam operations (the releases for hydropower generation). To factor out the effects of dam operations, the third scenario was evaluated to address the potential for changes in the water balance (from the introduction of the 40-mgd discharge). The fourth scenario was developed to directly evaluate the hydrologic equivalent to the baseline scenario with the discharge at essentially the same temperature as ambient conditions. The results indicated that the temperature exceedences were clearly attributed to the dam operations. Figure 5-2 shows the model results at Buford Dam for the discharge rate, water surface elevation, and temperature of the discharge.

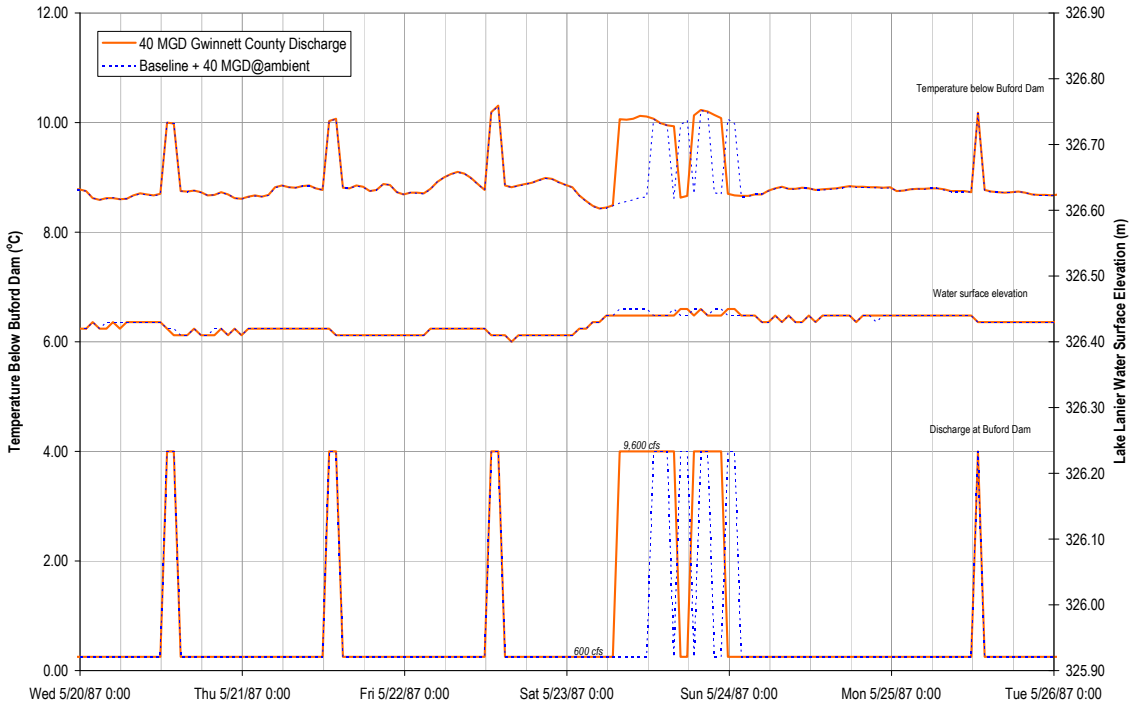


FIGURE 5-2
Hourly Model Results for Discharge at Expected Temperature vs. Discharge at Ambient Temperature
USACE Gwinnett County Diffuser/Pipeline EA

Temperatures in the lake segment directly upstream of the dam were also evaluated to determine the influence of dam operations on the temperature releases from the dam. The temperatures predicted by the model were compared for Scenarios 2 and 4. Results indicate that the maximum temperature difference between the two scenarios in any vertical layer in the lake over the five-year simulation period was only 0.52°C (0.094°F). This confirms that it is not possible for the water being released from the dam to be elevated above the 1.1°C (2°F) temperature standard as a result of the proposed 40-mgd discharge.

The largest temperature increase was 0.377°C (0.68°F) based on a comparison of the daily average temperatures for Scenarios 2 and 4. Figure 5-3 illustrates the daily average simulated temperatures and the differences between Scenarios 2 and 4.

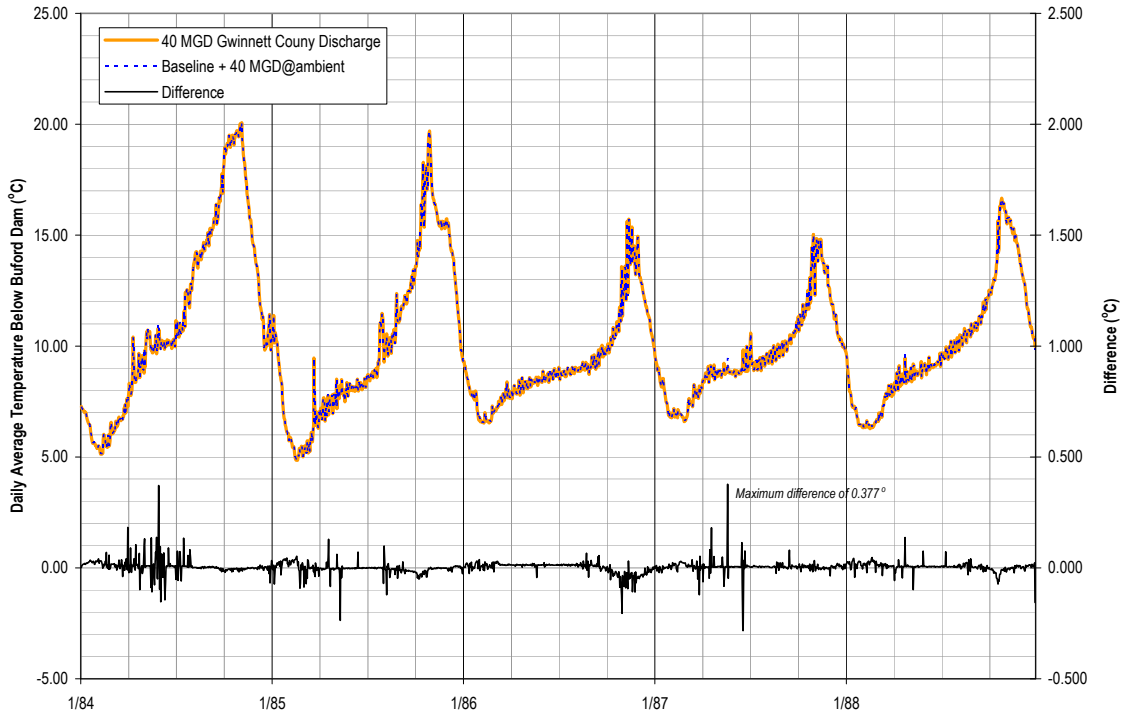


FIGURE 5-3
Daily Average of Simulated Temperatures and Temperature Differences
USACE Gwinnett County Diffuser/Pipeline EA

An additional sensitivity analysis was completed using the refined water quality model to address specific remaining concerns of the Georgia Department of Natural Resources, Fisheries and Wildlife Division regarding the calibration of the model for temperature, worse-case drought conditions, sensitivity to higher effluent temperatures, and potential impacts on lake stratification. The results of this analysis are included in Appendix F and summarized below:

- The Lake Lanier CE-QUAL-W2 application, in addition to being calibrated to observed data within the lake pool, predicts discharge temperatures below Buford Dam that are statistically comparable to observed temperatures.
- Simulated daily temperatures just upstream of the dam in Lake Lanier increased by at most 0.76°F (0.42°C) during a simulated drought period with reduced dam discharges when the heat load of the proposed 40-mgd discharge was included.
- A sensitivity analysis with an increase of 9°F (5°C) in the temperature of the proposed 40-mgd discharge showed an increase of at most 0.94°F (0.52°C) in simulated daily temperatures in the lake directly upstream of the dam under the same simulated drought conditions.

- Review of model-simulated temperature profiles in Lake Lanier showed little or no difference in thermal structure with or without the heat load of the proposed 40-mgd discharge.

Based on results of the revised temperature modeling, the Georgia EPD concluded that the State water quality standards will be met both in the lake and below Buford Dam in the Chattahoochee River and issued the draft NPDES discharge permit in August 2006.

Potential Impacts from Construction: Construction activities would not impact the temperature of Lake Lanier, as construction would not introduce temperature changes or vertical mixing of stratified layers within the lake.

Nonpoint Source Loads of Nutrients:

No Action Alternative: Growth and development are anticipated to occur in the Lake Lanier Basin under the No Action Alternative, as with all other scenarios. As growth and development occur, there will be potential for secondary impacts to water quality in Lake Lanier from nonpoint source pollution resulting from stormwater runoff. The counties in the MNGWPD that include areas draining to Lake Lanier (Gwinnett, Hall, Forsyth) are required to implement construction and post-construction stormwater management programs to minimize impacts from nonpoint sources (MNGWPD, 2003c). Implementation of stormwater management programs will greatly reduce the likelihood of significant secondary or cumulative impacts from nonpoint source pollution resulting from growth and development. Further, implementation of these programs will result in future reductions of nonpoint source loads to the Lake Lanier Basin from these counties as the plans are fully implemented through time.

Those counties not within the MNGWPD that include areas draining into Lake Lanier (Dawson, Lumpkin, Habersham) are not required to implement these stringent stormwater management programs and will not necessarily be as effective in limiting impacts from nonpoint source pollution resulting from growth and development or in reducing nonpoint source loads in the future. There is greater potential for secondary and cumulative impacts to water quality from nonpoint source pollution from growth and development in these counties.

Growth and development are also projected to occur in Gwinnett County outside the Lake Lanier Basin under the No Action Alternative. The stormwater management programs discussed above would apply to all of Gwinnett County, so this development would have limited potential to impact water resources in other basins in Gwinnett County and future nonpoint source loads to these basins should be reduced as stormwater programs are fully implemented.

The FWHWRC would have increased capacity under the No Action Alternative, although the discharge point is currently unknown. In the unlikely event that a spill at the FWHWRC were to bypass the multiple backup processes and storage provided at the facility, the flow could reach Ivy Creek, which eventually discharges to the Chattahoochee River downstream of Lake Lanier. During the design of the FWHWRC, protection of water quality and aquatic habitat in the Chattahoochee River was a significant concern. The facility design incorporated features to provide protection for the river in the event of an accidental spill. Site grading plans were developed and implemented that promote retention of released

water on the site. A 1.4-million-gallon spill containment tank was placed at the lowest elevation on the site to contain spills. All overflow drains at the plant are routed to this containment tank. The overflow for the spill control tank is routed to a different treatment plant. This spill control tank is sufficient to contain a continuous release of a 50-minute duration at a 40-mgd facility operation rate. Storm drains were designed to require pumping to remove the water from the site. There are 160 million gallons of emergency storage within the plant beyond the spill control tank. In the event of a power loss, water is automatically routed into the emergency storage tanks. Tanks and wet wells are equipped with redundant level controls and redundant pumps. The control measures implemented at FWHWRC minimize the potential of a release to reach the Chattahoochee River and the potential for impacts to the river.

Nonpoint source loads in the Lake Lanier Basin would be addressed by the watershed management plans required with each water withdrawal or NPDES permit application submittal. The requirement to implement these plans is included as an enforceable provision of each NPDES permit.

Potential Impacts from Discharge to Lake Lanier: The proposed project would have a limited potential effect on nonpoint source loads as a potential secondary impact. Landward of the lake, less than 2 square miles of Gwinnett County is within the 1,029-square-mile Lake Lanier Basin. Gwinnett County's stormwater management programs would minimize nonpoint source loads resulting from future development. As a result, there is only minimal potential for secondary impacts to Lake Lanier due to development in the Lanier Basin in Gwinnett County.

As the proposed project is to serve Gwinnett County and not other counties in the Lake Lanier Basin, the proposed project would not generate any growth or development in those counties and would cause no secondary impacts from nonpoint source loads to Lake Lanier from other counties.

As discussed under the No Action Alternative, growth and development are anticipated to occur throughout the Lake Lanier Basin and in Gwinnett County outside the Lake Lanier Basin, regardless of whether Gwinnett County discharges reclaimed water into Lake Lanier. The potential for secondary and cumulative impacts from nonpoint source pollution resulting from growth and development in the Lake Lanier Basin outside of Gwinnett County are the same as those discussed under the No Action Alternative, with a greater potential for impacts coming from those counties outside the MNGWPD.

As discussed under Section 5.3.7.4, the velocity of the discharge would not create sufficient turbulence to cause significant impacts to local circulation patterns in the vicinity of the diffuser.

Potential Impacts from Construction: Construction of the pipeline from FWHWRC to Lake Lanier would create the potential for nonpoint source loadings to other surface waters. Runoff from construction areas would have the potential to introduce pollutants into surface waters. However, construction and stormwater BMPs would be employed to prevent erosion damage (see Table 5-3). Specific BMPs that would be used would be determined from given site conditions and would include, but not be limited to, silt fencing, silt curtains, and fiber matting.

Construction within Lake Lanier could have the potential to introduce nutrients and turbidity into the water column. Some nutrients may have become concentrated in Lake Lanier sediments that would be disturbed during project installation. However, use of the turbidity curtain to contain the work site would prevent mixing of disturbed sediments with the waters of the lake. These sediments would settle to the lake bottom prior to removal of the turbidity curtain.

Other Potential Contaminants

Endocrine Disrupting Compounds: Endocrine disrupting compounds (EDCs), including phtalates, pharmaceuticals, and personal care products, are considered a potential concern for water quality. EDCs are natural or man-made compounds (NEIH, 2007; USEPA, 2007) that may alter the performance of the endocrine system in humans and wildlife. While EDCs may pose an issue, the current level of understanding of the potential risk is uncertain. None of the compounds that may pose such risks has been verified at a risk level at this time and no risk levels have been assigned to EDCs (USEPA, 2007). The partitioning of risk among potential sources (non-point source runoff, domestic/municipal wastewater stream, industrial wastewater stream, atmospheric deposition) is unknown. In addition, little is known about the potential health effects to humans or aquatic organisms exposed to low levels of most of these chemicals or to mixtures of these chemicals. (Frick and Zaug, 2003). The USGS (2007) states "Our ability to measure contaminants currently exceeds our understanding of their potential environmental effects."

While there is no intent to downplay the potential risk these compounds may pose, any effort at analysis relevant to the decision that must be made in this EA with the current state of knowledge on EDCs and their risks would be speculation. The uncertainty in the science would render the analysis unsuitable as a basis for making a decision on whether to issue an easement to Gwinnett County. Should the risks become more clearly defined and regulatory limits be established, USEPA and EPD would require and Gwinnett County would implement measures necessary to meet any required standards and remain in compliance with regulations. EDCs are not further considered in this document.

Other Contaminants: Other potential contaminants, including metals and other organic compounds (such as pesticides, herbicides, and other compounds), may be contained in the treated effluent and could result in impacts to aquatic life. Gwinnett County has been required by GA EPD to test the effluent quality from the FWHWRC on regular basis to evaluate the potential for toxic effects of the treated effluent to aquatic life. A series of toxicity tests were conducted in 2005 using both aquatic invertebrates (*Ceriodaphnia dubia*) and fat head minnows (*Pimephales promelas*). In each test, the results indicated no chronic toxicity associated with the effluent. In addition, Gwinnett County has complete a full priority pollutant scan on the effluent in 2005 and 2006 to determine the presence of metals, volitle organic compounds, and other contaminants. None of the samples collected identified contaminants above existing water quality standards. Based on these findings, the potential for impacts to aquatic resources were considered negligible and, therefore, not considered further in this document.

5.3.9.4 Potential Impacts to Other Surface Waters

No Action Alternative: Impacts to other surface waters resulting from implementation of the No Action Alternative would depend on the pipeline route and discharge point selected and cannot be determined with certainty. However, route selection would likely result in impacts similar to those for the pipeline route alternatives described below, plus additional potential impacts to the receiving water.

There is a potential for impacts to other surface waters (streams or rivers) from construction of the pipeline. Specific potential impacts cannot be accurately predicted because the route of the pipeline is unknown. However, installation would be done using standard construction techniques. Construction would comply with Nationwide Permit (NWP) General Conditions and the Georgia Erosion and Sedimentation Act and the Gwinnett County Soil Erosion and Sediment Control Ordinance, as amended November 28, 1995, for stormwater management. Installation, use, and maintenance of appropriate BMPs would minimize or prevent impacts from construction activities and runoff. Construction would be done in accordance with the Georgia Rules and Regulations for Water Quality Control, 391-3-6-18. Appropriate BMPs would be selected based on site-specific conditions. Representative BMPs were listed in Table 5-3 and include, but would not be limited to, sediment barriers (silt fence or straw bales), grade stabilization with seed and mulch, and geotextile slope stabilization, live stakes, riprap, coir fiber, and mats. Any impacts to other surface waters would be temporary and minor; no significant impacts would result from implementation of the No Action Alternative.

Potential Impacts from Discharge to Lake Lanier: Discharges at alternative diffuser Locations L1, L2, and L3 were ruled out by Georgia WRD concern over potential water quality issues. Subsequently GA EPD designated L4 as the diffuser location in NPDES Permit No. GA0038130. At the location L4, the modeling showed no significant hypolimnetic impact and essentially no increase in the temperature of the releases from the dam. At L5, a slight increase was indicated by modeling for a 40-mgd discharge at extremely low lake levels.

As discussed under the No Action Alternative, an accidental release at FWHWRC could reach Ivy Creek, which eventually discharges to the Chattahoochee River downstream of Lake Lanier. However, such a spill could not reach Lake Lanier without being pumped, as the reclaimed water must travel upslope to reach Lake Lanier. Thus, surface waters of the lake would not be impacted by an accidental release at FWHWRC.

Potential Impacts from Construction: There is a potential for impacts to other surface waters (streams or rivers) from construction of the pipeline. Installation would be done using standard accepted construction methods typically used to cross waters. Construction would comply with NWP General Conditions and the Georgia Erosion and Sedimentation Act and the Gwinnett County Soil Erosion and Sediment Control Ordinance, as amended November 28, 1995, for stormwater management. Installation, use, and maintenance of appropriate BMPs would prevent impacts from construction activities and runoff (see Table 5-3). Specific BMPs that would be used would be determined from given site conditions and would include, but not be limited to, silt fencing, silt curtains, and fiber matting. Construction would be done in accordance with the Georgia Rules and Regulations for Water Quality Control, 391-3-6-18. Any impacts to other surface waters would be temporary

and minor; no significant impacts would result from implementation of any of the action alternatives.

5.3.9.5 Water Quality and Hydrology Summary

A brief summary of the results of the hydrology and water quality evaluations is provided below.

Hydrology:

- The proposed 40-mgd discharge would increase the minimum lake level by 2.1 feet during drought conditions
- The discharge would result in 5.9 percent more flow into the lake that could be used for water supply, hydropower, or downstream flow augmentation.
- Construction of the pipeline and diffuser would not change the hydrology of the lake or its basic circulation patterns.
- Flood storage capacity of the lake would not be affected by the discharge and there would not be an increase in downstream flooding. During flood conditions, the proposed discharge would comprise 0.3 percent or less of the inflow to the lake.

Water Quality:

- Based on the modeling of the discharge alternatives, water quality standards in the lake will be maintained under all scenarios.
- The extreme drought and operating conditions used in the hydrological and water quality modeling (Scenarios C and D) were developed to simulate possible future lake levels that could result from increasing water supply demands in the Lake Lanier Basin. The resulting minimum lake surface elevation of 1,047.9 feet msl produced by the model has not occurred in the available historical record; in fact, the lowest lake level seen in the 2000-2001 drought was 1,055.6 feet msl, almost 8 feet higher. During the extreme low lake levels predicted by the modeling results, the diffuser vents would be located more than 80 feet below the lake surface elevation and more than 70 feet below the bottom of the conservation pool, at elevations ranging from 963.5 feet msl to 962 feet msl.
- During infrequent extreme drought and operating conditions, the wastewater treatment facility would be operated to minimize the potential for water quality violations including diverting flows to other facilities, enhancing treatment processes, storage, etc.
- Total nutrient loadings to the lake from point source discharges will be maintained below the lake standards. The discharge permit for the proposed discharge is linked to required reductions in nutrient (phosphorus) loadings at other facilities that discharge to the lake.
- Model results show that nitrogen and DO levels in the lake segment near the proposed discharge will comply with Georgia standards, even under extreme drought and operating conditions.

- The potential impacts to aquatic life are limited to minor increases in temperature in the immediate vicinity of the diffuser, well within the temperature standard.

5.3.10 Flood Plains

No Action Alternative

Impacts to flood plains resulting from implementation of the No Action Alternative would depend on the pipeline route and discharge point selected and cannot be determined with certainty. However, increased flow into a relatively small channel could result in scouring and entrenchment that could result in a stream abandoning its flood plain. Conversely, increased flows could result in increased flood elevations and expansion of flood plain area. It is expected that the discharge site selection process would avoid these circumstances if practicable and site-specific measures would be employed to mitigate potential increased flood elevations.

Potential Impacts from Discharge to Lake Lanier

Discharge of reclaimed water into Lake Lanier would not cause the lake to exceed its flood control pool elevation of 1,085 feet msl. As discussed above, the proposed project would result in an approximately 0.33 percent increase in the inflow to Lake Lanier when river inflows are at flood levels, and the input of the additional 61.8 cfs of reclaimed water would have a negligible effect on pool elevations under these conditions. The USACE has determined that a 50 percent reduction in the flood storage capacity of Lake Lanier would have no impact on downstream flood elevation except for 500-year floods (USACE, 1998b). The addition of the reclaimed water to Lake Lanier would result in less than a 0.25-inch increase in pool elevation when the Lake Lanier pool is above 1,071 feet msl. The addition of reclaimed water will not cause an increase in downstream flood elevations and will not impact downstream flood plains. Given the operating capability of the reservoir relative to flood releases, hydropower releases, and flood attenuation, the impacts to flood plains above the dam would be negligible.

Vegetation in the lower elevations of the flood control pool (1,071 to 1,074 feet msl) of Lake Lanier would exist in a dynamic state, as this portion of the lake is regularly inundated for extended periods during the growing season and also experiences regular wave action. Typically, inundation for more than 14 consecutive days during the growing season is sufficient to result in a change in vegetation (Mitsch and Gosselink, 2000; Tiner, 1999). Lake Lanier is routinely operated above its maximum conservation pool elevation of 1,071 feet msl. Lake elevations have exceeded 1,071 feet msl for more than 2 consecutive weeks in 29 of the last 41 years. This has occurred 43 times, with 40 of these occurring during the growing season. There have been 13 periods when inundation above 1,071 feet msl has extended for more than 100 consecutive days, most recently for 180 consecutive days from February to August in 2003 (USACE, 2003). During these periods above 1,071 feet msl, pool elevations are regularly at or above 1,073 feet msl.

Lake Lanier was continuously below 1,071 feet msl from late June 1998 until February 2003 (USACE, 2003). During these extended drought conditions and the 4.5-growing-season period without inundation, typical upland species would have become well established in this zone. However, the 180 continuous days of inundation immediately following, with an even longer period of associated saturation in the active root zone, would have eliminated this upland vegetation. Upon reduction in pool elevation, a new group of plants, some the

same and some different from the previous assemblage, would have begun to colonize these areas. Changes in vegetation (between upland species and more water-tolerant species) in this zone around Lake Lanier would occur with frequency, as inundation periods fluctuate and intervals between inundation increase and decrease.

Inflows of approximately 3,000 cfs are required to maintain Lake Lanier above 1,071 feet msl. At these inflow levels, discharge of reclaimed water would constitute approximately 2 percent of the inflow to the lake. This would equate to less than 0.25 inch of pool elevation when inflow without the discharge would increase pool elevation to 1,072 feet. With greater inflows and greater pool depth, the relative increase in pool elevation resulting from the discharge of reclaimed water would be moderated. An increase in pool elevation of less than 0.25 inch would not significantly impact flood plain vegetation around Lake Lanier, compared with the effects of frequent, but irregular inundation from routine lake operations.

Therefore, no significant impacts to flood plains surrounding Lake Lanier or downstream of Buford Dam would result from discharge of reclaimed water into Lake Lanier.

Potential Impacts from Construction

No significant impacts would occur in flood plains. All piping through flood plain areas would be placed below ground and no aboveground structures would be built. The ground surface would be returned to pre-construction contours and stabilized following installation of the pipe. There would be no impedance of flood conveyance or flood storage capacity. Some flood plain vegetation would be converted from forest and shrubland into maintained herbaceous ROW. Neither installation of the pipe nor ROW clearing would result in increases in upstream flood elevations or reduced flood conveyance capacity. As the width of the cleared ROW adjacent to perennial streams will be only 30 feet, any increased flood conveyance resulting from a lower coefficient of friction in the ROW or removal of woody vegetation from the ROW would be essentially negligible. No significant impacts to flood plains are anticipated to occur.

5.3.11 Groundwater

No Action Alternative

Implementation of the No Action Alternative would have no significant impacts on groundwater. There could be slight increases in groundwater recharge from the receiving stream, but these would be minor and not significant.

It is possible that future accidents may result in a release of reclaimed water that could reach groundwater. Any leaks would be temporary and repaired as soon as practicable through normal maintenance activity. If interaction between reclaimed water and groundwater were to occur or be suspected, sampling would be conducted to determine whether remediation would be necessary. Any needed remediation would be done as part of routine maintenance.

Potential Impacts from Discharge to Lake Lanier

There would be no significant impact to groundwater from discharge to the lake. Reclaimed water (up to 40 mgd) would be discharged into Lake Lanier and may slightly contribute to local groundwater recharge from the lake, but the increase would be insignificant compared to localized groundwater recharge that already occurs from the presence of the lake.

Potential Impacts from Construction

None of the pipeline routes would intersect groundwater, except shallow local groundwater zones associated with stream crossings. Any impacts would be of short duration and minor. Installation techniques would not create a situation in which a local groundwater pool would be drained. The pipeline route selected would have no significant impacts on groundwater.

It is possible that future accidents may result in a release of reclaimed water that could reach groundwater. However, any leaks would be temporary and repaired as soon as practicable through normal maintenance activity. If interaction between reclaimed water and groundwater were to occur or be suspected, sampling would be conducted to determine if remediation is needed. Any needed remediation would be done as part of routine maintenance.

5.3.12 Biological Communities

5.3.12.1 Upland Communities

No Action Alternative

Impacts to upland communities resulting from implementation of the No Action Alternative would depend on the pipeline route and discharge point selected and cannot be determined with certainty. However, route selection for the No Action Alternative would likely result in impacts to upland communities comparable to those described for the considered route alternatives.

Conversion of forested land, comparable to that described for the considered route alternatives below, would be likely to occur. Although the conversion of limited forested land to open space along a No Action Alternative route would not constitute a significant impact to upland communities in isolation, this conversion could result in cumulative impacts to forested land when coupled with additional growth and development in Gwinnett County. However, conversion of forested land from growth and development would greatly exceed the approximately 5 acres of forest that would be converted for the pipeline ROW, and the incremental impact of clearing for the ROW would be minimal.

No significant direct, indirect, or cumulative impacts to upland communities are expected to result from implementation of the No Action Alternative.

Potential Impacts from Discharge to Lake Lanier

There are no uplands in Lake Lanier near the proposed diffuser location. Therefore, no impacts to upland communities would result from discharge of reclaimed water to Lake Lanier.

Potential Impacts from Construction

Each route would result in the permanent conversion of approximately 5 acres of forests/ woodlots to maintain the ROW and temporary clearing of approximately 8 acres that would be allowed to return to pre-construction conditions after the pipeline is installed. It is estimated that approximately 0.6 acre of forested area would be cleared within Gwinnett County Park. Following installation of the project, half of this cleared forested area, centered on the pipeline, would be maintained as cleared ROW for future maintenance of the pipeline. The remainder of the cleared area would be allowed to return to wooded conditions.

Construction and stormwater BMPs would be employed to prevent erosion damage (see Table 5-3). Specific BMPs that would be used would be determined from given site conditions and would include, but not be limited to, silt fencing, silt curtains, and fiber matting. Pre-construction contours would be reestablished, to the extent practicable, to prevent changes in upland communities resulting from altered topography. Temporary disturbance of herbaceous and shrub vegetation would result from construction, but these areas would rapidly return to pre-disturbance conditions following the end of construction. Because of the developed and developing urban nature of the considered routes, forest conversion and temporary vegetation disturbance would not constitute significant impacts to upland communities. As discussed for the No Action Alternative, the incremental impact of forest conversion for ROW clearing would be minimal compared to the amount of forest conversion that would result from future growth and development.

Animals would experience temporary displacement to adjacent habitat areas during construction and some direct mortality from trenching activities may occur to animals living below ground. Displacement would be temporary and animals would return to the project area following the end of construction. Any direct mortality would be limited and localized and would not threaten continued existence of species. Local populations would quickly recover through intrinsic reproduction and/or immigration from surrounding populations. Following clearing for construction, the early regrowth in cleared forested areas would include substantial berry and soft mast species that would increase food resources for many animal species and provide cover for ground nesting birds. Impacts to animal species in upland communities from construction of the pipeline would be temporary and minor; no significant impacts would result.

Operation of the pipeline would have no impact for upland communities, except for maintenance activities. Any impacts from maintenance, such as periodic mowing and pipeline repair, would be temporary and localized and would not constitute significant impacts on upland communities.

5.3.12.2 Wetlands and Aquatic Communities

No Action Alternative

Impacts to aquatic communities, wetlands, and flood plains resulting from implementation of the No Action Alternative would depend on the pipeline route and discharge point selected and cannot be determined with certainty. However, route selection would likely result in impacts similar to those for the pipeline route alternatives described below, plus additional potential impacts to the receiving water. No significant impacts are expected due to the pipeline construction because the project would be expected to meet the conditions for authorization under a CWA Section 404 NWP, which does not allow more than minimal direct and cumulative impacts to waters as determined by the USACE NEPA analysis of the NWP program.

Because the reclaimed water would comply with all NPDES permit requirements, there would be no significant impacts to aquatic communities from nutrients or contaminants. However, the volume of the discharge would be up to 40 mgd, and there could be impacts to aquatic habitat in a receiving stream or streams from the addition of this volume of water on a daily basis, if 40 mgd would represent a substantial increase in typical daily stream volume. Depending on the size of the receiving stream, impacts could result from increased

water depth and/or increased channel scour and turbidity that would adversely impact aquatic animals, as discussed under Section 4.2.9. The Georgia WRD expressed concern that discharge of this water into the Chattahoochee River below Buford Dam would result in increased temperatures that could adversely impact the secondary trout fishery on that stretch of river. The Georgia EPD concurred with WRD and determined that, under the current conditions in the Chattahoochee River, such a discharge would not be allowed.

Potential Impacts from Discharge to Lake Lanier

No significant impacts to wetlands and aquatic communities are anticipated from the discharge of reclaimed water to Lake Lanier at the NPDES discharge permit specified location. The reclaimed water would be discharged into Lake Lanier in compliance with all NPDES permit conditions and would not significantly impact water quality in the lake, as discussed above. The potential impacts of hydrologic, temperature, and water quality changes to the lake and downstream riverine biological communities as a result of the proposed discharge are discussed below.

Hydrologic

Biological communities within the lake would not be impacted by the additional discharge to the lake. Reproduction for most warm water game fish (*Lepomis spp.* and *Micropterus spp.*) occurs in very shallow water along the shoreline, away from the diffuser location. The additional discharge could increases the availability and stability of habitat for warm water game fish and forage species (i.e. littoral communities) along the lake shoreline.

Biological communities that are located downstream in the Chattahoochee River would not be impacted by the additional discharge. The discharge would provide increased minimum flows to anadromous fish species and aquatic mussels downstream in the Chattahoochee River basin and enhance riverine habitats during extreme low flow periods.

Temperature

Biological communities within the lake would not be impacted by changes in temperature (see Section 5.3.9.3). Dilution modeling at both diffuser locations demonstrates that temperature changes with the new discharge are below the state standard beyond 3 meters (10 feet) from the diffuser.

Temperature impacts to biological communities downstream of Buford Dam in the Chattahoochee River are discussed in greater detail below. Water from Lake Lanier is released through Buford Dam to the Chattahoochee River from the lower hypolimnion of the lake. The cold-water releases from Buford Dam have created habitat for a non-native trout fishery downstream of the lake and as a result the river has been designated as a secondary trout stream under Georgia Rules and Regulations for Water Quality Control, Chapter 391-3-6-03.

Location L4 would discharge into the upper hypolimnion and as a result modeling has shown that there is no potential impact to temperature downstream of Buford Dam in the Chattahoochee River (see Far Field Temperature Modeling in Section 5.3.9.3).

Location L5 is at a greater depth (960 feet msl) than L4 (1,035 feet msl) and would discharge directly into the lower hypolimnion of the lake. Based on the potential concerns for impacts on the downstream secondary trout stream classification, a more detailed analysis of the far-field modeling was conducted to evaluate the potential impacts. Four metrics were

developed to evaluate potential changes in temperature to the downstream trout fishery. These metrics were developed following draft temperature-specific criteria developed for the Chattahoochee River and presented by Roy Burke at the MNGWPD Technical Coordinating Committee (June 2005). The metrics were as follows:

- Metric #1: water temperature should never exceed 71 deg F (25 deg C) more than once in any 30-day period.
- Metric #2: water temperature should never exceed 75 deg F (23.9 deg C) for more than 2 consecutive hours, or 3 total hours, in any 7-day period.
- Metric #3: water temperature should never exceed 71 deg F (21.7 deg C) for more than 12 consecutive hours, or 18 total hours, in any 24-hour period
- Metric #4 water temperature should never exceed 66 deg F (18.9 deg C) as a 7-day moving average.

The maximum instantaneous temperature from 1984 to 1988 is 68.2 deg F (20.1 deg C), thereby meeting Metrics 1 through 3 (Figure 5-4). The 7-day moving average (Metric 4) was 66 deg F (18.9 deg C) and was exceeded for a short period in 1984 for both the baseline and the L5 alternative (Figure 5-5). There was a minimal difference (<0.3 deg C) between the baseline and the L5 alternative for this time period, indicating that the discharge would have minimal additional temperature impact during this time period. The temperature evaluation indicates that there would be no significant impacts to the trout fishery in the Chattahoochee River. Upper thermal limits during warm summer periods were evaluated using Metrics 1-4 and findings indicate that the upper thermal limits were not exceeded for virtually the entire simulation period. The only exceedence of the metrics occurred for both the baseline and the L5 alternative during October.

Spawning temperatures for adult brown and rainbow trout were evaluated and temperature tolerance limits are summarized in Table 5-10 During normal spawning periods for brown and rainbow trout (February to May), average monthly temperatures range from 6.21 to 8.73 deg C and the worst 7-day average ranges from 5.05 to 8.04 deg C. Both values are well below the upper tolerance limit for trout spawning and indicate that there would be no potential impacts to spawning populations in the Chattahoochee River downstream of Buford Dam.

TABLE 5-10
Temperature Preference Data for Trout Species Stocked in the Chattahoochee River[a]
USACE Gwinnett County Diffuser/Pipeline EA

	Temperature (C)			
Species	**Non-Spawning Preferred Range**	**Upper Avoidance**	**Upper Lethal Limit**	**FTDMS Maximum Weekly Mean[b]**
Rainbow Trout	12-19	19-22	25-25.6	24
Brown Trout	12-19	20	25.6-27.2	24.1

[a] Data reported are principally for adults
[b] FTDMS – Fish and Temperature Database Matching System (Eaton et al., 1995).
Sources: Hokanson et al., 1973; Hokanson et al., 1977; Coutant, 1977; Raleigh, 1982; Raleigh et al., 1984; Raleigh et al., 1986; Armour, 1994; Eaton et al., 1995

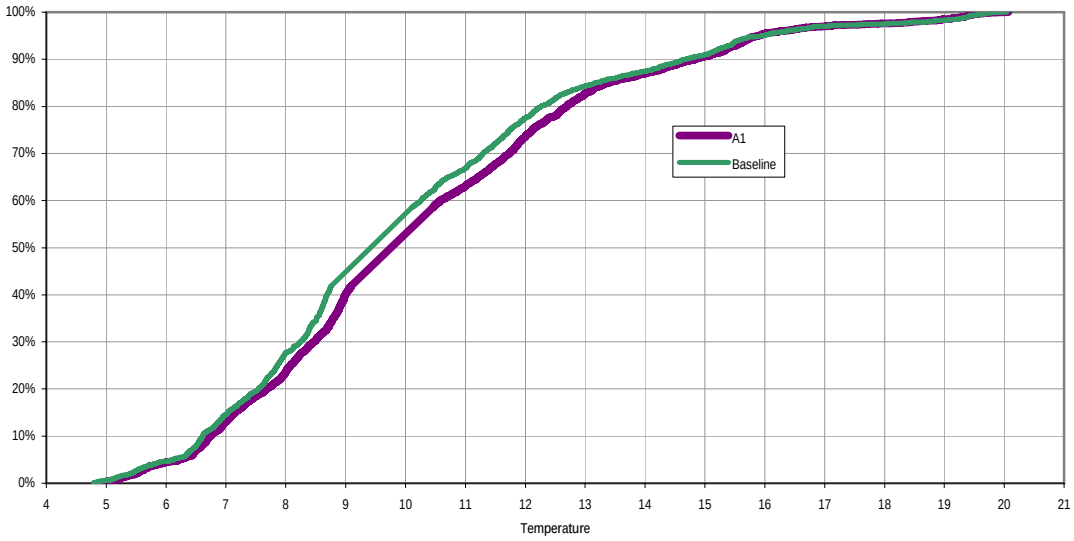


FIGURE 5-4

Comparison of Temperature Frequency Duration Curves (1984 – 1986)

USACE Gwinnett County Diffuser/Pipeline EA

Gwinnett County, Georgia

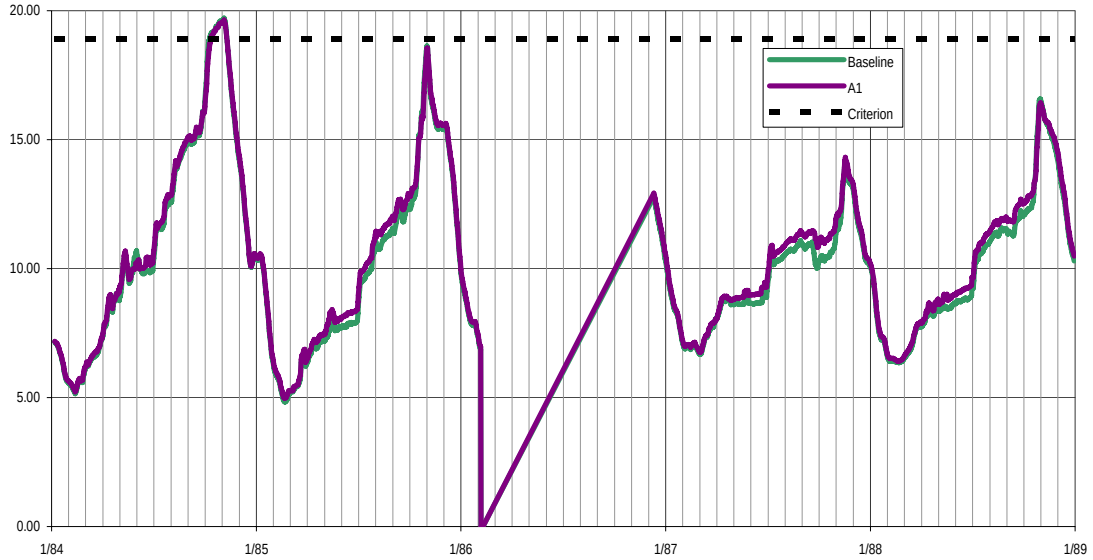


FIGURE 5-5

Comparison of 7-Day Moving Average Temperatures at Buford Dam

USACE Gwinnett County Diffuser/Pipeline EA

Gwinnett County, Georgia

While changes in temperature with the additional discharge are minimal as discussed above, they could potentially exceed the State standard during September and October (Section 5.3.9.3 and Table 5-9). However, as the above analysis shows, the upper thermal limits for trout are protected during both September and October as illustrated by Metrics 1 through 3 and as reported in the literature (Table 5-10). In addition, temperature impacts during the critical spawning periods (February to May) are well below the upper thermal limits as reported in the literature (Table 5-10). Therefore, no significant impacts to trout or other aquatic species are anticipated.

Gwinnett County has agreed, as part of the NPDES permit monitoring requirements, to fund the existing USGS temperature monitoring station located directly downstream of Buford Dam. This station will provide continuous temperature monitoring data that will be used to assess the potential impacts of the discharge in Lake Lanier on the temperature of the lake discharge to the upper Chattahoochee River. In addition, the county will be implementing a monitoring program at five locations within the lake, between the diffuser and the dam outlet, to evaluate near field impacts on water quality, including temperature.

Warmwater fish communities in the Chattahoochee River would not be impacted by the L5 alternative. These communities are naturally adapted to higher water temperatures than the cold-water discharge from Buford Dam.

Water Quality

Within Lake Lanier, there is a benthic macroinvertebrate community at the depth where the pipe would be trenched (CH2M HILL, 1999b). This community lives in the upper sediments and is composed primarily of sediment- and pollution-tolerant species (CH2M HILL, 1999b). As the extant benthic macroinvertebrate community is tolerant of degraded water conditions and the discharge of reclaimed water would not result in further degradation of water quality (see Section 5.3.9.4), there would be no impacts to the lake benthic community from discharge of reclaimed water in Lake Lanier. The impacts from the discharge to the warm water fish community within the lake would be long-term, but minor and insignificant as no water quality impacts are anticipated (see Section 5.3.9).

Water quality impacts in the river downstream of Lake Lanier are not anticipated (see Section 5.3.9). Therefore, no significant impacts on aquatic species would be expected.

Potential Impacts from Construction

A summary of impacts to waters of the United States for each considered alternative is provided in Table 5-11. Specific stream and wetland crossings are further discussed in following subsections.

TABLE 5-11
Stream and Wetland Impacts
USACE Gwinnett County Diffuser/Pipeline EA

	Route A	Route B	Route C/E
Number of Perennial Streams Crossed	6	7	5
Linear feet of Perennial Stream Temporarily Impacts	200	230	170
Number of Intermittent Streams Crossed	8	6	11
Linear feet of Intermittent Stream Temporarily Impacts	400	300	510

Number of Emergent and Scrub-Shrub Wetlands Crossed by ROW	5	3	3
Acres of Emergent and Scrub-Shrub Wetland Crossed by ROW	0.40	0.30	0.443
Number of Forested Wetlands Crossed by ROW	1	1	2
Acres of Forested Wetland Conversion	0.15	0.15	0.312
Total Acres of Wetland Impacts	0.55	0.45	0.755

Streams: Table 5-12 indicates the stream impacts for each considered alternative. Route B has the fewest stream crossings, and Route C/E the most. However, Route C/E has the least impacts to perennial streams. All impacts to streams would be temporary and limited to the period of construction at each crossing.

TABLE 5-12
Stream Impacts Along Each Considered Route
USACE Gwinnett County Diffuser/Pipeline EA

Stream Crossing	Flow Regime	Name	Crossed by Route		
			A	B	C/E
S1	Intermittent	Suwanee Creek Tributary 1	No	No	Yes, but no impact
S2	Perennial	Suwanee Creek	No	No	Yes
S3	Intermittent	Suwanee Creek Tributary 2	No	Yes	Yes
S4	Intermittent	Suwanee Creek Tributary 3	No	Yes	Yes, but no impact
S5	Intermittent	Suwanee Creek Tributary 4	No	Yes	Yes
S6	Intermittent	Richland Creek Tributary 1	No	No	Yes
S7	Intermittent	Richland Creek Tributary 2	No	No	Yes
S8	Intermittent	Richland Creek Tributary 3	No	No	Yes
S9	Perennial	Richland Creek	No	No	Yes
S10	Intermittent	Richland Creek Tributary 4	No	No	Yes
S11	Intermittent	Richland Creek Tributary 5	No	No	Yes
S12	Perennial	Richland Creek	No	No	Yes
S13	Intermittent	Richland Creek Tributary 6	No	No	Yes
S14	Perennial	Richland Creek	Yes	Yes	Yes
S15	Perennial	Richland Creek Tributary 7	Yes	No	Yes, but no impact
S16	Intermittent	Lake Lanier Tributary 1	Yes	Yes	Yes
S21	Perennial	Suwanee Creek Tributary 5	Yes	Yes	No
S22	Perennial	Suwanee Creek	Yes	Yes	No
S23	Intermittent	Suwanee Creek Tributary 6	Yes	No	No
S24	Intermittent	Suwanee Creek Tributary 7	Yes	No	No
S25	Intermittent	Level Creek Tributary 1	Yes	No	No
S26	Intermittent	Level Creek Tributary 2	Yes	No	No
S27	Perennial	Level Creek	Yes	No	No
S28	Perennial	Level Creek	No	Yes	No
S29	Intermittent	Level Creek Tributary 3	Yes	Yes	No
S30	Intermittent	Level Creek Tributary 4	Yes	Yes	No
S31	Perennial	Level Creek Tributary 5	Yes	Yes	No
S32	Perennial	Richland Creek Tributary 12	Yes	Yes	No
S33	Perennial	Richland Creek Tributary 13	No	Yes	No

Three streams would be crossed without impact by Route C/E. Streams 1, 5, and 15 would be crossed by the proposed pipeline beneath existing culverted road crossings. Neither the culverts nor the streams would be impacted by these crossings.

Streams would be crossed using open trench techniques. Gwinnett County has filed an application for a Section 10/404 permits for installation of the pipeline and outfall structure (Appendix C). No work on the pipeline would be done until after the permit is obtained. All work would comply with Section 10/404 permit conditions and the Georgia Erosion and Sedimentation Act.

Projects that are authorized under the NWP program have been determined by the USACE to have little or no impact to waters of the United States, including wetlands. Equipment would work from stream banks and not be operated in stream channels. Following installation of the pipe, the ground surface and stream bottom would be returned, as near as practicable, to pre-installation contours. No changes to flow patterns or barriers to movement of aquatic life forms would result from installation of the pipe.

All stream impacts would be temporary and minor. It is anticipated that all stream crossings would be authorized under a CWA Section 404 NWP, which the USACE has determined applies only to projects with minimal impacts to waters of the United States. Conditions of the CWA Section 404 permit would require that construction comply with the Georgia Erosion and Sedimentation Act and the Gwinnett County Soil Erosion and Sediment Control Ordinance, as amended November 28, 1995, for stormwater management. Installation, use, and maintenance of appropriate BMPs would prevent impacts to streams and water quality from construction activities and runoff (see Table 5-3). Specific BMPs that would be used would be determined from site conditions and would include, but not be limited to, silt fencing, silt curtain, and fiber matting. Construction would be done in accordance with the Georgia Rules and Regulations for Water Quality Control, 391-3-6-18. Bank stabilization and revegetation would immediately follow construction to prevent future erosion and sedimentation impacts.

No significant impacts would occur in flood plains. All piping would be placed below ground and no above-grade structures would be built. The ground surface would be returned to pre-construction contours and stabilized following installation. There would be no impedance of flood conveyance or flood storage capacity. Construction would comply with the Georgia Erosion and Sedimentation Act and the Gwinnett County Soil Erosion and Sediment Control Ordinance, as amended November 28, 1995. Specific BMPs that would be used to prevent impacts from construction activities and runoff would be determined from given site conditions and would include, but not be limited to, silt fencing, silt curtains, and fiber matting. Construction would be done in accordance with the Georgia Rules and Regulations for Water Quality Control, 391-3-6-18.

Wetlands: Tables 5-11 and 5-13 indicate the wetland impacts for each considered alternative. Route C/E has the greatest amount of forested wetland conversion (0.31 acre) and the greatest acreage of wetlands crossed (0.76 acre). No significant impacts to wetlands would result from implementation of any of the considered alternatives.

Wetland areas would be crossed using open trench techniques. Gwinnett County has filed an application for a CWA Section 404 permit for installation of the pipeline (Appendix C). No work on the pipeline would be done until after the permit is obtained. All work would comply with CWA Section 404 permit conditions. Equipment would work from timber mats while in wetland areas to minimize disturbance associated with work activities. Following installation of the pipe, the ground surface would be returned, to the extent practicable, to

TABLE 5-13
Wetlands Identified Along Each Alternative and Potential Impacts
USACE Gwinnett County Diffuser/Pipeline EA

Wetland Crossing	Classification	Impacts	Along Route		
			A	B	C/E
W1	PFO	Clearing, permanent conversion, temporary trenching and construction traffic	No	No	Yes
W1A	PEM	Temporary trenching and construction traffic	No	No	Yes
W2	PSS	Temporary trenching and construction traffic	No	No	Yes
W3	PFO	Clearing, permanent conversion, temporary trenching and construction traffic	No	No	Yes
W4	PEM	Temporary trenching and construction traffic	Yes	Yes	Yes
W5	PEM	Along reuse line, temporary trenching and construction traffic	No	No	No
W9	PSS	Temporary trenching and construction traffic	Yes	Yes	No
W10	PFO	Clearing, permanent conversion, temporary trenching and construction traffic	Yes	Yes	No
W11	PSS	Temporary trenching and construction traffic	Yes	No	No
W12	PSS	Temporary trenching and construction traffic	Yes	No	No
W13	PSS	Temporary trenching and construction traffic	Yes	Yes	No

pre-installation contours. During excavation of the trench, the top 6 inches of soil removed from the trench would be segregated and returned to the top when the trench is backfilled. Any excess excavated native soil that cannot be returned to the trench would be disposed of in an approved upland site as required by CWA Section 404 permit conditions.

Under any of the alternatives, there would be no loss of wetland acreage and only limited conversion of forested wetlands to other wetland types (see Table 5-11). Construction would comply with the Georgia Erosion and Sedimentation Act and the Gwinnett County Soil Erosion and Sediment Control Ordinance, as amended November 28, 1995, for stormwater management. Installation, use, and maintenance of appropriate BMPs would prevent impacts from construction activities and runoff (see Table 5-3). Specific BMPs that would be used would be determined from given site conditions and would include, but not be limited to, silt fencing, silt curtains, and fiber matting. Construction would be done in accordance with the Georgia Rules and Regulations for Water Quality Control, 391-3-6-18. Bank stabilization and revegetation would immediately follow construction to prevent future sedimentation impacts.

At crossings affecting scrub-shrub or forested wetlands, the pre-existing topography would be re-established, and the impacted areas would be allowed to revegetate as emergent wetlands. This is necessary to avoid growth of trees with extensive root systems that could compromise pipeline integrity over time. Therefore, the pipeline ROW would be maintained in herbaceous vegetation to facilitate maintenance access and promote operational integrity.

In wetland areas, any necessary tree clearing would be done mechanically. Removed trees would be chipped, uprooted, or timbered (rather than mowed). Tree removal would be a one-time effort and would result in temporary impacts to wetland systems. Thereafter, these areas would be mowed routinely to prevent establishment of larger trees within the permanent easement. All grades disturbed during tree removal would be restored to pre-

activity elevations. Although all trees would be removed from the permanent easement, an emergent wetland vegetation community would develop, as hydrology would not be altered. Outside the permanent easement, natural revegetation would occur.

Georgia requires mitigation for conversion of forested wetlands. Gwinnett County would provide any compensatory mitigation required as a condition of the CWA Section 404 permit through purchase of credits in a mitigation bank with a service area that includes Gwinnett County and the appropriate watersheds in its service area. The number of required credits would be determined according to the USACE Savannah District Standard Operating Procedures for Stream and Wetland Mitigation (Appendix G).

Typical conditions placed on any CWA Section 404 permit for work in wetlands require that pipeline construction and operation not cause existing wetlands to drain and mandate that either clay plugs or anti-seep collars be placed at the points where pipelines enter and leave wetlands to prevent creation of a "French drain effect" with drainage occurring along the pipe. Gwinnett County would require the installation contractor to place clay plugs at the entry and exit points of wetland areas to prevent accidental draining along the pipeline (Figure 5-6). Clay plugs are made with bentonite clay, a hydroscopic clay that swells when wet and has a very low hydraulic conductivity. The clay plug is placed across the entire trench to create a barrier to water movement along the pipe or the construction trench. The entire trench is blocked because porosity may be increased from disturbance and allow greater water flow than would have occurred in the undisturbed soils.

Lake Lanier: The area to be impacted by construction and side-casting is approximately 17.5 acres. Approximately 10 acres would be associated with construction of the pipeline, and 7.5 acres would be associated with side-casting of excess excavated material. Excess excavated material associated with pipeline construction would be left in place within the easement on the bottom of the lake. Further disturbance to re-establish bottom contours by moving sediments horizontally would cause additional short-term turbidity in the lake, while leaving the sediments spread on the lake bottom would have minimal impact on aquatic communities. There would be potential for localized resuspension of sediments at the sediment-water interface from lake currents during the period that the spread sediments stabilize. Much of the sediment stabilization would occur while the turbidity curtains are in place, minimizing the potential for resuspension.

In the nearshore portion of the outfall structure, Gwinnett County would remove all excavated material in areas above elevation 1,060 feet msl that could not be returned to the trench and transport that material to either the inert landfill on Sycamore Road or to the Buford Landfill on Richland Creek Road for disposal. This offsite disposal of excess excavated material would minimize the potential for impacts to recreational boating activities in nearshore or shallow waters. However, except in nearshore areas, the alternative of transporting excess excavated material from the lake bottom to either an on-shore or an offshore disposal area would be a more costly and less efficient operation, and would likely result in additional turbidity impacts since the material would be resuspended in the water column during loading onto a barge, and dewatering activities either on the barge or onshore would increase the potential for turbidity in the lake. Additionally, there would be the potential of an accident with the transport barge, which could result in spillage of material and a large, sudden influx of sediments to the water column and the

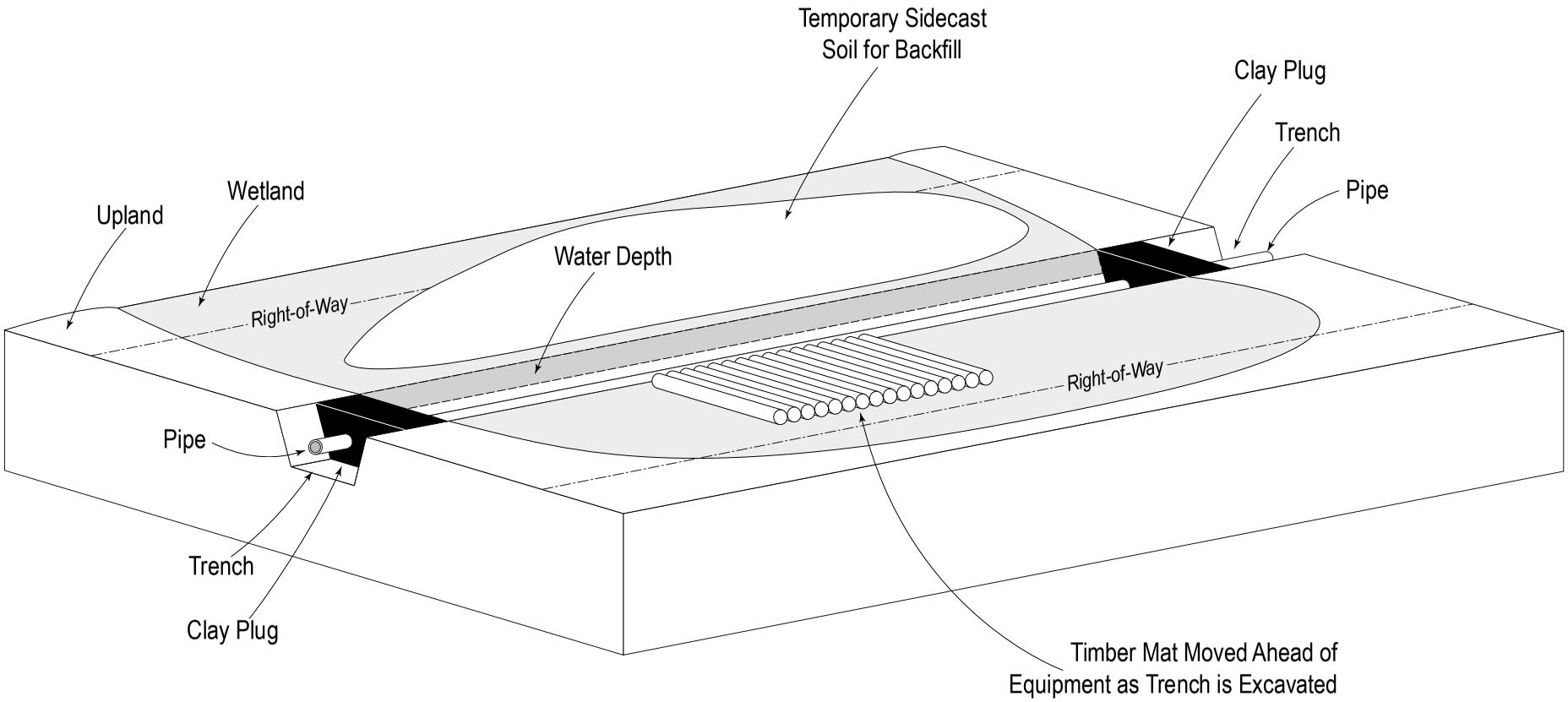


Figure 5-6
Clay Plug Wetland Construction Techniques
USACE Gwinnett County Diffuser/Pipeline EA
Gwinnett County, Georgia

CH2MHILL

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associated turbidity impacts. Implementation of BMPs could minimize these impacts, which would be expected to be short-term and localized.

Within Lake Lanier, there is a benthic macroinvertebrate community at the depth where the pipe would be trenched (CH2M HILL, 1999b). This community lives in the upper sediments and is composed primarily of sediment- and pollution-tolerant species (CH2M HILL, 1999b). These species would be displaced by construction activity, but would quickly recolonize the area after pipe installation is complete and excess excavated material is spread on the lake bottom. Potential impacts from excess side-cast material and gravel bedding are discussed separately below.

Side-cast excavated material would temporarily impact existing benthic invertebrate communities in an additional 7.5 acres of lake bottom. Krieger (2003) found that disposal of dredged material on lake bottoms had no discernable effects on benthic macroinvertebrate communities and sediment quality 1 year following the disposal. Other studies have shown that these types of impacts are short-term in nature, and that the benthic invertebrate populations (important as food for fish) re-establish within 2 years following construction. Frequency of disturbance has been cited as the most likely cause of changes in benthic community composition, with area frequently disturbed showing the greatest tendency to cause a change in composition following recolonization (USACE, 1998c). The project area would be subjected to only one disturbance period and would be expected to have a similar species assemblage following recolonization in areas where sediments are side-cast. Any future disturbance would be caused by infrequent repair or maintenance of the pipeline in the lake.

Recolonization of sediments occurs primarily as invertebrates disperse through the water column from nearby areas into the newly deposited material. The 7.5 acres that would be covered with side-cast material is less than 0.01 percent of the lake bottom. Therefore, impacts on benthic communities would be classified as temporary and minor. Any excavated material that could not be returned to the trench would be allowed to spread within the easement. The depth, placement, and potential migration of these materials are described in Section 5.3.4. The thickness of the excess excavated material left on the lake bottom would not be expected to significantly affect the rate or degree of recolonization by invertebrates.

Trenching or filling for exposed gravel bedding would impact a total of approximately 10 acres of bottom habitat, also less than 0.01 percent of the lake bottom. In these areas, the benthic invertebrate populations would be eliminated. A new and probably somewhat different population of benthic invertebrates would then recolonize the gravel bed areas over time, as a response to the new substrate in these areas. The somewhat altered benthic invertebrate community would fill the same role in the Lake Lanier food web as the current community. Therefore, the impact of the gravel bed areas would be minor and short-term in intensity and duration.

Combined, the area covered with side-cast material and gravel bedding will cover less than 0.02 percent of the lake bottom. Collectively, the temporary and minor impacts to this area would not constitute a significant impact to the lake bottom.

The impacts to the warm water fisheries during construction of the diffuser would be minor and insignificant. All fish species can avoid construction activities. Reproduction occurs in very shallow water and construction activities would not impact reproductive behavior. Placement of excess excavated material in shallow areas could create an impact on spawning of warm water fishes by elimination or disturbance of suitable habitat areas. Warm water fish in Lake Lanier typically spawn in shallow water that is less than 3 feet deep. To minimize or avoid potential impacts to fish spawning, all excess excavated material above elevation 1,060 feet msl will be removed to an onshore placement area or relocated within the easement to deeper parts of the lake. Non-rock material will be placed below 1,060 feet msl and allowed to spread across the easement. Any excess excavated rock materials will be relocated within the easement below an elevation of 1,035 feet msl so as not to present a navigation hazard to recreational boaters.

The impacts to fisheries and other aquatic resources from installation of the pipeline would be similar, regardless of the route selected. Installation of the proposed outfall pipeline may require blasting through rock outcrops in portions of the ROW easement at the shoreline as the pipeline enters the lake. The contractor will be required to prepare a general blasting plan that describes all proposed blasting. From the general blasting plan, a detailed blasting plan will be developed to address:

- Location, number, diameter, and depth of blast holes
- Explosives used
- Delay sequencing
- Type and manufacturer of all explosive materials
- Safety
- Communications
- Any other pertinent or required information.

Both plans will meet the general requirements of the USACE blasting specifications and be submitted to the USACE for approval prior to use of blasting on the project. The blasting procedures employed will be similar to those used on the Shoal Creek Water Intake Facility, also located in the Gwinnett County Park easement, which was developed in cooperation with USACE and resulted in no noise and structural damage complaints. BMPs for underwater blasting include the following:

- Notification of the USACE 24 hours before each underwater blast.
- Peak water overpressure pulse shall not exceed 50 pounds per square inch (psi) at 100 feet from the blast.
- If the pulse exceeds 50 psi, the contractor will conduct blasting inside a bubble curtain containing two rows of bubbler pipes.

After blasting and installation of the pipe, the bottom surface would be restored, as near as practicable, to pre-installation contours. Blasting should not be required in other areas where the pipeline would be installed.

Underwater blasting would result in mortality to aquatic invertebrates within the blast zone and can result in fish mortality (as reviewed in Keevin and Hempen, 1997). With invertebrates, the principle means of damage is direct physical impact from the blast, and

little shock wave damage occurs (as reviewed in Keevin and Hempen, 1997). No blast effects on invertebrates were detectable at 66 ft (20 m) from the blast site. Localized mortality to aquatic invertebrates is unavoidable. However, because of the low pressure of the blasts (less than or equal to 50 psi), the radius of impact would be small, and the area would be expected to recolonize relatively quickly following completion of construction.

With fish, the principle means of damage is damage to gas-containing organs resulting from the shock wave created by the blast. As stated above, it is expected that no blasts would exceed 50 psi at 100 feet from the blast. This is below the mortality threshold for most freshwater fish and half of the limit established by the National Marine Fisheries Service for shortnose sturgeon (as reviewed in Keevin and Hempen, 1997). While fish mortality is likely to occur within 100 feet of the blast, no fish populations in Lake Lanier would be eliminated, and recolonization and reuse of the area would be expected to occur rapidly following completion of construction.

Once past the rock outcrops, the pipeline would be installed by trenching, side-casting the sediment, and backfilling over the pipeline. Silt curtains would be used to contain sediments temporarily displaced by trenching activities. Any impacts to fisheries resources resulting from installation would be minor and short-term.

The project would not have any significant long-term adverse impacts on the ecology of Lake Lanier benthic invertebrate and fish communities. Furthermore, because the impacts are short-term in nature and recovery is anticipated to occur in most locations, the project is not expected to have any significant adverse long-term cumulative effects on the ecology of Lake Lanier.

5.3.13 Endangered, Threatened, and Other Listed Species

No Action Alternative

Impacts to endangered, threatened, or otherwise protected species resulting from implementation of the No Action Alternative would depend on the pipeline route and discharge point selected and cannot be determined with certainty. However, the route selection process would likely result in no impacts to listed species, similar to what is described below for the pipeline route alternatives. It is assumed that project design and route selection would be coordinated with state and federal agencies to avoid impacts to protected species to the extent practicable and avoid any significant impacts to protected species.

Potential Impacts from Discharge to Lake Lanier

No protected species are known from Lake Lanier in the area of the proposed diffuser. Discharge of reclaimed water through the diffuser would not result in violations of water quality standards in the lake nor impair the lake's designated uses. Therefore, no direct impacts to endangered, threatened, or otherwise protected species would occur from discharge of reclaimed water into Lake Lanier.

There is the potential for upstream water uses to negatively impact sensitive aquatic species in the lower reaches of the Chattahoochee River or in the Apalachicola River, including the Gulf sturgeon and the freshwater mussels Fat three-ridge, Purple bank-climber and Chipola slabshell. However, because the proposed action under consideration in this analysis would result in the return of water to Lake Lanier there would potentially be additional water available in the Chattahoochee River system for water supply needs in the upper

basin and downstream needs for aquatic resources. Therefore, the proposed discharge to the lake should not impact the ability of the Mobile District to meet the conditions of the Biological Opinion issued by the US Fish and Wildlife Service in 2006 for the Interim Operations Plan at Jim Woodruff Dam, or as modified in February 2007, to ensure adequate flows for the maintenance of habitat conditions for the Gulf sturgeon and mussels in the Apalachicola River. In fact, the proposed discharge would likely provide a beneficial effect by providing additional water stored in Lake Lanier to help meet the downstream flow requirements for these protected species. As a result, there would be no direct impacts to downstream sensitive species.

Potential Impacts from Construction

All considered pipeline route alternatives are within areas that are relatively developed and include substantial portions within roadbeds or maintained utility ROWs. No suitable habitat for any of the plant species listed as possibly occurring in the project area was identified along the routes and no occurrences of any of these species were noted. Implementation of any of the considered pipeline route alternatives would not impact any endangered, threatened, or otherwise protected plant species.

Due to the nature of the alternatives (i.e., mostly roads and existing ROWs), no impacts to protected animal species are expected to occur under any of the alternatives. No suitable habitat for any of the species listed for Gwinnett County was identified along the routes with the exception of suitable bald eagle habitat along Route A. No nests were observed along the route and no previous recorded sightings from the project area (except for occasional migratory individuals) are known. No impacts to endangered, threatened, or otherwise protected animal species are expected to result from implementation of any of the pipeline route alternatives.

5.3.14 Noise

Noise associated with construction of the proposed pipeline would be generated by the various trucks, backhoes, bulldozers, and other heavy equipment required to dig and tunnel, install the pipe, and re-grade the ROW. Table 5-14 summarizes noise levels generated by heavy equipment typically used during construction of highways, which is similar to equipment required for construction of the proposed pipeline and diffuser.

TABLE 5-14
Estimated Peak Hour Construction Noise
USACE Gwinnett County Diffuser/Pipeline EA

Construction Phase	Equipment	Noise Level at 25 feet (dBA-Leq)	Noise Level at 50 feet (dBA-Leq)
Clearing and grubbing	Bulldozer, backhoe	95	89
Earthwork	Scraper, bulldozer	97	91
Foundation	Backhoe, loader	94	88
Superstructure	Crane, loader	95	89
Base preparation	Trucks, bulldozer	97	91
Paving	Paver, trucks	98	92

Source: U.S. Department of Transportation, 1977.

No Action Alternative

Implementation of the No Action Alternative would result in construction-related noise impacts from installation of the pipeline and discharge structure at unspecified locations. It is likely that these locations would be along road ROWs where additional traffic noise would be present, such that the construction noise would not constitute the only noise for an otherwise quiet area. Any impacts would be temporary and minor due to project design to limit work to hours when potentially sensitive receptors would not be present or would be less disturbed. No significant noise-related impacts are expected to result from implementation of this alternative.

Potential Impacts from Discharge to Lake Lanier

No noise would be generated by release of reclaimed water through the diffuser on the lake bottom and there are no sensitive receptors should any incidental noise be created. Therefore, no impacts from noise would result from discharge of reclaimed water to Lake Lanier.

Potential Impacts from Construction

Implementation of any of the considered pipeline route alternatives would result in construction-related noise impacts from installation of the pipeline. Construction locations are along road ROWs where traffic noise is present and construction would not constitute the only source of noise in otherwise quiet areas. Any impacts would be temporary and minor due to project design; work would be limited to hours when potentially sensitive receptors would not be present or would be less disturbed. No significant noise-related impacts are expected to result from implementation of these alternatives.

Construction in Lake Lanier would generate typical construction-related noise, but not near any sensitive receptors, as Gwinnett County Park would remain closed and the work would occur in the lake. No noise impacts are expected from general construction-related noise.

As discussed earlier (see Sections 4.2.7.4 and 4.2.7.5), blasting of bedrock will be required for a short distance in Gwinnett County Park along the roadway entry into the site, and may be required in nearshore portions of the lake. The extent of blasting would be minimized by ripping as much of the weathered bedrock as possible and blasting only to the extent required to place the pipeline within the ROW trench, with the crown of the pipe below elevation 1,045 feet msl in the lake. Gwinnett County Park would remain closed when any required blasting would be done, thereby minimizing potential impacts from noise. The nearest house to the blasting location is 400 feet away from where charges would be placed and the Lake Lanier saddle dike is 1,000 feet from the blast site (see Blasting Plan, Appendix D). Additionally, the contractor would be required to submit a blasting plan and noise control plan, similar to the plan for Gwinnett County Park in Appendix D, should blasting be required in the lake. The plan would address noise monitoring equipment, temporary noise barriers, and noise reduction materials and equipment, as necessary. The combination of distance to receptors and use of the noise control plan would prevent significant impacts from noise generated by blasting. The blasting plan would minimize vibration and thus keep blasting damage to residential structures to a minimum.

5.4 Cumulative Impacts

Because of uncertainties associated with future growth in Gwinnett County and the Lake Lanier Basin and the additional uncertainty regarding specific measures that would be implemented in years following the Proposed Action, quantitative analysis of potential cumulative impacts is not possible. The following qualitative considerations are provided.

5.4.1 Potential Cumulative Impacts on Future Use and Operation of Lake Lanier

In this section, resource areas with potential for cumulative impacts on future use and operation of Lake Lanier are considered. The resource areas are discussed in separate paragraphs. Any resource areas not discussed in this section were determined to have no potential for cumulative impacts on future use and operation of Lake Lanier.

The reclaimed water discharge would comply with all NPDES permit limits to preserve water quality. Waste load allocations based on the Georgia EPD modeling are intended to ensure that the discharge will be protective of water quality. Continued growth in the Lake Lanier Basin and north Georgia metropolitan area is expected (see Section 5.4.3). This growth will result in additional water supply and wastewater treatment needs in the basin, and future discharges of reclaimed water are likely to be authorized for Lake Lanier. However, it is assumed that the Georgia EPD will continue to require future permittees to improve wastewater treatment such that there is no net increase in wasteloads to the lake, consistent with current Georgia EPD policy. Any wasteload allocations would also be expected to be consistent with water quality standards for Lake Lanier. Additionally, the MNGWPD comprehensive plans to improve water quality in the MNGWPD as development occurs will help mitigate cumulative impacts on the lake. Therefore, established or revised wasteload allocations based on this policy would prevent discharges from resulting in significant cumulative impacts on Lake Lanier water quality.

For all action alternatives, there would be no cumulative nonpoint source impacts in Lake Lanier. Although pollutant loads to the lake are dominated by nonpoint sources (CH2M HILL, 1999a), there would be little new nonpoint source pollution or runoff into the lake as a result of this project. In addition, new stormwater control requirements for developments implemented in Gwinnett, Hall, and Forsyth Counties as part of the MNGWPD program, along with Gwinnett County's existing program, would help reduce these loads in the future. Additionally, the MNGWPD program includes eventual retrofitting or upgrading of some existing structures to further improve water quality and reduce nonpoint source (NPS) pollution.

Previous construction of the Shoal Creek Water Intake Facility (structures and pumphouse) at Gwinnett County Park resulted in restriction of approximately 1.1 acres of public use area within the park, and the eventual closing of the park for public access due to security concerns at the public water supply intake facility. Gwinnett County is relocating the impacted existing picnicking areas and associated recreational facilities from Gwinnett County Park to adjacent public use areas within Gwinnett County to provide for equivalent recreational facilities. Therefore, no cumulative impacts on the operation of Gwinnett County Park due to construction of the outfall pipeline would result, other than clearing of forested areas within the approximately 250 linear feet of the pipeline easement that does not overlay the water supply intake easement through the park.

Any potential impacts to Lanier Park would be temporary and primarily limited to disturbance or disruption of recreational activities along the east side of the public use area. Once construction is complete, there would be no further potential to impact Lanier Park. Therefore, no cumulative impacts to recreational use of Lanier Park would result.

There would be no cumulative impacts on other recreational activities at the lake due to operation of the diffuser or significant cumulative changes in water quality from the Proposed Action. As return of reclaimed water to the Chattahoochee River Basin and Lake Lanier is part of the MNGWPD long-term water management strategy, it is likely that other discharges of reclaimed water to Lake Lanier would be proposed. As discussed above, it is anticipated that the Georgia EPD NPDES permit policy will continue to allow no net increase in nutrient loads to the lake and will prevent significant cumulative impacts from all future discharges of reclaimed water to the lake, but any such proposed discharges would be evaluated on a case-by-case basis by the Georgia EPD and the USACE Mobile District. With no significant impacts to water quality, most recreational uses would continue normally.

Infrastructure to support future discharges of reclaimed water into Lake Lanier would have the potential to create physical impacts that restrict access to public use areas and recreational facilities. The USACE Mobile District would evaluate any such proposed projects on a case-by-case basis to assure that no significant impacts to recreational use would result, or could require sufficient mitigation or replacement facilities for any areas significantly impacted.

There would be no cumulative impacts on recreational boat traffic from the Proposed Action. The depth of the diffuser would preclude any interaction of the discharge with recreational boat traffic. As discussed above, with Location L5 there would be one section of pipe approximately 240 feet long with the crown above 1,035 feet msl that could result in exposed pipe at extremely low lake levels. However, this section of pipe would be along a ridgeline that extends to 1,041 feet msl and the presence of the pipe would not increase the potential for short-term impacts to recreational boat traffic beyond what currently exists with the ridgeline alone. Future discharges to the lake would result in increased water availability and would be likely to result in elevated minimum lake levels for a given operating condition. This could result in minor positive cumulative impacts on recreational boat use of Lake Lanier under extreme operating conditions. Any proposed future projects would be evaluated on a case-by-case basis by the USACE Mobile District to assure that no significant negative impacts to recreational boat traffic result.

5.4.2 Potential Cumulative Impacts along Pipeline Routes

There would be minimal cumulative impacts along the considered pipeline route alternatives. Once the pipe is installed and the ground surface restored, the pipeline would not impact or interact with other projects. As the pipeline would be collocated with other utility and transportation ROWs for the greater portion of its length, its future operation would not significantly constrain land use opportunities. While substantial conversion of forest/woodlots is occurring in Gwinnett County, the amount converted along the considered routes (0.15 to 0.31 acres) is insignificant compared with that occurring for residential, industrial, and commercial development in Gwinnett County. Future growth in Gwinnett County will occur regardless of the alternative selected, including the No Action

Alternative. Impacts from residential, industrial, and commercial development would occur regardless of whether wastewater treatment capacity is increased at FWHWRC or increased through additional onsite systems. The incremental effect of the pipeline route selected would be minimal compared with the total growth that would occur in Gwinnett County.

5.4.3 Potential Cumulative Impacts in the Lake Lanier Basin

The Lake Lanier Basin is undergoing substantial growth that is projected to continue into the future. Forecasts indicate that growth will occur in all counties surrounding Lake Lanier. This growth would likely result in conversion of open areas into residential/commercial/ industrial areas and could result in increased point source discharges and NPS pollution entering Lake Lanier. The MNGWPD has developed comprehensive integrated plans for water supply, wastewater treatment, and watershed protection. Implementation of these plans would reduce current and future NPS pollution in the basin and provide additional controls for point sources.

Development in the Lake Lanier Basin will happen regardless of whether an action alternative or the No Action Alternative is implemented. The considered action alternatives would have no significant cumulative impacts in the Lake Lanier Basin, as the increased wastewater treatment in Gwinnett County would promote growth and development outside the Lake Lanier Basin. Less than 2 square miles of Gwinnett County lie within the Lake Lanier Basin, and USACE owns 1.05 square miles of that land. Opportunities for development on or adjacent to this USACE property are limited. The project as proposed would serve only Gwinnett County, not surrounding counties. Therefore, the project would not stimulate growth and development in other counties in the Lake Lanier Basin. Gwinnett County's compliance with MNGWPD requirements for sedimentation and erosion control on development projects and post-construction stormwater controls on developments would minimize cumulative impacts from development in the Lake Lanier Basin. These requirements have been designed to prevent deterioration of water quality as development occurs and allow for future improvements in water quality through retrofitting of existing systems.

As growth occurs in the Lake Lanier Basin and Gwinnett County, there will be additional demands for water supply. Some of the demand can be met through reuse of reclaimed water to reduce the demand for raw water. The MNGWPD plans encourage direct, non-potable reuse of reclaimed water to reduce demands for raw water and indirect potable reuse of reclaimed water as a raw water supply. The proposed project is consistent with MNGWPD plans and provides for limited direct non-potable reuse, with the ability to expand that use as opportunities arise, and for indirect potable reuse. This provides additional water supply and reduces the potential for cumulative impacts on water supply in the Lake Lanier Basin.

The proposed project is to address discharge from the expanded FWHWRC. The current permitted discharge of 20 mgd from FWHWRC to the Chattahoochee River below Buford Dam would continue after implementation of the proposed project. The interim discharge of 9 mgd to the Chattahoochee River would stop upon implementation of the proposed action, reducing the potential for cumulative impacts to this section of the Chattahoochee River. The Georgia EPD has indicated that future releases of additional reclaimed water to the Chattahoochee River downstream of Buford Dam may be allowed. However, such

discharges would only be allowed after Georgia Power has removed its thermal load to the river and other extant discharges to the river are improved to meet more stringent discharge limits. Any future discharges would have the potential to result in cumulative impacts to the Chattahoochee River, but such impacts would be minimal (e.g., essentially no increase in temperature of waters released from Buford Dam and minor increases in available flow for downstream uses). The Georgia EPD, through its water quality and anti-degradation program, would determine whether such future discharges to the Chattahoochee River would impact the river and/or would be permitted.

5.4.4 Potential Cumulative Impacts from Growth in Gwinnett County

As noted in Section 1.3, Gwinnett County is projected to grow through the foreseeable future. Most of Gwinnett County is outside the Lake Lanier Basin and growth and development within the County would occur primarily outside the Lake Lanier Basin and could result in cumulative impacts to other drainage basins in Gwinnett County. However, this growth would occur regardless of the alternative selected, including the No Action Alternative. Compliance by Gwinnett County with MNGWPD requirements for sedimentation and erosion control on development projects and post-construction stormwater controls on developments would minimize or prevent cumulative deterioration of water quality as development occurs and allow for future improvements in water quality through retrofitting of existing systems. Full implementation of the integrated MNGWPD plan would result in minimal negative cumulative impacts to basins in Gwinnett County and would result in positive cumulative impacts on water quality and habitat structure in these basins.

This growth will place additional demands for water supply and wastewater treatment. The proposed project will be consistent with MNGWPD plans and provide for limited direct non-potable reuse, with the ability to expand that use as opportunities arise, and for indirect potable reuse. This provides additional water supply and reduces the potential for cumulative impacts on water supply in the Lake Lanier Basin. This is also true for water demands for Gwinnett County, which receives its water supply from Lake Lanier even though most of the County is outside the Lake Lanier Basin.

The proposed project addresses the projected demand for disposal of reclaimed water generated by wastewater treatment in Gwinnett County through approximately 2012. Clearly, additional treatment capacity will be needed in the future, and Gwinnett County will expand its treatment capacity to meet those demands. Additional wastewater discharges are likely to result from that capacity increase. Gwinnett County will increase direct non-potable reuse of reclaimed water as practicable opportunities arise. This will decrease the need for additional discharge of reclaimed water to surface waters. Current planning efforts in Gwinnett County have established a presumptive schedule for implementation of wastewater capacity expansion. However, there are uncertainties associated with developing such timelines and these plans will be updated and modified in the future. At present, Gwinnett County has no firm plan as to how discharges from potential future capacity increases would be handled. Capacity increases are likely to continue at the FWHWRC, which has the ability to discharge to the Chattahoochee River (existing 20-mgd discharge plus interim 9 mgd discharge) and also would have the ability to discharge to Lake Lanier (Proposed Action). MNGWPD plans for wastewater treatment indicate that future discharges of reclaimed water should be directed to either the lake or the river. Any future

discharges would be consistent with MNGWPD plans and would comply with state water quality and NPDES discharge requirements to protect water quality.

Absent system expansion, additional demand for domestic wastewater treatment would likely be handled through onsite systems. As discussed under Section 3.2.1, this would result in greater negative impacts than facility treatment and subsequent discharge, and it could limit residential, commercial, and industrial growth.

5.5 Unavoidable Adverse Environmental Effects

Unavoidable adverse environmental impacts are those environmental consequences of an action that cannot be avoided by changing the nature of the action or through mitigation. For the proposed project, unavoidable adverse environmental impacts would manifest as temporary disruption of traffic flow during pipeline construction under and adjacent to roadways. There would be temporary and long-term impacts to wetlands, but these impacts would be mitigated. There would be disturbance to the bottom of Lake Lanier resulting from construction; however, sediment accumulation would render these changes negligible with time. Incidental mortality of fish and benthic invertebrates would result if blasting is required in the nearshore area of Lake Lanier. Any losses would be minor and rapid population recovery following completion of work would be expected.

5.6 Irreversible or Irretrievable Commitment of Resources

An irreversible commitment of resources occurs when future options for a given resource are constrained or precluded. This term typically is applied to nonrenewable resources or resources that are renewable only over a very long period of time, such as wetlands or riparian habitats. An irretrievable commitment of resources refers to the dedication of renewable resources to one effort that results in a reduction of production or use for other efforts.

For the actions considered in this EA, there would be only minimal irreversible commitments of resources. Minor clearing of forested wetlands would occur along the pipeline route. Minimal soil erosion also could occur along the pipeline route, resulting in an irreversible transport of limited amounts of soil downstream. No other nonrenewable resources would be expected to be irretrievably committed by this project.

A portion of Lake Lanier would be unavailable for use for recreational purposes during the in-lake construction of the outfall structure. Once construction is complete, recreational use of these areas could resume. Under extremely low lake levels near or below the minimum pool elevation of 1,035 ft msl, the portions of the pipe that near elevation 1,035 ft msl would preclude recreational boating in its immediate vicinity. However, the proximity to higher elevations on the adjacent slope would minimize any restrictions resulting from the pipe.

Gwinnett County Park was closed to recreational use prior to the installation of the water supply intake structure. This facility would remain closed following installation of the pipeline and diffuser, but no additional commitment of recreational resources on the shore of Lake Lanier would result.

There would be incidental mortality of fish near the blast area if use of explosives is required for rock removal in nearshore areas of Lake Lanier. This would be a temporary localized reduction in fish numbers, and recreational fishing would quickly recover from this short-term loss of fish. No other irretrievable commitment of resources would be expected.

6.0 Coordination

Agency consultation related to the development of this document has included direct coordination with the Georgia State Historic Preservation Office (SHPO) and with the Savannah District USACE to develop the Section 10/404 permit application (see Appendix C). While the Section 10/404 permit application was being developed, additional contact with the SHPO was made and also with the U.S. Fish and Wildlife Service (USFWS) and Georgia Department of Natural Resources (DNR). SHPO, USFWS, and DNR also were contacted during initial project planning and development of the Environmental Information Document (EID).

The U.S. Environmental Protection Agency (EPA), USFWS, SHPO, and DNR and the other Federal and State agencies were provided the opportunity to comment on the Draft Environmental Assessment (EA). Notification of availability of the Draft EA for review was made to these agencies and the public through Public Notice FP07-SL01-7 on March 9, 2007 (Section 7.0). Additionally, the Mobile District provided initial notification to the Native American Tribal Councils of the availability of the Draft EA for review via an email notice on March 18, 2007 (Section 7.0).

6.1 Federal Agencies

6.1.1 USFWS

The USFWS was sent a letter by the US Army Corps of Engineers, Mobile District on March 23, 2007 to document consultation with the USFWS under Section 7 of the Endangered Species Act (ESA) and to submit a copy of the Draft EA for agency review and comment. Specifically, the letter referenced the potential impacts of the proposed discharge to Lake Lanier on the ability of the Mobile District to meet the requirements in the Biological Opinion issued for the Interim Operations Plan at Jim Woodruff Dam. The Mobile District noted that the Draft EA documented that the proposed discharge would likely have a positive impact on the ability to meet the downstream flow targets to support the protected aquatic species in the lower Chattahoochee and Apalachicola Rivers. On April 12, 2007 the USFWS submitted a letter indicating that the agency had no specific comments on the Draft EA and would defer their comment to future proposals related to water management of the ACF Basin. By letter dated April 30, 2007, the USFWS provided further comment and concurred that although the Gulf sturgeon and listed mussels may be affected, they are not likely to be adversely affected by the proposed action. This completes the Federal responsibility to consult with USFWS under Section 7 of the ESA.

6.1.2 USGS

The US Geological Survey (USGS) Reston, Virginia office submitted a comment letter dated April 12, 2007, on the Draft EA that included feedback on the hydrologic analysis and non-traditional water quality parameters.

Hydrology

USGS identified an error in the Draft EA on page 5-39 at line 21. The document identified 1,052 cubic feet per second (cfs) as the lowest recorded mean annual flow below Buford Dam. USGS pointed out that the lowest recorded flow below Buford Dam was 757 cfs.

The 1,052 number was intended to identify the lowest pool elevation recorded for the lake measured as feet relative to mean sea level (ft msl). The document has been corrected to include the correct low cfs value and to properly identify the 1,052 number as ft msl. Additional text corrections were made where the 1,052 value was used for cfs comparisons for flow. The 757 cfs value provided by USGS was used as appropriate.

Non-Traditional Pollutants (Endocrine Disrupting Compounds)

USGS noted that the water quality section of the Draft EA did not discuss the potential impacts of "emerging contaminants" including endocrine disrupting compounds (EDCs) on Lake Lanier. While EDCs may pose an issue, the current level of understanding of the potential risk is uncertain. None of the compounds that may pose such risks has been verified at a risk level at this time and no risk levels have been assigned to EDCs (USEPA, 2007). The text of the water quality section of the EA was amended to note the potential concerns regarding EDCs.

Other Contaminants (Metals and Other Potential Toxicants)

The USGS also noted that the water quality section of the Draft EA did not include a discussion of other potential contaminants and the potential for impacts on aquatic life. A paragraph was added to Section 5.3.9.3 noting that Gwinnett County conducted periodic toxicity tests to evaluate the potential toxicity of the effluent and that both the aquatic invertebrate and fish tests indicated that there was no chronic toxicity associated with the effluent. In addition, the priority pollutant scans in 2005 and 2006 found that there were no exceedances of water quality standards for any of the potential contaminants in the treated effluent.

6.2 State Agencies

6.2.1 Georgia Department of Natural Resources, State Historic Preservation Office (SHPO)

The Georgia SHPO was contacted by the Mobile District to document coordination under the National Historic Preservation Act for the Draft EA. A letter from the SHPO was submitted on April 17, 2007 indicating that they were deferring comment until they had reviewed all the cultural resource surveys. By email dated April 18, 2007, the Georgia SHPO was provided copies of the Draft EA and copies of the cultural resources surveys, and requested to respond within 30 days. Additional electronic copies were provided in additional consultation correspondence by letter dated May 17 and email dated May 23, 2007. The Georgia SHPO responded by letter on June 13, 2007 concurring that the proposed undertaking would have no effect on archeological resources located within the area of potential effect. The SHPO also concurred that the proposed project would have no adverse

effect to historic properties located within the area of potential effect. This completed the Federal responsibility to consult under Section 106 of the National Historic Preservation Act.

6.2.2 Georgia Department of Natural Resources, Wildlife Resources Division (DNR-WRD)

The DNR-WRD indicated in a letter dated April 12, 2007 that they were concerned about the potential impacts of the proposed discharge on cool water fisheries habitat in the lake and downstream of the dam on trout habitat in the Chattahoochee River. In addition, they were concerned about elevated temperatures in the river having a negative impact on their existing trout hatchery. Therefore, DNR-WRD requested that reservoir temperature profile monitoring be conducted down lake from the proposed discharge and within the dam forebay area to characterize the effect of the deepwater discharge and the influence of power generation releases on downstream cool water fisheries habitat and trout stream resources. Gwinnett County has agreed to implement a monitoring program in Lake Lanier between the diffuser and the dam outlet to measure water quality conditions, including temperature, at five locations. In addition, the county will be funding the maintenance of the existing USGS temperature monitoring station located directly below Buford dam. This combination of monitoring activities, to be conducted under the conditions of the NPDES permit, will address the potential concerns about temperature impacts expressed by the DNR staff.

6.3 Regional/Local Agencies

6.3.1 Metropolitan North Georgia Water Planning District

The Metropolitan North Georgia Water Planning District (District) is responsible for implementation of the water, wastewater, and watershed management plans that were developed for the 16-county metro Atlanta area in 2003. Kit Dunlap, the current chairperson, submitted a letter dated April 2, 2007, expressing support for the proposed action indicating the proposed discharge to Lake Lanier was consistent with the District plans and was integral to the overall water supply strategy for north Georgia.

6.4 Tribal Consultation

The Notice of availability dated March 9, 2007 was distributed to the Native American Indian Tribe contacts. In addition, consultation was conducted with the individual tribal representatives by email dated April 18, letter dated May 17, and follow-on email dated May 23, 2007, which included electronic copies of the Draft EA and cultural resources surveys.

The United Keetoowah Band of the Cherokee Indians submitted responses dated March 20 and March 28, 2007 stating no objection but requesting notification if any remains, artifacts or other items are inadvertently discovered.

The Cherokee Nation responded by email dated June 4, 2007, stated no knowledge of historic, cultural or sacred sites in the proposed project site, but requested that construction activity cease and the Cherokee Nation and other appropriate agencies be immediately notified in the event ground disturbance reveals an archeological site or human remains.

By letters dated April 21 and May 11, the Catawba Indian Nation requested a copy of the Draft EA. Hard copies of the Draft EA and the cultural resources surveys were provided, and additional electronic copies were provided by the above referenced correspondence on May 17 and 23, 2007. By email on May 31, 2007, the Catawba Indian Nation stated they were signing off on the Draft EA.

By email correspondence dated April 18, 2007, the Mississippi Band of Choctaw Indians noted the proposed action was outside their area of concern.

By email dated June 2, 2007, the Thlophthlocco Tribal Town indicated they had received sufficient information to satisfy their concerns.

No other official comments were provided by tribal representatives. This completed the Federal responsibility to consult with the Indian tribes regarding the proposed action. In the event additional tribal comments are received, they will be included in the administrative record for this action.

6.5 Public Comments

Only one letter, dated March 21, 2007, was submitted by Mr. and Mrs. Clifford Ives on the Draft EA. The Ives noted that they were most concerned about the overall management of Lake Lanier and the use of water in the ACF Basin for water supply in the Atlanta metro area. Their concern was that continued reallocation of water for municipal uses in north Georgia would potentially impact downstream reservoirs, specifically Lake Seminole. The proposed action may actually increase the flexibility of the Corps operations to meet downstream needs.

7.0 Comments

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Notice of Availability

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF

CESAM-PD-EI
PUBLIC NOTICE NO. FP07-SL01-7

09 March 2007

PUBLIC NOTICE
US ARMY CORPS OF ENGINEERS

NOTICE OF AVAILABILITY
DRAFT ENVIRONMENTAL ASSESSMENT
US ARMY CORPS OF ENGINEERS EASEMENT AND
SECTION 10/404 PERMIT DECISIONS FOR
PLACEMENT OF WATER RECLAMATION FACILITY DISCHARGE PIPELINE AND
DIFFUSER IN LAKE SIDNEY LANIER, GWINNETT COUNTY, GEORGIA

The U.S. Army Corps of Engineers (USACE), Mobile District has received a request from Gwinnett County, Georgia, for an easement to construct and maintain a treated wastewater pipeline and diffuser through the Gwinnett County Park and into Lake Sidney Lanier. Gwinnett County has also prepared a Pre-Construction Notification requesting consideration of a Department of the Army Permit from the USACE, Savannah District, for construction of the discharge pipeline and diffuser, extending from the F. Wayne Hill Water Resources Center (an advanced wastewater treatment and water reclamation facility) to the discharge point in Lake Lanier, pursuant to Section 10 of the River and Harbor Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344). The proposed diffuser and discharge location has been permitted by the Georgia Environmental Protection Division under the National Pollutant Discharge Elimination System (NPDES Permit No. GA0038130, issued on 3 November 2006). The proposed easement and Department of the Army permit actions have been addressed in a Draft Environmental Assessment, prepared pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality regulatory guidance in 40 CFR 1500-1508, and the USACE regulatory guidance in 33 CFR 230. The draft Environmental Assessment document is available for public review and comment and has been posted on the Mobile District public access website at the following location:

http://www.sam.usace.army.mil/pd/Pd1.htm

Additional copies of the draft Environmental Assessment have been placed for review at the USACE Lake Lanier Project Office, located at 1050 Buford Dam Road, Buford, Georgia; and at several public libraries in the Lake Lanier area, as listed in this notice. CD-ROM copies of the Draft Environmental Assessment will also be available upon request.

EVALUATION: Upon completion of the public coordination period set forth in this notice, the environmental assessment will be finalized and the final determination of the NEPA documentation requirements made. If the determination is to finalize the environmental assessment and prepare a Finding of No Significant Impact, these documents will be placed on file in the Mobile District Office for future reference.

The decision whether to proceed with the proposed action will be based on evaluation of the probable impact, including cumulative impacts of the proposed activity on the public interest. The decision will reflect the national concern for both protection and utilization of important resources. The benefits that may be reasonably expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered, including the cumulative effects thereof: conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, flood plain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership, and in general, the needs and welfare of the people.

COORDINATION: The USACE, Mobile District is soliciting comments from the general public; federal, state and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of the proposed activity. The USACE, Mobile District will use any comments received to determine whether or not to proceed with the proposed easement action. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are also used to determine the need for a public meeting to determine the overall public interest in the proposed activity. You are requested to communicate the information contained in this notice to other parties who may have an interest in the proposed action.

CORRESPONDENCE: Comments on the Draft Environmental Assessment should be directed to Commander, U.S. Army Corps of Engineers, Mobile District, Post Office Box 2288, Mobile, Alabama 36628-0001. For more information, contact Ms. Joanne Brandt, Compliance Manager, Inland Environment Team at (251) 690-3260, or via email joanne.u.brandt@sam.usace.army.mil. Comments should be received not later than **13 April 2007**.

CURTIS M. FLAKES
U.S. Army Corps of Engineers
Mobile District

Gwinnett County Libraries

Library Headquarters
1001 Lawrenceville Highway
Lawrenceville, GA 30045

Buford-Sugar Hill Branch
2100 Buford Hwy
Buford, GA 30518

Duluth Branch
3480 Duluth Park Lane
Duluth, GA 30096

Forsyth County Libraries
Cumming Branch
585 Dahlonega Road
Cumming, GA 30040

Sharon Forks Branch
2820 Old Atlanta Road
Cumming, GA 30041

Hall County Libraries
Headquarters
Branch Manager: Adrian Mixson
127 Main Street NW
Gainesville, GA 30501

Blackshear Place Branch
Branch Manager: Barbara Perry
2927 Atlanta Highway
Gainesville, GA 30507

Clermont Branch
Branch Manager: Rick Kiser
197 King Street
Clermont, GA 30527

East Hall Branch & Special Needs Library
Branch Manager: Kathy Evans
2434 Old Cornelia Highway
Gainesville, GA 30507

Murrayville Branch
Branch Manager: Rick Kiser
4796 Thompson Bridge Road
Gainesville, GA 30507

Agency Correspondence

U.S. Fish and Wildlife Service

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

March 23, 2007

REPLY TO ATTENTION OF
Inland Environment Team
Planning and Environmental Division

Ms. Sandra Tucker, Field Supervisor
U.S. Fish and Wildlife Service
105 Westpark Drive
Westpark Center, Suite D
Athens, Georgia 30606

Dear Ms. Tucker:

This correspondence is submitted to document consultation between the U.S. Army Corps of Engineers, Mobile District and the U.S. Fish and Wildlife Service pursuant to our responsibility to consult under Section 7 of the Endangered Species Act (ESA). Enclosed for your review is a copy of the Notice of Availability and an electronic copy of the Draft Environmental Assessment (CD-ROM copy) for a proposed U.S. Army Corps of Engineers Easement and Section 10/404 permit decisions for placement of a water reclamation facility discharge pipeline and diffuser in Lake Sidney Lanier, Gwinnett County, Georgia. The applicant for these actions is Gwinnett County. The proposed outfall pipeline and diffuser would discharge up to 40 million gallons per day (MGD) of treated wastewater from the F. Wayne Hill Water Resources Center (an advanced wastewater treatment and water reclamation facility) to a discharge point permitted by the Georgia Environmental Protection Division under the National Pollutant Discharge Elimination System program (NPDES Permit No. GA0038130, issued November 3, 2006). The proposed easement decision would be made by the Mobile District and the proposed Department of the Army Section 10/404 permit decision would be made by the Savannah District.

Section 4.2.11 Endangered, Threatened, and Other Listed Species of the enclosed Draft Environmental Assessment (EA) notes that a previous survey of the proposed pipeline corridor found no state-listed or federally-listed endangered or threatened species or potentially suitable habitat for such species. In addition, no areas within or adjacent to the proposed project area have been designated as critical habitat for federally-listed species. As noted in the Draft EA, although the Southern bald eagle may occur within the Lake Lanier area, no nest areas have been observed in the Project area; and the eagle is unlikely to occur along developed areas affected by the pipeline corridor. Based on the conclusions of the Draft EA in Section 5.3.13 Endangered, Threatened, and Other Listed Species, there should be no effect on federally-listed species or critical habitat for such species in the project area. In addition to these observations and discussions in the Draft EA, it was determined that the discharge of additional treated wastewater into Lake Lanier could result in additional storage in the reservoir that could be used to meet both water supply needs in the upper basin or other downstream needs in the basin. Therefore, the proposed easement and Department of Army permit will not likely adversely affect the

ability of the Mobile District to meet the conditions of the Biological Opinion issued for the Interim Operations Plan at Jim Woodruff Dam; and therefore would not likely adversely affect the Gulf sturgeon or listed mussels (Fat three-ridge, Purple bank-climber or Chipola slabshell) that occur on the Apalachicola River. Any effect related to the additional water discharged into Lake Lanier would likely be considered a beneficial effect to these downstream species by providing additional water within the system that could potentially be available to the meet the downstream needs for these protected species.

In accordance with Section 7 of the ESA, we hereby request your concurrence with our determination that the construction and operation of the proposed facilities will not affect federally-listed species in the project area, and will not likely adversely affect federally-listed species in downstream areas on the Apalachicola River.

I am forwarding copies of this letter to Ms. Gail Carmody, U.S. Fish and Wildlife Service, Mr. Jim Scarbrough, Gwinnett County Department of Public Utilities and Mr. Doug Baughman, CH2M Hill. If you have any questions or comments related to this request or the proposed actions, please feel contact Ms. Joanne Brandt, Compliance Manager, Inland Environment Team, at (251) 690-3260 or email joanne.u.brandt@sam.usace.army.mil.

Sincerely,

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosures

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF

CESAM-PD-EI
PUBLIC NOTICE NO. FP07-SL01-7

09 March 2007

PUBLIC NOTICE
US ARMY CORPS OF ENGINEERS

NOTICE OF AVAILABILITY
DRAFT ENVIRONMENTAL ASSESSMENT
US ARMY CORPS OF ENGINEERS EASEMENT AND
SECTION 10/404 PERMIT DECISIONS FOR
PLACEMENT OF WATER RECLAMATION FACILITY DISCHARGE PIPELINE AND
DIFFUSER IN LAKE SIDNEY LANIER, GWINNETT COUNTY, GEORGIA

The U.S. Army Corps of Engineers (USACE), Mobile District has received a request from Gwinnett County, Georgia, for an easement to construct and maintain a treated wastewater pipeline and diffuser through the Gwinnett County Park and into Lake Sidney Lanier. Gwinnett County has also prepared a Pre-Construction Notification requesting consideration of a Department of the Army Permit from the USACE, Savannah District, for construction of the discharge pipeline and diffuser, extending from the F. Wayne Hill Water Resources Center (an advanced wastewater treatment and water reclamation facility) to the discharge point in Lake Lanier, pursuant to Section 10 of the River and Harbor Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344). The proposed diffuser and discharge location has been permitted by the Georgia Environmental Protection Division under the National Pollutant Discharge Elimination System (NPDES Permit No. GA0038130, issued on 3 November 2006). The proposed easement and Department of the Army permit actions have been addressed in a Draft Environmental Assessment, prepared pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality regulatory guidance in 40 CFR 1500-1508, and the USACE regulatory guidance in 33 CFR 230. The draft Environmental Assessment document is available for public review and comment and has been posted on the Mobile District public access website at the following location:

http://www.sam.usace.army.mil/pd/Pd1.htm

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EVALUATION: Upon completion of the public coordination period set forth in this notice, the environmental assessment will be finalized and the final determination of the NEPA documentation requirements made. If the determination is to finalize the environmental assessment and prepare a Finding of No Significant Impact, these documents will be placed on file in the Mobile District Office for future reference.

The decision whether to proceed with the proposed action will be based on evaluation of the probable impact, including cumulative impacts of the proposed activity on the public interest. The decision will reflect the national concern for both protection and utilization of important resources. The benefits that may be reasonably expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered, including the cumulative effects thereof: conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, flood plain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership, and in general, the needs and welfare of the people.

COORDINATION: The USACE, Mobile District is soliciting comments from the general public; federal, state and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of the proposed activity. The USACE, Mobile District will use any comments received to determine whether or not to proceed with the proposed easement action. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are also used to determine the need for a public meeting to determine the overall public interest in the proposed activity. You are requested to communicate the information contained in this notice to other parties who may have an interest in the proposed action.

CORRESPONDENCE: Comments on the Draft Environmental Assessment should be directed to Commander, U.S. Army Corps of Engineers, Mobile District, Post Office Box 2288, Mobile, Alabama 36628-0001. For more information, contact Ms. Joanne Brandt, Compliance Manager, Inland Environment Team at (251) 690-3260, or via email joanne.u.brandt@sam.usace.army.mil. Comments should be received not later than **13 April 2007**.

CURTIS M. FLAKES
U.S. Army Corps of Engineers
Mobile District

Gwinnett County Libraries

Library Headquarters
1001 Lawrenceville Highway
Lawrenceville, GA 30045

Buford-Sugar Hill Branch
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Buford, GA 30518

Duluth Branch
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Cumming Branch
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Cumming, GA 30040

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Gainesville, GA 30507

Murrayville Branch
Branch Manager: Rick Kiser
4796 Thompson Bridge Road
Gainesville, GA 30507

United States Department of the Interior

Fish and Wildlife Service

105 West Park Drive, Suite D
Athens, Georgia 30606

West Georgia Sub Office
P.O. Box 52560
Ft. Benning, Georgia 31995-2560

Coastal Sub Office
4270 Norwich Street
Brunswick, Georgia 31520

APR 1 2 2007

Commander
U.S. Army Corps of Engineers
Mobile District
P.O. Box 2288
Mobile, Alabama 36628-0001

FWS Log No. NGO-7449

Dear Sir:

The U.S. Fish and Wildlife Service has received Public Notice No. FP07-SL01-7 regarding the availability of the draft environmental assessment and permit decisions for placement of a water reclamation facility discharge pipeline and diffuser in Lake Sidney Lanier, Gwinnett County, Alabama. We have no comments at this time. We will be involved with future reviews associated with Gwinnett County's permit request, and your larger efforts related to management of the Apalachicola, Chattahoochee and Flint reservoir system.

Thank you for the opportunity to comment and we look forward to continue coordination with you and your staff regarding this and other environmental issues.

Sincerely,

Sandra S. Tucker

Sandra S. Tucker
Field Supervisor

CO PD-EI

United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE

105 West Park Drive, Suite D
Athens, Georgia 30606

West Georgia Sub Office
P.O. Box 52560
Ft. Benning, Georgia 31995-2560

Coastal Sub Office
4270 Norwich Street
Brunswick, Georgia 31520

APR 30 2007

Mr. Curtis M. Flakes
Chief, Planning and Environmental
Division
Department of the Army
Mobile District, Corps of Engineers
P.O. Box 2288
Mobile, Alabama 366628-0001

FWS Log No. NGO-7449

Dear Mr. Flakes:

The U.S. Fish and Wildlife Service has received your March 23, 2007, letter requesting our concurrence with your determinations regarding federally-listed species and the proposed U.S. Army Corps of Engineers easement and Section 10/404 permit decisions for placement of a water reclamation facility discharge pipeline and diffuser in Lake Sidney Lanier, Gwinnett County, Georgia. These comments are provided in accordance with the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

You have requested our concurrence with your determination that no federally-listed species will be affected in Lake Lanier. Neither the Endangered Species Act or implementing regulations require concurrence with a Federal agency's determination that species will not be affected. The trigger for consultation is that species or critical habitat may be affected. We do, however, concur with your determination that the Gulf sturgeon and listed mussels in the Apalachicola River may be affected but not adversely.

Any questions or comments regarding this matter can be forwarded to me at telephone 706-613-9493 ext. 230 or the Athens address provided above.

Sincerely,

Sandra S. Tucker

Sandra S. Tucker
Field Supervisor

cc: file
USFWS, Panama City, Florida

Agency Correspondence

U.S. Geological Survey

United States Department of the Interior

U. S. GEOLOGICAL SURVEY

Reston, VA 20192

In Reply Refer To:
Mail Stop 423

APR 1 2 2007

Ms. Joanne Brandt, Compliance Manager
U.S. Army Corps of Engineers
Post Office Box 2288
Mobile Alabama 36628-0001

Subject: Draft Environmental Assessment for Section 10/404 Permit Decisions for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia

Dear Ms. Brandt:

As requested by your correspondence of March 9, 2007, the U.S. Geological Survey (USGS) has reviewed the subject draft environmental assessment (EA) and offers the following comments.

GENERAL COMMENT

The draft EA has relied on the 1999 North Advanced Water Reclamation Facility Expansion and Reclaimed Water Pipeline Environmental Information Document (included), issued by the Gwinnett County Department of Public Utilities, for much of its scientific information. As the report is nearly a decade old, the scientific information may be dated and more recent information has not been included. Incorporation of more recent scientific information, such as that noted below, into the draft EA warrants consideration.

SPECIFIC COMMENTS

Section 5.3.9.2 Potential Hydrology Impacts of Considered Alternatives, page 5-39, lines 19-21

Annual mean streamflow at the USGS gaging station number 02334430, Chattahoochee River at Buford Dam, near Buford, GA was 880 cfs in 2001 and 757 cfs in 2002. These values are significantly lower than the 1988 annual mean streamflow value stated in the draft EA. The annual streamflow statistics are available on the Internet at:
http://waterdata.usgs.gov/nwis/annual/?referred_module=sw&site_no=02334430&por_02334430_2=862037,00060,2,1942,2005&year_type=W&format=html_table&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=parameter_selection_list

Section 5.3.9.3 Potential Impacts to Lake Lanier Water Quality and Temperature, page 5-41, lines 33-36

The section describes potential effects of traditional contaminants in treated municipal wastewater on the water quality of the reservoir, specifically nutrient levels, chlorophyll a, dissolved oxygen, and temperature. However, other constituents that may be detected in treated wastewater effluent, such as metals, phthalates, and pharmaceuticals and personal care products, also can affect lake ecology. Although Federal water-quality criteria do not yet exist for so-called "emerging contaminants," consideration should be given to addressing in the draft EA their potential occurrence in the treated municipal effluent and possible effects on the receiving waterbody. The USGS "Emerging Contaminants in the Environment" website (http://toxics.usgs.gov/regional/emc/index.html) provides broad coverage of this topic. Also see the related comment below.

Appendix A, Proposed Water Reclamation Facility Expansion, 1999 North Advanced Water Reclamation Facility Expansion and Reclaimed Water Pipeline Environmental Information Document, Section 1, Introduction, Table 3, Treatment Processes as Barriers to Pollutants, page 1-4

The table lists treatment processes for four categories of pollutants, including total organic carbon (TOC). However, recent research has shown that chemicals used by individuals, commercial applications, agriculture, and industry can enter the environment as part of the domestic and municipal wastewater pathway. These chemicals include pharmaceuticals (such as antibiotics), hormones, detergents, disinfectants, plasticizers, fire retardants, insecticides, and antioxidants. Many of these contaminants are endocrine disrupting chemicals (EDCs). As chemical analytical techniques have evolved and physiological information about the potency of EDCs is recently emerging (Albertini and others, 2006; Blazer, 2006; Calafat and McKee, 2006; Fisher, 2004; Hokanson and others, 2006; Latini and others, 2006; Weuve and others, 2006; and Wolff and others, 2007), it would benefit the public if the potential presence of such contaminants in the treated municipal effluent were addressed in the draft EA. Information on the presence of such emerging contaminants within or near the study area is available from a series of monitoring studies for the upper Chattahoochee River Basin at http://toxics.usgs.gov/regional/emc/upper_chattahoochee.html. Information on current USGS studies can be obtained by contacting Brian Hughes, Assistant Director, USGS Georgia Water Science Center, at (770) 903-9162, or at wbhughes@usgs.gov.

REFERENCES

Albertini R., Bird M., Doerrer N., Needham L., Robison S., Sheldon L., and Zenick H., 2006, The use of biomonitoring data in exposure and human health risk assessments. Environmental Health Perspectives 114: 1755-1762.

Blazer V., 2006, Fish with male and female characteristics found in the Potomac River, As noted in the Washington Post, September 6, 2006, http://www.washingtonpost.com/wp-dyn/content/article/2006/09/05/AR2006090501384.html.

Calafat A.M., and McKee R.H., 2006, Integrating biomonitoring exposure data into the risk assessment process: phthalates [Diethyl phthalate and di(2-ethylhexyl) phthalate] as a case study, Environmental Health Perspectives 114: 1783-1789.

Fisher J.S., 2004, Environmental anti-androgens and male reproductive health: focus on phthalates and testicular dysgenesis syndrome. Reproduction 127: 305-315.

Hokanson R., Hanneman W., Hennessey M., Donnelly K.C., McDonald T., Chowdhary R., Busbee D.L., 2006, DEHP, bis(2)-ethylhexyl phthalate, alters gene expression in hyman cells: possible correlation with initiation of fetal development abnormalities. Human Exposure Toxicology 25: 687-695.

Latini G., Del Vecchio A., Massaro M., Verrotti A., and De Felice C., 2006, Phthalate exposure and male infertility. Toxicology 226: 90-98.

Weuve J. and others, 2006, Exposure to phthalates in neonatal ICU infants: urinary concentrations of monoesters and oxidative metabolites. Environmental Health Perspectives 114: 1424-1431.

Wolff M.S., Teitelbaum S.L., Windham G., and others, 2007, Pilot study of urinary biomarkers of phytoestrogens, phthalates, and phenols in girls. Environmental Health Perspectives 115(1): 116-121.

Thank you for the opportunity to review and comment on this draft EA. If you have any questions concerning our comments, please contact Lloyd Woosley of the USGS Environmental Affairs Program, at (703) 648-5028 or at lwoosley@usgs.gov.

Sincerely,

James F. Devine
Senior Advisor for Science Applications

Agency Correspondence

Georgia State Historic Preservation Office

Georgia Department of Natural Resources

Noel Holcomb, Commissioner

Historic Preservation Division

W. Ray Luce, Division Director and Deputy State Historic Preservation Officer
34 Peachtree Street, NW, Suite 1600, Atlanta, Georgia 30303-2316
Telephone (404) 656-2840 Fax (404) 657-1040 http://www.gashpo.org

April 17, 2007

PD-EI

Curtis M. Flakes
US Army Corps of Engineers
Mobile District
Attention: Joanne Brandt
P.O. Box 2288
Mobile, Alabama 36628-0001

RE: FP07-SL01-7: Construct a Waste Water Pipeline, Lake Sydney Lanier
Gwinnett County, Georgia
HP-070316-001

Dear Mr. Flakes:

The Historic Preservation Division (HPD) has received the information submitted regarding the above referenced project. Our comments are offered to assist the US Army Corps of Engineers (USACE) in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

We have received your Notice of Availability for a Draft Environmental Assessment for the subject project. Per Section 106 regulations, we will withhold comment until receiving information pertaining to cultural resources.

We look forward to receiving your Section 106 documentation. Please refer to project number **HP-070316-001** in future correspondence regarding this undertaking. If we may be of further assistance, please do not hesitate to contact me at (404) 651-6624, or Michelle Volkema, Environmental Review Specialist, at (404) 651-6546.

Sincerely,

Elizabeth Shirk

Elizabeth Shirk
Environmental Review Coordinator

ES:mav

Bowers, Linda/ATL

From: Ree.R.Rodgers@sam.usace.army.mil

Sent: Wednesday, April 18, 2007 12:19 PM

To: Elizabeth_Shirk@dnr.state.ga.us; david_crass@dnr.state.ga.us; russtown@nc-cherokee.com; tylehowe@nc-cherokee.com; preservation@muscogeenation-nsn.gov; rallen@cherokee.org; rgthrower@hotmail.com; chascoleman@prodigy.net; aqttcultural@yahoo.com; actridoc@actribe.org; kkaniatobe@astribe.com; gingy.nail@chickasaw.net; tcole@choctawnation.com; KCarleton@choctaw.org; radushane@gmail.com; mbharjo_seminole@yahoo.com; shawneetribe@neok.com; shawneetribe@shawnee-tribe.com

Cc: Joanne.U.Brandt@sam.usace.army.mil; Michael.J.Eubanks@sam.usace.army.mil; Kenneth.P.Bradley@sam.usace.army.mil; Curtis.M.Flakes@sam.usace.army.mil; David.B.Crampton@sas02.usace.army.mil; Paula.M.Feldmeier@sam.usace.army.mil; Joseph.A.Giliberti@sam.usace.army.mil

Subject: Mobile District USACE Gwinnett Cty, Georgia Water Line Corridor

Attachments: Proposed Project Area.doc; Project Area Close Up.doc

Greetings!

Please find attached for your review and comment the *Draft Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decision for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia,* the *Cultural Resources Surveys of the proposed pipeline corridors performed by R.S. Webb and Associates in 2002,* and a copy of the *Notice of Availability* distributed by the Mobile District US Army Corps of Engineers (USACE) March 9, 2007 (click on the following weblink). A formal letter will also be mailed with the referenced documents provided on compact discs.

ftp://ftp.sam.usace.army.mil/Gwinett%20Cty,%20GA%20Water%20Line%20reports/

Proposed Work to be Performed:

The Mobile District, USACE is considering granting an easement across Corps land to Gwinnett County, Georgia for the construction and maintenance of a treated wastewater pipeline and diffuser through Gwinnett County Park into Lake Sidney Lanier. Gwinnett County has also applied for a regulatory permit (pursuant to Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act) through the Savannah District USACE for the construction of the discharge pipeline and diffuser which will extend from the F. Wayne Hill Water Treatment and Reclamation Facility to the discharge point in Lake Lanier (see attached map).

<<Proposed Project Area.doc>> <<Project Area Close Up.doc>>

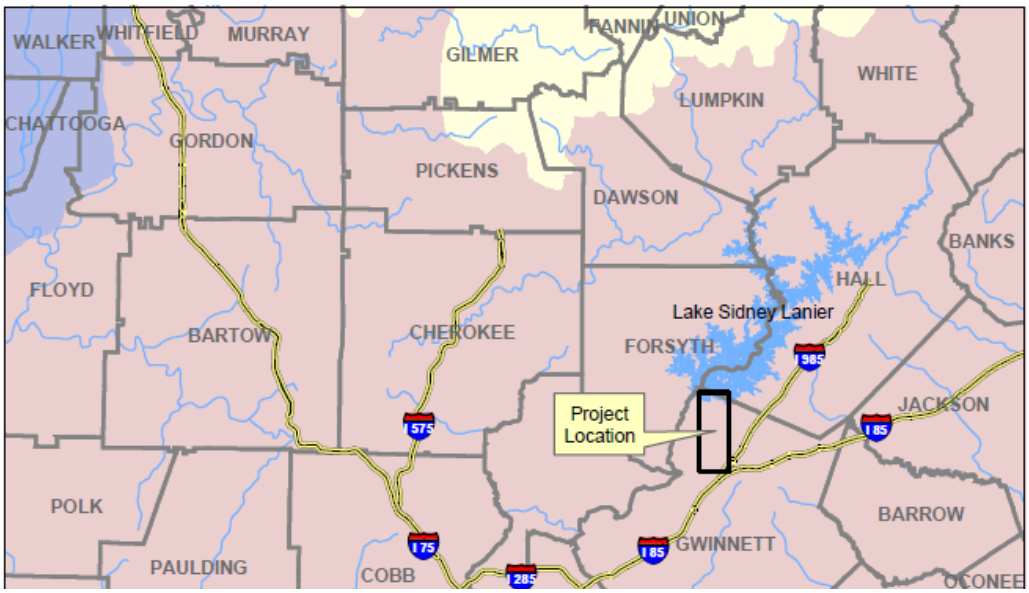
Potential Impacts to Cultural Resources:

At the request of Gwinnett County, Georgia, Parsons Engineering Sciences, Inc. contracted cultural resources firm, R.S. Webb & Associates to conduct an intensive archaeological and historic architectural survey through the area of potential effect for the pipeline construction. These surveys were completed in 2001 and 2002 (please see weblink for access to reports). Two resources were recommended for avoidance, a historic culvert and a historic railway crossing (GW-1, GW-2). No archaeological resources were identified within the pipeline corridors. As a result of these findings, it does not appear that there will be an adverse effect to cultural resources as a result of this undertaking.

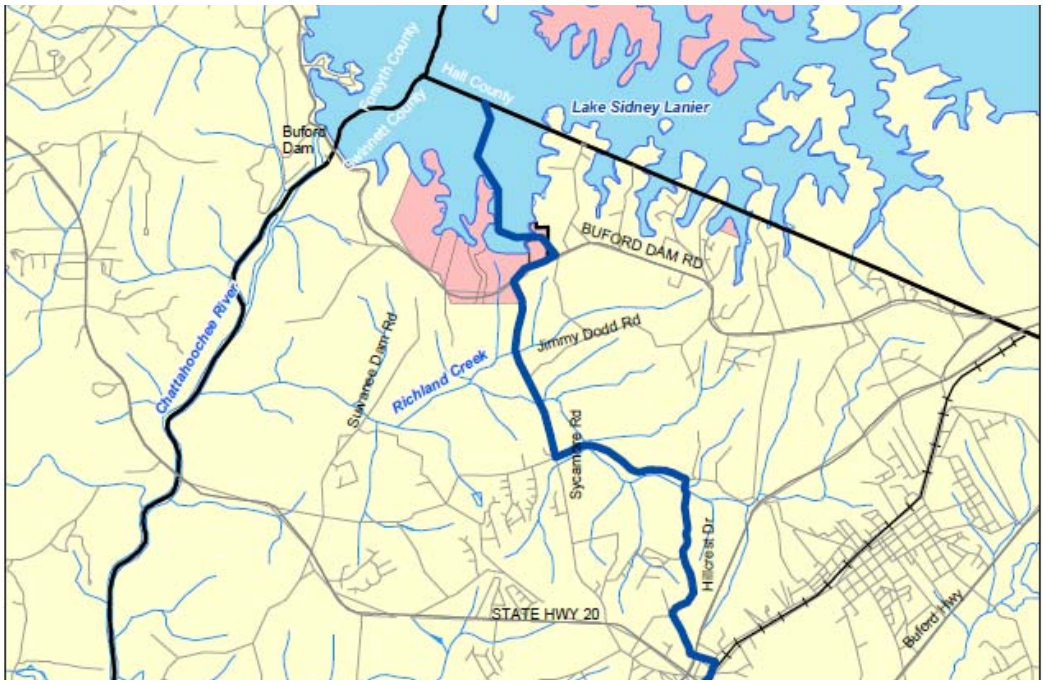
We are interested in any comments or concerns you may have regarding this project. If you feel further coordination or consultation is necessary, we would appreciate any responses within thirty (30) days of your receipt of this letter or before May 25, 2007. If you require additional information or clarification, please contact Ms. Ree Rodgers at 251-690-2775, or through this email address. Thank you for your time and support of the Mobile District Cultural Resources Program.

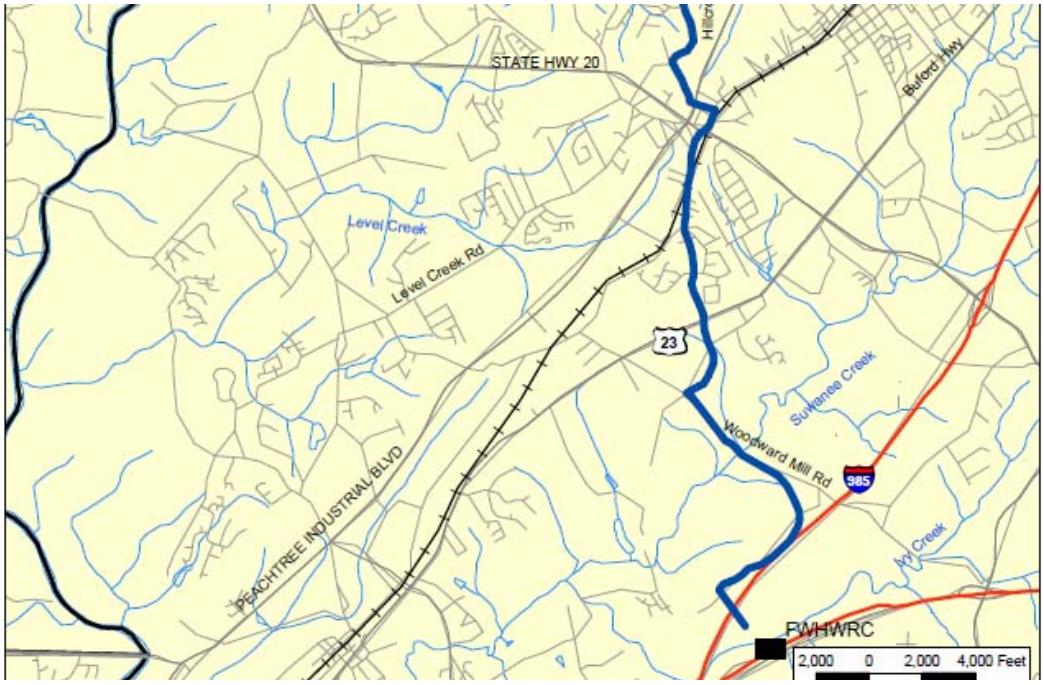
Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District
CESAM-PD-EI (Rodgers)
P.O. Box 2288
Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727



Proposed Project Area (page 20 of 639, Draft EA)





Project Area Close Up (there is some overlap at State Hwy 20 on this map).

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

May 17, 2007

REPLY TO
ATTENTION OF

Inland Environment Team
Planning and Environmental Division

Dr. W. Ray Luce
Director and Deputy State Historic Preservation Officer
Georgia Department of Natural Resources
Historic Preservation Division
Attention: Ms. Betsy Shirk
34 Peachtree Street, N.W.
Suite 1600
Atlanta, Georgia 30303-2316

Dear Dr. Luce:

Please find enclosed for your review and comment under Section 106 of the National Historic Preservation Act two compact discs containing the Draft Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decision for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia, the Cultural Resources Surveys of the proposed pipeline corridors performed by R.S. Webb and Associates in 2002, and a copy of the Notice of Availability distributed by the Mobile District, U.S. Army Corps of Engineers (Corps) March 9, 2007. This letter is being mailed to complement email coordination with Ms. Elizabeth Shirk of your office sent on April 20, 2007. Hard copies of the referenced documents can be provided upon request. The following website can also be accessed to view the documents online in PDF format.

ftp://ftp.sam.usace.army.mil/Gwinett%20Cty,%20GA%20Water%20Line%20reports/

Proposed Work to be Performed:

The Mobile District, Corps is considering granting an easement across Corps land to Gwinnett County, Georgia for the construction and maintenance of a treated wastewater pipeline and diffuser through Gwinnett County Park into Lake Sidney Lanier. Gwinnett County has also applied for a regulatory permit (pursuant to Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act) through the Savannah District, Corps for the construction of the discharge pipeline and diffuser which will extend from the F. Wayne Hill Water Treatment and Reclamation Facility to the discharge point in Lake Lanier (see enclosed map).

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At the request of Gwinnett County, Georgia, Parsons Engineering Sciences, Inc. contracted cultural resources firm, R.S. Webb & Associates to conduct an intensive archaeological and historic architectural survey through the area of potential effect for the pipeline construction. These surveys were completed in 2001 and 2002. Two resources were recommended for avoidance, a historic culvert and a historic railway crossing (GW-1, GW-2). No archaeological resources were identified within the pipeline corridors. As a result of these findings, it does not appear that there will be an adverse effect to cultural resources as a result of this undertaking.

We are interested in any comments or concerns you may have regarding this project. If you feel further coordination or consultation is necessary, we would appreciate any responses within thirty (30) days of your receipt of this letter. If you require additional information or clarification, please contact Ms. Ree Rodgers at (251) 690-2775, or Ms. Joanne Brandt, NEPA Compliance, Planning and Environmental Division at (251) 690-3260. Thank you for your time and support of the Mobile District Cultural Resources program.

Sincerely,

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosure

Bowers, Linda/ATL

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:48 PM
To: Elizabeth Shirk
Cc: Eubanks, Michael J SAM; Brandt, Joanne U SAM; Bradley, Kenneth P SAM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Follow Up Flag: Follow up
Flag Status: Flagged

Attachments: ga_shpo signed_.pdf

Greetings!
We are sending this email to provide an update on the coordination we have received regarding the review of the Draft Environmental Assessment and two cultural resources investigations reports for the proposed Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia.

As promised, please see attached copies of the formal letter. These letters were also sent by regular mail with the referenced documents provided on compact discs. Also, pasted below please find the original email requesting review that was sent April 18, 2007.

To date our office has received comments from the Catawba Nation stating they are interested in additional information available on the project for their review, and we have also received a response from the Mississippi Band of Choctaw Indians stating that this project was outside of their area of concern. Additionally, the Georgia SHPO requested the referenced documents in hard copy which we provided to them by regular mail.

You will find in the two cultural resources survey reports that no archaeological resources were identified within the pipeline corridors. Two historic resources were identified (one culvert, and one railway crossing) within the proposed construction corridor, and avoidance of these sites has been recommended. As a result of these findings, it does not appear that there will be an adverse effect to cultural resources as a result of this undertaking.

We respectfully request any comments or concerns or a desire for further consultation be provided to us on or before Thursday May 31, 2007. Please direct any inquiries or comments to Ms. Ree Rodgers at 251-690-2775, or through this email address. Your input is valuable and greatly appreciated! Thank you for your time and support of the Mobile District cultural resources program.

ga_shpo signed_.pdf

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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727
****

Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District
CESAM-PD-EI (Rodgers)
P.O. Box 2288
Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727

Georgia Department of Natural Resources

Noel Holcomb, Commissioner

Historic Preservation Division

W. Ray Luce, Division Director and Deputy State Historic Preservation Officer
34 Peachtree Street, NW, Suite 1600, Atlanta, Georgia 30303-2316
Telephone (404) 656-2840 Fax (404) 657-1040 http://www.gashpo.org

June 13, 2007

Ree Rodgers, M.A.
Cultural Resources, Planning Division
US Army Corps of Engineers, Mobile District
P.O. Box 2288
Mobile, Alabama 36628-0001

RE: FP07-SL01-7: Construct Waste Water Pipeline, Lake Sydney Lanier
Gwinnett County, Georgia
HP-070316-001

Dear Ms. Rodgers:

The Historic Preservation Division (HPD) has reviewed the reports, *Cultural Resources Survey of the Proposed Gwinnett County Lake Lanier Water Reuse Line Corridor, Gwinnett County, Georgia*, dated September 11, 2003, by R.S. Webb & Associates; and *Cultural Resources Survey of the Proposed Gwinnett County Water Pipeline Corridor North Extension, Gwinnett County, Georgia*, dated April 20, 2001, by R.S. Webb & Associates. Our comments are offered to assist the US Department of the Army Corps of Engineers (USACE) and its applicants in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

Based on the information provided, we concur that the portion of archaeological sites 9GW510, 9GW511, and 9GW512 located within the proposed project's area of potential effect (APE), should not be considered eligible for inclusion in the National Register of Historic Places (NRHP). The NRHP eligibility of that portion of each site located outside the proposed project's APE is unknown. Therefore, we concur that the proposed undertaking will have no effect on archaeological resources located within the subject project's APE, as defined in 36 CFR Part 800.4(d)(1).

Furthermore, we concur that the Southern Railroad should be considered eligible for inclusion in the NRHP. Furthermore, we concur that the subject project as proposed will have **no adverse effect** to historic properties located within the project's area of potential effect, as defined in 36 CFR Part 800.5(d)(1).

Please refer to project number **HP-070316-001** in any future correspondence regarding this undertaking. If we may be of further assistance, please do not hesitate to contact Elizabeth Shirk, Environmental Review Coordinator, at (404) 651-6624, or Michelle Volkema, Environmental Review Specialist, at (404) 651-6546.

Sincerely,

Karen Anderson-Córdova
Manager, Planning and Local Assistance Unit

KAC:mav

cc: Julie Kovach, ARC

Agency Correspondence

Georgia Department of Natural Resources –

Wildlife Resources Division

Noel Holcomb, Commissioner
Dan Forster, Director

Georgia Department of Natural Resources
Wildlife Resources Division

2070 U.S. Highway 278, S.E., Social Circle, Georgia 30025
(770) 918-6400

April 12, 2007

DFR
cs PD
PD-EIM
Joanne

Colonel Peter F. Taylor, Jr., Commander
U.S. Army Corps of Engineers
Mobile District
Post Office Box 2288
Mobile, Alabama 36628-0001

Dear Colonel Taylor:

This letter is in response to your March 9, 2007 Notice of Availability of a Draft Environmental Assessment (EA) on the proposed Gwinnett County wastewater discharge into Lake Lanier (Public Notice Number FP07-SL01-7). My staff has reviewed the draft EA and offers the following comments.

My agency appreciates the efforts by the Corps of Engineers to address our questions regarding potential fisheries impacts from the proposed project. We are most concerned about the effects of a warmer water discharge on coolwater fisheries habitat in Lake Lanier and on trout stream resources and Buford State Trout Hatchery operations downstream from Buford Dam. Given the sensitivity of these aquatic resources to water temperature changes and inherent limitations to modeling reservoir water quality, we recommend that reservoir and tailwater temperature monitoring be required as a permitting condition for the Gwinnett discharge operation. Reservoir temperature profile monitoring should be conducted down lake from the discharge and within the dam forebay to characterize the effect of the deepwater discharge and the influence of the power generation releases. Only with adequate monitoring will we be able to validate the model predictions and ensure that aquatic resources of the upper Chattahoochee river system are protected. Monitoring may also help our agencies identify problems due to model limitations and allow us to seek solutions from responsible parties for any natural resource impacts from this project.

Thank you for the opportunity to comment on this important natural resource issue in north Georgia. My staff and I appreciate the longstanding cooperative efforts between our agencies to conserve wildlife resources and provide outdoor recreational opportunities on Army Corps projects in Georgia. If you have any questions, regarding these comments, feel free to contact Assistant Fisheries Chief John Biagi here at our Division Headquarters (770-918-6406).

Sincerely,

Dan Forster

DF:lc

cc: Dr. Carol Couch

Agency Correspondence

Metropolitan North Georgia Water Planning District

April 2, 2007

Ms. Joanne Brandt
Compliance Manager
US Army Corps of Engineers
P.O. Box 2288
Mobile, Alabama 36628 – 0001

Re: CESAM – PD- EI
Public Notice No. FP07-SL01-7

Dear Ms. Brandt:

The Metropolitan North Georgia Water Planning District was created by the Georgia General Assembly in 2001 to prepare and help implement water and wastewater plans in the sixteen county metropolitan Atlanta area. The District adopted wastewater, water supply and watershed management plans in 2003. By State law, all water related permits issued by the Georgia Environmental Protection Division (EPD) to local governments in the District area must be consistent with the plans.

The Long-Term Wastewater Management Plan specifies that reclaimed water produced by the Gwinnett County Wayne F. Hill Water Reclamation Center shall be returned to Lake Lanier. This discharge of highly treated wastewater will enhance the drinking water availability to the local governments in the District area and will not harm the water quality of Lake Lanier. This discharge is permitted by EPD.

The Metropolitan North Georgia Water Planning District supports your issuance of an easement to Gwinnett County to construct and maintain a treated wastewater pipeline and diffuser through the Gwinnett County Park and into Lake Lanier. We urge you to issue this easement expeditiously after the public notice period expires.

Sincerely,

Kathryn L. Dunlap
Chairman

C: Jim Scarbrough

40 Courtland St., NE ♦ Atlanta, Georgia 30303-2538
Telephone: (404) 463-3256 ♦ Facsimile (404) 463-3254

Tribal Correspondence

From: Rodgers, Ree R SAM
Sent: Wednesday, April 18, 2007 12:19 PM
To: Elizabeth Shirk; david_crass@dnr.state.ga.us; russtown@nc-cherokee.com; tylehowe@nc-cherokee.com; Joyce Bear; rallen@cherokee.org; rgthrower@hotmail.com; charles coleman; Augustine Asbury; Beryl Battise; Kaniatobe, K MVS External Stakeholder; gingy.nail@chickasaw.net; tcole@choctawnation.com; Carleton, Ken; radushane@gmail.com; mbharjo_seminole@yahoo.com; shawneetribe@neok.com; Shawnee Tribe
Cc: Brandt, Joanne U SAM; Eubanks, Michael J SAM; Bradley, Kenneth P SAM; Flakes, Curtis M SAM; Crampton, David B SAS; Feldmeier, Paula M SAM; Giliberti, Joseph A
Subject: Mobile District USACE Gwinnett Cty, Georgia Water Line Corridor

Attachments: Proposed Project Area.doc; Project Area Close Up.doc

Greetings!

Please find attached for your review and comment the *Draft Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decision for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia,* the *Cultural Resources Surveys of the proposed pipeline corridors performed by R.S. Webb and Associates in 2002,* and a copy of the *Notice of Availability* distributed by the Mobile District US Army Corps of Engineers (USACE) March 9, 2007 (click on the following weblink). A formal letter will also be mailed with the referenced documents provided on compact discs.

ftp://ftp.sam.usace.army.mil/Gwinnett%20Cty,%20GA%20Water%20Line%20reports/

Proposed Work to be Performed:

The Mobile District, USACE is considering granting an easement across Corps land to Gwinnett County, Georgia for the construction and maintenance of a treated wastewater pipeline and diffuser through Gwinnett County Park into Lake Sidney Lanier. Gwinnett County has also applied for a regulatory permit (pursuant to Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act) through the Savannah District USACE for the construction of the discharge pipeline and diffuser which will extend from the F. Wayne Hill Water Treatment and Reclamation Facility to the discharge point in Lake Lanier (see attached map).

Proposed Project Area.doc Project Area Close Up.doc

Potential Impacts to Cultural Resources:

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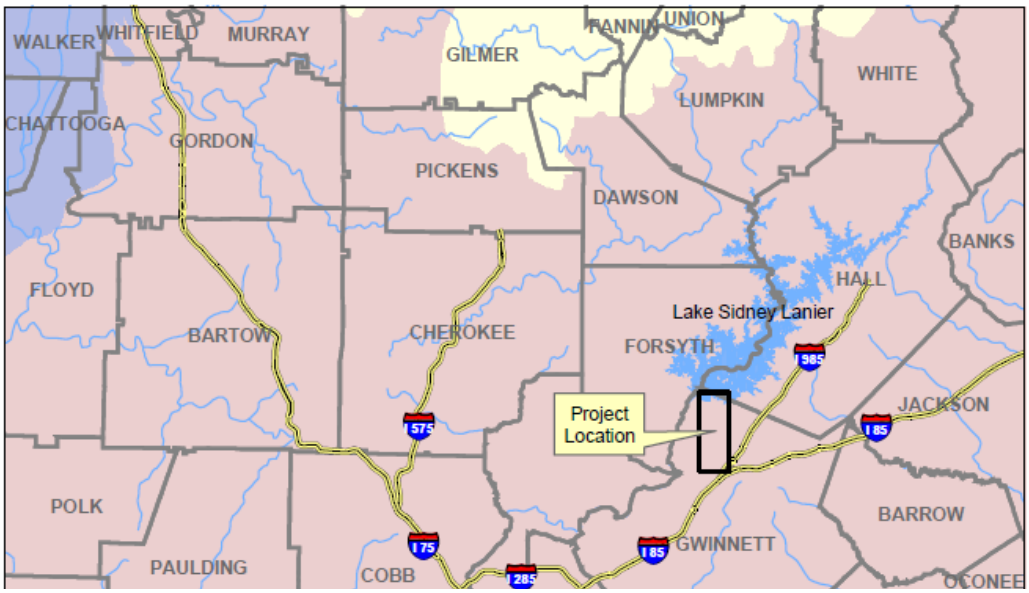
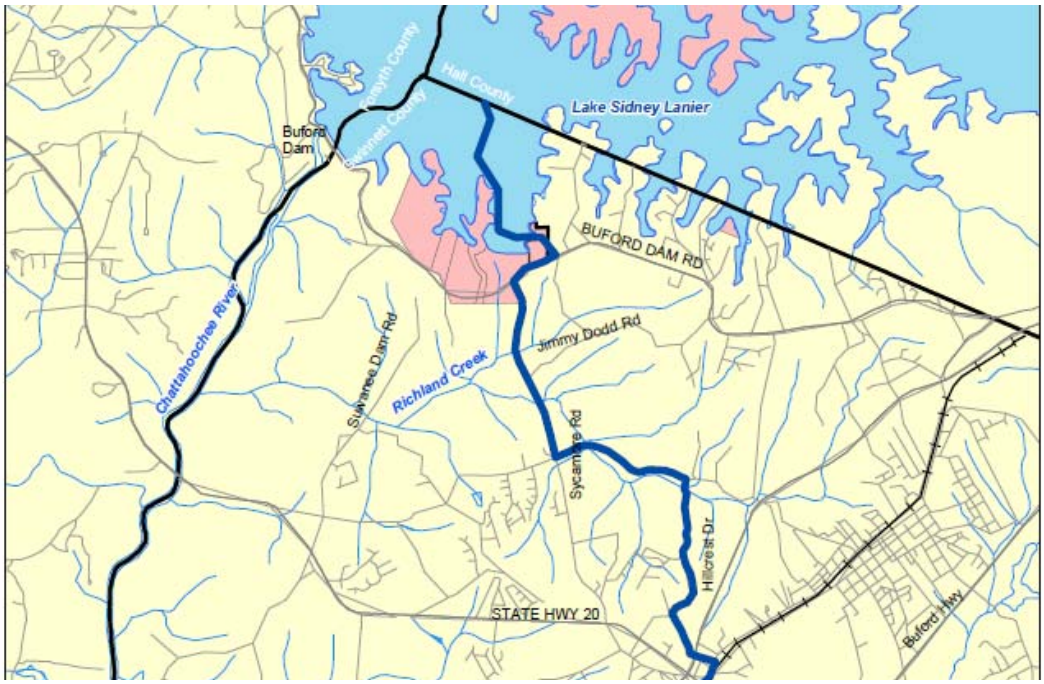
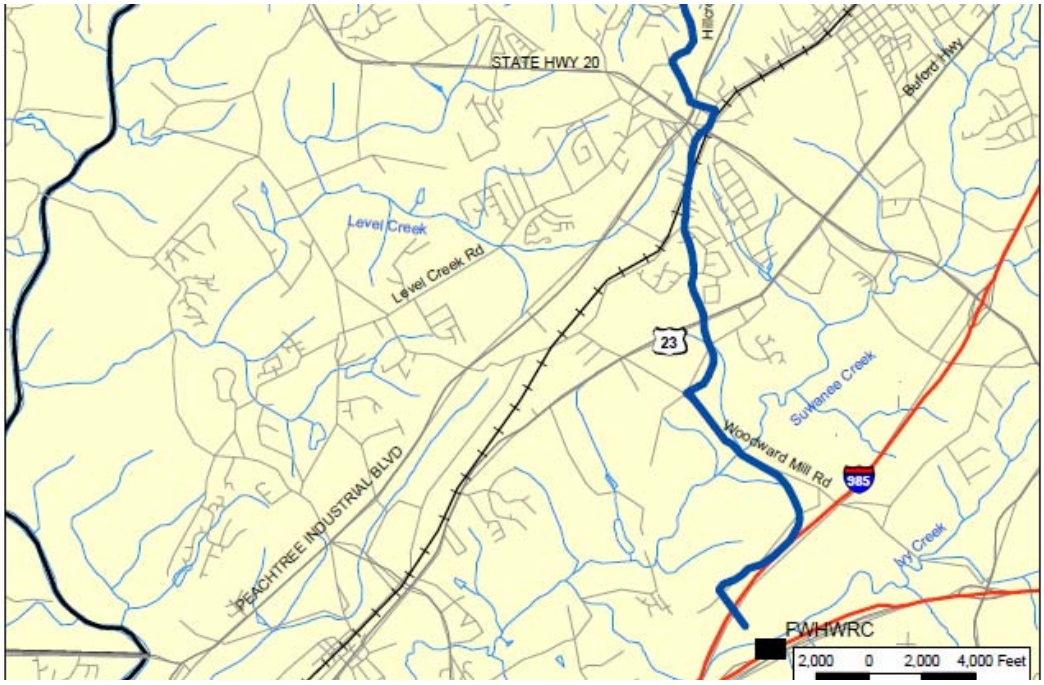
Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District
CESAM-PD-EI (Rodgers)
P.O. Box 2288
Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727



Proposed Project Area (page 20 of 639, Draft EA)





Project Area Close Up (there is some overlap at State Hwy 20 on this map).

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF

CESAM-PD-EI
PUBLIC NOTICE NO. FP07-SL01-7

09 March 2007

PUBLIC NOTICE
US ARMY CORPS OF ENGINEERS

NOTICE OF AVAILABILITY
DRAFT ENVIRONMENTAL ASSESSMENT
US ARMY CORPS OF ENGINEERS EASEMENT AND
SECTION 10/404 PERMIT DECISIONS FOR
PLACEMENT OF WATER RECLAMATION FACILITY DISCHARGE PIPELINE AND DIFFUSER IN LAKE SIDNEY LANIER, GWINNETT COUNTY, GEORGIA

The U.S. Army Corps of Engineers (USACE), Mobile District has received a request from Gwinnett County, Georgia, for an easement to construct and maintain a treated wastewater pipeline and diffuser through the Gwinnett County Park and into Lake Sidney Lanier. Gwinnett County has also prepared a Pre-Construction Notification requesting consideration of a Department of the Army Permit from the USACE, Savannah District, for construction of the discharge pipeline and diffuser, extending from the F. Wayne Hill Water Resources Center (an advanced wastewater treatment and water reclamation facility) to the discharge point in Lake Lanier, pursuant to Section 10 of the River and Harbor Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344). The proposed diffuser and discharge location has been permitted by the Georgia Environmental Protection Division under the National Pollutant Discharge Elimination System (NPDES Permit No. GA0038130, issued on 3 November 2006). The proposed easement and Department of the Army permit actions have been addressed in a Draft Environmental Assessment, prepared pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality regulatory guidance in 40 CFR 1500-1508, and the USACE regulatory guidance in 33 CFR 230. The draft Environmental Assessment document is available for public review and comment and has been posted on the Mobile District public access website at the following location:

http://www.sam.usace.army.mil/pd/Pd1.htm

Additional copies of the draft Environmental Assessment have been placed for review at the USACE Lake Lanier Project Office, located at 1050 Buford Dam Road, Buford, Georgia; and at several public libraries in the Lake Lanier area, as listed in this notice. CD-ROM copies of the Draft Environmental Assessment will also be available upon request.

The United Keetoowah Band of Cherokee Indians in Oklahoma has no objection to the referenced project. However, if any remains, artifacts or other items are inadvertnetly discovered, please cease construction immediately and contact us at 918-456-6533 or by letter.

MAR 2 0 2007

Lisa C. Stopp, Tribal NAGPRA POC Date

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DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF

CESAM-PD-EI
PUBLIC NOTICE NO. FP07-SL01-7

09 March 2007

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US ARMY CORPS OF ENGINEERS

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DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

May 17, 2007

REPLY TO
ATTENTION OF

Inland Environment Team
Planning and Environmental Division

Principal Chief Michell Hicks
Eastern Band of the Cherokee Nation
Attention: Mr. Russ Townsend
Post Office Box 455
Cherokee, North Carolina 28719

Dear Principal Chief Hicks:

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Sincerely,

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosure

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:44 PM
To: tylehowe@nc-cherokee.com
Cc: Eubanks, Michael J SAM; Brandt, Joanne U SAM; Bradley, Kenneth P SAM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Attachments: east_cherokee signed.pdf

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east_cherokee signed.pdf

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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727
****

Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District
CESAM-PD-EI (Rodgers)
P.O. Box 2288
Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:28 PM
To: russtown@nc-cherokee.com
Cc: Eubanks, Michael J SAM; Brandt, Joanne U SAM; Bradley, Kenneth P SAM; Giliberti, Joseph A
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Follow Up Flag: Follow up
Flag Status: Flagged

Attachments: east_cherokee signed.pdf

Greetings!
We are sending this email to provide an update on the coordination we have received regarding the review of the Draft Environmental Assessment and two cultural resources investigations reports for the proposed Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia.

As promised, please see attached copies of the formal letter. These letters were also sent by regular mail with the referenced documents provided on compact discs. Also, pasted below please find the original email requesting review that was sent April 18, 2007.

To date our office has received comments from the Catawba Nation stating they are interested in additional information available on the project for their review, and we have also received a response from the Mississippi Band of Choctaw Indians stating that this project was outside of their area of concern. Additionally, the Georgia SHPO requested the referenced documents in hard copy which we provided to them by regular mail.

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We respectfully request any comments or concerns or a desire for further consultation be provided to us on or before Thursday May 31, 2007. Please direct any inquiries or comments to Ms. Ree Rodgers at 251-690-2775, or through this email address. Your input is valuable and greatly appreciated! Thank you for your time and support of the Mobile District cultural resources program.

east_cherokee signed.pdf

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and Associates in 2002, and a copy of the Notice of Availability distributed by the Mobile District US Army Corps of Engineers (USACE) March 9, 2007 (click on the following weblink). A formal letter will also be mailed with the referenced documents provided on compact discs.
ftp://ftp.sam.usace.army.mil/Gwinett%20Cty,%20GA%20Water%20Line%20reports/

Proposed Work to be Performed:

The Mobile District, USACE is considering granting an easement across Corps land to Gwinnett County, Georgia for the construction and maintenance of a treated wastewater pipeline and diffuser through Gwinnett County Park into Lake Sidney Lanier. Gwinnett County has also applied for a regulatory permit (pursuant to Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act) through the Savannah District USACE for the construction of the discharge pipeline and diffuser which will extend from the F. Wayne Hill Water Treatment and Reclamation Facility to the discharge point in Lake Lanier (see attached map).

Potential Impacts to Cultural Resources:

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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727
****

Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District
CESAM-PD-EI (Rodgers)
P.O. Box 2288
Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223

Fax: 251-690-2727

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:38 PM
To: rallen@cherokee.org
Cc: Eubanks, Michael J SAM; Brandt, Joanne U SAM; Bradley, Kenneth P SAM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Attachments: cherokee signed.pdf

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cherokee signed.pdf

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Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727
****

Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

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CESAM-PD-EI (Rodgers)
P.O. Box 2288
Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727

From: Rodgers, Ree R SAM
Sent: Monday, June 04, 2007 11:47 AM
To: Richard Allen
Cc: Brandt, Joanne U SAM
Subject: RE: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Good Morning Mr. Allen,

Thank you very much for your response, we will honor your request to be contacted should any sites or remains be discovered during the course of work activities.

Thanks again and take care!
Ree

Ree Rodgers, M.A.
SAM-USACE, Cultural Resources
desk: 251-690-2775

-----Original Message-----
From: Richard Allen [mailto:Richard-Allen@cherokee.org]
Sent: Monday, June 04, 2007 10:40 AM
To: Rodgers, Ree R SAM
Subject: RE: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Mr. Rodgers:

The Cherokee Nation has no knowledge of any historic, cultural or sacred sites within the affected area. Should any ground disturbance reveal an archaeological site or human remains, we ask that the all activity cease immediately and the Cherokee Nation and other appropriate agencies be contacted immediately.

Thank you,

Dr. Richard L. Allen

Policy Analyst

Cherokee Nation

P.O. Box 948

Tahlequah, Oklahoma 74465

(918) 453-5466

From: Rodgers, Ree R SAM [mailto:Ree.R.Rodgers@sam.usace.army.mil]
Sent: Wednesday, May 23, 2007 1:38 PM
To: Richard Allen

Cc: Eubanks, Michael J SAM; Brandt, Joanne U SAM; Bradley, Kenneth P SAM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

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<<cherokee signed.pdf>>
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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727
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Catawba Indian Nation
Tribal Historic Preservation Office
P. O. Box 750
Rock Hill, South Carolina 29731
803-328-2427 Fax 803-328-5791

CRPO-EAD
PD-EI

21 April 2007

US Army corps of Engineers
Mobile District, Corps of Engineers
PO Box 2288
Mobile, Alabama 36628-0001

Re: THPO #	Project #	Project description / location,
2007-134-3	FP07-SL01-7	Public Notice re. Availability of draft EA for water reclamation facility discharge and pipeline and diffuser in Lake Sidney Lanier, Gwinnett Co., GA from Curtis M. Flakes

Dear Sir or Madam,

The Catawba Indian Nation is not the general public. We would like a hard copy or the Draft Environmental Assessment in order to provide comments.

If you have questions please contact our office 803-328-2427, Sandra Reinhardt, ext. 233 (sandrar@ccppcrafts.com).

Sincerely,

Sandra Reinhardt for

Wenonah G. Haire
Tribal Historic Preservation Officer

Catawba Indian Nation
~~Tribal~~ Historic Preservation Office
P. O. Box 750
Rock Hill, South Carolina 29731
803-328-2427 Fax 803-328-5791

11 May 2007

Department of the Army
Army Engineer District, Mobile
PO Box 2288
Mobile, Alabama 36628-0001

Re: THPO #	Project #	Project description / location,
2007-134-3	FP07-SL01-7	Public Notice re. Availability of draft EA for water reclamation facility discharge and pipeline and diffuser in Lake Sidney Lanier, Gwinnett Co., GA

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Sincerely,

Sandra Reinhardt for
Wenonah G. Haire
Tribal Historic Preservation Officer

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

May 17, 2007

REPLY TO
ATTENTION OF

Inland Environment Team
Planning and Environmental Division

Mr. Gilbert Blue
Catawba Tribe
Attention: Dr. Wenonah Haire
Post Office Box 188
Catawba, South Carolina 29704

Dear Mr. Blue:

Please find enclosed for your review and comment two compact discs containing the Draft Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decision for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia, the Cultural Resources Surveys of the proposed pipeline corridors performed by R.S. Webb and Associates in 2002, and a copy of the Notice of Availability distributed by the Mobile District, U.S. Army Corps of Engineers (Corps) March 9, 2007. Hard copies of the referenced documents can be provided upon request. The following website can also be accessed to view the documents online in PDF format.

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We are interested in any comments or concerns you may have regarding this project. If you feel further coordination or consultation is necessary, we would appreciate any responses within thirty (30) days of your receipt of this letter. If you require additional information or clarification, please contact Ms. Ree Rodgers at (251) 690-2775, or Ms. Joanne Brandt, NEPA Compliance, Planning and Environmental Division at (251) 690-3260. Thank you for your time and support of the Mobile District Cultural Resources program.

Sincerely,

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosure

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 4:05 PM
To: sandrar@ccppcrafts.com
Cc: Eubanks, Michael J SAM; Brandt, Joanne U SAM; Bradley, Kenneth P SAM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Attachments: catawba_gwinnett signed.pdf

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Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727

From: Rodgers, Ree R SAM
Sent: Thursday, May 31, 2007 11:32 AM
To: sandrar
Cc: Brandt, Joanne U SAM
Subject: RE: CRS for Lake Sidney Lanier

Hi Sandra,
Hope your week is going well, I'm glad the reports made it to you. Please let me know if you need anything else. I'll make a note in my contact list that Chief Blue is no longer in office and will be looking for his replacement soon -
Thank you!
Ree

Ree Rodgers, M.A.
SAM-USACE, Cultural Resources
desk: 251-690-2775

-----Original Message-----
From: sandrar [mailto:sandrar@ccppcrafts.com]
Sent: Thursday, May 31, 2007 10:28 AM
To: Rodgers, Ree R SAM
Subject: RE: CRS for Lake Sidney Lanier

Hi Ree,

We received the copies. Thank You. I have signed off on them and sent them to Dr. Haire for her comments (if any). I had just noticed that a cover letter was addressed to Chief Blue. He has very recently resigned, so we are still in the process of notifying everyone. It seems to take a while for changes to get into all the data bases, so I will probably paste a reminder onto everything we send out for a couple of months.

Sandra

On Fri, 25 May 2007 16:48:19 -0500, Rodgers, Ree R SAM wrote
> Hi again Sandra,
> Does this mean you did not receive the copies I mailed to you of the
> cultural resources investigations and the EA portions for the Gwinnett
> County water pipeline? Let me know, Thanks, Ree
>
> Ree Rodgers, M.A.
> SAM-USACE, Cultural Resources
> desk: 251-690-2775
>
> -----Original Message-----
> From: sandrar [mailto:sandrar@ccppcrafts.com]
> Sent: Friday, May 25, 2007 1:47 PM
> To: Rodgers, Ree R SAM
> Subject: CRS for Lake Sidney Lanier
>
> Hi Ree,
>
> I'm checking to be sure I sent you the updated Chief's contact
> information. Chief Gilbert Blue recently resigned.
> The new Chief is Evans George. You can reach him c/o CIN- THPO, PO
> Box 750, Rock Hill, SC 29731.
>
> Sandra Reinhardt
> Catawba Indian Nation

> Tribal Historic Preservation Office
> Archaeology Department
> 803-328-2427 ext. 233
> --
> Open WebMail Project (http://openwebmail.org)

Sandra Reinhardt
Catawba Indian Nation
Tribal Historic Preservation Office
Archaeology Department
803-328-2427 ext. 233
--
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DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

May 17, 2007

REPLY TO
ATTENTION OF
Inland Environment Team
Planning and Environmental Division

Chief Gregory E. Pyle
Choctaw Nation
Attention: Mr. Terry Cole
Post Office Drawer 1210
Durant, Oklahoma 74702-1210

Dear Chief Pyle:

Please find enclosed for your review and comment two compact discs containing the Draft Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decision for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia, the Cultural Resources Surveys of the proposed pipeline corridors performed by R.S. Webb and Associates in 2002, and a copy of the Notice of Availability distributed by the Mobile District, U.S. Army Corps of Engineers (Corps) March 9, 2007. This letter is being mailed to complement email coordination with Mr. Terry Cole of your Tribal Historic Preservation Office sent on April 20, 2007. Hard copies of the referenced documents can be provided upon request. The following website can also be accessed to view the documents online in PDF format.

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Chief, Planning and Environmental
Division

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From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:42 PM
To: tcole@choctawnation.com
Cc: Eubanks, Michael J SAM; Brandt, Joanne U SAM; Bradley, Kenneth P SAM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Attachments: choctaw_signed.pdf

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To date our office has received comments from the Catawba Nation stating they are interested in additional information available on the project for their review, and we have also received a response from the Mississippi Band of Choctaw Indians stating that this project was outside of their area of concern. Additionally, the Georgia SHPO requested the referenced documents in hard copy which we provided to them by regular mail.

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We respectfully request any comments or concerns or a desire for further consultation be provided to us on or before Thursday May 31, 2007. Please direct any inquiries or comments to Ms. Ree Rodgers at 251-690-2775, or through this email address. Your input is valuable and greatly appreciated! Thank you for your time and support of the Mobile District cultural resources program.

choctaw_signed.pdf

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ftp://ftp.sam.usace.army.mil/Gwinett%20Cty,%20GA%20Water%20Line%20reports/

Proposed Work to be Performed:

The Mobile District, USACE is considering granting an easement across Corps land to Gwinnett County, Georgia for the construction and maintenance of a treated wastewater pipeline and diffuser through Gwinnett County Park into Lake Sidney Lanier. Gwinnett County has also applied for a regulatory permit (pursuant to Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act) through the Savannah District USACE for the construction of the discharge pipeline and diffuser which will extend from the F. Wayne Hill Water Treatment and Reclamation Facility to the discharge point in Lake Lanier (see attached map).

Potential Impacts to Cultural Resources:

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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727
****

Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District
CESAM-PD-EI (Rodgers)
P.O. Box 2288
Mobile, Alabama 36628-0001
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DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

May 17, 2007

REPLY TO
ATTENTION OF

Inland Environment Team
Planning and Environmental Division

Chief Christine Norris
Jena Band of Choctaw Indians
Attention: Ms. Dana Masters
Post Office Box 14
Jena, Louisiana 71342

Dear Chief Norris:

Please find enclosed for your review and comment two compact discs containing the Draft Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decision for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia, the Cultural Resources Surveys of the proposed pipeline corridors performed by R.S. Webb and Associates in 2002, and a copy of the Notice of Availability distributed by the Mobile District, U.S. Army Corps of Engineers (Corps) March 9, 2007. This letter is being mailed to complement email coordination with Ms. Dana Masters of your Tribal Historic Preservation Office sent on April 20, 2007. Hard copies of the referenced documents can be provided upon request. The following website can also be accessed to view the documents online in PDF format.

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Sincerely,

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosure

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:49 PM
To: jbcpreservations@aol.com
Cc: Eubanks, Michael J SAM; Brandt, Joanne U SAM; Bradley, Kenneth P SAM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Attachments: jena_signed.pdf

Greetings!
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jena_signed.pdf

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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
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DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

May 17, 2007

REPLY TO
ATTENTION OF

Inland Environment Team
Planning and Environmental Division

Warrior Charles Coleman
Thlopthlocco Tribal Town
Post Office Box 188
Okemah, Oklahoma 74859

Dear Warrior Coleman:

Please find enclosed for your review and comment two compact discs containing the Draft Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decision for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia, the Cultural Resources Surveys of the proposed pipeline corridors performed by R.S. Webb and Associates in 2002, and a copy of the Notice of Availability distributed by the Mobile District, U.S. Army Corps of Engineers (Corps) March 9, 2007. This letter is being mailed to complement email coordination with your Tribal Historic Preservation Office sent on April 20, 2007. Hard copies of the referenced documents can be provided upon request. The following website can also be accessed to view the documents online in PDF format.

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Sincerely,

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosure

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:57 PM
To: charles coleman
Cc: Eubanks, Michael J SAM; Brandt, Joanne U SAM; Bradley, Kenneth P SAM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Attachments: thlopthlocco signed.pdf

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thlopthlocco signed.pdf

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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727
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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District
CESAM-PD-EI (Rodgers)
P.O. Box 2288
Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727

From: Rodgers, Ree R SAM
Sent: Wednesday, May 30, 2007 3:18 PM
To: Charles Coleman
Cc: Brandt, Joanne U SAM
Subject: RE: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Attachments: thlopthlocco signed.pdf

thlopthlocco signed.pdf

Hi Mr. Coleman!
How are you? Is everything well over there? Let me try to attach the letter again - it should come to you as a PDF file. We are just needing Thlopthlocco Tribal Town's comments as to whether there are any concerns for this project area. No archaeological resources were located during the surveys of the pipeline corridors or in Lake Lanier where the pipeline will end. Please see this weblink for views of the reports and project maps :
ftp://ftp.sam.usace.army.mil/Gwinett%20Cty,%20GA%20Water%20Line%20reports/
Because there were no findings we do not foresee any impacts to cultural resources, however, we will include the language in the project plans that if any cultural materials or potential remains are located during construction that work will cease, the finds will be protected, and the Mobile District project manager will be contacted immediately (and then appropriate consultation procedures would begin). Please let me know if you have trouble accessing any of the attachments and I will get them to you another way!
Take care of yourself!
Ree

Ree Rodgers, M.A.
SAM-USACE, Cultural Resources
desk: 251-690-2775

-----Original Message-----
From: Charles Coleman [mailto:chascoleman@prodigy.net]
Sent: Thursday, May 24, 2007 7:32 AM
To: Rodgers, Ree R SAM
Subject: Re: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Great to hear dfrom you>
I have been wondering what was up with Mobile I began to think you didn't like us anymore.
But now I am happy again.
What can I do for you?

I didn't find any attrachments

Coleman
Thlopthlocco

----- Original Message -----
From: Rodgers, Ree R SAM <mailto:Ree.R.Rodgers@sam.usace.army.mil>
To: charles coleman <mailto:chascoleman@prodigy.net>
Cc: Eubanks, Michael J SAM <mailto:Michael.J.Eubanks@sam.usace.army.mil> ; Brandt, Joanne U SAM <mailto:Joanne.U.Brandt@sam.usace.army.mil> ; Bradley, Kenneth P SAM <mailto:Kenneth.P.Bradley@sam.usace.army.mil>
Sent: Wednesday, May 23, 2007 1:56 PM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

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<<thlopthlocco signed.pdf>>

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Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727
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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District
CESAM-PD-EI (Rodgers)
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Mobile, Alabama 36628-0001
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DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

May 17, 2007

REPLY TO
ATTENTION OF

Inland Environment Team
Planning and Environmental Division

Lt. Governor Kenneth Blanchard
Absentee-Shawnee Tribe of Oklahoma
Attention: Ms. Karen Kaniatobe
2025 S. Gordon Cooper Drive
Shawnee, Oklahoma 74801

Dear Lt. Governor Blanchard:

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Sincerely,

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosure

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:31 PM
To: Kaniatobe, K MVS External Stakeholder
Cc: Eubanks, Michael J SAM; Brandt, Joanne U SAM; Bradley, Kenneth P SAM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Attachments: absentee shawnee signed.pdf

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absentee shawnee signed.pdf

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ftp://ftp.sam.usace.army.mil/Gwinett%20Cty,%20GA%20Water%20Line%20reports/

Proposed Work to be Performed:

The Mobile District, USACE is considering granting an easement across Corps land to Gwinnett County, Georgia for the construction and maintenance of a treated wastewater pipeline and diffuser through Gwinnett County Park into Lake Sidney Lanier. Gwinnett County has also applied for a regulatory permit (pursuant to Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act) through the Savannah District USACE for the construction of the discharge pipeline and diffuser which will extend from the F. Wayne Hill Water Treatment and Reclamation Facility to the discharge point in Lake Lanier (see attached map).

Potential Impacts to Cultural Resources:

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We are interested in any comments or concerns you may have regarding this project. If you feel further coordination or consultation is necessary, we would appreciate any responses within thirty (30) days of your receipt of this letter or before May 25, 2007. If you require additional information or clarification, please contact Ms. Ree Rodgers at 251-690-2775, or through this email address. Thank you for your time and support of the Mobile District Cultural Resources Program.

Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727
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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District
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DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

May 17, 2007

REPLY TO
ATTENTION OF

Inland Environment Team
Planning and Environmental Division

Chairman McClamrock Battise
Alabama-Coushatta Tribe of Texas
Attention: Ms. Beryl Battise
571 State Park Road 56
Livingston, Texas 77351

Dear Chairman Battise:

Please find enclosed for your review and comment two compact discs containing the Draft Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decision for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia, the Cultural Resources Surveys of the proposed pipeline corridors performed by R.S. Webb and Associates in 2002, and a copy of the Notice of Availability distributed by the Mobile District, U.S. Army Corps of Engineers (Corps) March 9, 2007. This letter is being mailed to complement email coordination with Ms. Beryl Battise of your Tribal Historic Preservation Office sent on April 20, 2007. Hard copies of the referenced documents can be provided upon request. The following website can also be accessed to view the documents online in PDF format.

ftp://ftp.sam.usace.army.mil/Gwinett%20Cty,%20GA%20Water%20Line%20reports/

Proposed Work to be Performed:

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Sincerely,

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosure

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:33 PM
To: Beryl Battise
Cc: Eubanks, Michael J SAM; Brandt, Joanne U SAM; Bradley, Kenneth P SAM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Attachments: al-coushatta signed.pdf

Greetings!
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To date our office has received comments from the Catawba Nation stating they are interested in additional information available on the project for their review, and we have also received a response from the Mississippi Band of Choctaw Indians stating that this project was outside of their area of concern. Additionally, the Georgia SHPO requested the referenced documents in hard copy which we provided to them by regular mail.

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al-coushatta signed.pdf

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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727
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Ree R. Rodgers, M.A.
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DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

May 17, 2007

REPLY TO
ATTENTION OF
Inland Environment Team
Planning and Environmental Division

Chief Tarpie Yargee
Alabama-Quassarte Tribal Town of the Creek Nation
Attention: Ms. Augustine Asbury
Post Office Box 187
Wetumka, Oklahoma 74883

Dear Chief Yargee:

Please find enclosed for your review and comment two compact discs containing the Draft Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decision for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia, the Cultural Resources Surveys of the proposed pipeline corridors performed by R.S. Webb and Associates in 2002, and a copy of the Notice of Availability distributed by the Mobile District, U.S. Army Corps of Engineers (Corps) March 9, 2007. This letter is being mailed to complement email coordination with Ms. Augustine Asbury of your Tribal Historic Preservation Office sent on April 20, 2007. Hard copies of the referenced documents can be provided upon request. The following website can also be accessed to view the documents online in PDF format.

ftp://ftp.sam.usace.army.mil/Gwinett%20Cty,%20GA%20Water%20Line%20reports/

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Sincerely,

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosure

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:34 PM
To: Augustine Asbury
Cc: Eubanks, Michael J SAM; Brandt, Joanne U SAM; Bradley, Kenneth P SAM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Attachments: al-quassarte signed.pdf

Greetings!
We are sending this email to provide an update on the coordination we have received regarding the review of the Draft Environmental Assessment and two cultural resources investigations reports for the proposed Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia.

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To date our office has received comments from the Catawba Nation stating they are interested in additional information available on the project for their review, and we have also received a response from the Mississippi Band of Choctaw Indians stating that this project was outside of their area of concern. Additionally, the Georgia SHPO requested the referenced documents in hard copy which we provided to them by regular mail.

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al-quassarte signed.pdf

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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

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Office: 251-690-2775, Cell: 251-463-2223
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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District
CESAM-PD-EI (Rodgers)
P.O. Box 2288
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Fax: 251-690-2727

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

May 17, 2007

REPLY TO
ATTENTION OF
Inland Environment Team
Planning and Environmental Division

Governor Bill Anoatubby
The Chickasaw Nation
Attention: Ms. Gingy Nail
Post Office 1548
Ada, Oklahoma 74821-1548

Dear Governor Anoatubby:

Please find enclosed for your review and comment two compact discs containing the Draft Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decision for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia, the Cultural Resources Surveys of the proposed pipeline corridors performed by R.S. Webb and Associates in 2002, and a copy of the Notice of Availability distributed by the Mobile District, U.S. Army Corps of Engineers (Corps) March 9, 2007. This letter is being mailed to complement email coordination with your Tribal Historic Preservation Office sent on April 20, 2007. Hard copies of the referenced documents can be provided upon request. The following website can also be accessed to view the documents online in PDF format.

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Sincerely,

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosure

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:40 PM
To: gingy.nail@chickasaw.net
Cc: Eubanks, Michael J SAM; Brandt, Joanne U SAM; Bradley, Kenneth P SAM
Subject: Mobile District USACE, Gwinnett County Water Outfall Pipeline UPDATE

Attachments: chickasaw signed.pdf

Greetings!
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chickasaw signed.pdf

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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
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Cultural Resources, Planning Division

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DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

May 17, 2007

REPLY TO
ATTENTION OF
Inland Environment Team
Planning and Environmental Division

Chief Charles D. Enyart
Eastern Shawnee Tribe of Oklahoma
Attention: Ms. Robin Dushane
Post Office Box 350
Seneca, Missouri 64865

Dear Chief Enyart:

Please find enclosed for your review and comment two compact discs containing the Draft Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decision for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia, the Cultural Resources Surveys of the proposed pipeline corridors performed by R.S. Webb and Associates in 2002, and a copy of the Notice of Availability distributed by the Mobile District, U.S. Army Corps of Engineers (Corps) March 9, 2007. This letter is being mailed to complement email coordination with Ms. Robin Dushane of your Tribal Historic Preservation Office sent on April 20, 2007. Hard copies of the referenced documents can be provided upon request. The following website can also be accessed to view the documents online in PDF format.

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Sincerely,

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosure

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:46 PM
To: radushane@gmail.com
Cc: Eubanks, Michael J SAM; Brandt, Joanne U SAM; Bradley, Kenneth P SAM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Follow Up Flag: Follow up
Flag Status: Flagged

Attachments: east_shawnee signed.pdf

Greetings!
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ftp://ftp.sam.usace.army.mil/Gwinett%20Cty,%20GA%20Water%20Line%20reports/

Proposed Work to be Performed:

The Mobile District, USACE is considering granting an easement across Corps land to Gwinnett County, Georgia for the construction and maintenance of a treated wastewater pipeline and diffuser through Gwinnett County Park into Lake Sidney Lanier. Gwinnett County has also applied for a regulatory permit (pursuant to Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act) through the Savannah District USACE for the construction of the discharge pipeline and diffuser which will extend from the F. Wayne Hill Water Treatment and Reclamation Facility to the discharge point in Lake Lanier (see attached map).

Potential Impacts to Cultural Resources:

At the request of Gwinnett County, Georgia, Parsons Engineering Sciences, Inc. contracted cultural resources firm, R.S. Webb & Associates to conduct an intensive archaeological and historic architectural survey through the area of potential effect for the pipeline construction. These surveys were completed in 2001 and 2002 (please see weblink for access to reports). Two resources were recommended for avoidance, a historic culvert and a historic railway crossing (GW-1, GW-2). No archaeological resources were identified within the pipeline corridors. As a result of these findings, it does not appear that there will be an adverse effect to cultural resources as a result of this undertaking.

We are interested in any comments or concerns you may have regarding this project. If you feel further coordination or consultation is necessary, we would appreciate any responses within thirty (30) days of your receipt of this letter or before May 25, 2007. If you require additional information or clarification, please contact Ms. Ree Rodgers at 251-690-2775, or through this email address. Thank you for your time and support of the Mobile District Cultural Resources Program.

Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727
****

Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District
CESAM-PD-EI (Rodgers)
P.O. Box 2288
Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

May 17, 2007

REPLY TO
ATTENTION OF

Inland Environment Team
Planning and Environmental Division

Town King/Mekko Gary Bucktrot
Kialegee Tribal Town of the Creek Nation
Attention: Mr. Marsey Harjo
Post Office Box 332
Wetumka, Oklahoma 74883

Dear Town King/Mekko Bucktrot:

Please find enclosed for your review and comment two compact discs containing the Draft Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decision for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia, the Cultural Resources Surveys of the proposed pipeline corridors performed by R.S. Webb and Associates in 2002, and a copy of the Notice of Availability distributed by the Mobile District, U.S. Army Corps of Engineers (Corps) March 9, 2007. This letter is being mailed to complement email coordination with Mr. Marsey Harjo of your Tribal Historic Preservation Office sent on April 20, 2007. Hard copies of the referenced documents can be provided upon request. The following website can also be accessed to view the documents online in PDF format.

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Sincerely,

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosure

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:51 PM
To: mbharjo_seminole@yahoo.com
Cc: Eubanks, Michael J SAM; Bradley, Kenneth P SAM; Brandt, Joanne U SAM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Attachments: kialegee signed.pdf

Greetings!
We are sending this email to provide an update on the coordination we have received regarding the review of the Draft Environmental Assessment and two cultural resources investigations reports for the proposed Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia.

As promised, please see attached copies of the formal letter. These letters were also sent by regular mail with the referenced documents provided on compact discs. Also, pasted below please find the original email requesting review that was sent April 18, 2007.

To date our office has received comments from the Catawba Nation stating they are interested in additional information available on the project for their review, and we have also received a response from the Mississippi Band of Choctaw Indians stating that this project was outside of their area of concern. Additionally, the Georgia SHPO requested the referenced documents in hard copy which we provided to them by regular mail.

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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
Fax: 251-690-2727
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Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District
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DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

May 17, 2007

REPLY TO
ATTENTION OF
Inland Environment Team
Planning and Environmental Division

Principal Chief A.D. Ellis
Muscogee (Creek) Nation
Attention: Ms. Joyce Bear
Highway 75, Loop 56
Post Office Box 580
Okmulgee, Oklahoma 74447-0580

Dear Chief A.D. Ellis:

Please find enclosed for your review and comment two compact discs containing the Draft Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decision for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia, the Cultural Resources Surveys of the proposed pipeline corridors performed by R.S. Webb and Associates in 2002, and a copy of the Notice of Availability distributed by the Mobile District, U.S. Army Corps of Engineers (Corps) March 9, 2007. This letter is being mailed to complement email coordination with Ms. Joyce Bear of your Tribal Historic Preservation Office sent on April 20, 2007. Hard copies of the referenced documents can be provided upon request. The following website can also be accessed to view the documents online in PDF format.

ftp://ftp.sam.usace.army.mil/Gwinett%20Cty,%20GA%20Water%20Line%20reports/

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Sincerely,

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosure

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:53 PM
To: Joyce Bear
Cc: Eubanks, Michael J SAM; Bradley, Kenneth P SAM; Brandt, Joanne U SAM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Attachments: muscogee signed.pdf

Greetings!
We are sending this email to provide an update on the coordination we have received regarding the review of the Draft Environmental Assessment and two cultural resources investigations reports for the proposed Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia.

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muscogee signed.pdf

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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
Office: 251-690-2775, Cell: 251-463-2223
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Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District
CESAM-PD-EI (Rodgers)
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DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

May 17, 2007

REPLY TO
ATTENTION OF

Inland Environment Team
Planning and Environmental Division

Chairman Eddie Tullis
Poarch Band of Creek Indians
Attention: Mr. Robert Thrower
5811 Jack Springs Road
Atmore, Alabama 36502-5025

Dear Chief Eddie Tullis:

Please find enclosed for your review and comment two compact discs containing the Draft Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decision for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia, the Cultural Resources Surveys of the proposed pipeline corridors performed by R.S. Webb and Associates in 2002, and a copy of the Notice of Availability distributed by the Mobile District, U.S. Army Corps of Engineers (Corps) March 9, 2007. This letter is being mailed to complement email coordination with Mr. Robert Thrower of your Tribal Historic Preservation Office sent on April 20, 2007. Hard copies of the referenced documents can be provided upon request. The following website can also be accessed to view the documents online in PDF format.

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Sincerely,

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosure

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:54 PM
To: rgthrower@hotmail.com
Cc: Eubanks, Michael J SAM; Bradley, Kenneth P SAM; Brandt, Joanne U SAM
Subject: Mobile District USACE, Gwinnett County, Georgia Water Outfall Pipeline UPDATE

Attachments: poarch_signed.pdf

Greetings!
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poarch_signed.pdf

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Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

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Ree R. Rodgers, M.A.
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DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

May 17, 2007

REPLY TO
ATTENTION OF
Inland Environment Team
Planning and Environmental Division

Chairman Ron Sparkman
Shawnee Tribe
Attention: Ms. Rebecca Hawkins
21 8 Tribes Trail
Miami, Oklahoma 74354

Dear Chairman Sparkman:

Please find enclosed for your review and comment two compact discs containing the Draft Environmental Assessment for U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decision for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia, the Cultural Resources Surveys of the proposed pipeline corridors performed by R.S. Webb and Associates in 2002, and a copy of the Notice of Availability distributed by the Mobile District, U.S. Army Corps of Engineers (Corps) March 9, 2007. This letter is being mailed to complement email coordination with Ms. Rebecca Hawkins of your Tribal Historic Preservation Office sent on April 20, 2007. Hard copies of the referenced documents can be provided upon request. The following website can also be accessed to view the documents online in PDF format.

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Sincerely,

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosure

From: Rodgers, Ree R SAM
Sent: Wednesday, May 23, 2007 2:55 PM
To: Shawnee Tribe; shawneetribe@neok.com
Cc: Eubanks, Michael J SAM; Brandt, Joanne U SAM; Bradley, Kenneth P SAM
Subject: Mobile District USACE, Gwinnett County Water Outfall Pipeline UPDATE

Attachments: shawnee_signed.pdf

Greetings!
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shawnee_signed.pdf

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ftp://ftp.sam.usace.army.mil/Gwinett%20Cty,%20GA%20Water%20Line%20reports/

Proposed Work to be Performed:

The Mobile District, USACE is considering granting an easement across Corps land to Gwinnett County, Georgia for the construction and maintenance of a treated wastewater pipeline and diffuser through Gwinnett County Park into Lake Sidney Lanier. Gwinnett County has also applied for a regulatory permit (pursuant to Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act) through the Savannah District USACE for the construction of the discharge pipeline and diffuser which will extend from the F. Wayne Hill Water Treatment and Reclamation Facility to the discharge point in Lake Lanier (see attached map).

Potential Impacts to Cultural Resources:

At the request of Gwinnett County, Georgia, Parsons Engineering Sciences, Inc. contracted cultural resources firm, R.S. Webb & Associates to conduct an intensive archaeological and historic architectural survey through the area of potential effect for the pipeline construction. These surveys were completed in 2001 and 2002 (please see weblink for access to reports). Two resources were recommended for avoidance, a historic culvert and a historic railway crossing (GW-1, GW-2). No archaeological resources were identified within the pipeline corridors. As a result of these findings, it does not appear that there will be an adverse effect to cultural resources as a result of this undertaking.

We are interested in any comments or concerns you may have regarding this project. If you feel further coordination or consultation is necessary, we would appreciate any responses within thirty (30) days of your receipt of this letter or before May 25, 2007. If you require additional information or clarification, please contact Ms. Ree Rodgers at 251-690-2775, or through this email address. Thank you for your time and support of the Mobile District Cultural Resources Program.

Ree R. Rodgers, M.A.
Cultural Resources, Planning Division

U.S. Army Corps of Engineers, Mobile District CESAM-PD-EI (Rodgers) P.O. Box 2288 Mobile, Alabama 36628-0001
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Public Comments

①

Dear Sirs, 3/21/07

In response to your 3/9/07 notice for placement of a water reclamation facility discharge pipeline and diffuser in Lake Sidney Lanier, Gwinnett County, Georgia, I say so what! We probably end up with most of Atlanta's wastewater here in Southwestern Georgia anyway, as the Chattahoochee River runs south, doesn't it!!!

What I cannot accept is the water grab in Lake Sidney Lanier that is about to take place, stealing millions of gallons from Southwest Georgia → (Lake Seminole in particular) The plans seems to divert over ⅓ of Lake Seminole's capacity for Atlanta's growing water needs!

YOU MUST FIND ANOTHER WAY! Lake Seminole will die from shallow water's if you do not find another way!!!

(OVER) Even now Seminole County is dying!

you can't drive 5 miles on RTE 253 in Seminole County without finding abandoned housing and closed businesses of all kinds! Even the hot spots left like Wingates Lodge, Trafe End Marina and Spring Creek Marina (one other marina near WOOD RUFF FARM)) are all run down and dilapidated, because they fear that one day Lake Seminole will disappear from Atlanta's need for drinking water! Seminole county and Lake Seminole are already dying, PLEASE FIND ANOTHER WAY!!!

Personally, my wife and have just made a move from Florida to Bainbridge to semi-retire. We are avid boaters and could not resist the lure of upon retirement the Flint, Chattahoochee, and Appalachicola Rivers all with at least 50 wide and 9' deep channels from the Gulf of Mexico to Lake Eufaula and beyond! Also to Bainbridge on the Flint! And Lake Seminole on top of it! a

(OVER)

boater's paradise!
We could not understand why people when introducing themselves to us would say, WHY BAINBRIDGE ???
Now we know !!! We still haven't purchased our next boat yet, and will not until the ARMY CORP of engineers makes this decision! YES or NO to the great water grab?
If you let Southwest Georgia down in 2007-2008 we never will sample the boating life here!
We will move away to some distant mountains where the army corp of engineers cannot break our hearts!

Sincerely,
Mr. + Mrs. Clifford Ives
2279 Pondtown Rd.
Bainbridge, Georgia 39817-1519

(Please answer up close + personal !!!)

8.0 References

Armour, C. L. 1994. Evaluating temperature regimes for protection of brown trout. U.S. Dept. Interior National Biological Survey, Resource Publication 201, Washington, D.C.

Coutant, C. C. 1977. Compilation of temperature preference data. J. Fish. Res. Board Can. 34:739-745

Eaton, J. G., J. H. McCormick, B. E. Goodno, D. G. O'Brien, H. G. Stefany, M. Hondzo, and R. M. Scheller. 1995. A field information-based system for estimating fish temperature tolerances. Fisheries 20:10-18.

Hokanson, K. E. F., J. H. McCormick, B. R. Jones and J. H. Tucker. 1973. Thermal requirements for maturation, spawning, and embryo survival of the brook trout, Salvelinus fontinalis. J. Fish. Res. Board Can 30:975-984.

Hokanson K.E.F., C.F. Kleiner, and T. W. Thorslund. 1977. Effects of constant temperatures and diel temperature fluctuations on specific growth and mortality rates and yield of juvenile rainbow trout, *Salmo gairdneri.* J. Fish Res. Board Can. 34:639-648

Raleigh, R. F. 1982. Habitat suitability index models: brook trout. U.S. Fish and Wildlife Service, FWS/OBS-82/10.24. September 1982.

Raleigh, R. F., T. Hickman, R. C. Solomon, and P. C. Nelson. 1984. Habitat suitability information: rainbow trout. U.S. Fish and Wildlife Service, FWS/OBS-82/10.60. January 1984.

Raleigh, R. F., L. D. Zuckerman, and P. C. Nelson. 1986. Habitat suitability index models and instream flow suitability curves: brown trout. U.S. Fish and Wildlife Service, Biological Report 82(10.124). September 1986 revised.

Biagi, John and Richard P. Brown. Upper Temperature Tolerance of Juvenile and Adult Brown and Rainbow Trout Tested Under Flowing Conditions. GA Dept of Natural Resources, Wildlife Resources Division, Fisheries Management Section. 1997.

Camp, Dresser and McKee (CDM). *Gwinnett County Water and Wastewater Master Plan Update.* Prepared for Gwinnett County Department of Public Utilities. 1999.

Camp, Dresser and McKee (CDM). 2002 *Gwinnett County Water and Wastewater Master Plan Update.* Prepared for Gwinnett County Department of Public Utilities. 2003.

CH2M HILL. *Gwinnett County Water and Wastewater Master Plan*. Prepared for Gwinnett County Department of Public Utilities. 1993.

CH2M HILL. *North Advanced Water Reclamation Facility Environmental Information Document.* Prepared for Gwinnett County Department of Public Utilities. February 1996a.

CH2M HILL. *Reclaimed Water Pipeline for the North Advanced Water Reclamation Facility Environmental Information Document*. Prepared for Gwinnett County Department of Public Utilities. February 1996b.

CH2M HILL. *North Advanced Water Reclamation Facility Expansion and Reclaimed Water Pipeline Design Development Report.* Prepared for Gwinnett County Department of Public Utilities. March 1999a.

CH2M HILL. Flowery Branch – Mud Creek Watershed Assessment. Prepared for Hall County and the Cities of Flowery Branch and Oakwood. October 1999b

CH2M HILL. *Community Watershed Assessment and Watershed Management Plan: Hall County and the City of Gainesville*. March 2000a.

CH2M HILL. *Community Watershed Assessment and Watershed Management Plan: Forsyth County*. March 2000b.

CH2M HILL Crooked Creek Stormwater Master Plan. Prepared for Gwinnett County Department of Public Utilities. 2003

CH2M HILL and Brown and Caldwell. Chattahoochee Tributaries Watershed Improvement Plan. Prepared for Gwinnett County Department of Public Utilities. 2005

Council on Environmental Quality (CEQ). 2003. Considering Cumulative Effects Under the National Environmental Policy Act. http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm

Crook, James. "Water Reclamation and Reuse Criteria." Asano, Takashi (ed.). *Water Quality Management Volume 10*. Wastewater Reclamation and Reuse. 1998.

DeKalb County Water and Sewer Division (DCWSD) and CH2M HILL. *South River Watershed Assessment and Management Plan*. 2001.

Forsyth County, Georgia. www.forsythco.com. Accessed 2003.

Frick, E.A. and S.D. Zaugg. Organic Wastewater Contaminants in the Upper Chattahoochee River basin, Georgia, 1999-2002. *Proceedings of the 2003 Georgia Water Resources Conference*. Kathryn J. Hatcher, editor, Institute of Ecology, The University of Georgia, Athens, Georgia. 2003.

Georgia State Board of Natural Resources. Water Issues White Paper. 2001

Georgia Department of Natural Resources (DNR). *Report on Georgia's Environment*. 2001.

Georgia DNR. *Guidelines for Eating Fish from Georgia Waters: 2003 Update*. 2003.

Georgia Environmental Protection Division (EPD). *Rules and Regulations for Water Quality Control*. Department of Natural Resources. Revised. December 2002.

Georgia Geologic Survey. "Georgia Pollution Susceptibility Map". *Hydrologic Atlas 20*. 1992.

Georgia Geologic Survey. "Most Significant Ground-Water Recharge Areas of Georgia" *Hydrologic Atlas 18*. 1989.

Georgia Geologic Survey. "Most Significant Ground-Water Recharge Areas of Georgia." *Hydrologic Atlas 20*. 1992.

Gwinnett County, Georgia. www.gwinnett.ga.us. Accessed 2003.

Hall County, Georgia. www.hallcounty.org. Accessed 2003.

Keevin, T.M. and G.L. Hempen. 1997. The Environmental Effects of underwater Explosions with Methods to Mitigate Impacts. U.S. Army Corps of Engineers, St. Louis District. https://www.denix.osd.mil/denix/Public/ES-Programs/Conservation. Website accessed February 6, 2007.

Krenkel, P.A., and V. Novotny. *Water Quality Management*. Academic Press. New York, NY. 1980.

Krieger, K.A. Effect of open-lake dredge spoil disposal on benthic macroinvertebrates of western Lake Erie. Presented at the North American Benthological Society Annual Meeting. Athens, GA. Abstract available at http://www.benthos.org/database/allnabstracts.cfm/db/Athens2003abstracts/id/473. 2003.

Kundell, James E. *Diagnostic/Feasibility Study of Lake Sidney Lanier, Georgia*. Prepared for Georgia EPD. 1998.

LimnoTech Inc., and J.E. Edinger Associates. *Application of Linked Watershed and Water Quality Models for Lake Lanier*. Prepared for Upper Chattahoochee River Basin Group. February 1998.

McNab, W.H., and P. Avers. *Ecological Subregions of the United States*. Prepared in cooperation with Regional Compilers and the ECOMAP Team of the Forest Service. U.S. Department of Agriculture (USDA). WO-WSA-5. 1994.

Metcalf &Eddy. *Technical Memorandum No. 5, Evaluation of Potential Sites for the Suwanee Water Reclamation Facility*. Prepared for Gwinnett County Department of Public Utilities. August 1994.

National Institute of Environmental Health Sciences. Endocrine Disruptors. Endocrine Disruptors. 2006. Accessed via http://www.niehs.nih.gov in 2007.

Lawrenceville Weather. 2007. www.lawrencevilleweather.com/about.htm; website accessed February 5, 2007.

Metropolitan North Georgia Water Planning District. *Final Water Supply and Water Conservation Management Plan*. http://www.northgeorgiawater.org/. Adopted September 2003, posted November 2003. 2003a.

Metropolitan North Georgia Water Planning District. *Final Long-term Wastewater Management Plan*. http://www.northgeorgiawater.org/. Adopted September 2003, posted November 2003. 2003b.

Metropolitan North Georgia Water Planning District. *Final Report District-wide Watershed Management Plan*. http://www.northgeorgiawater.org/. Adopted September 2003, posted November 2003. 2003c.

Mineral Management Service (MMS). Clean Air Act Guidelines. 1999.

Mitsch, W.J. and J.G. Gosselink. Wetlands, 3rd edition. John Wiley & Sons, Inc., New York, NY. 920 pp. 2000.

Natural Resources Conservation Service. Prime farmland web page. USDA. http://www.ga.nrcs.usda.gov/gasoil/prime.htm#table. Accessed March 13, 2003.

Noise Unlimited, Inc. *Boat Noise Tests Using Static and Full-Throttle Measurement Methods*. Prepared for the New Jersey Division of State Police, Marine Law Enforcement Bureau, 1995

Rommé, R.C. and R.P. Reaves. Fort Leonard Wood Endangered Species Management Plan for the Indiana Bat (*Myotis sodalis*), Gray Bat (*Myotis grisescens*), and Bald Eagle (*Haliaeetus leucocephalus*). 1999.

R.S. Webb & Associates. *Cultural Resources Survey of the Proposed Gwinnett County Water Pipeline Corridor North Extension*. 2001.

Soil Conservation Service (SCS). *An Update for the Soil Survey of Gwinnett Co. Georgia*. Rehner, Richard (ed.). USDA. 1988.

Sonzogni, W.C., et al. "Bioavailability of Phosphorus Inputs to Lakes." *Journal of Environmental Quality*. Vol. 11 no. 4: 555-56. 1982.

Tiner, R.W. *Wetland Indicators*. Lewis Publishers, Boca Raton, FL. 392 pp. 1999

TRC Garrow Associates. *Reclaimed Water Pipeline Project Archaeological and Historic Architecture Survey*. Prepared for CH2M HILL. March 1999.

United States Army Corps of Engineers (USACE). *Updating of the Master Plan Lake Sidney Lanier, Chattahoochee River, GA*. Mobile District. 1988.

USACE. *1997 Lake Sidney Lanier, Georgia Historic Properties Management Plan, Preliminary Review Draft*. Environment and Resources Planning Section. Mobile District. Mobile, Alabama. 1997.

USACE. *Lake Sidney Lanier Lakeshore Management Plan*. Mobile District. Buford, Georgia. 1998a.

USACE. *Draft Environmental Impact Statement : Water Allocation for the Apalachicola-Chattahoochee-Flint (ACF) River Basin*. Mobile District. 1998b.

USACE. *Oakland Harbor Navigation improvement (-50 Foot) Project: Final Environmental Impact Statement/Report*. San Francisco District. 1998c.

USACE. *Final Environmental Impact Statement for Operation and Maintenance of Lake Sidney Lanier, Georgia*. Prepared by TetraTech for the Mobile District U.S. Army Corps of Engineers. November 2003.

USACE. ACF Historical Data. http://water.sam.usace.army.mil/gage/acfhist.htm. 2003.

U.S. Bureau of the Census. 2000 Census. http://venus.census.gov/cdrom/lookup/990540991. No date.

U.S. Bureau of the Census. 1990 Census. 1990 U.S. Census Poverty Status. http://venus.census.gov/cdrom/lookup/990540991. No date.

U.S. Department of Commerce (USDOC). *Total Full-time and Part-time Employment by Industry*. Bureau of Economic Analysis (BEA). 2001. http://www.bea.doc.gov/bea/regional/reis/action.cfm. Accessed January 4, 2002.

U.S. Department of Transportation. *Highway Construction Noise: Measurement, Prediction, and Mitigation*. 1977.

U.S. Environmental Protection Agency (EPA). Envirofacts Database. (http://www.epa.gov/enviro/). Accessed 2003.

U.S. EPA. Endocrine Primer. http://www.epa.gov/oscpmont/oscpendo/pubs/edspoverview/primer.htm. Accessed 2007.

U.S. Geological Survey (USGS). Groundwater Conditions in Georgia. 1999.

USGS. http://ga.water.usgs.gov/. Accessed 2000.

USGS. Issue Based Research – Emerging Contaminants Ecological Effects. http://toxics.usgs.gov/regional/emc/ecological_effects.html Accessed 2007.

University of Georgia. Geology of Georgia. www.gly.uga.edu/GAGeology.html. Accessed 2002.

Welch, E.B. *Effects of Wastewater*. Chapman Hall. 1992.

Wharton, C.H. *The Natural Environments of Georgia*. Produced Under a Grant from Georgia DNR. Office of Planning and Research. Georgia State University. Atlanta, Georgia. 1978.

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10.0 List of Recipients

To be provided in Final Report.

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Appendix A

North Advanced Water Reclamation Facility Expansion and Reclaimed Water Pipeline Environmental Information Document and Supplemental Information

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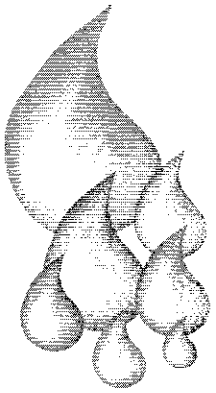
Gwinnett County
Department of Public Utilities

North Advanced Water Reclamation Facility Expansion and Reclaimed Water Pipeline



Environmental

Information

Document

CH2MHILL

Jordan Jones & Goulding

July 1999

W031999010ATL / Cover 1.FH8

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Acronyms

ACF	Apalachicola-Chattahoochee-Flint
ADMMF	average daily maximum month flow
APE	Area of Potential Effects
AWRF	Advanced Waters Reclamation Facility
BMP	best management practice
BOD	biochemical oxygen demand
CDM	Camp Dresser & McKee
CFU	Coliform Forming Units
CIP	Capital Improvements Plan
COD	chemical oxygen demand
CWA	Clean Water Act
DNR	Department of Natural Resources
DO	dissolved oxygen
DPU	Department of Public Utilities
EID	Environmental Information Document
EPA	Environmental Protection Agency
EPD	Environmental Protection Division
FIRM	Flood Insurance Rate Maps
kg	kilograms
LTI	LimnoTech, Inc.
MACT	Maximum Achievable Control Technology
M&E	Metcalf & Eddy
MG	million gallons
mg/L	milligrams per liter
mgd	million gallons per day
ml	milliliter
MSL	mean sea level
NH3-N	ammonia
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NTU	nephelometric turbidity units
NWI	National Wetlands Inventory
OSHA	Occupational Safety and Health Administration
RACT	Reasonably Achievable Control Technology
TP	total phosphorus

TKN	Kjeldahl nitrogen
TSS	Total Suspended Solids
UCBG	Upper Chattahoochee Basin Group
USFWS	United States Fish and Wildlife Service
WPCP	Water Pollution Control Plant
WRF	Water Reclamation Facility

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Executive Summary

The Gwinnett County Department of Public Utilities (DPU) is proposing to expand the North Advanced Water Reclamation Facility (AWRF) and to construct a new reclaimed water pipeline to return 40 million gallons per day (mgd) of highly reclaimed water to Lake Sidney Lanier (Lake Lanier). This Environmental Information Document (EID), along with its companion document, the North AWRF Expansion and Reclaimed Water Pipeline Design Development Report, has been prepared to comply with the Georgia Department of Natural Resources (DNR) Environmental Protection Division's (EPD) requirements for planning of proposed projects. The Antidegradation Evaluation for the proposed expansion is included as Appendix D to this EID. As part of the permit application process, a review of this EID will be performed by the EPD.

The proposed expanded North AWRF would provide a high treatment level for a design total of 60 mgd of reclaimed water (20 mgd currently and 40 mgd additional) and produce reclaimed water suitable for indirect reuse. This treatment would consist of advanced secondary treatment technologies (biological) followed by tertiary (physical/chemical or membrane) treatment technologies. The existing release location is on the Chattahoochee River, where the North AWRF's reclaimed water is combined with Crooked Creek Water Reclamation Facility's (WRF's) reclaimed water. The proposed return location for the North AWRF's 40 mgd of additional reclaimed water is in Lake Lanier, the County's sole water supply source.

As part of the proposed North AWRF expansion, a new reclaimed water pipeline would be constructed to transmit reclaimed water from the facility to Lake Lanier. The construction easement for the proposed pipeline would be a maximum of 80 feet wide; however, during detailed design specific site constraints may require a reduction in this easement width. The proposed pipeline would originate at the reclaimed water pumping station located on the south end of the North AWRF. Extending in a northerly direction near Suwanee, Georgia, it would continue north through Sugar Hill, Georgia, generally west of Buford, Georgia, to an ending point in Lake Lanier.

Proposed Expansion of North AWRF

No long-term adverse impacts to the environment have been identified as a result of the proposed expansion of the North AWRF. Short-term, construction-related impacts would occur from fugitive dust emissions and construction equipment noise, but these impacts are relatively isolated in nature, well within the existing buffers surrounding the site, and of short duration. Such short-term impacts are not considered significant.

Use of an advanced level of treatment (best available technology) and multiple treatment processes (so that each pollutant must pass through two or more barriers in the process) would preclude potential reclaimed water impacts on Lake Lanier. The proposed return of reclaimed water will have no measurable effect on water quality in Lake Lanier. This conclusion is based on comparison of the model results for numerous simulations both with

and without the North AWRF outfall, and the detection limits associated with laboratory tests for chlorophyll-a and total phosphorus.

Numerous reliability measures have also been incorporated in the North AWRF location and design. For example, in addition to the multiple processes as barriers to pollutants, the facility has multiple units of each treatment process such that if a unit is out of service the remaining units will still treat the full design flow of the North AWRF. The North AWRF has on-site storage tanks (60 million gallons total) that can be used to hold reclaimed water from several points in the process. The current 20-mgd facility has two independent power supply feeds, as well as backup power generation, to ensure power is available for all key processes.

Finally the location of the facility also serves to protect the lake. The North AWRF site, and the sewer collection system draining to the facility, is not in the Lake Lanier watershed and therefore does not drain to the lake. The highly treated reclaimed water leaving the facility must still be pumped to the lake, avoiding the possibility of incompletely treated water going to the lake.

In the event of a spill the lake would not be affected. A spill at the North AWRF site that manages to evade the multiple backup processes and the 60 MG of storage could reach Ivy Creek, which eventually flows to the Chattahoochee River downstream of Lake Lanier. Any spill within the county's collection system would flow to the nearest basin or creek to its location and away from Lake Lanier.

Water quality impacts on aquatic life would be limited to minor increases in temperature in the immediate area of the outfall in Lake Lanier. Potential impacts would be minimized through the design and installation of an appropriate diffuser. The reclaimed water released will be much higher in dissolved oxygen (in spite of the slightly higher temperature) than the lake water, providing a net benefit to aquatic life in the lake. The quality of the reclaimed water returned to Lake Lanier would be better than the average baseflow coming into the lake from its tributaries.

Minor stormwater impacts at the North AWRF site, primarily associated with erosion during construction, would be minimized using best management practices (BMPs). Impacts on site safety would be associated primarily with construction of the facilities. Site safety issues would be addressed by compliance with Occupational Safety and Health Administration (OSHA) regulations and appropriate construction management supervision.

Table 1 summarizes the assessment of environmental impacts associated with the expansion of the North AWRF. Overall environmental impacts would be minor and primarily associated with temporary construction-related activities.

TABLE 1
North AWRF Expansion
Summary of Environmental Impacts

Environmental Category	Adverse Environmental Impact
Wetlands	None – No wetlands will be impacted on site.
Floodplain/River Corridor	None – No floodplains will be impacted on site.
Water Supply	None – Beneficial impacts will result from increased supply of highly treated water.
Water Resources	Minor – Short-term sedimentation/erosion issues; beneficial impacts in long-term from return of high quality reclaimed water to Lake Lanier; no measurable effect on lake quality as a result of water return.
Groundwater Recharge Areas	None – No groundwater recharge area.
Stormwater	Minor – Short-term construction-related activities, minimal expansion of impervious surfaces. Runoff controls within current facility design.
Wastewater	None – Beneficial impact from increased treatment capacity and treatment levels.
Air Quality	Minor – Short-term fugitive dust emissions from construction. Odor control facilities designed for long-term control.
Solid Wastes	Minor – Short-term construction waste; increased sludge disposal. Current capacity exists at the landfill.
Soil Stability/Erodibility	Minor – Short-term construction-related erosion potential. BMPs will be implemented to minimize.
Protected Mountains	None – No protected mountains.
Protected Species	None – No protected species on site.
Critical Habitats	None – No critical habitat on site.
Historical	None – No historical sites or resources on site.
Archaeological	None – No archaeological resources on site.
Parks/Recreation	None – No parks on site.
Energy Supply	None – Required energy within system capacity.
Beaches	None – No beaches on site.
Dunes	None – No dune areas on site.
Shoreline	None – No shoreline on plant site.
Estuary/Coastal Marshland	None – No estuary on plant site.
Forest Land	None – Expansion site currently cleared.
Barrier Islands	None – No barrier islands in area.
Aquatic Life/Trout Streams	None – Water quality of trout habitat not impacted.
Noise	Minor – Short-term construction-related noise. Operating hour restrictions can minimize disturbance.
Farmland	None – No farmland associated with plant site.
Site Safety	Minor – Temporary hazards possible during construction. Adherence to OSHA regulations will minimize.
Energy Use	None – Energy efficiency will be optimized in design.
Financial Considerations	Minor – Project identified in Capital Improvement Plan (CIP), within bonding ability of County.

Proposed Pipeline Construction

Unavoidable impacts associated with the construction of the proposed reclaimed water pipeline include minor impacts on soil erodibility and wetlands, floodplains, water resources, wastewater, solid waste, noise, and site safety.

Minor impacts on soil stability/erodibility are associated with installation of the pipeline along existing creeks and the lake shore. Implementation of construction BMPs and compliance with the Georgia Soil, Erosion, and Sedimentation Act can mitigate potential impacts. Use of hay bales, silt screens, sediment basins, and appropriate site grading can minimize erosion during construction in these areas of concern.

Minor impacts on wetlands, floodplains, and forest lands would be associated with construction of the pipeline. Installation of the pipeline in wetland areas could be permitted by the U.S. Army Corps of Engineers under Nationwide Permit 12, which allows for discharges of material for utility line backfill or bedding. The permit requires there be no change in preconstruction contours, the top 6 to 12 inches of the trench be backfilled with topsoil from the trench, and excess material be removed to upland areas immediately upon completion of construction. Compliance with these measures can further minimize the long-term impacts on wetland habitat.

The minor water supply impacts are primarily associated with the potential sedimentation and erosion during pipeline construction. Implementation of sedimentation and erosion BMPs can mitigate the potential impacts on water resources. Because the construction area would remain pervious, no long-term increase in stormwater runoff is expected to occur.

Construction of the proposed pipeline would generate construction material requiring disposal, resulting in minor impacts on solid waste. The amount of construction and demolition material generated by the project would be minimized by using existing easements and rights-of-way that have already been cleared.

Temporary noise and air quality impacts would be associated with operation of heavy equipment and site work during installation of the pipeline. Potential impacts on adjacent land uses would be minimized by restricting construction activity to normal business hours. Site safety issues are always a concern around construction sites. Implementation of OSHA requirements and proper construction supervision would minimize potential safety conflicts during construction of the pipeline.

An existing bungalow along the potential pipeline corridor may be eligible for inclusion on the National Register of Historic Places (NRHP). The removal of three existing trees from in front of this bungalow could adversely impact the resources view shed and historic context. An alternative to this impact could be the rerouting of the alignment away from the property to avoid removal of the trees. If the impact cannot be avoided, a Section 106 compliance document and further consultation with the State Historic Preservation Officer would be required.

Table 2 summarizes potential environmental impacts associated with the proposed reclaimed water pipeline. Overall environmental impacts would be minor and primarily associated with temporary construction-related activities.

TABLE 2
Reclaimed Water Pipeline
Summary of Environmental Impacts

Environmental Category	Environmental Impact
Wetlands	Minor–Small-scale conversion, no net loss.
Floodplain/River Corridor	Minor–Work in floodplains, but no alteration to base elevations.
Water Supply	Minor–Short-term construction-related erosion potential. Use of BMPs to minimize.
Water Resources	None–No additional demand.
Groundwater Recharge Areas	None–No groundwater recharge area affected.
Stormwater	Minor–Short-term construction-related erosion potential. Use of BMPs to minimize.
Wastewater	None–No wastewater generated.
Air Quality	Minor–Short-term construction-related fugitive dust potential. Use of BMPs to minimize.
Solid Wastes	Minor–Short-term construction-related debris. Adequate capacity for disposal.
Soil Stability/Erodibility	Minor–Increased erosion potential around creeks can be minimized through BMPs.
Protected Mountains	None–No protected mountains in area.
Protected Species	None–No protected species identified in corridor.
Critical Habitats	None–No critical habitats identified in corridor.
Historical	Major–Potential adverse impact to NRHP eligible structure. Alignment alteration can minimize.
Archaeological	None–No archaeological resources identified.
Parks/Recreation	None–No long-term disruption to park use or lake activities.
Energy Supply	None–No impact on available energy supplies.
Beaches	None–No beach habitat in project area.
Dunes	None–No dunes present in corridor.
Shoreline	None–No protected shorelines in project area.
Estuary/Coastal Marshland	None–No estuaries in project area.
Forest Land	Minor–Small amount of tree area to be cleared.
Barrier Islands	None–No barrier islands in project area.
Aquatic Life/Trout Streams	None–No impacts to primary or secondary trout streams.
Noise	Minor–Short-term construction-related noise potential. Use of BMPs to minimize.
Farmland	None–Corridor does not cross farmlands.
Site Safety	Minor–Temporary hazards possible during construction. Adherence to OSHA regulations will minimize.
Energy Use	None–Energy efficiency will be optimized in design.
Financial Considerations	Minor–Project identified in CIP, within bonding ability of County.

SECTION 1

Introduction

Background

The Gwinnett County Department of Public Utilities (DPU) is proposing a 40-million-gallon-per-day (mgd) expansion of the 20-mgd North Advanced Water Reclamation Facility (AWRF), located adjacent to Ivy Creek near the intersection of Interstates I-985 and I-85. Expansion of the facility is consistent with the *Gwinnett County Water and Wastewater Master Plan* (CH2M HILL, 1993), the *Atlanta Region Sub-Area Future Wastewater Treatment Feasibility Study* (Atlanta Regional Commission, April 1992), and the *Gwinnett County Water and Wastewater Master Plan Update* (CDM, 1998). Currently, the 20-mgd North AWRF is under construction (set to begin operation by August 2000) and the reclaimed water will be released into the Chattahoochee River using the Crooked Creek Water Reclamation Facility (WRF) outfall. The proposed additional 40-mgd of reclaimed water from the expanded facility would be returned into Lake Lanier.

The Master Plan Update was prepared to address water supply and wastewater management issues from a comprehensive water resources management perspective. The Master Plan Update concluded that Gwinnett County will need to pursue a holistic strategy that recognizes that reclaimed water releases must be considered in the context of water supply withdrawals in order to satisfy long term water demands in the region.

All of Gwinnett County's drinking water comes from Lake Lanier, which is in the Chattahoochee River Basin. Water within this basin flows to the Gulf of Mexico. However, most of the Gwinnett County population and its smaller WRFs are located in other river basins that eventually flow to the Atlantic Ocean. This interbasin transfer reduces the amount of water available for users in the Chattahoochee River Basin, which is an important issue in the Apalachicola-Chattahoochee-Flint (ACF) Basin study and associated interstate water negotiations. The 20-mgd North AWRF will help counter this inter-basin transfer. It is important for Gwinnett County to continue to increase the return of highly reclaimed water to the Chattahoochee River Basin in order to further reduce interbasin transfer and supplement the water supply for multiple uses in the Chattahoochee Basin.

This environmental information document (EID) summarizes the potential environmental impacts of construction and operation of a proposed expansion to the North AWRF and a new proposed pipeline and discharge to Lake Lanier. This EID incorporates and updates the EID prepared during the site selection process (M&E, 1994), the EID prepared for construction and operation of the initial 20-mgd North AWRF and reclaimed water pipeline (CH2M HILL, 1996), and the Design Development Report prepared for the additional 40-mgd expansion to the North AWRF (CH2M HILL, 1999).

Project Description

Project Location

The project study area lies in the Piedmont physiographic region of Georgia. Its location in relationship to Gwinnett County, Lake Lanier, and surrounding counties is shown in Figure 1. The project origination point at the North AWRF is located approximately 25 miles northeast of the city of Atlanta, and the proposed termination point at Lake Sidney Lanier is approximately 35 miles northeast of Atlanta.

The proposed reclaimed water pipeline is located in north Gwinnett County. The proposed pipeline would originate at the effluent pumping station located on the south end of the North AWRF. Extending in a northerly direction near Suwanee, Georgia, it would continue north along a route through Sugar Hill, Georgia, generally west of Buford, Georgia, to an ending location in Lake Lanier.

Proposed Water Reclamation Facility Expansion

Gwinnett County is proposing a 40-mgd expansion to the existing 20-mgd North AWRF. The expanded North AWRF would provide a high level of treatment producing up to 60 mgd of reclaimed water suitable for indirect reuse. This treatment would consist of advanced secondary treatment technologies followed by tertiary (physical/chemical) treatment technologies. The proposed discharge limits are 25 mg/L for chemical oxygen demand (COD), 1.0 nephelometric turbidity units (NTU), 0.5 mg/L ammonia (NH3-N), 0.13 mg/L total phosphorus (TP), 23/100 mL fecal coliform, and a minimum of 6 mg/L of dissolved oxygen (DO). The technologies incorporated in the process train would effectively remove pollutants including, but not limited to, trace organic constituents, nutrients, metals, and pathogenic organisms.

The multiple barrier treatment concept implemented for the existing 20 mgd facility would be similarly employed for the expanded treatment trains (Table 3). Although preliminary and secondary treatment units for the proposed expansion would match existing facilities, there are two options for expanding the tertiary (advanced polishing) processes. The first option is to expand the high-pH lime facilities and other physical/chemical treatment units. The second option is to add a membrane treatment facility. In this second option, the existing high-pH lime facilities and other physical/chemical treatment units would be modified as necessary to process the membrane reject streams (portion of the flow that does not pass through the membrane).

The expansion of treatment facilities would be consistent with the design flow allocation developed for the existing AWRF. All primary, secondary, and solids handling facilities are sized on QMAX30 flows and sidestreams, whereas all tertiary treatment facilities are sized to treat the higher QMAX7 design flow. In addition, reliability and redundancy criteria applied to the existing 20 mgd North AWRF would be maintained for the expanded 60 mgd facility (with the primary criterion being the ability to treat design flow with at least one treatment unit type out-of-service). Some of these design features that focus on reliably producing an effluent meeting the specified quality requirements include:

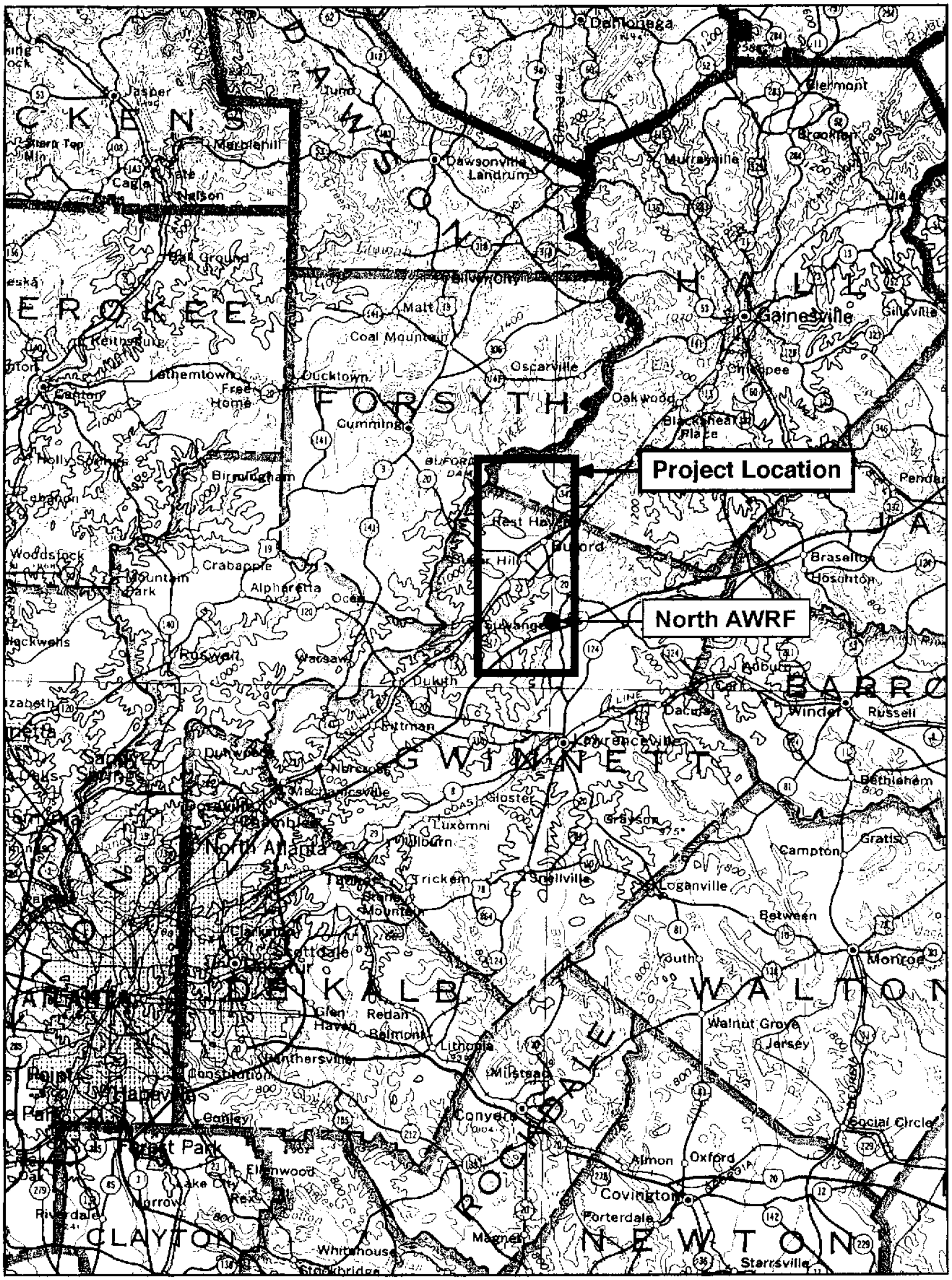

Figure 1
Location Map
Proposed North AWRF Expansion and Reclaimed Water Pipeline
Gwinnett County, Georgia

CH2MHILL

TABLE 3
Treatment Processes as Barriers to Pollutants

Treatment Barriers	Suspended Solids	Pathogens	Metals	Total Organic Carbon
Biological Nutrient Removal	X	X	X	X
Chemical Assisted Coagulation Sedimentation	X	X	X	X
Granular Media Filtration	X	X		
Carbon Adsorption				X
Micro or Ultrafiltration	X	X		
Nanofiltration or Reverse Osmosis	X	X	X	X
Disinfection (ozonation, UV, chlorination, etc.)		X		

Source: Draft No. 5, Guidelines for Potable Water Reuse, May 1999.

- Meeting or exceeding EPA Class I reliability and redundancy requirements
- Dual power feeds as well as on-site backup power generation
- Flow equalization
- Diversion and storage (80 MG total) of in-plant flows
- Continuous real-time monitoring of key performance parameters
- Emergency storage of treated effluent for additional testing (if needed) prior to release to the Chattahoochee River or Lake Lanier
- Multiple unit process treatment and flow routing flexibility

Aesthetic provisions would also be continued in the expansion and include covering tanks prone to producing odors, scrubbing off-gasses, matching site-sensitive architectural design, and landscaping that supports generous buffer areas.

The existing components and additional components that would comprise the proposed expanded North AWRF are described in detail in the companion document to this EID, the *North Advanced Water Reclamation Facility Expansion and Reclaimed Water Pipeline Design Development Report* (CH2M HILL, 1999).

A proposed layout and design for the expanded North AWRF using the high-pH lime option is shown in Figure 2. Figure 3 shows a proposed layout and design for the expanded facility using the membrane option.

Proposed Reclaimed Water Pipeline

As part of the North AWRF expansion, a new reclaimed water pipeline would be constructed to carry reclaimed water from the facility to Lake Lanier. Figure 4 shows the three corridors evaluated. The proposed corridor and two alternatives are discussed in Section 2 under Pipeline Routing Alternatives.

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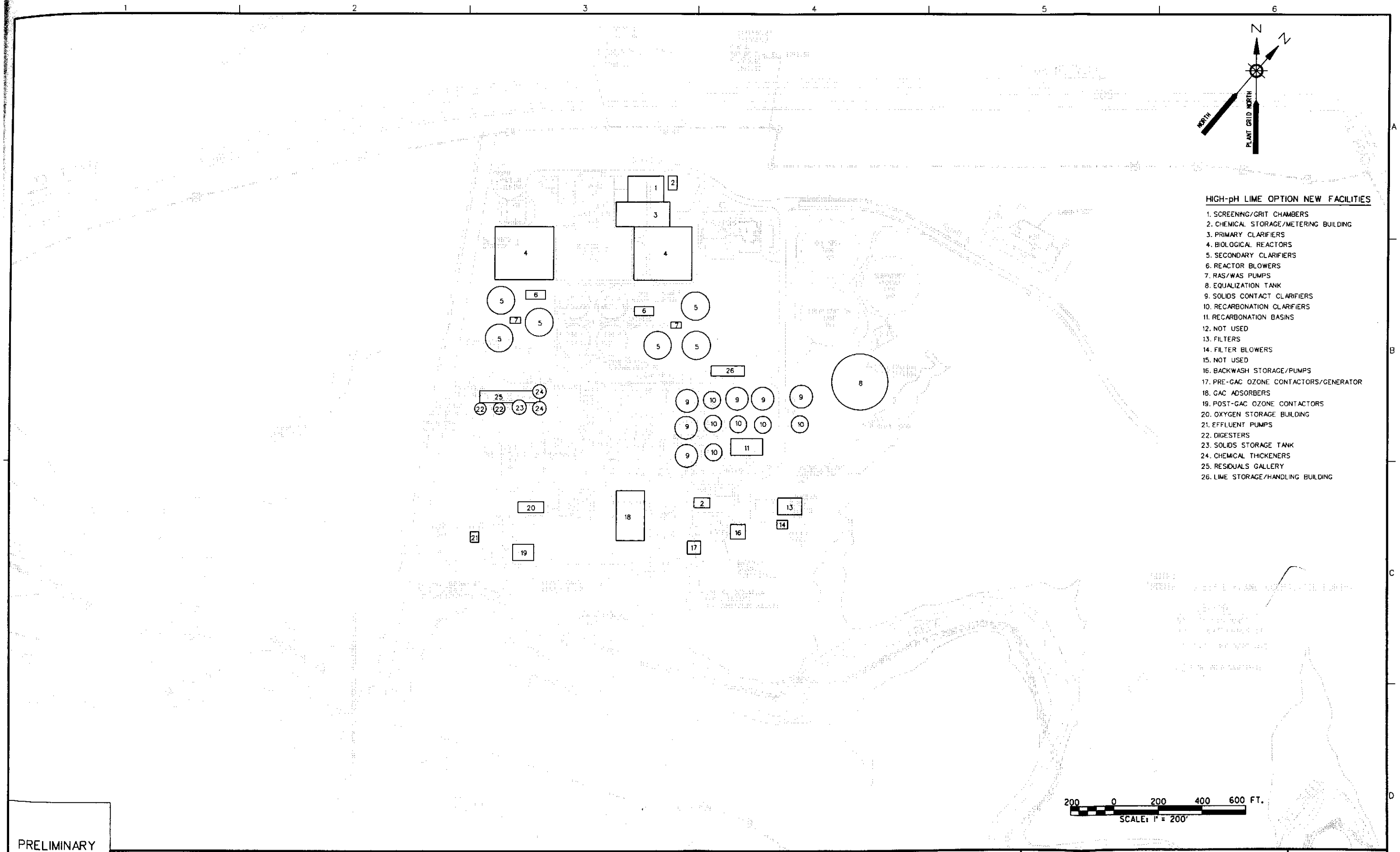

HIGH-pH LIME OPTION NEW FACILITIES

1. SCREENING/GRIT CHAMBERS
2. CHEMICAL STORAGE/METERING BUILDING
3. PRIMARY CLARIFIERS
4. BIOLOGICAL REACTORS
5. SECONDARY CLARIFIERS
6. REACTOR BLOWERS
7. RAS/WAS PUMPS
8. EQUALIZATION TANK
9. SOLIDS CONTACT CLARIFIERS
10. RECARBONATION CLARIFIERS
11. RECARBONATION BASINS
12. NOT USED
13. FILTERS
14. FILTER BLOWERS
15. NOT USED
16. BACKWASH STORAGE/PUMPS
17. PRE-GAC OZONE CONTACTORS/GENERATOR
18. GAC ADSORBERS
19. POST-GAC OZONE CONTACTORS
20. OXYGEN STORAGE BUILDING
21. EFFLUENT PUMPS
22. DIGESTERS
23. SOLIDS STORAGE TANK
24. CHEMICAL THICKENERS
25. RESIDUALS GALLERY
26. LIME STORAGE/HANDLING BUILDING

PRELIMINARY

NOT FOR CONSTRUCTION

DSGN					
DR					
CHK					
APVD	NO.	DATE	REVISION	BY	APVD

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

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FIGURE 2
GWINNETT COUNTY NORTH AWRF
HIGH-pH LIME OPTION

NEW FACILITIES

SHEET	1
DWG	1
DATE	JAN 1999
PROJ	148188.NP

21-MAY-1999

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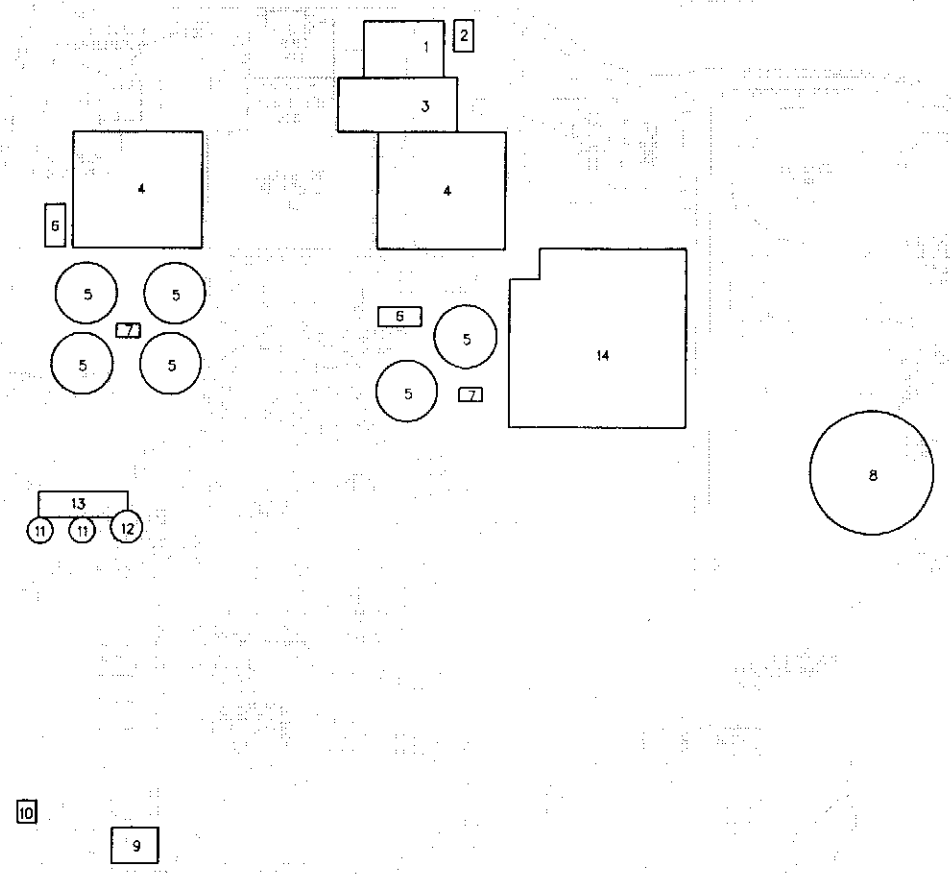

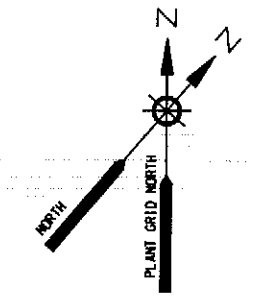

MEMBRANE OPTION NEW FACILITIES

1. SCREENING/GRIT CHAMBERS
2. CHEMICAL STORAGE/METERING BUILDING
3. PRIMARY CLARIFIERS
4. BIOLOGICAL REACTORS
5. SECONDARY CLARIFIERS
6. REACTOR BLOWERS
7. RAS/WAS PUMPS
8. EQUALIZATION TANK
9. POST-GAC OZONE CONTACTORS
10. EFFLUENT PUMPS
11. DIGESTERS
12. SOLIDS STORAGE TANK
13. RESIDUALS GALLERY
14. MEMBRANE TREATMENT BUILDING

200 0 200 400 600 FT.
SCALE: 1" = 200'

PRELIMINARY

NOT FOR CONSTRUCTION

DSGN					
DR					
CHK					
APVD	NO.	DATE	REVISION	BY	APVD

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

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FIGURE 3
GWINNETT COUNTY NORTH AWRF
MEMBRANE OPTION
NEW FACILITIES

SHEET 2
DWG 2
DATE JAN 1999
PROJ 148188.NP

21-MAY-1999

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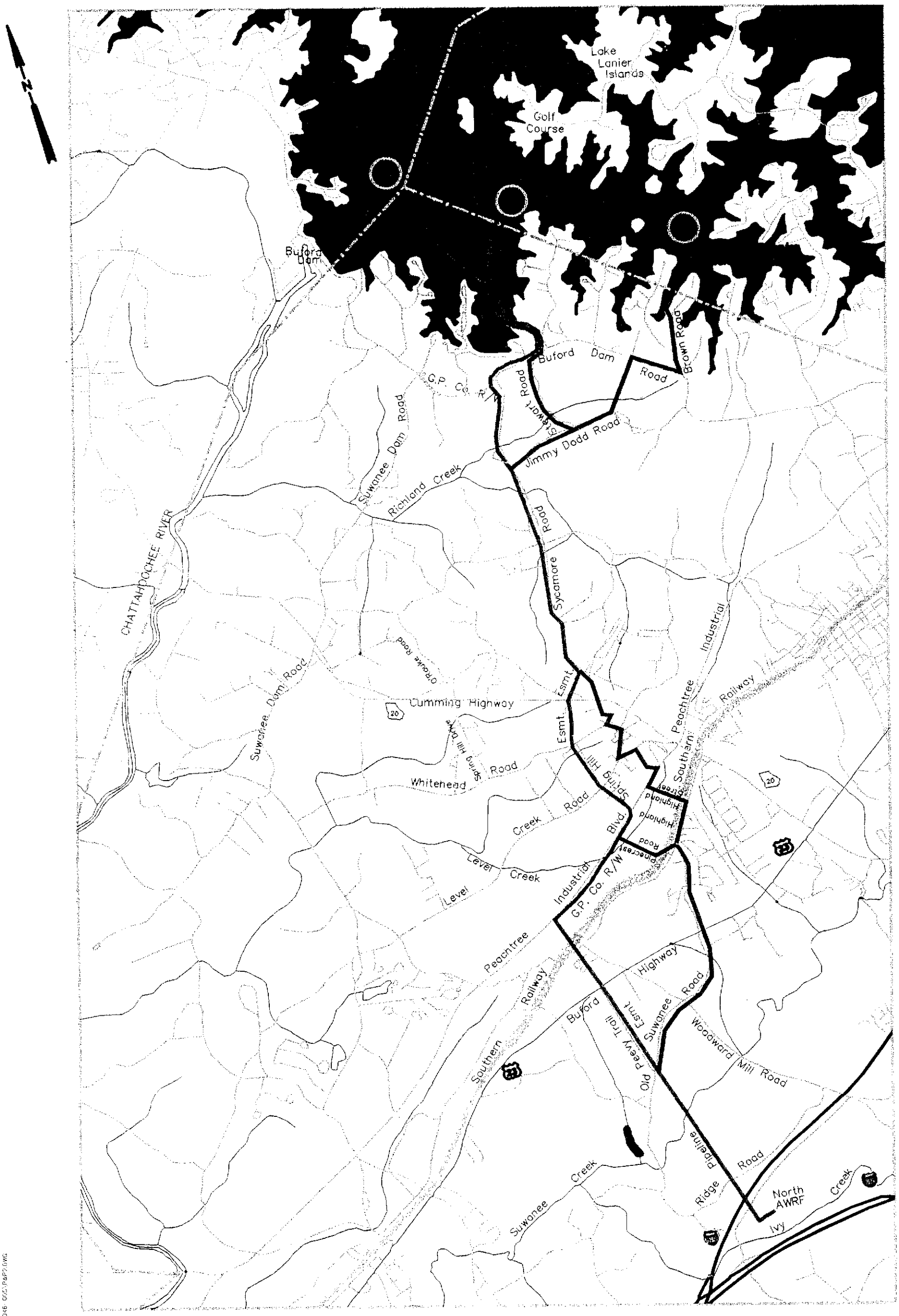

L-1 Discharge Location Pipeline Route (Recommended) Alternate Route #1 Alternate Route #2	Jordan Jones & Boulding	**Gwinnett County** **Reclaimed Water Pipeline From North AWRF To Lake Lanier**	**Figure 4**

SECTION 2

Alternatives Analysis

Introduction

Several alternatives have been examined through the various Master Plans and EIDs referenced in Section 1 for both siting the existing North AWRF and for various reclaimed water release options. Because the North AWRF will be operational as a 20-mgd facility by August 2000, alternatives discussed in this section relate to the proposed 40-mgd expansion of the facility and the various options for releasing or reusing the additional 40 mgd of reclaimed water.

North AWRF Expansion

New County Facility Construction

Alternative locations for the North AWRF were evaluated and the results summarized in a siting study performed in 1994 (M&E, 1994). The siting study evaluated three alternative locations for an AWRF. These locations in the northern portion of Gwinnett County are:

- Level Creek Site – 650-acre tract located west of Suwanee in the area between Level Creek, the Chattahoochee River, and Settles Bridge Road
- Suwanee Creek Site – 580-acre tract located east of Suwanee in the area between Suwanee Creek, Woodward Mill Road, and I-985
- Ivy Creek Site – 760-acre tract located east of Suwanee between I-985, the proposed Outer Loop, a tributary to Ivy Creek, and I-85

Each site was evaluated based on physical, environmental, cultural, and other development factors. Key criteria in the site selection process were the size of the tract, raw sewage pumping requirements, wetland area potentially impacted, capital costs for construction of the facilities, and general site topography (due to the potential impacts of site topography on site development costs). The Ivy Creek site was selected as the site for the existing 20-mgd North AWRF. In addition, the Ivy Creek Site was selected because it provided additional land for future expansion. The proposed 40-mgd expansion could be completed on this site within the area originally cleared for construction of the 20-mgd facility.

Future Wastewater Treatment

According to the 1998 Master Plan Update (CDM, 1998), by the year 2000, Gwinnett County will have a total of 64 mgd average daily maximum month flow (ADMMF) of permitted wastewater treatment capacity. Projected wastewater flows are shown in Table 4.

If the County grows according to the current population projections, the projected wastewater flow (including the capacity margin) will be as high as 70 mgd ADMMF by the

year 2005. This will exceed the 2005 capacity of 64 mgd, indicating the County will need to expand its treatment facilities.

TABLE 4
Future Wastewater Treatment Capacity

Year	Projected Wastewater Flow(1) Using Low Population Projections mgd max. month	Projected Wastewater Flow(1) Using High Population Projections mgd max. month	Year 2000 Treatment Capacity (Including NAWRF) mgd max. month	Additional Treatment (High Population Projections) mgd ADMMF
2000	54	58	64.1	–
2005	63	70		6
2010	75	83		19
2015	87	101		37
2020	97	114		59
2025	105	126		62
2030	115	138		73
2035	120	145		80
2040	124	151		87
2045	127	156		92
2050	130	161		97

(1) This includes capacity margin; actual wastewater flows will be slightly less. The capacity margin is used to trigger the need for new facilities and provide adequate time for construction.

(2) Source: CDM, 1998 (project flow values rounded to nearest 1 mgd)

Figure 5 shows projected wastewater flow and the capacity margin through the year 2030. The population and flow projections show that additional treatment capacity will be needed on or before the year 2005.

Siting evaluations indicated that future expansions to between 60 and 80 mgd would be possible at the North AWRF site. Expansion of the North AWRF would be less expensive than constructing a new facility in a different area of the County. Expansion at the North AWRF site would also have far less environmental impact because of the characteristics of the site (as summarized previously in this section) and because the expansion area has already been cleared and site grading performed (minimizing additional environmental impacts to the site). Therefore, the expansion was proposed at the existing North AWRF site.

Onsite Wastewater Treatment Systems

Gwinnett County currently has 80,000 to 90,000 individual onsite wastewater disposal systems (septic tanks). In addition, several independent entities within the County own and operate their own small package wastewater treatment plants and have discharge permits

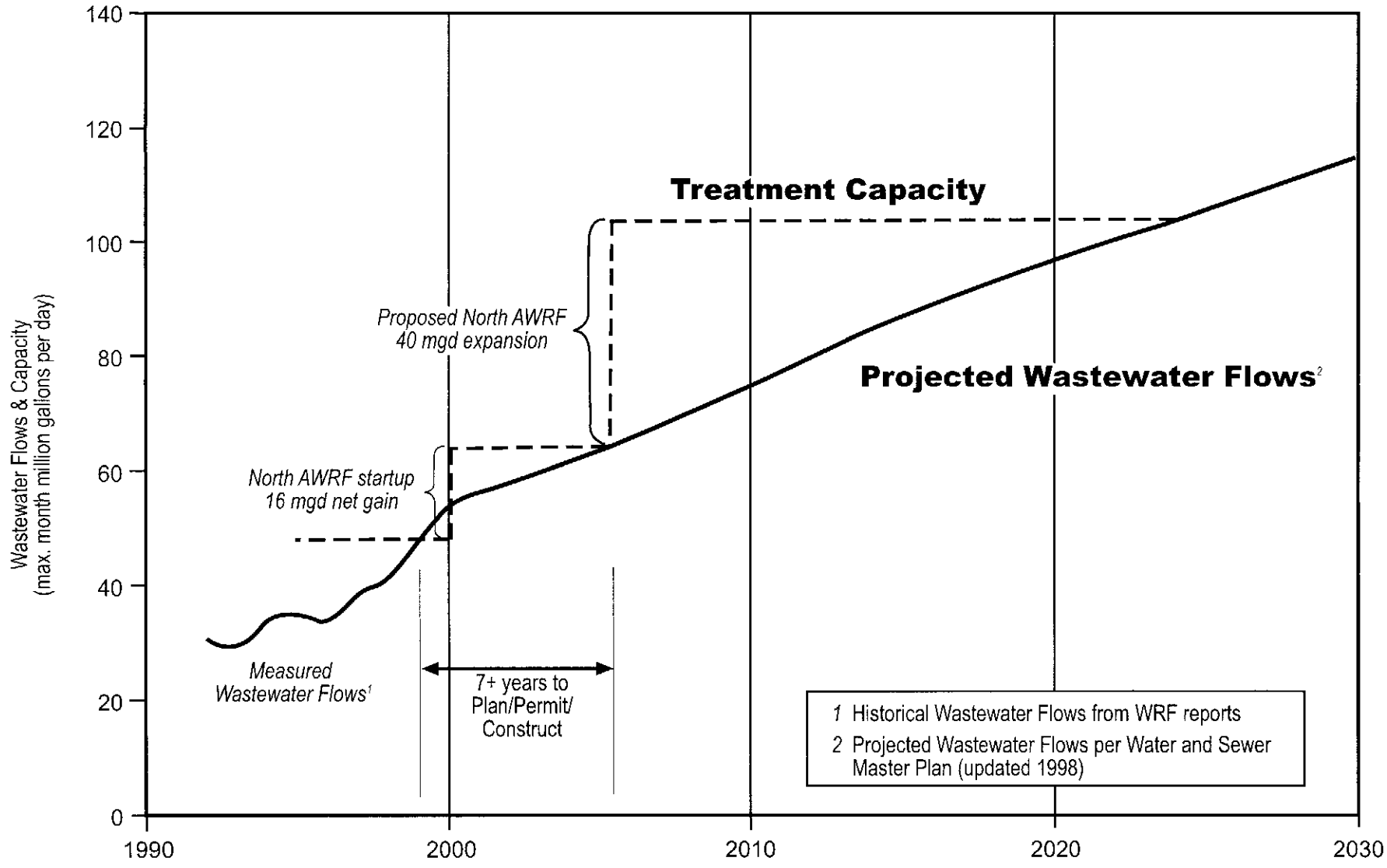

Figure 5
Projected Wastewater Flows
and Treatment Capacities

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W021999003ATL / FIG.5.FH.8

issued by the EPD (CDM, 1998). Private package plants typically cannot provide the level of treatment obtainable by municipal plants. In addition, septic systems require large land areas, have high failure rates, are incompatible with mixed-use zoning, and are very costly to retrofit to sewer systems. Septic systems do not provide the nutrient removal or disinfection that water reclamation facilities provide. Furthermore, the current goal of the County is to reduce the number of septic tank systems to 10 percent of the total homes and businesses over the next 50 years. Forcing future development to be reliant on either package systems or septic systems would not be compatible with existing goals and objectives of the County's Master Plan. Therefore, onsite wastewater treatment systems were not considered favorable alternatives.

Reclaimed Water Release Alternatives

The technologies employed in the new North AWRF will produce reclaimed water of extremely high quality. The location of the plant, discharge location, and collection system provides Gwinnett County with very high levels of flexibility in conveyance and treatment. The most critical component in future wastewater treatment will be the future release locations. Through the master planning process the County evaluated a number of potential release options. The following section describes the process used to evaluate future reclaimed water release alternatives and the general ranking of the alternatives.

Evaluation of Wastewater Discharge Options

A Water and Wastewater Master Plan Update Advisory Panel was developed to help evaluate discharge alternatives and included a diverse group of stakeholders. Representatives of the following groups were included in the Advisory Panel:

- **Homeowners Associations:** representing homeowners in Gwinnett County
- **Business Community:** representing business owners and operators in Gwinnett County.
- **Development:** representing members of organizations related to development in Gwinnett County.
- **Large Water Users:** representing schools, businesses, and industries in Gwinnett County that consume large quantities of water daily
- **Gwinnett County Cities:** representing the 15 incorporated municipalities within Gwinnett County
- **Environmental Organizations:** representing environmental organizations and groups that are interested in Gwinnett County.
- **Citizens-at-Large:** representing residents of Gwinnett County who are not members of any of the other stakeholder groups (CDM, 1998).

Potential sites for additional reclaimed water release and recycling options were developed by the Advisory Panel during a brainstorming session. The Advisory Panel initially listed

potential reclaimed water release options regardless of the perceived feasibility or cost of implementation. The following potential options were initially identified:

1. Blended Reuse/Designated Single-Purpose Reservoir
2. Pipe-to-Pipe Direct Reuse
3. Blending Reuse Without a Reservoir-Blended in Tank/Plant Site
4. Blending/Reuse using Lake Lanier
5. Discharge to Chattahoochee River Basin
6. Discharge to Yellow River Basin
7. Land Application-Traditional Systems/Irrigation
8. Consumptive Industrial or Irrigational Reuse
9. Regional Cooperation
10. Mulberry Basin
11. All Atlantic Slope Basins
12. Groundwater Injection
13. Hybrid Reuse Alternatives
14. Locate Discharges above Water Intake
15. Pollution Trading

At a subsequent meeting, the Advisory Panel combined several of the alternatives into a generalized short-list. The short list was finalized as follows:

- Blended Reuse
- Direct Reuse
- Discharge to Lake Lanier
- Discharge to Chattahoochee River
- Discharge to Yellow River
- Land Application
- Regional - Pole Bridge to South River
- Other Atlantic Slope Discharge

Consumptive non-potable industrial or irrigational reuse and water conservation were agreed to be integral components of all reclaimed water release options.

Several evaluation exercises were completed with the Advisory Panel. Initially, the panel conducted a multiple-attribute utility analysis to collectively state preferences. The panel evaluated the various reclaimed water release alternatives against the evaluation criteria groups. The four criteria groups included:

Group 1: Intrusion and disturbance; property values; condemnations.

Group 2: Inter-governmental cooperation; high/low growth flexibility; use of existing supply.

Group 3: Water quality impacts; interbasin transfer; use and reuse; recreation protection; use of existing infrastructure.

Group 4: Best available technology; reliability.

The Advisory Panel assumed that each reclaimed water release alternative would be required to meet water quality standards, including effects of non-point controls, and that

each alternative would meet all other regulatory requirements including public health protection. The panel did not consider costs in this preliminary stage of the analysis.

Advisory Panel members assigned weight factors for each of the criteria groups and values for how well each alternative met the criteria. These numbers were then used to calculate a numeric value associated with each alternative for use as one tool in developing information for decision making. The results varied widely and did not produce preferences that agreed with the actual perceptions of the Advisory Panel.

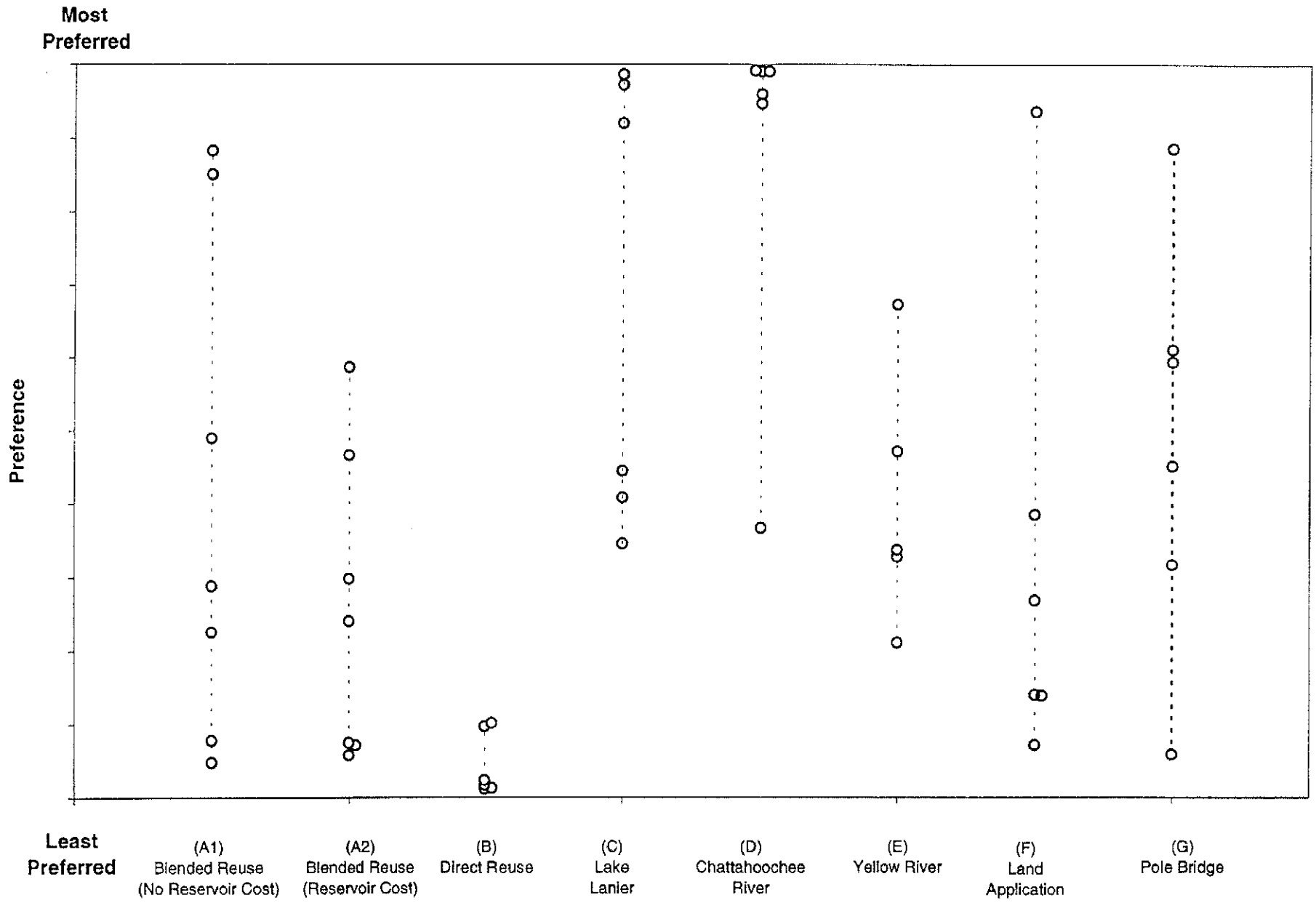
The Advisory Panel therefore held a second evaluation to refine its preferences for reclaimed water release alternatives. The Advisory Panel considered each alternative in terms of the selection criteria, the potential public and political feasibility of implementation, and the alternative's present worth cost estimate. The future reclaimed water release plans were grouped into three time periods (short-term: present to the year 2010; mid-term: the year 2010 to the year 2030; and long-term: the year 2030 to the year 2050). Each panel member then rated the alternatives on a dimensionless relative scale (from "most preferred" to "least preferred") for each of the three time periods. Figures 6, 7, and 8 show the panel's groupings of preference for each of the alternatives during each of the planning periods. Most alternatives showed a broad range of preferences assigned by the panel members.

The following paragraphs provide a brief summary of each of the alternatives considered by the panel.

Blended Reuse

Under this alternative, reclaimed water would be piped to a large (1- to 1.5-billion gallon) raw water reservoir and blended (maximum blend ratio of 50 percent) with raw water from Lake Lanier. The blended water in the reservoir would then be filtered and treated at a water treatment facility for potable use. Since the cost associated with this alternative is highly dependent on the cost of the reservoir, and since the reservoir may be constructed independent of any blending scenario, blended reuse was evaluated as two alternatives (one assuming that reservoir and associated infrastructure costs are part of the alternative, and a second assuming these facilities would be built as part of other system improvement projects).

A majority of the panel did not prefer this alternative for the near term planning period. This was attributed to several factors, including the lack of an existing regulatory framework for implementation, concern over public acceptance, and no existing blended reuse systems online in the United States with a successful operating history. Currently regulators in other states are recommending some period of storage in another waterbody (aquifer or large surface water reservoir) prior to reuse to provide some additional level of protection (Crook, 1998). Blended reuse of reclaimed water is not currently recommended or

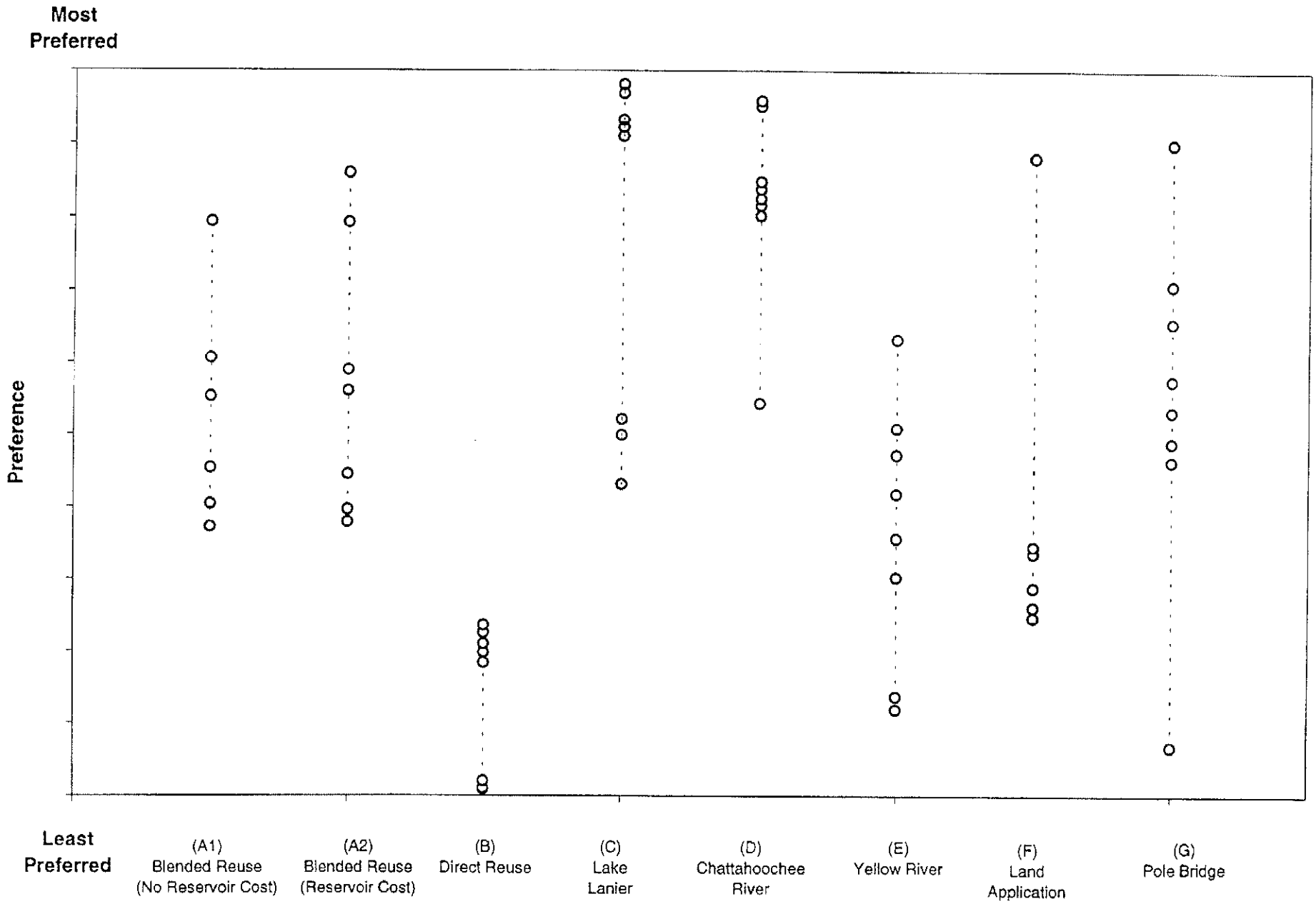


Source: **CDM** Camp Dresser & McKee
Gwinnett County Water & Wastewater
Master Plan Update 1998

CH2MHILL

Figure 6
Present - 2010 Wastewater Discharge Alternative Preference

W041999021ATL/FIG 6



Source: **CDM** Camp Dresser & McKee
Gwinnett County Water & Wastewater
Master Plan Update 1998

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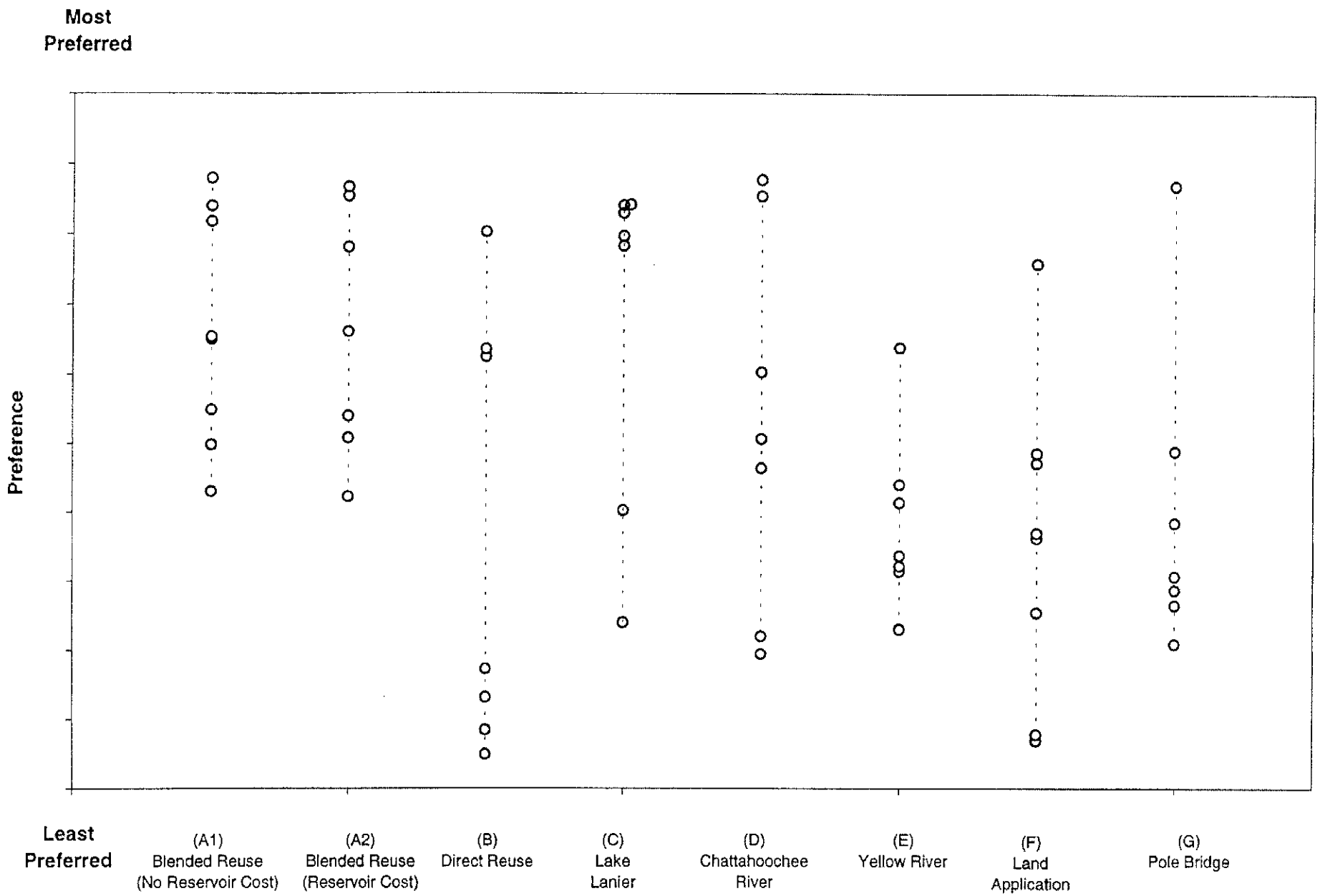
W041999021ATL/FIG 7

Figure 7
Present - 2010 - 2030 Wastewater Discharge Alternative Preference



Source: **CDM** Camp Dresser & McKee
Gwinnett County Water & Wastewater
Master Plan Update 1998

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Figure 8
2030 - 2050 Wastewater Discharge Alternative Preference

W041999021ATL/FIG 8

promoted by most water treatment technologists and regulators.

Direct Reuse

Under this alternative, future reclaimed water would undergo additional treatment to achieve potable water quality. The reclaimed water would be transferred to the Lanier Filter Plant and mixed in the clear wells with treated Lake Lanier water before distributing for use. This alternative received consistently low preference ratings from the panel in the near- and mid-term planning. Concerns similar to those related to blended reuse (but more emphatic) presumably drove the low preference ratings, including the lack of an existing regulatory framework for implementation, concern over public acceptance, and no existing direct reuse systems online in the United States with a successful operating history. Currently regulators in other states are recommending some period of storage in another waterbody (aquifer or large surface water reservoir) prior to reuse to provide some additional level of protection (Crook, 1998). Direct reuse of reclaimed water is not currently recommended or promoted by water treatment technologists and regulators.

Discharge to Lake Lanier

Under this alternative, a new reclaimed water pump station and pipeline would be constructed to release future reclaimed water to Lake Lanier. This option would return the reclaimed water to Gwinnett's water supply source (alleviating interbasin transfer). It is also consistent with the State's strategy of reducing net water loss in the Chattahoochee basin and retaining flow as high in the basin as possible as part of the strategy for resolution of the ACF water conflict.

The Advisory Panel showed a moderate to high preference for Lake Lanier as the receiving water for reclaimed water release in the near-, mid-, and long-term planning periods. Due to its relatively high preference rating and potential for accepting reclaimed water and augmenting water supplies, the Advisory Panel recommended that Lake Lanier be moved forward as potential candidate for reclaimed water release.

Discharge to Chattahoochee River

Under this alternative, future reclaimed water would be released to the Chattahoochee River through the pipeline currently being constructed (with the initial 20 mgd North AWRF). This option would return the reclaimed water to its basin of origin (albeit downstream of the lake water source) alleviating interbasin transfer. It is also consistent with the State's strategy of reducing net water loss in the Chattahoochee basin. However, this alternative would not take advantage of the opportunity afforded by the Lake Lanier option to retain flow as high in the basin as possible as part of the strategy for resolution of the ACF water conflict.

The Advisory Panel gave the Chattahoochee River alternative mid to high preference ratings during the near-term planning period and it was clearly the preferred reclaimed water release location for the next wastewater expansion. The cost associated with sending the next unit of discharge to the Chattahoochee River would be extremely low compared to the other alternatives since the pipeline currently under construction could likely handle the next expansion. The Advisory Panel also gave the Chattahoochee River alternative a high rating preference in the mid-term planning period as well, showing a desire to continue to

discharge to the Chattahoochee River, if possible. In the long-term planning period, the Chattahoochee River received less of a preference, with Lake Lanier and blended reuse receiving higher preference levels. This indicates that the Advisory Panel feels that in the long-term future, growth in the Atlanta Region will require reduced loading to the Chattahoochee River.

Discharge to Yellow River

Under this alternative, future reclaimed water would be released to the Yellow River through a new pipeline and pump station. Additional releases to the Yellow River have not been supported by the EPD because of interbasin transfer concerns, and concerns over water quality downstream in Jackson Lake.

The Advisory Panel gave the Yellow River a fair to poor preference rating for all three planning periods. In the mid- and long-term planning periods, Chattahoochee River, Lake Lanier, and blended reuse alternatives had a higher preference than release to the Yellow River.

Land Application

Under this alternative, reclaimed water would be applied to land. Pump stations and force mains would be required to deliver the water to the sites. Several studies on the feasibility of land application for disposal of future reclaimed water have been completed for Gwinnett County. The 1993 Water and Wastewater Master Plan evaluated land application as an option for the southern portion of the County. The study determined that land application was not viable for Gwinnett County due to the low application rates, large land area requirements, steep topography, high land cost, and limited availability of large tracts of land suitable for land application. A second study, completed in 1996, examined the potential for land application for the reclaimed water from the North AWRF. This study found that land tracts available in the County could not support the 20-mgd initial phase design capacity of the North AWRF, and that the present worth cost was significantly higher than a release to the Chattahoochee River. Additionally, land application scored less favorably based on non-monetary criteria. For example, land application did not support the EPD strategy for return flows to meet the anticipated ACF water allocation formula being negotiated with the states of Alabama and Florida. Land application is a depletive disposal method and has essentially the same effect as an interbasin transfer from the Chattahoochee River Basin.

Land application received mixed preference ratings for all three planning periods by the Advisory Panel. The Advisory Panel recommended that non-potable reuse (reuse that replaces potable water use, e.g., landscape irrigation) be implemented whenever possible to reduce water consumption and the quantity of reclaimed water released to surface waters. Land application on golf courses and other irrigation and industrial uses should be pursued whenever possible; however, a large restricted-access land application system that does not replace existing or future potable water uses is not a favorable alternative for reclaimed water.

Transfer to Pole Bridge WPCP

Under this alternative, future wastewater flow would be transferred to DeKalb County Pole Bridge Water Pollution Control Plant (WPCP), and Gwinnett would share costs in upgrading and expanding the facility. Pole Bridge discharges to the South River. A new pump station would be constructed within Gwinnett County along with a new force main to transfer the wastewater to the Pole Bridge WPCP.

The Advisory Panel showed a mixed preference for this alternative across all three planning periods. This alternative, if pursued, would also require the development of other reclaimed water release alternatives in parallel to handle the projected build-out treatment needs. Regional cooperation would be critical to the development of such an alternative, and if pursued, would clearly be dependent on cooperation with DeKalb County. This alternative would also increase interbasin transfer.

Other Atlantic Slope Discharge

Since Gwinnett County lies on the headwaters of the Alcovy, Apalachee, Big Haynes, and Mulberry Creek basins, releasing large quantities of reclaimed water could significantly increase average stream flow. Additionally, the issue of interbasin transfer would likely limit significant potential release along the Atlantic Slope. Gwinnett County, however, will assess all potential opportunities for discharge along the Atlantic Slope in the future as they arise.

Selection of Preferred Alternatives

With the construction of the North AWRF, Gwinnett County will be on the cutting edge of wastewater treatment, both from a technical and conceptual standpoint. The technologies employed will produce reclaimed water that will be of extremely high quality. North AWRF effluent has the potential to enhance receiving stream quality. The location of the facility, discharge location, and collection system provides Gwinnett County with very high levels of flexibility in conveyance and treatment (CDM, 1998).

The most critical component in future wastewater treatment is the future release locations. The treatment levels undertaken will be used for future treatment facilities and could continue to set the standard for the region. To successfully develop future wastewater discharge alternatives, the County must remain flexible and not place all efforts on a single alternative; if that alternative fails, the County will face significant planning problems (CDM, 1998).

Therefore the County should pursue several reclaimed water release alternatives in the near-term planning period to maintain flexibility, should unforeseen circumstances arise during the permitting process. Collectively, the Advisory Panel preferred the Chattahoochee River, and next Lake Lanier, for potential near-term release locations. These alternatives also received high preference ratings in the mid- and long-term. Other alternatives, such as blended reuse, were recommended to be considered in the mid- and long-term only if additional releases to the Chattahoochee River and Lake Lanier were not possible.

As stated earlier, nonpotable reuse should be pursued whenever possible. Often, however, the demand for reclaimed water can be seasonal or intermittent. This would necessitate obtaining NPDES permits, even if they are not consistently utilized.

Steps in Implementing Preferred Alternatives

In implementing nonpotable reuse, the County requested an urban reuse permit from EPD to support marketing of the reclaimed water flowing down the reclaimed water pipeline from the North AWRF to the Chattahoochee River at Crooked Creek. The County has also performed a pricing study, and is actively marketing the effluent to potential customers along the pipeline route and around the North AWRF.

In implementing the preferred alternatives, the County requested a preliminary wasteload allocation (precursor to a permit application) to the Chattahoochee River in the fall of 1998 as part of the next increment of expansion of the North AWRF to meet projected demands by 2005. Because permitting and construction can take up to seven years, it was critical to begin this process. The EPD responded verbally, stating that at the present time it would not consider new or expanded NPDES permits to the Chattahoochee River until it had developed a comprehensive strategy with all dischargers to the river to reduce loads and improve water quality. The Chattahoochee River from below Buford Dam to below Atlanta is proposed to be recategorized on the State 305(b) lists as a 303(d) active status impaired water.

The EPD then strongly recommended that Gwinnett County pursue its other preferred near-term alternative, release of reclaimed water to Lake Lanier. Lake Lanier is meeting state water quality standards, and the high quality of the North AWRF reclaimed water would protect the quality of the lake. The Lake Lanier alternative also has the additional advantage of storing the reclaimed water high in the ACF system to meet the objectives outlined in the water allocation negotiations between Georgia, Alabama, and Florida. This document, and the related studies and documents, were prepared in support of the NPDES permit application for Lake Lanier.

Reclaimed Water Pipeline Routing Alternatives

As part of the North AWRF expansion, a new reclaimed water pipeline would be constructed to carry reclaimed water from the facility to Lake Lanier. Three alternative corridors and release points were considered and evaluated as a part of the design process for the proposed pipeline. These alternative corridors and release points are shown in Figure 4 and described below.

Proposed Corridor/Release Point L-1

The proposed reclaimed water pipeline corridor, shown in Figure 4, would originate within the North AWRF site and interconnect with the new and existing reclaimed water pumping station. From there, the proposed pipeline would cross under I-985 and follow existing pipeline and Georgia Power transmission line easements and local road right-of-ways in a northerly direction through the Sugar Hill area and on to Lake Lanier (Figure 4). The easement for the proposed pipeline would be a maximum of 80 feet.

Access to the lake would be through the corridor adjacent to the Gwinnett Park that would be used for the proposed new water intake as well as the reclaimed water pipeline. After entering Lake Lanier, the proposed pipeline would run approximately 6,700 feet to the outfall site, located near the submerged confluence of the Chattahoochee River and Shoal Creek (identified as L-1 on Figure 4). The pipeline would be constructed along the bottom of the lake. At the outfall site, the proposed pipeline would terminate in a diffuser assembly to effectively disperse and mix the reclaimed water.

The entire length of the proposed pipeline is approximately 51,000 feet, of which approximately 5,000 feet would be along roadways.

Alternative Corridor No. 1/Release Point L-2

Alternative Corridor No. 1 follows the same alignment as the proposed route, departing from the recommended alignment at Old Suwanee Road. This alternative generally follows Old Suwanee Road to the Southern Railway and one of two routes through Sugar Hill and on to Gwinnett Park at Lake Sidney Lanier, which is closed to the public. Within Gwinnett Park, the pipeline would proceed along park roads to the shore line, where it would enter the lake and run approximately 5,200 feet along the lake bottom to the release point (L-2 on Figure 4).

The length of this alternative is approximately 51,200 feet. Because this corridor would require more traffic disruption and more private easements than the proposed alignment, it was not preferred. In addition, sub-portions of this corridor would intrude on established city neighborhoods, community support facilities, and cultural resources in and around Sugar Hill.

Alternative Corridor No. 2/Release Point L-3

This alternative follows the proposed alignment to Jimmy Dodd Road, where it would proceed northeasterly along existing road right-of-ways and alongside Georgia Power easement, then it would turn northerly and follow local roads to the lake. Once entering the lake cove, the reclaimed water pipeline would extend approximately 3,000 feet along the bottom of the lake to the release point (L-3 on Figure 4).

This alternative is approximately 51,800 feet. Like Alternative Route No. 1, this corridor would require more traffic disruption than the proposed alignment, and would require more private easements than the proposed alignment. Therefore, it was not preferred. In addition, sub-portions of this corridor considered would intrude on established city neighborhoods, community support facilities, and cultural resources in and around Sugar Hill.

No Action

This alternative assumes no expansion to the existing North AWRF or construction of the reclaimed water pipeline. Preliminary evaluation indicates that with the current projected rate of growth, Gwinnett County will have a wastewater ADMMF (including the capacity margin) of as high as 70 mgd by the year 2005. This will be higher than the 2005 capacity of 64.1 mgd, indicating the County will be within the capacity margin and above 90 percent of

available capacity (CDM, 1998). Without expanding the wastewater treatment facilities to meet this demand, Gwinnett County would be faced with either imposing moratoriums on additional sewer hook-ups in the near future or having plant violations occur. A moratorium on sewer hook-ups would result in more development on individual disposal systems, which would result in the County being built out with only the type of development that can occur on individual disposal systems. Plant violations are not allowed under the Clean Water Act (CWA) or under State of Georgia regulations. This alternative is not considered reasonable as it is not compatible with the goals and objectives of the County as put forth in their recent Master Plan Update (CDM, 1998), which calls for improving the reliability of the water and sewer system, proactively planning for water and sewer capacity, and protecting the public health and environment.

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SECTION 3

Environmental Consequences

Introduction

An EID to assess the potential environmental affects of the construction and operation of a proposed water reclamation facility at the Ivy Creek location was prepared as part of the siting study in 1994 (M &E, 1994). That EID addressed the potential environmental consequences of construction and operation of an 80-mgd facility. An additional EID was prepared specifically for the North AWRF in 1996 (CH2M HILL, 1996) to cover a 20-mgd facility. An EID was also prepared in 1996 to cover the reclaimed water pipeline from the North AWRF to the Chattahoochee River (CH2M HILL, 1996). This EID incorporates and updates information from these previous EIDs. The following sections review the potential environmental effects of:

- Construction and operation of a 40-mgd expansion to the existing 20-mgd North AWRF
- Construction of a reclaimed water pipeline from the North AWRF to Lake Lanier and the release of reclaimed water effluent into Lake Lanier

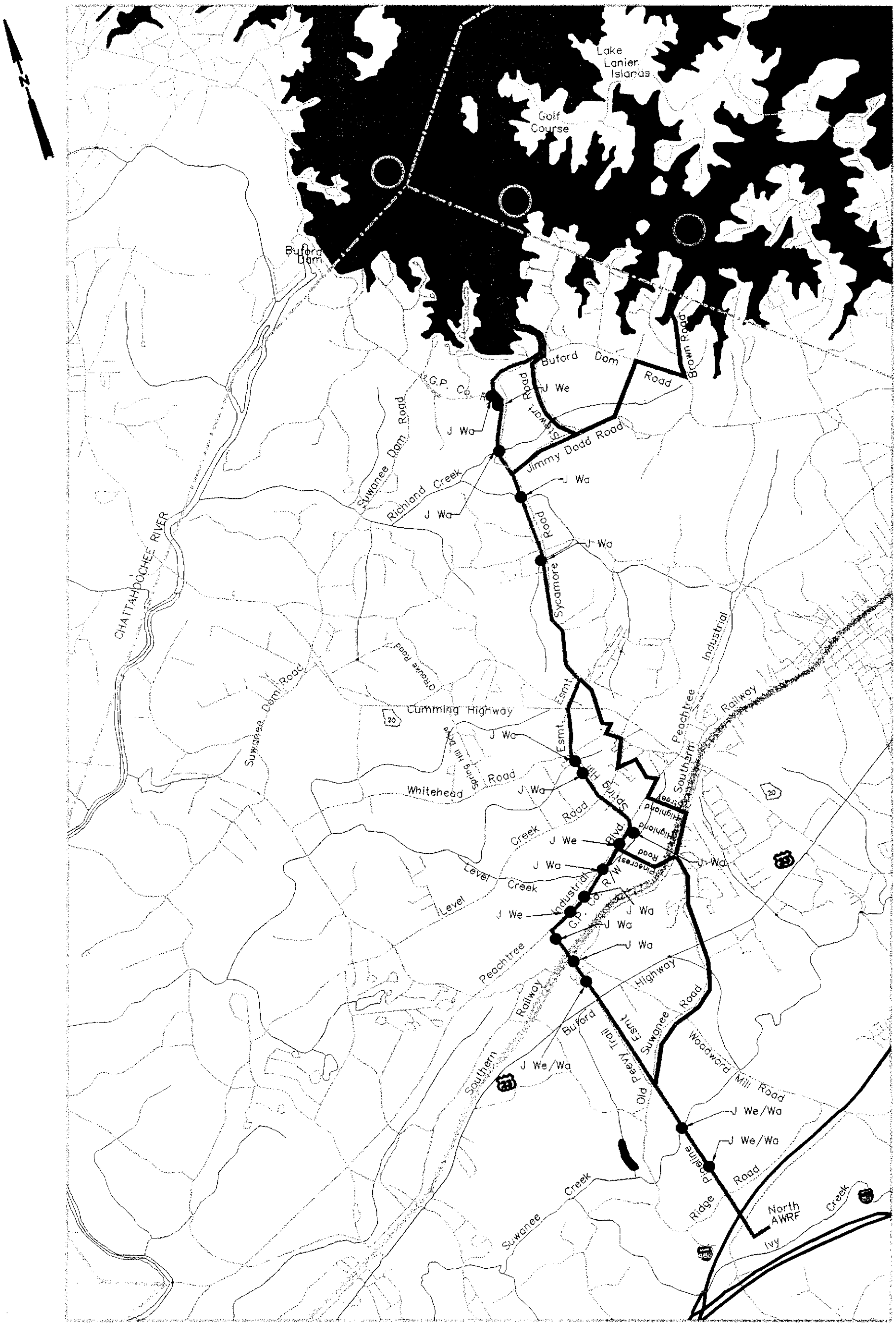
Wetlands

Proposed North AWRF Expansion

No impacts to wetlands are anticipated from the proposed expansion of the North AWRF. In assessing the potential impact that construction of the North AWRF could have on wetlands, National Wetlands Inventory (NWI) maps prepared by the U.S. Fish and Wildlife Service (USFWS) and soils maps prepared by the Natural Resource Conservation Service (NRCS) were reviewed. The wide Ivy Creek floodplain appears to have vegetation and soils indicative of sites with federally jurisdictional wetlands, based on NWI and NRCS maps (M&E, 1994; CH2M HILL, 1996). The NRCS soils maps show floodplain soils on the site that are described as frequently flooded with an average flood event lasting from 2 to 7 days. Based on the NRCS soils and NWI map information, the floodplain wetland areas on the site were estimated to include a total of 70 acres. The existing North AWRF has been sited to avoid these wetland areas and the proposed expansion would occur in developed areas of the site away from these identified wetlands areas.

Proposed Reclaimed Water Pipeline

Studies conducted along the proposed project alignment identified the presence of six jurisdictional wetlands. The wetlands were classified as palustrine forested, palustrine scrub/shrub, and palustrine emergent systems. The proposed pipeline would impact approximately 0.5 acres of these wetlands during its construction. Figure 9 depicts the locations of jurisdictional wetlands and waters located along the routing of the proposed reclaimed water pipeline.



● J We	Jurisdictional Wetland	
● J Wa	Jurisdictional Water	
● J We/Wa	Jurisdiction Wetland/Water	

Jordan Jones & Boulding

Gwinnett County

Locations of Jurisdictional Wetlands/Waters along Reclaimed Water Pipeline Rt.

Figure 9

Construction of the proposed pipeline would require converting an estimated 490 linear feet of mostly scrub-shrub, with some forested wetlands, to emergent wetlands. Trees would be mechanically removed from the forested wetlands. The removal of trees that must be chipped, uprooted, or timbered (rather than mowed), would be a one-time effort and would result in temporary impacts to wetland systems. Thereafter, these areas would be mowed routinely so that larger trees could not become established within the permanent easement. All grades disturbed during tree removal would be restored to pre-activity elevations. Although all trees would be removed from the maximum 80 foot-wide easement, an emergent wetland vegetation community would be allowed to develop. This would ensure that no loss of flood storage or stormwater filtration would occur as a result of the project.

Floodplain/River Corridor

Proposed North AWRF Expansion

No impacts on the floodplain associated with Ivy Creek are anticipated from the proposed expansion of the North AWRF. The existing site layout for the North AWRF and the proposed expansion are located away from the identified floodplains. Although Ivy Creek does have a significant floodplain, it is not a river subject to the protection provisions and development restrictions of the Metropolitan River Protection Act (O.C.G.A. 12-5-440). Based on available Flood Insurance Rate Maps (FIRM), the total floodplain area of the site is approximately 150 acres. The northern two-thirds of the site is relatively free of the floodplain and is therefore the focal point of the site layout. Due to the steep topography, the floodplain associated with tributaries of Ivy Creek is limited to the floodway and is generally contained within the banks of the tributary.

Proposed Reclaimed Water Pipeline

Gwinnett County FIRM indicate that portions of the proposed pipeline are located in Zone A5 of Suwanee Creek (a regulatory floodway), Zone A of Level Creek and Richland Creek, and Zone A of Lake Lanier.

Zone A5 designates areas that are within the 100-year floodplain, with base flood elevations and flood hazard factors determined. Zone A designates areas that are within the 100-year floodplain, with base flood elevations and flood hazard factors not determined. Construction would not permanently alter the size, function, or character of the floodplain habitat. None of the three streams crossed is designated as a State-protected river corridor.

Water Supply

Proposed North AWRF Expansion

The reclaimed water for the existing 20-mgd North AWRF currently is released into the Chattahoochee River as a combined effluent with the Crooked Creek WRF. This existing discharge point is downstream of active potable water intakes for Fulton and DeKalb Counties and an inactive potable water intake for Gwinnett County. The intakes for Cobb-Marietta Water Authority and the City of Atlanta are further downstream of the existing release location. The high quality of the reclaimed water and the emphasis on multiple

treatment barriers would reliably protect the quality of water for downstream users. In addition, nitrogen removal would ensure that low nitrate levels are maintained to further protect downstream water supplies.

Gwinnett County withdraws its water supply from Lake Lanier. It is presumed that these withdrawals will increase regardless of whether or not the North AWRF is expanded. Expansion of the North AWRF would increase the release of highly treated reclaimed water into the Chattahoochee River Basin through Lake Lanier and help reduce interbasin transfer. As a result, the water supply for Chattahoochee Basin water users would be supplemented.

Proposed Reclaimed Water Pipeline

Construction of the proposed pipeline would result in temporary impacts to water quality along Suwanee Creek, Level Creek, Richland Creek, and within Lake Lanier due to erosion and sedimentation. However, these impacts would be controlled and minimized through the implementation of BMPs. Therefore, construction would not be expected to adversely affect the quality or quantity of water available for water supply in the Chattahoochee River.

Water Resources

Proposed North AWRF Expansion

Existing Conditions

The *Diagnostic Feasibility Study of Lake Sidney Lanier, Georgia* (Kundell, 1998), commonly called the Lanier Clean Lakes Study, includes an extensive report of the water quality conditions in Lake Lanier. The report also includes a comprehensive review of the literature data referenced in the following discussion.

The data presented in the Clean Lakes Study showed that dissolved oxygen (DO) becomes depleted in the hypolimnion (lower depths of lake) during the summer, dropping below 4 mg/L. This DO level depletion in the hypolimnion is typical of deep lakes in the southeastern United States. The problem is exacerbated in the summer because the epilimnetic (closer to the surface) water, which has ample DO, becomes warm and remains at the surface of the lake.

Phosphorous and nitrogen are important nutrients affecting the trophic status (i.e., quality) of lake systems. Because phosphorus was shown to be a limiting (critical) nutrient for algal growth, it was considered an essential parameter for determining water quality. Nutrient data collected for the Clean Lakes Study showed that the annual average total phosphorus (TP) concentrations in the main lake near Buford Dam to be 0.03 mg/L with values ranging as high as 0.06 mg/L. The TP was slightly higher in the open water embayments, ranging from 0.03 mg/L to 0.11 mg/L.

Recent data collected through June of 1998 for the Lanier Clean Lakes Study also show that TP concentrations in the lake are not high, ranging from 0.01 mg/L to 0.03 mg/L with an average of 0.02 mg/L. Based on phosphorus values alone, the quality of the lake is mesotrophic. This is a moderate rating indicating water quality is good. However, the tributary TP data collected indicate that phosphorus levels in the tributaries are higher with the highest concentrations in Flat Creek (0.19 mg/L average TP concentration).

The Environmental Protection Agency (EPA) published a number of water quality criteria to assist states in developing water quality standards (EPA, 1986). Nutrient levels in natural waters can vary considerably by region, and states have taken different approaches to developing total phosphorus standards. For example, total phosphorus concentration criteria adopted by states ranged from 0.01 mg/L to 0.30 mg/L depending on the water body type (EPA, 1988).

The general criteria in the EPA guidance (EPA, 1986) included total phosphorus concentrations of 0.05 mg/L for a stream at the point it enters an impoundment, 0.10 mg/L for free standing waters, and 0.025 mg/L within the body of the lake. In Georgia, a different approach of phosphorus criteria is used. State statute requires that phosphorus related water quality criteria for impoundments be in the form of a chlorophyll-a (algae) concentration, total phosphorus loading in pounds per acre foot per year, and total phosphorus loading from each major tributary in pounds per year. There are no concentration-based phosphorus criteria, perhaps because the long-term total lake loading is more important for controlling the eutrophication process than a concentration reading at any location at any point or time.

Lake Lanier, like many lakes in the Southeast, is not deep enough or cold enough to stratify year-round. Thus stratification, and the potential to release phosphorus from accumulated bottom sediments, is an annual occurrence and does not accumulate for many years before release. Although desorption and regeneration of particulate phosphorus does occur, most of the phosphorus load into a lake is permanently stored in sediment and thus lakes are the ultimate sink for phosphorus in fresh waters (Sonzogni et. al., 1982; Welch, 1992). This is particularly true for Georgia Piedmont lakes such as Lake Lanier, where the phosphorus is tightly adsorbed to clay particles. The water quality model (CE QUAL W-2) described in the following section is designed and calibrated to conservatively simulate these processes.

Total phosphorus refers to all forms of phosphorus (i.e., organic and inorganic) found in both dissolved and particulate phases. Only a small portion of this total phosphorus is in a form readily bio-available, or able to promote algal growth. It is widely recognized that the dissolved inorganic phosphate (dissolved orthophosphate) fraction in natural waters is the most bio-available form of phosphorus (Krenkel and Novotny, 1980). The common measures for phosphorus (total phosphorus and total orthophosphate) over-estimate the bio-available fraction of phosphorus. Therefore concentration measures and regulatory limits on total phosphorus are very conservative with respect to preventing unacceptable levels of algal growth.

A summary of the fecal coliform levels in Lake Lanier and the surrounding tributaries is also provided in the Clean Lakes study (Kundell, 1998). A review of historical data since 1973 by the Clean Lakes Group for evaluating long-term trends of fecal coliform in the Lake showed no significant seasonal variations, no significant trends, and low annual mean concentrations (i.e., < 50 Coliform Forming Units [CFU]/100 ml). However, the fecal coliform concentrations at tributary stream stations did show the following patterns:

- Seasonal variation (highest in July through September)
- Increasing historical concentrations since 1978 for Wahoo, Balus, and Flat Creeks, and the Chattahoochee River

- Geometric mean concentrations of > 160 CFU/100 ml in the winter and fall, >220 CFU/100 ml for spring, and > 390 CFU/100 ml for summer

In the Clean Lakes Study two streams, Limestone Creek and West Fork Little River, were evaluated to determine if the fecal coliform state standard (geometric mean of 200 CFU/ 100 ml) was exceeded. The geometric means for May 1996 dry weather events were 833 CFU/100 ml for West Fork Little River and 340 CFU/100 ml for Limestone Creek. During April 1996 storm events, the fecal coliform counts were 2,637 CFU/100 ml for West Fork Little River and greater than 10,000 CFU/100 ml for Limestone Creek. The data showed that the high bacterial densities in most streams were unrelated to municipal discharges. Only two stream stations were downstream from municipal wastewater treatment plants (Flat Creek and Flowery Branch). Also, the fecal coliform bacterial densities in the streams studied were unrelated to stream flow. It was concluded from these data that high bacteria concentrations in most of the monitored streams are associated with other activities common in these watersheds. Non-point sources, most notably septic system drain fields and runoff from agricultural operations, were cited as possible sources.

Modeling of Existing and Potential Future Conditions

A suite of mathematical models was applied to evaluate the water quality impacts of the proposed release into Lake Lanier (see Appendix B). Several proposed outfall locations were evaluated using various combinations (scenarios) of point source and non-point source loadings using the Lake Lanier Management Tool (LimnoTech, 1998). Near-field water quality effects were also evaluated at the proposed outfall locations using a dilution model (PLUMES).

Lake Lanier Management Tool Modeling

The Lake Lanier Management Tool was developed by LimnoTech, Inc. (LTI) as part of a study initiated by the Upper Chattahoochee Basin Group (UCBG) and has been reviewed by Georgia EPD and a number of stakeholders interested in Lake Lanier. The entities making up the UCBG at the time of sampling, model development, and calibration were Forsyth County, Hall County, City of Gainesville, Lake Lanier Association, and Gwinnett County. This model was selected for the evaluation of lake-wide water quality effects from the proposed outfall because it represents an established and agency agreed upon model of conditions specific to Lake Lanier.

The Lake Lanier Management Tool is comprised of the watershed model GWLF and the water quality model CE-QUAL-W2 bundled into a single system. The watershed model component of the Lake Lanier Management Tool simulates pollutant contributions from the watershed based on factors such as land use, soils type, slopes, precipitation, septic systems and other wastewater treatment facilities located in the watershed. The lake water quality model component subsequently uses pollutant contributions predicted by the watershed model to simulate the response of these pollutant contributions in terms of in-lake water quality.

For the purpose of evaluating Gwinnett's proposed permit application, the Lake Lanier Management Tool was used to determine the effect of the proposed North AWRF reclaimed water return on the TP and chlorophyll-a concentrations in Lake Lanier. The model was applied using the 1984 to 1988 five-year meteorological period and various current and

future land use conditions. This meteorological period was previously selected as the critical environmental design period for the application of the Lake Lanier Management Tool (LTI, 1998) in part because it bracketed the worst drought to occur in the lake's history. The critical meteorological record resulted in lake surface water elevations that oscillated between 1,063 feet MSL and 1,074 feet MSL with an average of 1069 feet MSL.

Numerous simulations were conducted to determine the potential effect of the proposed outfall. The scenarios shown in Appendix B are briefly summarized as:

Scenario 1: Current conditions and existing dischargers

Scenario 2: Current conditions in overall watershed, existing dischargers, future land use in Gwinnett County's watershed only, and Gwinnett's 40-mgd proposed outfall

Scenario 3: Future land use in overall watershed (without stormwater BMPs), existing dischargers, but no new discharges

Scenario 4: Future land use in overall watershed (without stormwater BMPs), existing dischargers, and Gwinnett's 40-mgd proposed outfall

Scenario 5: Future land use in overall watershed (with additional stormwater BMPs), existing dischargers, but no new discharges

Scenario 6: Future land use in overall watershed (with additional stormwater BMPs), existing dischargers, and Gwinnett's 40-mgd proposed outfall.

The modeling effort illustrates that nonpoint sources in the watershed dominate the TP inputs to the lake, ranging from 84 percent of the total load in Scenario 2 to 93 percent in Scenario 3. Existing point sources contribute from 6 percent (Scenario 4) to 12 percent (Scenario 1) of the total load.

The model demonstrates that the reclaimed water return from the proposed North AWRF expansion would not significantly increase either the whole lake, or Segment 19 near the dam, summer average TP and chlorophyll-a concentrations. This conclusion is based on the comparison of baseline scenarios (depicting numerous probable future conditions) with the exact same baseline scenario conditions but adding the proposed North AWRF outfall. The model results are summarized in Table 2 of Appendix B.

The slight differences between the chlorophyll-a levels in the lake for scenarios with and without the North AWRF outfall are not only small (0.0001 mg/L or less) in both absolute and percentage terms, they may also be considered insignificant from a practical and statistical standpoint. The average detection level for the chlorophyll-a laboratory test is 0.0002 mg/L, so the projected change in the lake attributable to the proposed project is not technically measurable. Similarly, the differences between TP concentrations in the lake for scenarios with and without the North AWRF outfall are between 0.0001 mg/L and 0.0002 mg/L. The detection level for the TP laboratory test used in the UCBG lake sampling effort is a far higher 0.004 mg/L, so the projected change in the lake attributable to the proposed project is not technically measurable even using the most stringent methods. By comparison a typical laboratory TP detection level (as used by EPD and others) is 0.02 mg/L, or 5 times higher.

Under all scenarios evaluated, the modeled TP concentrations in the main lake are below the general EPA criterion of 0.025 mg/L. In fact, the projected TP concentrations under the worst case scenario modeled (full development, maximum discharges, and without stormwater controls) are only 0.012 mg/L at the outfall. All of the other scenarios modeled are considerably lower.

Near-Field Modeling

PLUMES is a dilution model supported by EPA and designed to conduct near-field modeling analyses. This model is widely accepted as a tool in evaluating and designing outfall diffusers. PLUMES is included in the EPA's Compendium of Tools for Watershed Assessment and TMDL Development (EPA, 1997). The PLUMES model is composed of sophisticated mathematical models that analyze and predict the initial dilution behavior of aquatic plumes (EPA, 1997).

The PLUMES model was applied for the proposed diffuser locations to the worst case scenario of stratified summer conditions in Lake Lanier. Stratified conditions reduce the ability of the discharge plume to mix with the upper layers of the water column due to density gradients. A review of the temperature profiles for the lake, provided by LTI, indicated that the lake stratifies for most of the year (April-November), with the most significant stratification occurring during July and August.

Table 3 in Appendix B contains a summary of the expected effective dilution at the edge of the near-field zone, and the expected distance from the outfall (within the near-field zone) at which the difference between the effluent and the ambient temperatures is less than 5°F. The model predicts that this condition is met within 6.6 feet (2 meters) of the diffuser. The model also predicts that a very high level of dilution is achieved within a short distance from the diffuser. In all model scenarios, a dilution factor of 2 (i.e., effluent is diluted with ambient water by half) is achieved in less than 1.6 feet (0.5 meters). Effective dilution factors larger than 20 (i.e., effluent is diluted with more than 19 volumes of ambient water) are reached at distances that range from about 49 feet to 66 feet (15 to 20 meters) from the diffuser location.

Modeling Conclusions

- The return of the proposed North AWRF outfall's reclaimed water does not measurably affect water quality in Lake Lanier. This conclusion is based on comparison of the model results for numerous simulations both without and with the North AWRF outfall.
- The location of the proposed North AWRF outfall does not have a measurable effect on the water quality response in the lake. This was demonstrated for the three alternative outfall locations when very similar predictions of TP and chlorophyll-a levels were obtained regardless of the location of the outfall under various management scenarios.
- The simulations clearly show that nonpoint sources in the watershed dominate the Lake Lanier system. For the various scenarios modeled, the portion of the TP load to the lake attributable to nonpoint sources ranged from 84 percent to 93 percent.
- The model shows that the current and future highest concentrations of TP and chlorophyll-a are expected upstream of the proposed North AWRF outfall (particularly in the upper embayments of the lake). This finding is consistent with the finding that nonpoint sources dominate the impacts to the lake.

- Location LN1 provides higher dilutions at the edge of the near-field zone.
- The proposed diffuser configuration achieves a high level of dilution within a short distance of the outfall location.
- The model predicts that significant and rapid dilution is achieved before the plume reaches a trapping level near the thermocline.
- The proposed diffuser configuration provides rapid mixing of the effluent temperature with the ambient temperature within 2 meters (6.6 feet) of the diffuser.

Summary

No measurable effect on the water quality of Lake Lanier is projected from the proposed reclaimed water return from the expanded North AWRF. The proposed expansion would return approximately 40 mgd of highly reclaimed water high in dissolved oxygen to the lake, protecting beneficial uses such as water supply, recreation, fishing, and hydropower. Near-field modeling indicated no increase in ambient water temperatures that would affect aquatic life, and a very high dilution factor close to the diffuser.

Proposed Reclaimed Water Pipeline

The proposed pipeline construction would not result in additional demand for water from available water resources. Impacts on water quality would be limited to temporary effects due to surface runoff, erosion, and sedimentation, which can be mitigated by using BMPs for erosion and sediment control during construction.

Groundwater Recharge Areas

Proposed North AWRF Expansion

The proposed expansion is not expected to impact local groundwater recharge. The site is not designated as a Significant Recharge Area as mapped by the Georgia DNR in Hydrologic Atlas 18 (Georgia DNR, 1989). Also, based on maps of the relative susceptibility of shallow unconfined aquifers to pollution from man-made surface sources, Hydrologic Atlas 20 (Georgia DNR, 1992) rates the site in the "least susceptible" category.

Proposed Reclaimed Water Pipeline

Construction and operation of the proposed pipeline is not anticipated to have any impact on groundwater resources. According to Hydrologic Atlas 18 (Georgia DNR, 1989), the site is not within any of the most significant groundwater recharge areas in the state.

Stormwater

Proposed North AWRF Expansion

Approximately 100 acres of the entire 700-acre site is currently being developed for the 20-mgd facility. The area of the proposed expansion of the AWRF consists of cleared and disturbed lands within the 100-acre site layout of the 20-mgd facility. Expansion of the facility would add only minimally to impervious services and runoff estimates from the

entire 100-acre development (approximately 0.07 inch given a 3-inch rainfall event) included in the original site design (CH2M HILL, 1996).

Appropriate stormwater runoff controls, consisting of detention ponds and sediment basins, have been incorporated into the existing 20-mgd facility. These controls, in addition to the significant natural buffer area on the site, provide direction and control of stormwater to protect Ivy Creek. The current facility will be implemented in accordance with the Georgia Rules and Regulations for Water Quality Control, 391-3-6-18, at the time of construction.

Proposed Reclaimed Water Pipeline

Installation of the proposed pipeline would result in a temporary increase in erosion and sedimentation to those creeks it crosses during construction. Use of BMPs and compliance with the Gwinnett County Soil Erosion and Sediment Control Ordinance, as amended November 28, 1995, will minimize the effects as much as possible. The pipeline easement would remain pervious once construction and revegetation is completed. Therefore, no increase in stormwater runoff for downstream property owners is anticipated. Use of silt fences, hay bales, and related BMPs during construction can minimize temporary impacts of stormwater runoff on water quality in the adjacent surface streams. The project would be implemented in accordance with the Georgia Rules and Regulations for Water Quality Control, 391-3-6-18, at the time of construction.

Wastewater

Proposed North AWRF Expansion

The proposed North AWRF expansion would produce an additional 40 mgd of highly treated reclaimed water that would be returned to Lake Lanier. The proposed North AWRF expansion represents an overall expansion of the Gwinnett County wastewater reclamation system to serve county-wide growing need for wastewater treatment capacity and is consistent with the Master Plans and the Regional Wastewater Plan discussed in Section 2 of this document. Concerning the character of the wastewater to be treated, because of the residential, commercial, and light industrial nature of the North AWRF's service area, as well as the industrial pretreatment ordinances enacted and enforced by the County, the facility would not treat significant volumes of industrial wastewater.

The expected quality of reclaimed water from the proposed expanded treatment facility for conventional pollutants and nutrients has been discussed above. Toxicants of concern in municipal effluents from an aquatic life standpoint are generally metals and residual chlorine. The proposed advanced secondary and tertiary treatment would prevent the release of toxicants at levels that could pose a threat to aquatic life processes or humans. Since disinfection with chlorine is not used in either the current or expanded plant processes, residual chlorine will not be an issue in the reclaimed water. Recent investigations of metals levels in municipal effluents in Georgia have shown that levels are generally below the instream water quality standards in the effluent from advanced secondary treatment facilities and frequently below typical analytical detection levels (CH2M HILL, 1996). The proposed tertiary technologies would provide additional removal of metals. Organic pollutants of potential concern to human health at downstream water

supplies and/or through bioaccumulation and consumption of fish have not been detected in priority pollutant analyses of existing Gwinnett County WRF discharges and are not expected from the proposed facility expansion. The tertiary treatment options being considered for the expanded facility would provide removal of potential organics in the wastewater beyond that of Gwinnett's existing WRFs.

Proposed Reclaimed Water Pipeline

Construction of the proposed pipeline would not generate wastewater that must be treated and disposed of by direct release to a surface stream or indirect release to an existing municipal sewer system.

Air Quality

Proposed North AWRF Expansion

Construction activities for the proposed expansion to the North AWRF would cause temporary air quality degradation in the immediate vicinity of the site, primarily from dust due to land disturbance and from mobile equipment exhaust emissions.

Because of the residential, commercial, and light industrial nature of the of the North AWRF projected service area, as well as the industrial pretreatment ordinances enacted and enforced by Gwinnett County, the facility would not treat significant volumes of industrial wastewater. Also, the facility would not include any on-site incinerators as part of its solids handling processes. As a result, the expanded facility would not emit any regulated air pollutant in sufficient quantities or concentrations to trigger state or federal air quality requirements.

The expanded North AWRF would not be a "major source" of air pollution emissions as defined in Georgia's Title V regulations, and is therefore not required to prepare a Title V air operating permit. The facility is also not subject to Reasonably Achievable Control Technology (RACT) requirements under Georgia air quality regulations. The North AWRF also does not trigger the requirement to meet Maximum Achievable Control Technology (MACT) standards for municipal wastewater treatment plant emissions. Finally, although 40 CFR 60, Subpart O establishes standards for sewage treatment plants, such standards are applicable only to plants with sludge incineration capabilities. No sludge incineration facilities are included in the design for the expanded North AWRF.

Although the project site is well buffered from nearby residents and areas of public access, odor control facilities are an integral feature of the North AWRF. The predominant odors of concern are hydrogen sulfide and volatile acids from fermentation of wastewater and sludge in the influent sewer and sludge handling processes. The approach to plant odor control focuses on containment of potential odor sources and treatment of off-gasses from these sources. Liquid treatment and sludge handling processes at the facility are enclosed.

Proposed Reclaimed Water Pipeline

Air quality impacts resulting from construction of the pipeline would be temporary and consist mainly of emissions from heavy equipment and dust generated by construction

activities. The number of vehicles and pieces of heavy equipment required for construction would not be great enough to significantly diminish existing ambient air quality in the project vicinity. Because the proposed pipeline route is within existing easements or rights-of-way, much of the construction would be buffered from other residential and commercial land uses. Therefore, temporary dust emissions are not anticipated to be a significant impact.

Solid Wastes

Proposed North AWRF Expansion

Construction of the proposed expansion to the North AWRF would generate typical construction-related solid waste. Construction-related solid waste would be hauled offsite for disposal. This debris is not anticipated to have a significant impact on landfill capacity in the County.

Operation of the proposed expanded facility would produce biosolids and chemical solids. The biosolids and chemical solids produced at the facility would be dewatered to reduce their volume and would be handled through either landfilling or beneficial reuse (assuming favorable market conditions).

At the design flow of 60 mgd, the facility would produce an annual average of approximately 21 dry tons per day of biosolids with a total of approximately 100 tons of biosolids at 80 percent water content. The high-pH lime tertiary treatment process being considered would produce an average of approximately 78 dry tons per day of dewatered chemical solids (primarily lime). The membrane option would produce approximately 14 dry tons per day of chemical solids.

Sludge generated by the facility would be disposed of at a solid waste landfill or land-applied in compliance with applicable federal, state, and County regulations.

Proposed Reclaimed Water Pipeline

The proposed construction activities would generate solid wastes consisting of demolition material, land-clearing debris, and nonhazardous waste material, which would be disposed of in a local landfill in compliance with applicable federal, state, and County regulations. The volume of solid waste generated would be relatively minor as most of the construction would take place in existing easements and rights-of-way and would not require significant amounts of land clearing. Therefore, construction of the proposed pipeline would not significantly affect existing landfill capacity. No active or closed landfills exist within the proposed pipeline route.

Soil Stability/Erodibility

Proposed North AWRF Expansion

Soils at the site belong to the Madison, Congaree, Louisberg, and Davidson series, as indicated on soil survey maps compiled by the NRCS. The soils on the site are relatively

stable, with the exception of the alluvial soils of the Congaree Series. The Congaree Series alluvium is confined to the areas of the tributaries to Ivy Creek (CH2M HILL, 1996).

Expansion of the North AWRF would require some additional disturbance within the 100 acres previously cleared and prepared. Land-disturbing activities would comply with the Georgia Soil, Erosion and Sedimentation Act, as amended and the Gwinnett County Soil Erosion and Sediment Control Ordinance, as amended November 28, 1995. BMPs employed during construction would include:

- Minimizing the amount of exposed soil
- Maintaining existing vegetation where possible between the disturbed area and water courses
- Making proper use of berms, hay bales, and silt fences

The facility expansion would be implemented in accordance with the Georgia Rules and Regulations for Water Quality Control, 391-3-6-18, at the time of construction.

Proposed Reclaimed Water Pipeline

Construction of the proposed pipeline would result in the temporary displacement of soils. This could result in temporary impacts to water quality due to erosion and sedimentation. However, these impacts can be controlled and minimized through the use of silt fences, hay bales, or other erosion control devices. Construction practices would follow, to the extent practicable, the *Manual for Erosion and Sediment Control in Georgia* (Georgia Soil and Water Conservation Commission, 1992) and the Gwinnett County Soil Erosion and Sediment Control Ordinance, as amended November 28, 1995. The project would be implemented in accordance with the Georgia Rules and Regulations for Water Quality Control, 391-3-6-18, at the time of construction.

Protected Mountains

Proposed North AWRF Expansion

The proposed expansion of the facility and associated construction would not impact protected mountains as defined by O.C.G.A. 12-2-8 (for the protection of mountains in the state). Elevations at the site range between 960 and 1140 feet above MSL.

Proposed Reclaimed Water Pipeline

The project area lies entirely within the Piedmont physiographic region in Gwinnett County. The proposed pipeline and associated construction would not impact protected mountains as defined by O.C.G.A. 12-2-8.

Protected Species

Proposed North AWRF Expansion

The proposed expansion of the North AWRF would occur on lands previously cleared and disturbed during construction of the 20-mgd facility. No federally or state protected species exist on these cleared areas and the expansion of the North AWRF is not expected to impact any federal or state protected species.

As a part of the 1996 EID for the 20-mgd facility, a Protected Species Survey was conducted, including a literature review and site inspection (CH2M HILL, 1996). The Georgia DNR and the USFWS list eight protected animal species and 13 protected plant species that could occur in Gwinnett County. Of these, only marginal habitat for one animal species, the Bewick's Wren (*Thryomanes bewickii*), listed as "Rare" by the State of Georgia, exists at the site. No Bewick's Wrens were observed during the 1996 site surveys.

One colony of Pink Lady's Slipper (*Cypripedium acaule*), listed as "Unusual" by the State of Georgia, was observed in the disturbed mixed forest community at the northeast corner of the project property. Because this area is within undisturbed buffer area for the facility, no impact from the facility expansion is anticipated. The North AWRF property also includes marginal habitat for goldenseal (*Hydrastis canadensis*, a State-listed Endangered plant); Bay star-vine (*Schisandra glabra*, a State-listed Threatened plant) and Piedmont barren strawberry (*Waldsteinia lobata*, a State-listed Threatened plant); Wood's False Hellebore (State-listed Rare plant); and Harper's heartleaf and Yellow Lady's Slipper (State-listed Unusual species). None of these species is located in the vicinity of the proposed facility expansion.

Proposed Reclaimed Water Pipeline

Existing habitats along the proposed pipeline corridor have been highly modified due to residential, commercial, and industrial developments. Where the project corridor would use existing pipeline easements, power line easements, and road rights-of-way, protected species may have already been affected, and any additional effect would be minimal. No state or federal endangered or threatened species habitats were observed within the proposed pipeline corridor. A potential habitat was observed for the bald eagle (*Haliaeetus leucocephalus*); however, a review of the state animal survey for bald eagle locations does not record the site or surrounding area as having a bald eagle nest. The construction of the proposed pipeline should not impact this area.

Critical Habitats

Proposed North AWRF Expansion

Construction and operation of the expanded North AWRF would not affect U.S. Forest Service Lands, U.S. Wildlife Refuges, Wilderness Areas, or Wild or Scenic Rivers. The area of the proposed facility expansion is a previously disturbed and cleared area and no critical habitats are present.

The habitats and vegetation communities on the undisturbed portions of the facility property include pine forest, submesic hardwood forest, mesic hardwood forest, disturbed

forest, and disturbed uplands. These habitats are common in the piedmont portions of Georgia and are not considered rare or unique.

Proposed Reclaimed Water Pipeline

Construction and operation of the proposed reclaimed water pipeline would not affect U.S. Forest Service Lands, U.S. Wildlife Refuges, Wilderness Areas, or Wild or Scenic Rivers. The corridor of the proposed pipeline has been highly disturbed and no critical habitats are present.

Historical Resources

Proposed North AWRF Expansion

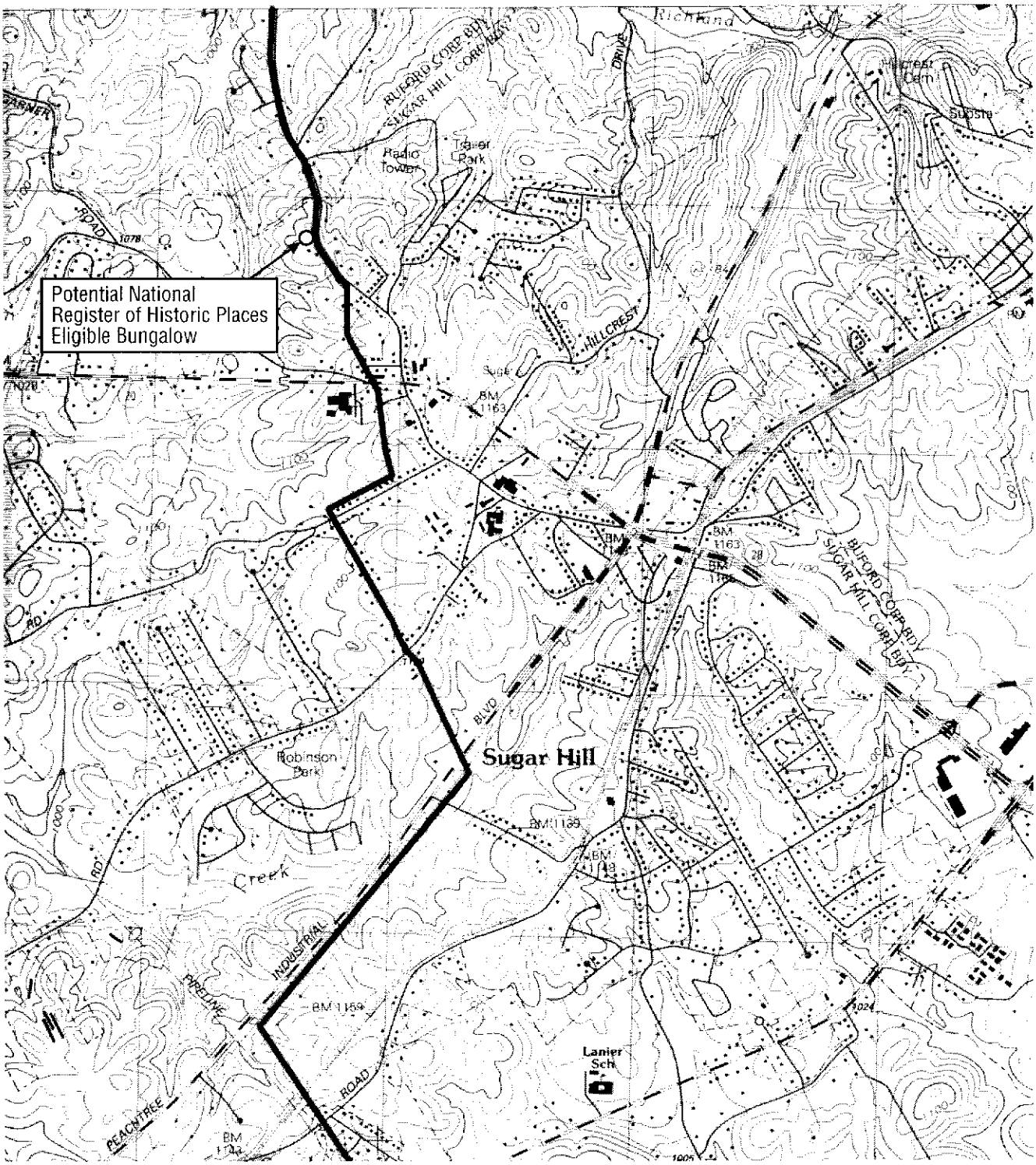
The area of the proposed facility expansion is a previously disturbed and cleared area and no historical structures or significant historic sites are present. Previous historical surveys of the property (CH2M HILL, 1996) identified no standing architectural or intact cultural deposits or discovered any sites that would contribute to an understanding of the region's history.

Proposed Reclaimed Water Pipeline

Background research and a reconnaissance-level survey were performed to determine potential impacts to historical and/or cultural resources within the proposed pipeline's Area of Potential Effects (APE). The APE is defined as an area in which the proposed project could physically or visually affect any architectural resource aged 50 years or older. The reconnaissance survey identified 13 historic architectural resources within the APE, of which only one was determined to be potentially eligible for inclusion on the NRHP.

The site is located at 5414 Sycamore Road (see Figure 10) and consists of a one-story, frame, front-gabled bungalow. The dwelling features drop siding, a standing seam metal roof, exposed rafter tails, and a brick pier with concrete block infill foundation. The building's windows feature double-hung sash in both four-over-four and modern, horizontal, two-over-two configurations. A partial-width gabled porch is located at the front side of the dwelling. A historic gabled addition is located at the west side of the building. A smaller, shed-roofed addition of unknown age is located at the rear of the resource. One historic outbuilding consisting of a frame garage/workshop, is also located on the property. Modern alterations to the resource appear to be minor and the resource is recommended eligible for the NRHP as a good example of a front-gabled bungalow.

As proposed, the pipeline corridor could follow a route along the west side of Sycamore Road that would necessitate the removal of three trees located in the front yard of the bungalow. Removal of the trees could result in an adverse effect on the resource by impacting its view shed. An alternative to avoid this impact could be to reroute the pipeline to avoid the trees and property entirely. Discussions with the State Historic Preservation Officer will be required to determine the eligibility of the property and the level of any potential impact. If the impact cannot be avoided, a Section 106 compliance document will need to be prepared. A Phase I cultural resources survey will be performed when the final construction corridor has been determined, surveyed, and staked.



contour interval = 20 feet

0 mile 1

0 feet 4000

0 kilometer 1

Project Area

Map source: Suwanee, GA
Quadrangle, 7.5 minute 1992

Figure 10
Project Corridor and Location of Potential
Eligible Historic Architectural Resource
Proposed AWRF Expansion and Reclaimed Water Pipeline
Gwinnett County, Georgia

CH2MHILL

W031999010ATL\Fig 10.fh8

Archaeological

Proposed North AWRF Expansion

The area of the proposed facility expansion is a previously disturbed and cleared area and no archaeological sites are present. Previous archaeological and cultural resource surveys of the property (CH2M HILL, 1996) identified one site with cultural remains, the Ivy Creek Rockshelter. The remains consist of a prehistoric habitation site located under a rock ledge in the northwestern corner of the property east of Plunketts Road. The area is well away from the current facility and the proposed expansion and would not be impacted by continued construction activities on the property.

Proposed Reclaimed Water Pipeline

Construction of the proposed pipeline is anticipated to have no impact to archaeological resources. No known archaeological resources exist within the corridor of the proposed pipeline. Reconnaissance-level surveys and limited shovel testing revealed no evidence of cultural remains. Given the disturbed nature of the area, the potential for discovering subsurface intact archaeological resources is low. Where the project corridor would use existing pipeline easements, power line easements, and road rights-of-way, archaeological resources may have been affected in the past, and any additional affect would be minimal. However, a Phase I cultural resources survey is recommended when the final construction corridor has been determined, surveyed, and staked.

Parks/Recreation

Proposed North AWRF Expansion

No existing or known previous parks, scenic open areas, or other recreational resources would be impacted by the construction or operation of the expanded North AWRF. The siting of the facility leaves large undisturbed buffer areas which are planned for use as natural areas and for recreational and educational activities (CH2M HILL, 1996).

Proposed Reclaimed Water Pipeline

The proposed pipeline would cross through Gwinnett Park, which is closed. Once entering the park, the pipeline would proceed along park roads until reaching the shoreline of the lake. A pressure reducing/sustaining valve gallery, housed in an aboveground building, would be built at the lake shoreline. This building and equipment would be designed to blend in with the surroundings. The diffuser of the proposed pipeline would be located more than 1 mile from the shoreline and at a depth greater than 120 feet. Water quality modeling predicts no adverse impacts to water quality that could affect swimming or other lake recreational activities. The construction and operation of the proposed pipeline should not restrict access to or adversely affect park and recreational resources.

Energy Supply

Proposed North AWRF Expansion

The North AWRF receives it electricity from Georgia Power through the North AWRF Substation. The North AWRF Substation is fed from the Lawrenceville and Exit 44 Substations by 115-kV transmission lines. The North AWRF Substation has a rated capacity of 10,000 MVA with an existing peak demand of 10,000 kW.

Proposed Reclaimed Water Pipeline

Operation of the proposed pipeline would require pumping the reclaimed water from the North AWRF to the discharge point in Lake Lanier. Electricity is available from a number of suppliers in the area. Capacity is available within the service area for the minimal amounts of electricity required. Backup power generators or a second independent electrical feed to pumping stations can be provided to guarantee continued operation during electrical failure. No significant impacts on energy supply are anticipated.

Beaches (Ocean)

Proposed North AWRF Expansion

The site is not located near any ocean beach areas.

Proposed Reclaimed Water Pipeline

The corridor of the proposed pipeline is not within an ocean beach area.

Dunes

Proposed North AWRF Expansion

The site is not located near any coastal or inland sand dunes.

Proposed Reclaimed Water Pipeline

No coastal sand dunes, beaches, sandbars, or shoals are present within the corridor of the proposed pipeline.

Shoreline

Proposed North AWRF Expansion

Construction and operation of the expanded North AWRF would not disturb any Georgia Coastal Shoreline area or any other areas covered under the river corridor protection requirement of the Shoreline Assistance Act, O.C.G.A. 12-5-4.2.

Proposed Reclaimed Water Pipeline

Construction and operation of the proposed pipeline would not disturb any Georgia Coastal Shoreline area or any other areas covered under the river corridor protection requirement of the Shoreline Assistance Act, O.C.G.A. 12-5-4.2.

Estuary/Coastal Marshlands

Proposed North AWRF Expansion

The North AWRF site is not located near any estuary.

Proposed Reclaimed Water Pipeline

No coastal areas or estuaries would be impacted from the proposed pipeline.

Forest Land

Proposed North AWRF Expansion

The site of the proposed North AWRF expansion is cleared and disturbed land and contains no forested area. Much of the remaining property of the existing North AWRF is primarily forested, with limited areas of open or maintained land. Primary forested communities include pine forest, submesic hardwood forest, mesic hardwood forest, disturbed mixed forest, and disturbed uplands. The pine forest community includes middle-aged to mature pines (loblolly and shortleaf pine), whereas a mixture of oaks, hickory, and sourwood dominate the canopy in the submesic hardwood forest. The mesic hardwood community includes tulip poplar; white, Southern red, and water oaks; sweetgum; red maple; sourwood; and beech. Canopy species in the disturbed mixed forest consist of a combination of pines and a mixture of deciduous trees included in the submesic and mesic hardwood communities.

Proposed Reclaimed Water Pipeline

The project area contains numerous bisected woodlands that are increasingly being replaced by residential growth and new commercial developments. However, there are no designated forest lands in the project corridor. The maximum construction easement width for the proposed pipeline is 80 feet; however, during detailed design specific site constraints may require a reduction in the easement width. Where the project corridor would use existing pipeline easements, power line easements, and road rights-of-way, the area is already clear of trees and additional clearing of trees would be minimal. After crossing Whitehead Road, the alignment does encounter pockets of undeveloped land with tree cover. Small areas off Sycamore Road, where easements would be required from private property, also contain tree cover that would require removal. It is estimated that a total of no more than 5 acres of trees throughout the entire corridor would require clearing to construct the proposed pipeline.

Barrier Islands

Proposed North AWRF Expansion

The site is not located near any barrier island.

Proposed Reclaimed Water Pipeline

The project corridor is not located near any barrier island.

Aquatic Life/Trout Streams

Proposed North AWRF Expansion

The reclaimed water effluent produced by the expanded North AWRF would be released into Lake Lanier, which is not designated as a trout habitat. However, Lake Lanier does feed the Chattahoochee River downstream of Buford Dam, which has been designated as a Secondary Trout Stream under Georgia Rules and Regulations for Water Quality Control, Chapter 391-3-6-03.

The highly treated effluent would meet, or exceed, pH, bacteria, and other water quality criteria for the Chattahoochee River's Drinking Water and Recreation Water Use classification and the DO criterion for the river's Secondary Trout Stream designation. Water quality modeling for both the near field and for the entire lake as a whole do not predict any significant change in water temperature or nutrient loading as a result of the release into Lake Lanier that could impact trout resources or other fish resources in either Lake Lanier or in the Chattahoochee River.

The data presented in the Clean Lakes Study showed that DO becomes depleted in the hypolimnion during the summer and drops below the tolerance levels for fish survival. This tolerance level is critical for striped bass and other game fish. The problem is exacerbated in the summer because the epilimnetic water, which has ample DO, becomes too warm and exceeds the temperature threshold for striped bass.

Proposed Reclaimed Water Pipeline

The proposed pipeline does not cross any designated primary or secondary trout streams.

Noise

Proposed North AWRF Expansion

Noise levels at the site would increase during the construction process; however, the undisturbed buffer areas and adjacent interstate highway buffers would significantly mitigate noise migration to residential areas (CH2M HILL, 1996). As part of the facility design, measures are incorporated to minimize noise due to mechanical operations.

Proposed Reclaimed Water Pipeline

Noise associated with the construction of the proposed pipeline would be generated by the various trucks, backhoes, bulldozers, and other heavy equipment required to dig and tunnel, install the pipe, and regrade the easement or right-of-way. Table 5 summarizes the noise levels generated by heavy equipment typically used during construction of highways, which is similar to equipment required for construction of the proposed pipeline.

TABLE 5
Estimated Peak Hour Construction Noise

Construction Phase	Equipment	Noise Level at 25 feet (dBA-Leq)	Noise Level at 50 feet (dBA-Leq)
Clearing and grubbing	Bulldozer, backhoe	95	89
Earthwork	Scraper, bulldozer	97	91
Foundation	Backhoe, loader	94	88
Superstructure	Crane, loader	95	89
Base preparation	Trucks, bulldozer	97	91
Paving	Paver, trucks	98	92

Source: U.S. Department of Transportation. *Highway Construction Noise: Measurement, Prediction, and Mitigation.* 1977.

In general, construction-related noise is temporary and of short duration. Construction related activities near residential areas or other sensitive receptors are usually restricted to daytime hours. Because of their temporary nature, these short-term, construction related impacts are not considered to be significant. Operation of the proposed pipeline would not result in any long-term impacts to the existing noise environment.

Farmland

Proposed North AWRF Expansion

The proposed expansion of the North AWRF would not impact farmlands. The site is currently not farmed, and no evidence was discovered to indicate that the site was farmed in the past. The site's soil and topographic characteristics are not conducive to conventional agriculture (CH2M HILL, 1996).

Proposed Reclaimed Water Pipeline

The corridor for the proposed pipeline would not impact existing farmland.

Site Safety

Proposed North AWRF Expansion

The construction and operation of the proposed expansion to the North AWRF would conform to OSHA provisions and recognized industrial safety standards. The facility

design would incorporate provisions for worker, visitor, and surrounding area resident safety. Vehicle traffic to and from the site during construction and operation would be by limited access and would not pose significant safety threats to area residents.

Proposed Reclaimed Water Pipeline

All construction activities for the proposed pipeline would comply with OSHA rules and regulations to ensure that a safe working environment exists for all employees. Public access to active work areas within the project corridor would be restricted in accordance with state regulations.

Energy Use

Proposed North AWRF Expansion

The expanded North AWRF would be designed to use energy-efficient processes and equipment to conserve energy resources and to minimize operating costs, while meeting treatment quality and reliability goals.

Proposed Reclaimed Water Pipeline

There would be a one-time use of energy associated with construction of the proposed pipeline. Operational energy use would increase, but would not significantly exceed that used by treatment facilities in similar applications. The increase in power consumption would primarily result from operating the pumping stations which are required to maintain the operating pressure needed to move the reclaimed water through the system to the discharge point. The amount of power required to operate pumping stations is insignificant and can be met by existing capacity.

Financial Considerations

Proposed North AWRF Expansion

The Gwinnett County Board of Commissioners had budgeted up to $146 million in its Capital Improvements Plan (CIP) for the proposed North AWRF. The County has sufficient reserves and revenue bonding capacity to successfully finance and implement the project.

The capital costs, operating costs, and any interest associated with the expanded facility would be funded using income from new connection fees and water and sewer rates as a component of the continued operation and upgrade of Gwinnett County's water and wastewater system.

Proposed Reclaimed Water Pipeline

The Gwinnett County Board of Commissioners has budgeted up to $30 million in its CIP for the proposed water reclamation pipeline. The funds to construct and operate the proposed reclaimed water pipeline would come from the Gwinnett County DPU water and sewer revenues.

SECTION 4

Mitigation of Adverse Impacts

Proposed North AWRF Expansion

No long-term adverse impacts to the environment have been identified as a result of expansion of the North AWRF. Short-term, construction-related impacts would occur from fugitive dust emissions and construction equipment noise, but these impacts are relatively isolated in nature, well within the existing buffers surrounding the site, of short duration, and can be mitigated using standard construction practices. Such short-term impacts are not considered significant.

Potential impacts would be mitigated by use of a high level of treatment and redundant treatment processes so that each pollutant passes through two or more barriers in the process. Because of the topography in the watershed, it would be unlikely for any partially treated sewage spills from the sewage collection system to enter Lake Lanier. The North AWRF also has storage tanks that can be used to divert water that does not meet the water quality standards in the permit. In addition, all reuse water leaving the North AWRF must be pumped. Water quality impacts on aquatic life would be limited to minor increases in temperature in the immediate area of the outfall in Lake Lanier. Potential impacts would be minimized through the design and installation of an appropriate diffuser. The quality of the water released into Lake Lanier would be comparable to or better than the average inflows from the lake's tributaries. Phosphorus and chlorophyll-a levels in the lake would not measurably change as a result of the project.

Minor stormwater impacts, primarily associated with erosion during construction, would be minimized using standard BMPs. Impacts on site safety would be associated primarily with construction of the facilities. Site safety issues would be addressed by compliance with OSHA regulations and appropriate construction management supervision.

Proposed Reclaimed Water Pipeline

Unavoidable impacts associated with the construction of the proposed reclaimed water pipeline include minor impacts on soil erodibility and minor impacts on wetlands, floodplains, water resources, wastewater, solid waste, noise, and site safety.

Minor impacts on soil stability/erodibility are associated with installation of the pipeline along existing creeks and the lake shore. Implementation of construction BMPs and compliance with the Georgia Soil, Erosion, and Sedimentation Act and the Gwinnett County Soil Erosion and Sediment Control Ordinance would mitigate potential impacts. Use of hay bales, silt screens, and appropriate site grading would minimize erosion during construction in these areas of concern.

Minor impacts on wetlands, floodplains, and forest lands would be associated with construction of the pipeline. Installation of the pipeline in wetland areas would be

permitted by the U.S. Army Corps of Engineers under Nationwide Permit 12, which allows for discharges of material for utility line backfill or bedding. The permit requires there be no change in preconstruction contours, the top 6 to 12 inches of the trench be backfilled with topsoil from the trench, and excess material be removed to upland areas immediately upon completion of construction. Compliance with these measures would further minimize the long-term impacts on wetland habitat.

The minor water supply impacts are primarily associated with the potential sedimentation and erosion during pipeline construction. Implementation of sedimentation and erosion BMPs would mitigate the potential impacts on water resources. Because the construction area would remain pervious, no long-term increase in stormwater runoff is expected to occur.

Construction of the proposed pipeline would generate construction material requiring disposal, resulting in minor impacts on solid waste. The amount of construction and demolition material generated by the project would be minimized by using existing easements and rights-of-way that have already been cleared.

Temporary noise and air quality impacts would be associated with operation of heavy equipment and site work during installation of the pipeline. Potential impacts on adjacent land uses would be minimized by restricting construction activity to normal business hours. Site safety issues are always a concern around construction sites. Implementation of OSHA requirements and proper construction supervision would minimize potential safety conflicts during construction of the pipeline.

A potential adverse impact for a potential route has been identified to an existing bungalow that may be eligible for inclusion on the NRHP. The potential pipeline corridor could necessitate the removal of three existing trees from in front of this bungalow, which could adversely impact the resource's view shed and historic context. Mitigation for this impact could be the rerouting of the alignment away from the property to avoid removal of the trees. A Section 106 compliance document and further consultation with the State Historic Preservation Officer would be required.

SECTION 5

Summary and Conclusions

Construction and operation of the expanded North AWRF and the reclaimed water pipeline would not have significant long-term adverse impacts on the environment. A potential impact to a historical building has been identified, but can be mitigated. Minor impacts associated with construction noise, fugitive dust, increased erosion potential, sedimentation would be localized, of short duration, and can be mitigated by use of BMPs.

Wetlands and forest land impacts are limited in nature and no long-term adverse impacts to these areas are anticipated. Due to the highly treated nature of the reclaimed water, no adverse impacts to the existing water resources of Lake Lanier would occur from the proposed project.

In general, water quality in Lake Lanier and the Chattahoochee River would be protected due to the return of the high quality reclaimed water. Phosphorus and chlorophyll-a levels in the lake would not measurably change as a result of the project. In addition, the lake's yield as a water source, especially during drought periods, would be improved.

SECTION 6

References

Atlanta Regional Commission. *Atlanta Region Sub-Area Future Wastewater Treatment Feasibility Study*. April 1992.

Camp, Dresser, and McKee (CDM). *Gwinnett County Water and Wastewater Master Plan Update*. Prepared for Gwinnett County Department of Public Utilities. 1998.

CH2M HILL. *Gwinnett County Water and Wastewater Master Plan*. Prepared for Gwinnett County Department of Public Utilities. 1993.

CH2M HILL. *North Advanced Water Reclamation Facility Environmental Information Document*. Prepared for Gwinnett County Department of Public Utilities. February 1996.

CH2M HILL. *Reclaimed Water Pipeline for the North Advanced Water Reclamation Facility Environmental Information Document*. Prepared for Gwinnett County Department of Public Utilities. February 1996.

CH2M HILL. *North Advanced Water Reclamation Facility Expansion and Reclaimed Water Pipeline Design Development Report*. Prepared for Gwinnett County Department of Public Utilities. March 1999.

Crook, James. "Water Reclamation and Reuse Criteria". Asano, Takashi, ed. *Water Quality Management Volume 10*. Wastewater Reclamation and Reuse. 1998.

Environmental Protection Agency. *Quality Criteria for Water*. EPA 440/5-86-001. 1986.

Environmental Protection Agency. *State Water Quality Criteria Summaries*. EPA 440/5-88-031. 1988.

Environmental Protection Agency. *Compendium of Tools for Watershed Assessment and TMDL Development*. EPA 841-B-97-006. 1997

Georgia Geologic Survey. *Most Significant Ground-Water Recharge Areas of Georgia*. Hydrologic Atlas 18. 1989.

Georgia Geologic Survey. *Most Significant Ground-Water Recharge Areas of Georgia*. Hydrologic Atlas 20. 1992.

Krenkel, P.A. and Novotny, V. *Water Quality Management*. Academic Press. New York, NY. 1980.

Kundell, James E. *Diagnostic/Feasibility Study of Lake Sidney Lanier, Georgia*. Prepared for Georgia EPD. 1998

LimnoTech, Inc. (LTI). *Development of Linked Watershed and Water Quality Models for Lake Lanier*. Ann Arbor, Michigan. 1998.

Metcalf & Eddy (M&E). *Technical Memorandum No. 5, Evaluation of Potential Sites for the Suwanee Water Reclamation Facility*. Prepared for Gwinnett County Department of Public Utilities. August 1994.

Sonzogni, W.C., Chapra S.C., Armstrong, D.E., and Logan T.J. *Bioavailability of Phosphorus Inputs to Lakes*. Journal of Environmental Quality. Vol. 11 no. 4: 555-56. 1982.

TRC Garrow Associates. *Reclaimed Water Pipeline Project Archaeological and Historic Architecture Survey*. Prepared for CH2M HILL. March 1999.

Welch, E.B., and Cooke, G.D. *Ecological Effects of Wastewater: Applied Limnology and Pollutant Effects*. Chapman and Hall. London. 1992.

SECTION 7

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

James H. Scarbrough

James H. Scarbrough, P.E.
Director of Planning and Permitting
Gwinnett County Department of Public Utilities

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Appendix A

Environmental Check List

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Table A-1
Environmental Checklist
North AWRF Expansion

Georgia Area/Category	Is Area Affected?			If Affected, How Severe?			
	No	Yes	Unknown	Minor	Median	Major	Unknown
1. Wetlands	X						
2. Flood Plain/River Corridor	X						
3. Water Supply	X						
4. Water Resources		X		X			
5. Groundwater Recharge Area	X						
6. Stormwater		X		X			
7. Waste Water	X						
8. Air Quality		X		X			
9. Solid Wastes		X		X			
10. Soil Stability/Erodibility		X		X			
11. Protected Mountains	X						
12. Protected Species	X						
13. Critical Habitats	X						
14. Historical	X						
15. Archeological	X						
16. Parks/Recreation	X						
17. Energy Supplies	X						
18. Beaches	X						
19. Dunes	X						
20. Shoreline	X						
21. Estuary	X						
22. Forest Land	X						
23. Barrier Island	X						
24. Aquatic Life/Trout Streams	X						
25. Noise		X		X			
26. Farm Land	X						
27. Site Safety		X		X			
28. Energy Use	X						

Table A-2
Environmental Checklist
North WRF Pipeline

Georgia Area/Category	Is Area Affected?			If Affected, How Severe?			
	No	Yes	Unknown	Minor	Median	Major	Unknown
1. Wetlands		X		X			
2. Flood Plain/River Corridor		X		X			
3. Water Supply		X		X			
4. Water Resources	X						
5. Groundwater Recharge Area	X						
6. Stormwater		X		X			
7. Waste Water	X						
8. Air Quality		X		X			
9. Solid Wastes		X		X			
10. Soil Stability/Erodibility		X		X			
11. Protected Mountains	X						
12. Protected Species	X						
13. Critical Habitats	X						
14. Historical		X				X	
15. Archeological	X						
16. Parks/Recreation	X						
17. Energy Supplies	X						
18. Beaches	X						
19. Dunes	X						
20. Shoreline	X						
21. Estuary	X						
22. Forest Land		X		X			
23. Barrier Island	X						
24. Aquatic Life/Trout Streams	X						
25. Noise		X		X			
26. Farm Land	X						
27. Site Safety		X		X			
28. Energy Use	X						

Appendix B

Water Quality Modeling

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Modeling Analysis for the North Advanced Water Reclamation Facility Potential Lake Lanier Outfall Locations

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COPIES: Ken Hall/ATL
Doug Baughman/ATL

DATE: April 27, 1999

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Overview

The Gwinnett County Department of Public Utilities (DPU) is applying for an NPDES permit to expand the 20 million gallons per day (mgd) North Advanced Water Reclamation Facility (North AWRF) to a capacity of 60 mgd. Treatment processes at this facility produce a high quality effluent suitable for indirect reuse. The current release location for the North AWRF is the Chattahoochee River, where the effluent is combined with effluent from the Crooked Creek Water Reclamation Facility (WRF). The proposed outfall location for the 40 mgd expansion of the North ARWF is a return to Lake Lanier.

A suite of mathematical models was applied to evaluate the water quality impacts of the proposed return of reclaimed water to Lake Lanier. Several proposed outfall locations were

evaluated using various combinations (scenarios) of point source and non-point source loadings using the Lake Lanier Management Tool (LimnoTech 1998). Near-field water quality effects were also evaluated at the proposed outfall locations using a dilution model (PLUMES). The following sections describe the modeling conducted for this evaluation and summarize the results of the water quality analysis.

The results of this analysis demonstrate that the proposed North AWRF outfall and the return of highly treated reclaimed water will not have a negative effect on the quality of Lake Lanier.

Application of Models

Potential Outfall Locations

The following locations were considered in the modeling analysis (Figure 1):

Shoal Creek Outfall (LN1-Lake Model Segment 19): This proposed location is approximately 1 mile upstream from Buford Dam, at the mouth of Shoal Creek, and at a depth of approximately 130 feet.

Shoal Creek Outfall (LN2-Lake Model Segment 56): This proposed location is approximately 4,000 feet upstream from the LN1 location, across from Lake Lanier Islands, and at a depth of approximately 110 feet.

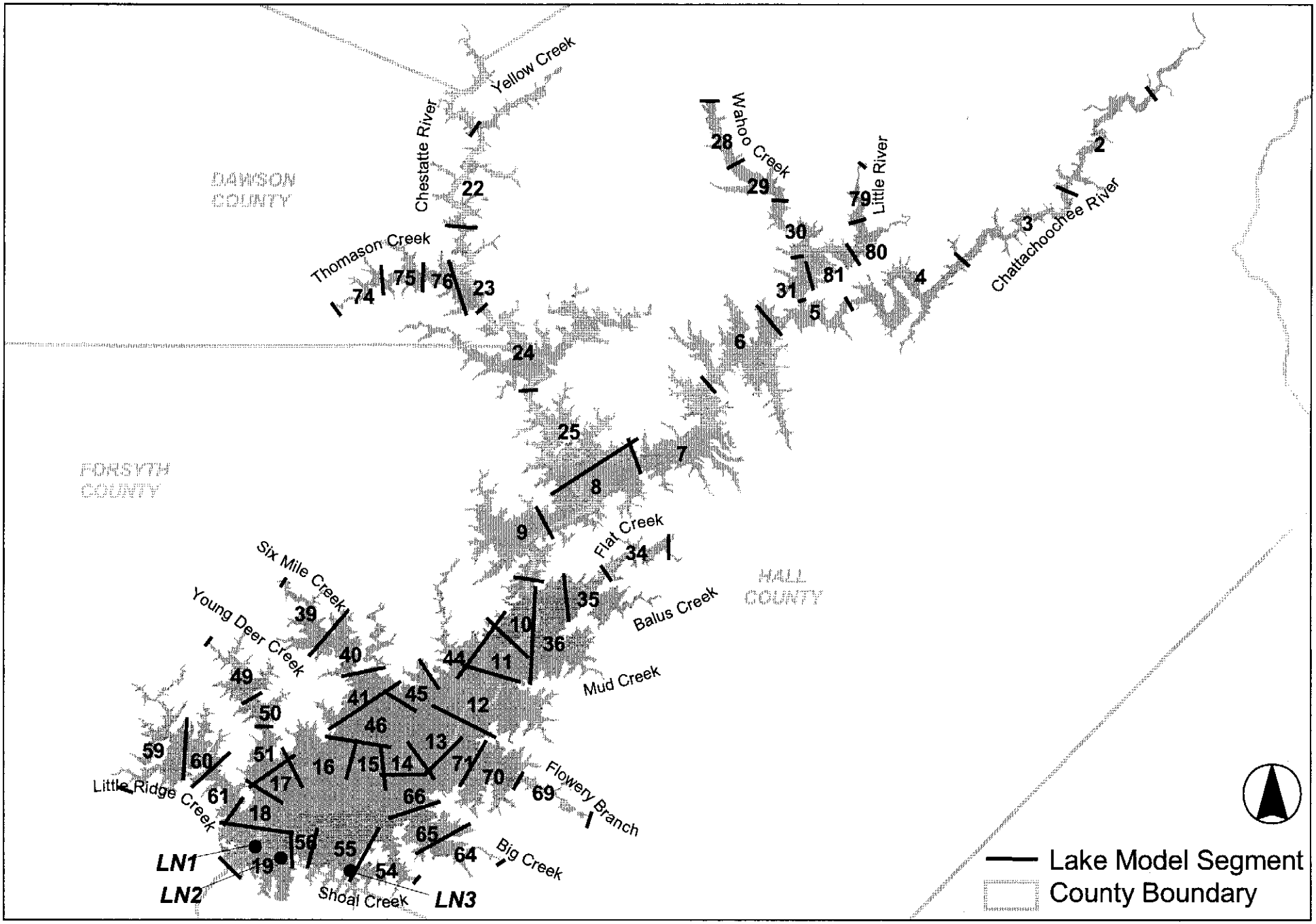
Shoal Creek Outfall (LN3-Lake Model Segment 55): This proposed location is in Shoal Creek Embayment, approximately 2.5 miles upstream from Buford Dam, and at a depth of approximately 90 feet.

Lake Lanier Management Tool: GWLF/CE-QUAL-W2

The Lake Lanier Management Tool was developed by LimnoTech, Inc. (LTI) as part of a study initiated by the Upper Chattahoochee Basin Group (UCBG) and has been reviewed by Georgia Environmental Protection Division (EPD) and the stakeholders associated with Lake Lanier. This model was selected for the evaluation of lake-wide water quality effects from the proposed discharge because it represents an established and agency agreed upon model of conditions specific to Lake Lanier.

The Lake Lanier Management Tool is comprised of the watershed model GWLF and the water quality model CE-QUAL-W2 bundled into a single system. The watershed model component of the Lake Lanier Management Tool simulates pollutant contributions from the watershed based on factors such as land use, soils type, slopes, precipitation, septic systems and other wastewater treatment facilities located in the watershed. The lake water quality model component subsequently uses pollutant contributions predicted by the watershed model to simulate the response of these pollutant contributions in terms of in-lake water quality. The Lake Lanier Management Tool was applied to evaluate the effect on in-lake Total Phosphorus (TP) and chlorophyll-a concentrations of the proposed 40 mgd (monthly maximum) return of North AWRF reclaimed water to the lake.

GWLF (developed by Cornell University) is one of the watershed models included in the EPA's *Compendium of Tools for Watershed Assessment and TMDL Development* (EPA,



CH2MHILL

Figure 1
Lake Lanier CE-QUAL-W2 Model Segments
and Proposed North AWARF Sidcharge Locations
Gwinnett County

1997). This model mechanistically simulates water and sediment movement, and uses simple empirical relationships to describe chemical behavior (LTI, 1998). The model includes surface run-off, groundwater flow sources, and nutrient loads from both point sources and septic systems. The model uses simple transport routing, based on the delivery ratio concept. A version of GWLF is currently being distributed by EPA's Office of Wetlands, Oceans and Watersheds (EPA, 1997). In the Lake Lanier application, daily streamflow and daily nutrient loads are used to compute daily nutrient concentrations from the contributing watersheds.

CE-QUAL-W2 (developed by the U.S. Army Corps of Engineers) is also included in the EPA's *Compendium of Tools for Watershed Assessment and TMDL Development* (EPA, 1997). CE-QUAL-W2 is a two-dimensional, laterally averaged hydrodynamic and water quality model. The model predicts variations in water movement, temperature, and constituents both longitudinally and vertically. This model is suitable for stratified waterbodies like reservoirs and narrow estuaries where large variations in lateral velocities and constituents do not occur (EPA, 1997). The model was specifically adjusted to address the unique characteristics of Lake Lanier such as lateral segmentation around mid-lake islands, and changes to water quality kinetics.

Both models were successfully calibrated and verified (LTI, 1998). Detailed information on the development and application of the GWLF and CE-QUAL-W2 models is documented in the report *Development of Linked Watershed and Water Quality Models for Lake Lanier* (LTI, 1998). These two models were combined in the user-friendly interface of the Lake Lanier Management Tool to facilitate their use in assessing management alternatives, including watershed protection and the addition of new outfalls to the lake.

For the purpose of evaluating Gwinnett's proposed permit application, the Lake Lanier Management Tool was used to determine the effect of the proposed North AWRF reclaimed water release on the TP and chlorophyll-a concentrations in Lake Lanier. The model was applied using the 1984 to 1988 five-year meteorological period and various current and future land use conditions. This meteorological period was previously selected as the critical environmental design period for the application of the Lake Lanier Management Tool (LTI, 1998). The critical meteorological record resulted in lake surface water elevations that oscillated between 1,063 feet MSL and 1,074 feet MSL with an average of 1069 feet MSL.

Input Data and Assumptions

Several scenarios were simulated to evaluate preferred outfall locations and assess relative changes in lake quality with and without the proposed Gwinnett outfall. These scenarios included the following input data and assumptions:

Scenario 1: Current Conditions: This scenario simulates the TP and chlorophyll-a conditions in the lake with the existing (1997) level of development, land management and point sources. Existing WWTPs discharge TP concentrations of 0.63 mg/L (Baldwin), 0.56 mg/L (Clakesville), 5.0 mg/L (Cleveland), 0.56 mg/L (Cornelia), 0.63 mg/L (Dahlonega), 0.63 mg/L (Demorest), 0.44 mg/L (Gainesville–Flat Creek), 3.58 mg/L (Gainesville #2), 0.63 mg/L (Lake Lanier Islands), and 0.63 mg/L (Lanier-Habersham).

Scenario 2: Future Land Use in Gwinnett County's watershed and Gwinnett's 40 mgd outfall (Segment 19): This scenario simulates a potential 40-mgd outfall at LN1-Segment 19 with a maximum reclaimed water TP concentration of 0.13 mg/L. This land use scenario represents full development in the watershed within Gwinnett County (approximately 3.2 square miles). Current (1997) land use conditions remain the same in the rest of the Lake Lanier watershed. Existing WWTPs discharge TP concentrations of 0.63 mg/L (Baldwin), 0.56 mg/L (Clakesville), 5.0 mg/L (Cleveland), 0.56 mg/L (Cornelia), 0.63 mg/L (Dahlonega), 0.63 mg/L (Demorest), 0.44 mg/L (Gainesville–Flat Creek), 3.58 mg/L (Gainesville #2), 0.63 mg/L (Lake Lanier Islands), and 0.63 mg/L (Lanier-Habersham).

Scenario 2A: Future Land Use in Gwinnett County's watershed and Gwinnett's 40 mgd outfall (Segment 55): This scenario simulates a potential 40-mgd outfall at LN3-Segment 55 with a maximum reclaimed water TP concentration of 0.13 mg/L. This land use scenario represents full development in the watershed within Gwinnett County (approximately 3.2 square miles). Current (1997) land use conditions remain the same in the rest of the Lake Lanier watershed. Existing WWTPs discharge TP concentrations of 0.63 mg/L (Baldwin), 0.56 mg/L (Clakesville), 5.0 mg/L (Cleveland), 0.56 mg/L (Cornelia), 0.63 mg/L (Dahlonega), 0.63 mg/L (Demorest), 0.44 mg/L (Gainesville–Flat Creek), 3.58 mg/L (Gainesville #2), 0.63 mg/L (Lake Lanier Islands), and 0.63 mg/L (Lanier-Habersham).

Scenario 2B: Future Land Use in Gwinnett County's watershed and Gwinnett's 40 mgd outfall (Segment 56): This scenario simulates a potential 40-mgd outfall at LN2-Segment 56 with a maximum reclaimed water TP concentration of 0.13 mg/L. This land use scenario represents full development in the watershed within Gwinnett County (approximately 3.2 square miles). Current (1997) land use conditions remain the same in the rest of the Lake Lanier watershed. Existing WWTPs discharge TP concentrations of 0.63 mg/L (Baldwin), 0.56 mg/L (Clakesville), 5.0 mg/L (Cleveland), 0.56 mg/L (Cornelia), 0.63 mg/L (Dahlonega), 0.63 mg/L (Demorest), 0.44 mg/L (Gainesville–Flat Creek), 3.58 mg/L (Gainesville #2), 0.63 mg/L (Lake Lanier Islands), and 0.63 mg/L (Lanier-Habersham).

Scenario 3: Future Land Use for all the watershed and No New WWTPs: This scenario represents projected future land use without stormwater BMPs in all of the Lake Lanier watershed. No new municipal wastewater treatment facilities are included (individual septic systems would provide wastewater treatment for new development). Existing WWTPs discharge TP concentrations of 0.63 mg/L (Baldwin), 0.56 mg/L (Clakesville), 5.0 mg/L (Cleveland), 0.56 mg/L (Cornelia), 0.63 mg/L (Dahlonega), 0.63 mg/L (Demorest), 0.44 mg/L (Gainesville–Flat Creek), 3.58 mg/L (Gainesville #2), 0.63 mg/L (Lake Lanier Islands), and 0.63 mg/L (Lanier-Habersham). This land use scenario represents full development throughout much of the Lake Lanier watershed. This future land use is the same "heavy development option" used in the UCBG Lake Lanier study (LTI, 1998).

Scenario 4: Future Land Use for all the watershed and Gwinnett's 40 mgd outfall only (Segment 19): This scenario represents projected future land use without stormwater BMPs in the entire Lake Lanier watershed. No new WWTPs are included other than the proposed North AWRF outfall in Segment 19 with a maximum reclaimed water TP concentration of 0.13 mg/L. It is assumed that individual septic systems would provide wastewater treatment for new development. Existing WWTPs discharge TP concentrations of 0.63 mg/L (Baldwin), 0.56 mg/L (Clakesville), 5.0 mg/L (Cleveland), 0.56 mg/L (Cornelia), 0.63 mg/L (Dahlonega), 0.63 mg/L (Demorest), 0.44 mg/L (Gainesville–Flat Creek), 3.58 mg/L

(Gainesville #2), 0.63 mg/L (Lake Lanier Islands), and 0.63 mg/L (Lanier-Habersham). This land use scenario represents full development throughout much of the watershed. This future land use is the same "heavy development option" used in the UCBG Lake Lanier study (LTI, 1998).

Scenario 5: Future Land Use with BMPs for all of the watershed and No New WWTPs: This scenario represents projected future land use with stormwater BMPs in the entire Lake Lanier watershed. The additional wastewater generated by new development would be served by land application or other nondischarge alternatives (no increase in septic systems due to new development). This land use scenario represents full development throughout much of the Lake Lanier watershed. This future land use scenario is the same "heavy development option" used in the UCBG study (LTI, 1998). Existing WWTPs discharge TP concentrations of 0.63 mg/L (Baldwin), 0.56 mg/L (Clakesville), 5.0 mg/L (Cleveland), 0.56 mg/L (Cornelia), 0.63 mg/L (Dahlonega), 0.63 mg/L (Demorest), 0.44 mg/L (Gainesville–Flat Creek), 3.58 mg/L (Gainesville #2), 0.63 mg/L (Lake Lanier Islands), and 0.63 mg/L (Lanier-Habersham).

Scenario 6: Future Land Use with BMPs for all of the watershed and Gwinnett's 40 mgd discharge (Segment 19): This scenario represents projected future land use with stormwater BMPs in the entire Lake Lanier watershed. The additional wastewater generated by new development will be served by land application or other nondischarge alternatives (no increase in septic systems due to new development). This land use scenario represents full development throughout much of the Lake Lanier watershed. This future land use scenario is the same "heavy development option" used in the UCBG study (LTI, 1998). Existing WWTPs discharge TP concentrations of 0.63 mg/L (Baldwin), 0.56 mg/L (Clakesville), 5.0 mg/L (Cleveland), 0.56 mg/L (Cornelia), 0.63 mg/L (Dahlonega), 0.63 mg/L (Demorest), 0.44 mg/L (Gainesville–Flat Creek), 3.58 mg/L (Gainesville #2), 0.63 mg/L (Lake Lanier Islands), and 0.63 mg/L (Lanier-Habersham). Gwinnett releases 40 mgd in Segment 19 with a maximum reclaimed water TP concentration of 0.13 mg/L.

Near Field Model: PLUMES

A dilution model was applied to aid in the evaluation and design of a diffuser for the North AWRF outfall. The model was used to evaluate the effects in the immediate vicinity of the outfall. The model computes the effective dilution achieved by the diffuser configuration at a monthly maximum flow of 40 mgd, and at daily or hourly peak flows of 50 mgd. In addition, the model was used to simulate changes in ambient temperature due to the impact of the reclaimed water in the near-field zone.

The near-field zone refers to an area close to the diffuser where the mixing or dilution processes are mainly dictated by the buoyancy and momentum of the reclaimed water plume. The far-field zone refers to the area, farther away from the outfall, where the ambient current velocity largely controls the mixing and dilution processes.

PLUMES is a dilution model supported by EPA and designed to conduct near-field modeling analyses. This model is widely accepted as a tool in evaluating and designing outfall diffusers. PLUMES is included in the EPA's *Compendium of Tools for Watershed Assessment and TMDL Development* (EPA, 1997). The PLUMES model is composed of sophisticated mathematical models that analyze and predict the initial dilution behavior of

aquatic plumes (EPA, 1997). The proposed location for the North AWRF diffuser outfall is in deep waters, generally referred to as "stable discharge" conditions where boundary interactions are not expected to be significant. PLUMES is a model suitable for simulating "stable discharge" conditions.

Input Data and Assumptions

Initial diffuser configuration information was developed by the project team. Ambient currents were obtained from previous modeling efforts conducted by LimnoTech in Lake Lanier in 1998 (LTI, 1998). Temperature profiles were obtained from data collected in 1996 and 1997 in support of LimnoTech's 1998 lake modeling efforts (LTI, 1998). Depth locations were approximated based on topographic maps as 40 meters at LN1, and 30 meters at LN 2 and LN3 for modeling purposes. These depths were in general agreement with LTI's documentation (LTI, 1998). Reclaimed water temperature data were obtained from average summer reclaimed water temperatures observed at Gwinnett's Crooked Creek WRF from July 1993 to March 1996 (CH2M HILL, 1996).

It was assumed that the average summer reclaimed water temperature leaving the Crooked Creek WRF (24.6 °C) is representative of the expected reclaimed water temperature leaving the North AWRF and reaching the outfall in Lake Lanier. This is a conservative assumption because the reclaimed water from the North AWRF has to travel for more than 8 miles via underground pipeline before it reaches the proposed outfall locations. The travel time of the reclaimed water through a buried pipeline will have a cooling effect on the reclaimed water throughout the year due to the relatively constant and cooler temperatures at a depth of 4 to 8 feet below the ground surface (CH2M HILL, 1996).

The model was applied to the worst case scenario of stratified summer conditions in Lake Lanier. Stratified conditions reduce the ability of the discharge plume to mix with the upper layers of the water column due to density gradients. A review of the temperature profiles for the lake, provided by LTI, indicated that the lake stratifies for most of the year (April-November), with the most significant stratification occurring during July and August. During this pronounced stratification period, the temperature gradient changes from 28 °C in the upper layers of the water column to 8 °C in the bottom of the lake. The ambient data indicated that the lake is unstratified from December to March when the water column temperatures average approximately 8 °C.

Model Results

Lake Lanier Management Tool: GWLF/CE-QUAL-W2

The modeling effort illustrates that nonpoint sources in the watershed dominate the TP inputs to the lake, ranging from 84 percent of the total load in Scenario 2 to 93 percent in Scenario 3 (see Table 1). Existing point sources contribute from 6 percent (Scenario 4) to 12 percent (Scenario 1) of the total load. The proposed North AWRF inputs between 3 and 4 percent of the total load.

Numerous simulations were conducted to determine the effect of the location of the outfall under several scenarios. The results indicate that the model-predicted concentrations in the lake are insensitive to changes in the outfall locations (LN1, LN2 and LN3). The model

results for TP and chorophyll-a concentrations do not change significantly among the different proposed locations (Table 2). Outfall location LN1 was recommended as the most favorable outfall location for a number of cost, routing, environmental impact, and logistical reasons.

The model demonstrates that the release from the proposed North AWRF expansion would not significantly increase the whole lake, or Segment 19 near the dam, summer average TP and chlorophyll-a concentrations. This conclusion is based on the comparison of baseline scenarios (depicting numerous probable future conditions) with the exact same baseline scenario conditions but adding the proposed North AWRF outfall. The model results are summarized in Table 2. The slight differences between the chlorophyll-a levels in the Lake for scenarios with and without the North AWRF outfall are not only small (0.1 μg/L or less) in both absolute and percentage terms, they may also be considered insignificant from a practical or statistical standpoint.

A review of the model results for scenarios without implementation of stormwater BMPs indicates that the highest predicted chlorophyll-a concentrations occur along the length of the lake (upstream from the proposed outfall locations), and in the arms (creeks and embayments) of the lake. The highest TP concentrations are predicted upstream of Browns Bridge, and in the arms of tributaries in the lower portion of the lake (Flat Creek, Balus Creek, Six Mile Creek, Young Deer Creek, Shoal Creek, Little Ridge Creek, Big Creek, and Flowery Branch). However, if stormwater BMPs were implemented, the highest TP and chlorophyll-a concentrations would be mostly upstream of Browns Bridge, and in fewer embayments of the lower portions of the lake such as Flat Creek and Six Mile Creek.

Table 1 provides a summary of the TP loads (kg/yr) contributioned by each category under the various simulation scenarios.

Table 2 provides a summary of the average summer chlorophyll-a and TP concentrations for the different scenarios considered in this analysis. The range represents the maximum and minimum summer average predicted during the five-year simulation period.

Table 1. Summary of TP Loads (kg/yr) from Point and Nonpoint Sources in the Lake Lanier Watershed

Scenario	Total Phosphorus (TP) Loads (kg/yr)			
	Nonpoint Sources	Existing Discharges	Proposed Gwinnett Outfall	Total TP Load
1	134,445 (88%)	18,605 (12%)	--	153,050
2	134,445 (84%)	18,605 (12%)	7,184 (4%)	160,234
2A	134,445 (84%)	18,605 (12%)	7,184 (4%)	160,234
2B	134,445 (84%)	18,605 (12%)	7,184 (4%)	160,234
3	260,793 (93%)	18,605 (7%)	--	279,398
4	260,793 (91%)	18,605 (6%)	7,184 (3%)	286,582
5	187,322 (91%)	18,605 (9%)	--	205,927
6	187,322 (88%)	18,605 (9%)	7,184 (3%)	213,111

Table 2. Summary of Simulated TP and Chlorophyll_a Concentrations
Average
(Range)

Scenario	Segment 19/ (LN1) Photic Zone		Segment 56 (LN2) Photic Zone		Segment 55 (LN3) Photic Zone		Whole Lake Photic Zone	
	Chl_a (µg/L)	TP (µg/L)	Chl_a (µg/L)	TP (µg/L)	Chl_a (µg/L)	TP (µg/L)	Chl_a (µg/L)	TP (µg/L)
1	**3.0** (2.4-3.5)	**6.5** (4.9-8.1)	**3.0** (2.4-3.4)	**6.3** (4.8-7.8)	**3.2** (2.8-3.6)	**7.4** (6.4-8.5)	**5.0** (4.5-5.6)	**14.4** (13.3-15.9)
2	**3.1** (2.5-3.6)	**6.7** (5.1-8.2)	**3.1** (2.5-3.5)	**6.5** (5.0-7.9)	**3.3** (2.9-3.7)	**7.5** (6.6-8.6)	**5.1** (4.6-5.6)	**14.5** (13.4-15.9)
2A	**3.2** (2.6-3.6)	**6.7** (5.2-8.2)	**3.1** (2.6-3.5)	**6.6** (5.1-8.0)	**3.4** (3.0-3.7)	**7.7** (6.7-8.7)	**5.1** (4.6-5.6)	**14.5** (13.4-15.9)
2B	**3.1** (2.5-3.6)	**6.7** (5.0-8.2)	**3.1** (2.5-3.5)	**6.5** (5.0-7.9)	**3.3** (2.9-3.7)	**7.6** (6.5-8.7)	**5.1** (4.5-5.6)	**14.5** (13.3-15.9)
3	**4.9** (4.6-5.3)	**11.8** (10.4-13.0)	**4.8** (4.5-5.2)	**11.3** (10.1-12.4)	**5.1** (4.7-5.6)	**12.8** (11.7-13.9)	**8.1** (7.7-8.9)	**26.7** (25.6-28.1)
4	**5.0** (4.8-5.4)	**11.9** (10.7-13.0)	**4.9** (4.6-5.3)	**11.5** (10.3-12.6)	**5.2** (4.8-5.7)	**13.0** (12.1-14.0)	**8.2** (7.7-8.9)	**26.7** (25.6-28.1)
5	**3.9** (3.4-4.4)	**9.0** (7.5-10.5)	**3.8** (3.4-4.2)	**8.8** (7.4-10.1)	**4.1** (3.7-4.5)	**9.9** (8.8-10.1)	**6.2** (5.6-6.9)	**19.5** (17.3-21.3)
6	**3.9** (3.5-4.4)	**9.1** (7.7-10.5)	**3.9** (3.5-4.3)	**8.9** (7.5-10.2)	**4.2** (3.8-4.5)	**10.0** (8.9-11.2)	**6.3** (5.7-6.9)	**19.6** (17.3-21.3)

Near-Field Model: PLUMES

Outfall Configurations

Numerous model iterations were conducted to determine diffuser configurations that would be efficient at the permitted flows and that would achieve high dilution factors within a short distance of the diffuser. The following configuration is recommended for an average monthly flow of 40 mgd and a modeled peak flow of 50 mgd. The configuration would consist of a 60-inch diameter pipe with eighteen 8-inch ports, spaced every 5 feet, at a 45-degree vertical angle, flowing in the direction of the stream flow. The ports would be located approximately 12 feet from the bottom of the lake.

Table 3 contains a summary of the expected effective dilution at the edge of the near-field zone, and the expected distance from the outfall (within the near-field zone) at which the difference between the effluent and the ambient temperatures is less than 5 °F. The model predicts that this condition is met within 6.6 feet (2 meters) of the diffuser. The model also predicts that a very high level of dilution is achieved within a short distance from the diffuser. In all model scenarios, a dilution factor of 2 (i.e., effluent is diluted with ambient water by half) is achieved in approximately less than 1.6 feet (0.5 meters). Effective dilution factors larger than 20 (i.e., effluent is diluted with more than 19 volumes of ambient water) are reached at distances that range from about 49 feet to 66 feet (15 to 20 meters) from the discharge point. Under stratified lake conditions, the model predicts that significant and

rapid dilution is achieved before the plume reaches a trapping level near the thermocline. When the thoroughly mixed plume reaches the trapping level, it does not rise further in the water column because the plume mixed with the cooler reservoir bottom water is denser than the upper portion of the water column. In contrast, when the lake is thermally mixed (unstratified), the plume mixes with the entire water column, again achieving a rapid and significant dilution in a short distance from the diffuser.

Table 3. Summary of Near-field Modeling Results

	LN1	LN2	LN3
Distance from Diffuser at which Impact of Effluent on Ambient Temperature is < 5°F	2 meters	2 meters	2 meters
Effective Dilution Factor at Edge of Near-Field Zone	25	20	20

Note: A sensitivity analysis at LN1 for 30 mgd and 50 mgd did not result in significantly different results than those obtained at the monthly average flow of 40 mgd. Similar sensitivity analysis results are expected at LN2 and LN3 since dilution and temperature results at monthly average flows are similar at all locations.

Conclusions

Lake Lanier Management Tool: GWLF/CE-QUAL-W2

- The location of the proposed North AWRF outfall does not have a significant effect on the water quality response in the lake. This was demonstrated for the three alternative outfall locations when very similar predictions of TP and chlorophyll-a levels were obtained regardless of the location of the outfall under various management scenarios (Tables 2).
- The simulations clearly show that nonpoint sources in the watershed dominate the Lake Lanier system. For the various scenarios modeled, the portion of the TP load to the lake attributable to nonpoint sources ranged from 84 percent to 93 percent (see Table 1).
- The addition of the proposed North AWRF outfall's reclaimed water does not significantly affect water quality in Lake Lanier. This conclusion is based on comparison of the model results for numerous simulations both without and with the North AWRF outfall (see Table 2).
- The model shows that the current and future highest concentrations of TP and chlorophyll-a are expected upstream of the proposed North AWRF outfall (particularly in the upper embayments of the lake). This finding is consistent with the finding that nonpoint sources dominate the impacts to the lake.

Near-Field Model: PLUMES

- There was no significant difference in predicted temperature and dilution profiles among the three alternative proposed outfall locations.
- Location LN1 provides higher dilutions at the edge of the near-field zone.

- The proposed diffuser configuration achieves a high level of dilution within a short distance of the outfall location.
- The model predicts that significant and rapid dilution is achieved before the plume reaches a trapping level near the thermocline.
- The proposed diffuser configuration provides rapid mixing of the effluent temperature with the ambient temperature within 2 meters of the diffuser.

Summary

The application of these models demonstrates that there is not a significant lake response in dilution, TP or chlorophyll-a for the proposed location of the diffuser. The models also do not predict a significant water quality effect in Lake Lanier due to the proposed reclaimed water outfall from the North AWRF. Finally, based on the slightly more favorable dilution observed at location LN1 (near the dam), and to prevent any further direct TP inputs to lake embayments, such as Shoal Creek, it is recommended that the diffuser be located at the LN1 site.

References

CH2M HILL, 1996. Technical Memorandum: Evaluation of Temperature Effects of the North AWRF Discharge. Atlanta, Georgia.

EPA, 1997. *Compendium of Tools for Watershed Assessment and TMDL Development.* Washington, DC (EPA841-B-97-006).

LimnoTech, Inc.(LTI), 1998. *Development of Linked Watershed and Water Quality Models for Lake Lanier.* Ann Arbor, Michigan.

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Appendix C

Public Information and Input (bound separately)

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Appendix D

Antidegradation Evaluation

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Executive Summary

The Gwinnett County Department of Public Utilities (DPU) is proposing to expand the North Advanced Water Reclamation Facility (AWRF) and to construct a new reclaimed water pipeline to return 40 million gallons per day (mgd) of highly reclaimed water to Lake Sidney Lanier (Lake Lanier). This Antidegradation Evaluation, is supported by the following documents (the North AWRF Expansion and Reclaimed Water Pipeline Design Development Report (DDR), June 1999; and the North AWRF Expansion and Reclaimed Water Pipeline Environmental Information Document (EID), June 1999), and has been prepared to comply with the Georgia Department of Natural Resources (DNR) Environmental Protection Division's (EPD) requirements for planning of proposed projects. As part of the permit application process, review of this Antidegradation Evaluation and other supporting documents will be conducted by the EPD.

The basis of the antidegradation evaluation is found in the Georgia Rules and Regulations for Water Quality Control, 391-3-6-.03(2)(b). In summary, this provision applies to waters in the State whose existing quality is better than the minimum levels established in the water quality standards. The provision goes on to state that these waters will be maintained at high quality, and that existing instream water uses and the level of water quality necessary to protect the existing uses will be maintained and protected. The State has the power to authorize new discharges that protect these beneficial uses when it is demonstrated that the project will provide necessary social or economic development, and also that the level of treatment required is the highest and best practicable under existing technology to protect existing beneficial water uses.

As this antidegradation evaluation and the associated DDR and EID demonstrates, the return of reclaimed water to Lake Lanier from the proposed North AWRF expansion protects water quality and enhances existing beneficial uses by providing a reliable water resource to enhance lake levels. The no discharge alternatives considered in Gwinnett's evaluation were more costly, less reliable, less protective of public health and the environment, and reduced available water resources in the region. For example, if consumptive use water withdrawal permits are implemented by EPD, every gallon of reclaimed water that is land applied is unavailable for use, and therefore requires costly (if even available) additional storage and water supplies. Rather than providing for continued economic growth at the expense of water quality, the proposed project would provide water supply benefits while meeting both economic and environmental goals.

The socio-economic analysis as configured by EPD does not conclusively show that a no-discharge option would be likely to interfere with economic growth and development in Gwinnett County. Other issues and constraints, such as the unavailability of sufficient land, would preclude the implementation of a no-discharge system capable of handling a 40-mgd capacity. Therefore the proposed project, based on the concepts of indirect water reuse, is the recommended management option and is considered to be supportive of EPD's comprehensive water resources objectives in the Chattahoochee Basin.

The proposed expanded North AWRF would provide a high treatment level for a design total of 60 million gallons per day (mgd) of reclaimed water (20 mgd currently and 40 mgd additional) and produce reclaimed water suitable for indirect water reuse. The existing release location is on the Chattahoochee River, where the North AWRF's reclaimed water is combined with Crooked Creek Water Reclamation Facility's (WRF's) reclaimed water. The proposed return location for the North AWRF's 40 mgd of additional reclaimed water is in Lake Lanier, the County's sole water supply source. Therefore the proposal reduces interbasin transfer as well as decreases the net loss of water in the Chattahoochee Basin. This proposal is consistent with the EPD's stated strategy to increase return flows to the upper Chattahoochee Basin in order to help meet water resources needs in the basin.

Use of an advanced level of treatment (best available technology) and multiple treatment processes (so that each pollutant must pass through at least two barriers in the process) would preclude potential reclaimed water impacts on the lake. This treatment would consist of advanced secondary treatment technologies (biological) followed by tertiary (physical/chemical or membrane) treatment technologies. Numerous reliability measures have also been incorporated in the North AWRF location and design. For example, in addition to the multiple processes as barriers to pollutants, the facility has multiple units of each treatment process such that if a unit is out of service the remaining units will still treat the full design flow of the North AWRF. The North AWRF has on-site storage tanks (60 million gallons total) that can be used to hold reclaimed water from several points in the process. The current 20-mgd facility has two independent power supply feeds, as well as backup power generation, to ensure power is available for all key processes.

Finally the location of the facility also serves to protect the lake. The North AWRF site, and the sewer collection system draining to the facility, is not in the Lake Lanier watershed and therefore does not drain to the lake. The highly treated reclaimed water leaving the facility must still be pumped to the lake, avoiding the possibility of incompletely treated water going to the lake.

In the event of a spill the lake would not be affected. A spill at the North AWRF site that manages to evade the multiple backup processes and the 60 MG of storage could reach Ivy Creek, which eventually flows to the Chattahoochee River downstream of Lake Lanier. Any spill within the county's collection system would flow to the nearest basin or creek to its location and away from Lake Lanier.

The proposed return of reclaimed water will have no measurable effect on the water quality in Lake Lanier. This conclusion is based on comparison of the lake model results for numerous simulations both with and without the North AWRF outfall. In order to effectively assess water quality issues in Lake Lanier, the Lake Lanier Management Tool (LimnoTech, 1998) was developed and approved by EPD. The Lake Lanier Management Tool combines the watershed model GWLF with the reservoir model CE-QUALW2 into a model framework calibrated specifically for Lake Lanier. The projected increase in lake chlorophyll-a levels due to the proposed outfall are not technically measurable (modeled increase of less than 0.1 μg/L, when test methods for chlorophyll-a have an average detection limit of 0.2 μg/L). The reclaimed water released will also be much higher in dissolved oxygen (in spite of the slightly higher temperature) than the lake water, providing a net benefit to aquatic life in the lake.

Introduction and Project History

Since 1970, the County has experienced a population change from 72,349 to a current estimate of about 499,000 people. Projections for the year 2020 indicate that the population will reach 834,000 people, assuming a moderate growth scenario (Gwinnett County Department of Planning and Development, 1997).

The County's permitted total wastewater treatment capacity is 64.1 million gallons per day (mgd), including 5 mgd of capacity at DeKalb County's Pole Bridge Plant. To meet projected water reclamation needs, the County's Department of Public Utilities (DPU) is developing a state of the art water reclamation facility in the vicinity of I-85 and I-985. This facility is referred to as the North Advanced Water Reclamation Facility (North AWRF). The initial design (currently permitted and under construction) provides 20 mgd of capacity. Additional treatment capacity is needed in the County around the year 2005. Because of the 5- to 7-year time period needed to permit and construct additional treatment capacity, the County is moving forward with permitting this proposed expansion of the North AWRF by 40 mgd to a total capacity of 60 mgd at the facility.

The DPU's plans to expand the North AWRF are consistent with the following documents:

- Gwinnett County Water and Wastewater Master Plan Update (CDM, 1998);
- Gwinnett County Water and Wastewater Master Plan (CH2M HILL, 1993);
- Atlanta Region Sub-Area Future Wastewater Treatment Feasibility Study (Atlanta Regional Commission, 1992); and
- Gwinnett County 2020 Comprehensive Plan (Gwinnett County Department of Planning and Development, 1997).

To satisfy anticipated wastewater treatment needs the 1993 *Gwinnett County Water and Wastewater Master Plan* (Master Plan) identified the need for additional wastewater treatment facilities. Two of these facilities were planned for the southern portion of the County and one for the northern portion. Because of concerns regarding interbasin transfer and water quality in the Yellow River basin, the request for a wasteload allocation for the proposed South Gwinnett WRF was denied by the Georgia Environmental Protection Division (EPD). The County then began planning to address wastewater needs by examining options for implementing the proposed North AWRF, which would reduce interbasin transfer and incorporate stringent treatment levels. A site selection process was completed in 1994 to determine the most feasible location for the North AWRF (Metcalf & Eddy [M&E], 1994). This site selection and characterization study evaluated three sites: Level Creek, west of Suwanee; Suwanee Creek, east of Suwanee; and Ivy Creek, east of Suwanee between I-985 and I-85. The latter site was selected for development of the North AWRF, and the plant is now under construction with a permitted capacity of 20 mgd.

The *Gwinnett County Water and Wastewater Master Plan Update* (Master Plan Update) was prepared in 1998 to address water supply and wastewater management issues from a total water resources management perspective. The Master Plan Update evaluated wastewater options ranging from land application systems to individual septage systems, and direct water reuse to indirect water reuse. In the end, it concluded that the County needs to pursue a strategy of returning high quality reclaimed water to the basin of origin, with indirect and/or direct reuse on the horizon to satisfy long-term water resource needs in the region.

All of the County's water comes from Lake Lanier, in the Chattahoochee River Basin. Water in this basin flows to the Gulf of Mexico. However, most of the County, and most of its smaller WRFs, are located in other river basins that eventually flow to the Atlantic Ocean. This interbasin transfer reduces the amount of water available for users downstream in the Chattahoochee River Basin. Therefore, it is important for the County to increase the return of highly treated reclaimed water to the Chattahoochee River Basin to reduce interbasin transfer and supplement regional water resources.

The proposed expanded North AWRF would provide a high treatment level for a design total of 60 mgd of reclaimed water (20 mgd currently and 40 mgd additional) and produce reclaimed water suitable for indirect water reuse. The existing release location is on the Chattahoochee River, where the North AWRF's reclaimed water is combined with Crooked Creek Water Reclamation Facility's (WRF's) reclaimed water. The proposed return location for the North AWRF's 40 mgd of additional reclaimed water is in Lake Lanier, the County's sole water supply source. Therefore the proposal reduces interbasin transfer as well as decreases the net loss of water in the Chattahoochee Basin. This proposal is consistent with the EPD's stated strategy to increase return flows to the upper Chattahoochee Basin in order to help meet water resources needs in the basin.

Use of an advanced level of treatment (best available technology) and multiple treatment processes (so that each pollutant must pass through at least two barriers in the process) would preclude potential reclaimed water impacts on the lake. This treatment would consist of advanced secondary treatment technologies (biological) followed by tertiary (physical/chemical or membrane) treatment technologies. Numerous reliability measures have also been incorporated in the North AWRF location and design. For example, in addition to the multiple processes as barriers to pollutants, the facility has multiple units of each treatment process such that if a unit is out of service the remaining units will still treat the full design flow of the North AWRF. The North AWRF has on-site storage tanks (60 million gallons total) that can be used to hold reclaimed water from several points in the process. The current 20-mgd facility has two independent power supply feeds, as well as backup power generation, to ensure power is available for all key processes.

Finally the location of the facility also serves to protect the lake. The North AWRF site, and the sewer collection system draining to the facility, is not in the Lake Lanier watershed and therefore does not drain to the lake. The highly treated reclaimed water leaving the facility must still be pumped to the lake, avoiding the possibility of incompletely treated water going to the lake.

In the event of a spill the lake would not be affected. A spill at the North AWRF site that manages to evade the multiple backup processes and the 60 MG of storage could reach Ivy

Creek, which eventually flows to the Chattahoochee River downstream of Lake Lanier. Any spill within the county's collection system would flow to the nearest basin or creek to its location and away from Lake Lanier.

Design features planned for the proposed North AWRF expansion create a highly reliable operation while consistently producing reclaimed water of high quality. Some of these design features which focus on reliably producing an effluent meeting the specified quality requirements include:

- Meeting or exceeding EPA Class I reliability and redundancy requirements
- Dual power feeds as well as on-site backup power generation
- Flow equalization
- Diversion and storage (80 MG total) of in-plant flows
- Continuous real-time monitoring of key performance parameters
- Emergency storage of treated effluent for additional testing (if needed) prior to release to the Chattahoochee River or Lake Lanier
- Multiple treatment barriers to each pollutant
- Multiple unit process treatment and flow routing flexibility

The existing components and additional components that would comprise the proposed expanded North AWRF are described in detail in the DDR (CH2M HILL, 1999).

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Alternatives Analysis

Need for Capacity. According to the 1998 Master Plan Update (CDM, 1998), by the year 2000, Gwinnett County will have a total of 64 mgd average daily maximum month flow (ADMMF) of permitted wastewater treatment capacity. If the County grows according to the current population projections, the projected wastewater flow (including the recommended three-year of 85 percent capacity margin) will be as high as 70 mgd ADMMF by the year 2005. This will exceed the 2005 capacity of 64 mgd, indicating the County will need to expand its treatment facilities.

Several water reclamation alternatives were examined through the various Master Plans and EIDs referenced in Section 1 for both siting the existing North AWRF and for various reclaimed water release options. The following paragraphs describe the evaluation process used recently in the Master Plan Update. For additional information on this public involvement process and the evaluation of options, refer to the EID and the Master Plan Update.

Master Plan Update Advisory Panel. A Water and Wastewater Master Plan Update Advisory Panel was developed to help evaluate water supply, reclaimed water release and reuse options, and included a diverse group of stakeholders. Representatives of the following groups were included in the Advisory Panel:

- **Homeowners Associations:** representing homeowners in Gwinnett County
- **Business Community:** representing business owners and operators in Gwinnett County.
- **Development:** representing members of organizations related to development in Gwinnett County.
- **Large Water Users:** representing schools, businesses, and industries in Gwinnett County which consume large quantities of water daily
- **Gwinnett County Cities:** representing the 15 incorporated municipalities within Gwinnett County
- **Environmental Organizations:** representing environmental organizations and groups that are interested in Gwinnett County.
- **Citizens-at-Large:** representing residents of Gwinnett County who are not members of any of the other stakeholder groups (CDM, 1998).

Preliminary List of Options. Potential options were developed by the Advisory Panel during a brainstorming session. The Advisory Panel initially listed potential reclaimed water release options regardless of the perceived feasibility or cost of implementation. A no action option (individual on-site wastewater disposal systems) was also evaluated, as discussed below. The following potential options were initially identified:

1. Blended Reuse/Designated Single-Purpose Reservoir
2. Pipe-to-Pipe Direct Reuse

3. Blending Reuse Without a Reservoir-Blended in Tank/Plant Site
4. Blending/Reuse using Lake Lanier
5. Discharge to Chattahoochee River Basin
6. Discharge to Yellow River Basin
7. Land Application-Traditional Systems/Irrigation
8. Consumptive Industrial or Irrigational Reuse
9. Regional Cooperation
10. Mulberry Basin
11. All Atlantic Slope Basins
12. Groundwater Injection
13. Hybrid Reuse Alternatives
14. Locate Discharges above Water Intake
15. Pollution Trading

Refined List of Options. At a subsequent meeting, the Advisory Panel combined several of the alternatives into a generalized short-list. The short list was finalized as follows:

- Blended Reuse
- Direct Reuse
- Discharge to Lake Lanier
- Discharge to Chattahoochee River
- Discharge to Yellow River
- Land Application
- Regional - Pole Bridge to South River
- Other Atlantic Slope Discharge

No Discharge Alternative: No Action (Septic Tanks). A "no action" alternative would require new dwellings to install private septage systems to handle their wastewater. Gwinnett County currently has 80,000 to 90,000 individual onsite wastewater disposal systems (septic tanks). In addition, several independent entities within the County own and operate their own small package wastewater treatment plants and have discharge permits issued by the EPD (CDM, 1998). Private package plants typically cannot provide the level of treatment obtainable by municipal plants.

On-site septic systems require large land areas, have high failure rates, are incompatible with mixed-use zoning, and are very costly to retrofit to sewer systems. Additionally, the soil conditions in the area are not conducive to reliable long-term septage system performance. Septic systems do not provide the nutrient removal or disinfection that water reclamation facilities provide. As a result, these systems pose a potential threat to public health and could result in the degradation of water quality in area streams.

Furthermore, the current goal of the County is to reduce the number of septic tank systems to 10 percent of the total homes and businesses over the next 50 years. Forcing future development to be reliant on either package systems or septic systems would not be compatible with existing goals and objectives of the County's Master Plan. Therefore, onsite wastewater treatment systems were not considered a preferred alternative by the Advisory Panel.

No Discharge Alternative: Nonpotable Reuse and Conservation. Consumptive non-potable industrial or irrigational reuse and water conservation were agreed to be integral components

of all reclaimed water release options. In implementing nonpotable reuse, the County requested an urban reuse permit from EPD to support marketing of the reclaimed water flowing down the reuse pipeline from the North AWRF to the Chattahoochee River at Crooked Creek. The County has also performed a pricing study, and is actively marketing the effluent to potential customers along the pipeline route and around the North AWRF.

No Discharge Alternative: Land Application Systems. Under this alternative, reclaimed water would be applied to land. Pump stations and force mains would be required to deliver the water to the sites. Several studies on the feasibility of land application for disposal of future reclaimed water have been completed for Gwinnett County. The 1993 Water and Wastewater Master Plan evaluated land application as an option for the southern portion of the County. The study determined that land application was not viable for Gwinnett County due to the low application rates, large land area requirements, steep topography, high land cost, and limited availability of large tracts of land suitable for land application.

An additional alternatives analysis for land application systems (LAS) was performed by DPU in the *Land Application Alternatives Evaluation for the Proposed North Advanced Water Reclamation Facility* technical memorandum (CH2M HILL, 1996). This analysis showed that there were significant impediments to developing large-scale LAS in the County, notably due to the lack of land available for this activity. This study found that land tracts available in the County could not support the 20-mgd initial phase design capacity of the North AWRF, and that the present worth cost was significantly higher than a release to the Chattahoochee River. Additionally, land application scored less favorably based on non-monetary criteria. For example, land application did not support the EPD strategy for return flows to meet the anticipated ACF water allocation formula being negotiated with the states of Alabama and Florida. Land application is a depletive disposal method and has essentially the same effect as an interbasin transfer from the Chattahoochee River Basin. The Advisory Panel generally did not view this as a preferred option.

No Discharge Alternative: Direct Reuse. Direct potable reuse of water (reclaimed water directly released into the water distribution system) also was considered in the evaluation. Several factors, however, were cited as concerns with direct potable reuse:

- Direct reuse is not a long-term, proven technology in the United States; whereas, indirect reuse has been shown by over 18 years of data to protect rivers and lakes as well as public health.
- There is no existing regulatory framework for direct reuse anywhere in the Country. Even Florida and California, the national leaders in water reuse, are not contemplating regulations to address direct reuse.
- The public needs much more information and familiarity with the concept of direct reuse before it can gain a meaningful level of acceptance.

Therefore, direct potable reuse was the least preferred option in the near term by the Advisory Panel and the County.

Preferred Options: Chattahoochee River and Lake Lanier. The County and Advisory Panel recommended that the County pursue several reclaimed water release options in the near-term planning period to maintain flexibility, should unforeseen circumstances arise during the

permitting process. Collectively, the Advisory Panel preferred the Chattahoochee River, and next Lake Lanier, for potential near-term release locations. These options also received high preference ratings in the mid- and long-term. Other options, such as blended reuse, were recommended for consideration in the mid- and long-term.

Nonpotable reuse should be pursued whenever possible, although it cannot meet a large percentage of the needs for the County. The demand for reclaimed water is low relative to the amount of reclaimed water available, and can be seasonal or intermittent. Therefore this option still necessitates obtaining NPDES permits.

Steps in Implementing Preferred Options. In implementing nonpotable reuse, the County requested an urban reuse permit from EPD to support marketing of the reclaimed water flowing down the reuse pipeline from the North AWRF to the Chattahoochee River. The County has also performed a pricing study, and is actively marketing the effluent to potential customers along the pipeline route and around the North AWRF.

In implementing the preferred options, the County requested a preliminary wasteload allocation (precursor to a permit application) to the Chattahoochee River in the fall of 1998 as part of the next increment of expansion of the North AWRF to meet projected demands by 2005. Because permitting and construction can take up to seven years, it was critical to begin this process. The EPD responded verbally, stating that at the present time it would not consider new or expanded NPDES permits to the Chattahoochee River until it had developed a comprehensive strategy with all dischargers to the river to reduce loads and improve water quality. The Chattahoochee River from below Buford Dam to below Atlanta is proposed to be recategorized on the State 305(b) lists as a 303(d) active status impaired water.

The EPD then strongly recommended that Gwinnett County pursue its other preferred near-term alternative, return of reclaimed water to Lake Lanier. Lake Lanier has good water quality, and the high quality of the North AWRF reclaimed water would protect the quality of the lake. Lake Lanier was the preferred water supply option for Gwinnett County of both the Advisory Panel and DPU. The Lake Lanier alternative has the additional advantage of storing the reclaimed water high in the ACF system to meet the objectives outlined in the water allocation negotiations between Georgia, Alabama, and Florida.

Conclusions. Numerous wastewater management options were evaluated in the planning studies conducted by Gwinnett County during the 1990s. These studies have consistently shown that an integrated approach with return of highly treated reclaimed water to the Chattahoochee River Basin is the preferred option for fiscal, environmental, and resource management reasons. This proposed expansion of the North AWRF is consistent with these plans, and provides an effective means of enhancing limited water supplies in the region.

The no discharge options of consumptive nonpotable reuse and conservation were deemed critical to all options and are currently being implemented. The other no discharge alternatives evaluated (e.g., no action, land application, direct reuse) were not preferred for a variety of reasons, as described in further detail in the EID and the Master Plan Update.

Environmental Effects

The environmental effects of expanding the North AWRF and constructing the reclaimed water pipeline are described in detail in the EID. No long term adverse impacts were identified as a result of the proposed project. The following paragraphs summarize some of the key findings related to water quality in Lake Lanier with respect to the proposed outfall.

Phosphorus. The *Diagnostic Feasibility Study of Lake Sidney Lanier, Georgia* (Kundell, 1998), commonly called the Lanier Clean Lakes Study, includes an extensive report of the water quality conditions in Lake Lanier. The report documents that phosphorus is the key pollutant of concern in Lake Lanier, and that levels are generally low in the open lake but higher in embayments. Based on phosphorus levels alone, the trophic status of the lake is mesotrophic. This is a moderate rating indicating that water quality is generally good.

The Environmental Protection Agency (EPA) published a number of water quality criteria to assist states in developing water quality standards (EPA, 1986). Nutrient levels in natural waters can vary considerably by region, and states have taken different approaches to developing total phosphorus standards. For example, total phosphorus concentration criteria adopted by states ranged from 0.01 mg/L to 0.30 mg/L depending on the water body type. (EPA, 1988).

The general criteria in the EPA guidance (EPA, 1986) included total phosphorus concentrations of 0.05 mg/L for a stream at the point it enters an impoundment, 0.10 mg/L for free standing waters, and 0.025 mg/L within the body of the lake. In Georgia, a different approach of phosphorus criteria is used. State statute requires that phosphorus related water quality criteria for impoundments be in the form of a chlorophyll-a (algae) concentration, total phosphorus loading in pounds per acre foot per year, and total phosphorus loading from each major tributary in pounds per year. There are no concentration-based phosphorus criteria, perhaps because the long-term total lake loading is more important for controlling the eutrophication process than a concentration reading at any location at any point in time.

Total phosphorus refers to all forms of phosphorus (i.e., organic and inorganic) found in both dissolved and particulate phases. Only a small portion of this total phosphorus is in a form readily bio-available, or able to promote algal growth. It is widely recognized that the dissolved inorganic phosphate (dissolved orthophosphate) fraction in natural waters is the most bio-available form of phosphorus (Krenkel and Novotny, 1980). The common measures for phosphorus (total phosphorus and total orthophosphate) over-estimate the bio-available fraction of phosphorus. Therefore concentration measures and regulatory limits on total phosphorus are very conservative with respect to preventing unacceptable levels of algal growth.

A suite of mathematical models was applied to evaluate the water quality impacts of the proposed release into Lake Lanier. Several proposed outfall locations were evaluated using various combinations (scenarios) of point source and non-point source loadings using the Lake

Lanier Management Tool (LimnoTech, 1998). Near-field water quality effects were also evaluated at the proposed outfall locations using a dilution model (PLUMES).

The Lake Lanier Management Tool was developed by LimnoTech, Inc. (LTI) as part of a study initiated by the Upper Chattahoochee Basin Group (UCBG) and has been reviewed by Georgia EPD and a number of stakeholders interested in Lake Lanier. The entities making up the UCBG at the time of sampling and model development and calibration were Forsyth County, Hall County, City of Gainesville, Lake Lanier Association, and Gwinnett County. This model was selected for the evaluation of lake-wide water quality effects from the proposed outfall because it represents an established and agency agreed upon model of conditions specific to Lake Lanier.

The model demonstrates that the reclaimed water released from the proposed North AWRF expansion would not measurably increase either the whole lake, or Segment 19 near the dam, summer average TP and chlorophyll-a concentrations. This conclusion is based on the comparison of baseline scenarios with the exact same baseline scenario conditions but adding the proposed North AWRF outfall. The model was applied using the 1984 to 1988 five-year meteorological period and various current and future land use conditions. This meteorological period was previously selected as the critical environmental design period for the application of the Lake Lanier Management Tool (LTI, 1998) in part because it bracketed the worst drought to occur in the lake's history. The critical meteorological record resulted in lake surface water elevations that oscillated between 1,063 feet MSL and 1,074 feet MSL with an average of 1069 feet MSL.

The slight differences between the chlorophyll-a levels in the lake for scenarios with and without the North AWRF outfall are not only small (0.1 μg/L or less) in both absolute and percentage terms, they may also be considered insignificant from a practical standpoint. The average detection level for the chlorophyll-a laboratory test is 0.2 μg/L, so the projected change in the lake is less than detectable levels. Similarly, the differences between TP concentrations in the lake for scenarios with and without the North AWRF outfall are between 0.1 μg/L and 0.2 μg/L. The detection level for the TP laboratory test used in the UCBG lake sampling effort is 4 μg/L, so the projected change in the lake is less than detectable levels even using stringent laboratory methods. By comparison a typical laboratory TP detection level (as used by EPD and others) is 20 μg/L.

Under all scenarios evaluated, the modeled TP concentrations in the main lake are below the general EPA criterion of 0.025 mg/L. In fact, the projected TP concentrations under the worst case scenario modeled (full development, maximum discharges, and without stormwater controls) are only 0.012 mg/L at the outfall. All of the other scenarios modeled are considerably lower.

Fecal Coliform. A summary of the fecal coliform levels in Lake Lanier and the surrounding tributaries is also provided in the Clean Lakes study (Kundell, 1998). A review of historical data since 1973 by the Clean Lakes Group for evaluating long-term trends of fecal coliform in the lake showed no significant seasonal variations, no significant trends, and low annual mean concentrations (i.e., < 50 Coliform Forming Units [CFU]/100 mL). The data showed that the high bacterial densities in streams and the lake were unrelated to municipal discharges. It was concluded from these data that high bacteria concentrations in most of the monitored streams are associated with other activities common in these watersheds. Non-point sources, most

notably septic system drain fields and runoff from agricultural operations, were cited as possible sources.

The proposed North AWRF expansion will protect the lake from additional fecal coliform inputs. Numerous reliability measures have been incorporated in the North AWRF location and design. The multiple barriers which reduce or remove enteric organisms (including fecal coliform and pathogens) at the North AWRF include biological treatment in multiple anoxic and anaerobic zones, high pH lime addition, clarification, recarbonation, deep bed filtration, ozonation, carbon adsorption, and reozonation. This combination of processes will produce reclaimed water with fecal coliform levels well below the proposed limits, and will not degrade the lake's quality. In addition to the multiple processes as barriers to pollutants, the facility has multiple units of each treatment process such that if a unit is out of service the remaining units will still treat the full design flow of the North AWRF. The North AWRF has on-site storage tanks (60 million gallons total) that can be used to hold reclaimed water from several points in the process if it does not meet specifications. The current 20 mgd facility has two independent power supply feeds, as well as backup power generation, to ensure power is available for all key processes.

Finally the location of the facility also serves to protect the lake. The North AWRF site, and the sewer collection system draining to the facility, is not in the Lake Lanier watershed and therefore does not drain to the lake. Therefore in the event of a spill, the lake would not be affected. The highly treated reclaimed water leaving the facility, having met all of the reliability and permit requirements, must still be pumped to the lake, avoiding the possibility of improperly treated water going to the lake. Therefore no increase in fecal coliform levels will occur as a consequence of the proposed project.

Temperature and Dissolved Oxygen. Water quality impacts on aquatic life would be limited to minor increases in temperature in the immediate area of the outfall in Lake Lanier. Potential impacts would be minimized through the design and installation of an appropriate diffuser. The reclaimed water released will be much higher in dissolved oxygen (in spite of the slightly higher temperature) than the lake water, providing a net benefit to aquatic life in the lake.

Summary. No measurable impact to the water quality of Lake Lanier is projected from the proposed return of reclaimed water associated with the expanded North AWRF. The proposed expansion would add approximately 40 mgd of highly reclaimed water high in dissolved oxygen to the lake. Near-field modeling indicated no increase in ambient water temperatures that would impact aquatic life and a very high dilution factor close to the diffuser. The proposed release from the North AWRF would also have the added benefit of additional clean water inflow for multiple beneficial uses, including recreation, water supply, fishing/wildlife, and hydropower.

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Socio-Economic Analysis

As required by the Clean Water Act, EPD adopted procedures for the implementation of a statewide antidegradation policy. The socio-economic portion of the antidegradation policy requires that the wastewater utility demonstrate that the additional point source load is necessary to accommodate economic and social development in the community. In addition, it must be demonstrated that the development of a no-discharge alternative such as land application would be cost prohibitive and would be considered an economic hardship on the community. Neither of these criteria address the issues of water supply and water reuse. The proposed North AWRF expansion project achieves important water quality (reuse and conjunctive use) and water quantity (return to basin of origin) objectives in addition to meeting all of the requirements of EPD's antidegradation review. The following analysis is being provided in support of the NPDES permit application.

Specific guidance and worksheets were developed by EPD in performing this socio-economic analysis. Three major steps are identified in the guidance:

1. Verify project costs and calculate the annual cost of the no-discharge alternative.

2. Determine if the no-discharge alternative would interfere with development in the community.

3. Determine if development in the community is important from both a social and economic perspective.

Cost Analysis of No-Discharge Alternatives

The DPU previously evaluated land application options as an alternative to discharge. This evaluation was performed to support the initial 20-mgd permit application for the North AWRF. A thorough review of land application sites (all potential restricted access sites were located in Alcovy Basin, a water supply watershed) determined that restricted access sites can only provide approximately 16.5 mgd of reuse capacity. If golf course irrigation is included, the estimated maximum reuse capacity in the County is 18.0 mgd, which is still significantly less than future wastewater management needs. Therefore, in order to obtain 20-mgd capacity, the land application and no-discharge alternatives included treatment of 2.0 mgd to indirect potable reuse standards suitable for discharge in either the Chattahoochee River or Lake Lanier, along with 1.5 mgd of wet weather discharge of effluent intended for golf course irrigation.

To analyze a 40-mgd increase in design flow at the North AWRF, the cost basis and rationale used in the previous no discharge alternative analysis were used. This basis of analysis is considered valid because present construction costs and the issues surrounding siting of land application alternatives are virtually equivalent to those evaluated with the original 20-mgd facility. The following alternatives are evaluated in this antidegradation evaluation report.

Alternative 1 - Expand the capacity of the North AWRF with treatment to indirect potable reuse standards and discharge of 40 mgd to Lake Lanier.

Alternative 2 - Optimum restricted-access land application of 16.5 mgd in conjunction with golf course irrigation of 1.5 mgd. Treatment to indirect potable reuse standards with discharge of flows exceeding land application capacity to Lake Lanier.

Storage and Pumping. Storage facilities are required at the North AWRF for flow equalization. An 8-MG lined reservoir was assumed to provide flow equalization for the effluent to be pumped to the restricted-access land application sites. This volume represents about one-half of the restricted-access MMADF of 16.5 mgd. A 1.5-MG storage tank would equalize the advanced wastewater treatment effluent flow to the golf courses. Any effluent not meeting urban water reuse standards would be discharged to the restricted-access storage reservoir and applied to the restricted-access land application sites.

The following transmission pump stations would be required at the North AWRF:

- A pump station to transfer the advanced wastewater treatment effluent from the North AWRF to Lake Lanier; and
- A pump station to transfer water from the equalization reservoir to the five golf courses and land application sites.

Restricted-Access Site Storage Reservoirs. Based upon the preliminary water balance, approximately 44 days (692 MG) of temporary storage are required. Adding 15 percent for unusable volume, the total constructed storage volume is 796 MG. Individual reservoirs would be constructed at each site.

Land Application Site Irrigation Systems. The capital cost of this alternative (for 18 mgd MMADF) is estimated at $441 million. The total annual operations and maintenance (O&M) cost for this alternative is estimated to be $16.8 million. A detailed summary of estimated capital and O&M costs for this alternative is provided in the Appendix.

Cost Summary. The results of the present worth comparison are presented in the following table. These results indicate that Alternative 1 is the most cost-effective alternative. Alternative 1 has the lowest capital cost and annual O&M costs when compared to Alternative 2.

Note also that all potential costs are not included in the no-discharge alternative. For example, if consumptive use water withdrawal permits are implemented as planned by EPD, every gallon of reclaimed water that is land applied is unavailable for use. Therefore additional water supplies will have to be pursued, if available at all. This will result in additional costs for storage and water supplies, and additional environmental impacts in developing these supplies.

Present Worth Comparison of
North AWRF Effluent Management Alternatives

Alternative	Capital ($1,000)	Annual O&M ($1,000)	Present Worth of O&M ($1,000)	Total Present Worth ($1,000)
Alternative 1 (40 mgd) – Advanced wastewater treatment with discharge to Lake Lanier	220,000	18,104	225,616	445,616
Alternative 2 (40 mgd) - Optimum restricted-access land application and golf course reuse; remaining 22 mgd provided by AWT w/ discharge to surface water	441,213	16,779	209,104	650,317

Note: The capital and annual costs shown above are based on limited data and assumptions made at the planning level of the project; hence, they are "order-of-magnitude" estimates that include conservative allowances for project contingencies. These estimates form the basis for relative comparison among the alternatives, but should not be compared directly with other projects that have different needs and conditions.

Socio-Economic Analysis

Based on this cost analysis, the following cost summary was prepared for the antidegradation cost review.

No Discharge Alternative (rounded to nearest $ thousand)

Capital costs	$441,212,500
Interest rate for financing	5%
Time period for financing	20 years
Annualization factor	0.080242587
Annualized capital costs	$35,404,033
Annual O&M costs	$16,779,050
Total annualized cost	$52,183,083

Current pollution control costs and their impact on the average household are summarized below.

Current Pollution Control Costs (rounded to nearest $ thousand)

Total annual cost of existing pollution control (1998)	$82,021,000
Amount of existing costs paid by households	$79,896,000
Number of households (year 2000 estimate)	185,612
Annual cost per household (existing)	$430.45
Total annual cost of no discharge alternative	$52,183,083
Amount to be paid by households	$52,183,083
Annual cost per household (no discharge alternative)	$281.14
Total annual cost of pollution control per household	$711.59

A municipal preliminary screener was established by EPD to determine the ability of a community to pay for a no discharge alternative project. The municipal preliminary screener estimates the total per household annual pollution control costs as a percentage of median household income.

Total per Household Annual Pollution Control Costs

Total annual pollution control cost per household	$711.59
Median household income (adjusted to year 2000)	$57,000
Municipal preliminary screener	1.25%

Since this value exceeds 1.0 percent, the economic analysis proceeds to a secondary test. Data for this analysis are derived from current financial statements.

Current Financial Statements

Direct net debt	$80,440,000
Overlapping debt	$897,473,000
Market value of property	$34,127,311,145
Bond rating	AAA
County's unemployment rate (1995)	3.2%
National unemployment rate (1990)	4.3%
County's median household income (1990 census)	$41,500
Georgia's median household income	$35,000
Property tax collection rate	98.71%
Property tax revenues	$148,303,741
Overall net debt	$977,913,000
Overall net debt as a percent full-market value of taxable property	2.87%
Property tax revenues as a percent of full-market value of taxable property	0.43%

The results of the two tests are considered jointly and are an indicator of whether the community is anticipated to incur substantial impacts that interfere with development. The *Assessment of Substantial Impacts Matrix* was developed by EPD and looks at a combination of factors in determining whether the impacts can be expected to be substantial. With a municipal preliminary screener between 1.0 and 2.0 percent, the secondary score needs to be less than 1.5 if the impact is likely to interfere with development. Given the strong economic conditions in the County, implementing a no discharge alternative is not considered by EPD's criteria as likely to interfere with development. However, we believe the economic impacts are unclear and it is certainly in the best interest of the County, the metropolitan Atlanta region, and the State of Georgia to promote the development of indirect potable water reuse.

In general, an antidegradation analysis is performed when it is determined that maintaining high quality waters will preclude important economic and social development in the community. The proposed North AWRF project, while requiring antidegradation review by the

Georgia EPD, will maintain the high water quality standards in Lake Lanier and the Chattahoochee River Basin while providing for the projected economic growth in Gwinnett County.

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APPENDIX A

References

Atlanta Regional Commission. *Atlanta Region Sub-Area Future Wastewater Treatment Feasibility Study*. April 1992

Camp, Dresser, and McGee. *Gwinnett County Water and Wastewater Master Plan Update. Prepared for Gwinnett County Department of Public Utilities*. 1998.

CH2M HILL. *Gwinnett County Water and Wastewater Master Plan. Prepared for Gwinnett County Department of Public Utilities*. 1993.

CH2M HILL. *North Advanced Water Reclamation Facility Environmental Information Document. Prepared for Gwinnett County Department of Public Utilities*. February 1996.

CH2M HILL. *Reclaimed Water Pipeline for the North Advanced Water Reclamation Facility Environmental Information Document*. February 1996.

CH2M HILL/Jordan Jones & Goulding. *North Advanced Water Reclamation Facility Expansion and Reclaimed Water Pipeline Design Development Report*. March 1999.

CH2M HILL/Jordan, Jones & Goulding. *North Advanced Water Reclamation Facility Expansion and Reclaimed Water Pipeline Environmental Information Document*. May 1999.

Jordan, Jones & Goulding. *Ecology Report for the North AWRF Expansion and Reclaimed Water Pipeline*. Prepared for CH2M HILL. March 1999.

TRC Garrow Associates. *Reclaimed Water Pipeline Project Archaeological and Historic Architecture Survey*. Prepared for CH2M HILL. March 1999.

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APPENDIX B

Cost Estimates for Management Options

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Alternative 1		**Design Flow=**	**40 MGD**		
Advanced Wastewater Treatment					
Capital Costs					
Wastewater Treatment Costs		$ 4.00	per gal	$ 160,000,000	
Pump Station & Pipeline				$ 10,000,000	
Contingency				$ 25,000,000	
Engr. & Admin.				$ 25,000,000	
Total Capital Cost				**$ 220,000,000**	
O&M Costs					
				Annual Costs	**Present Worth**
Treatment	$ 1,150	per MG/year		$ 16,790,000	$209,240,512
Pump Station & Pipeline	$ 90	per MG/year		$ 1,314,000	$16,375,344
Total O&M Costs				**$ 18,104,000**	**$225,615,856**
Total for Alternative 1					**$ 445,615,856**

Alternative 2	**AWT Treatment**		**AWT Q=**	**23.5**	**mgd**			
	LAS		**Secondary Q=**	**16.5**	**mgd**			
Capital Costs								
AWT Treatment Costs			$ 4.00	per gal		$ 94,000,000		
Sec Treatment Costs			$ 2.50	per gal		$ 41,250,000		
P.S.. and Pipeline						$ 20,000,000		
Storage						$ 500,000		
LAS System						$ 56,000,000		
Contingency						$ 63,525,000		
Engr & Admin						$ 52,937,500		
Land						$ 113,000,000		
Total Capital Cost						**$ 441,212,500**		
O&M Costs						**Annual Costs**		**Present Worth**
AWT Treatment		$ 1,150	per MG			$ 9,864,125		$122,928,801
Secondary Treatment		$ 800	per MG			$ 4,818,000		$60,042,929
P.S. & Pipeline		$ 90	per MG			$ 771,975		$9,620,515
LAS		$ 130	per MG			$ 782,925		$9,756,976
Storage & Transmission		$ 90	per MG			$ 542,025		$6,754,830
Total O&M Costs						**$ 16,779,050**		**$209,104,050**
Total for Alternative 2								**$ 650,316,550**

ATL Publications Schedule
09/09/2003

DATE	NAME	PM	PUBS LEAD	GRAPHICS	PAGES	COPIES	BINDING	WP / REPRO M	T	W	T	F	M	DUE DATE	COMMENTS
Sep-2003	Eastman	Dudley	Bowers		?				W						Fast-burn letter proposal; needs PDFs created by 12-1 p.m.
Aug-2003	Gwinnett EA	Baughman	Dunagan	minor	140	11	2-in binder	R	W R	W R				10-Sep	hand deliver draft Wed AM
Aug-2003	Augusta IT Master Plan	Peagler	Dunagan	none	145	5	GBC		W	W	W R			12-Sep	internal draft--custom tabs to be done for the final
Aug-2003	Grrrows Bend EIS	Short	Dunagan	minor	235	40	?			W				17-Sep	being produced in NWO
Oct-2001	Seafarer Pipeline FERC Application	Jenkins	Dunagan	touch-ups to figures (Kai)	1408	16	clipped							18-Oct	Little or no work until about 9/03
Aug-2003	Rockdale County SWMP	King	Hepburn	Poster		1				R				10-Sep	AMEC/CH2M HILL was shortlisted for the Rockdale County Stormwater Management Program. Steve worked with Cody Wellons last week to create poster W082003017ATL for the presentation. Steve King has minor modifications and will provide changes to the GD on 9/9.
Sep-2003	St Johns County Environmental Services proposal	W. Ogburn	Hepburn	cover, tabs	50	TBD	Spiral			R				18-Sep	Working with Chuck Klice and Walt Ogburn on the St. Johns Count Envirnonmental Sercvices proposal. I will also obtain an electronic copy of the St. Johns River Design/Build WTP proposal to ensure consistency bf information. If time permits, production will be done in GA, if not production will be done by Chuck Klice and GNV production folks.
Jul-2003	Clayton County Water Authority Project Descriptions	R. Hirsekorn	Hepburn	none	none	none	none							ongoing	Ongoing support
May-2003	Rockdale County - Rockdale Water Resources (Master Plan)	S. Lavinder/D. Muckerman/P. Corleto	Hepburn	Cover, tabs, presentation (flash)	30	TBD	spiral							TBD	Working on the positioning (Storylining/Storyboard-ID project drivers, project issues, funding mechanism, selection process and competitor's strengths/weaknesses) with Pat, Steve, and Dave. The RFP is due out six weeks (end of August).
Aug-2003	City of Raleigh	Stowe	Hepburn	cover, tabs	50	5	Spiral							TBD	Awaiting RFP requirements.
Sep-2003	City of Raleigh Public Utilities Department, Johnson WTP Process Operations	Solomon	Hepburn/?	Cover	20	5					R			25-Sep	JD notified me that this RFP is coming. Not sure what what is required. Waiting further clarification.
Sept. 2003	Five Mile Creek Sampling Station Reconnaissance	Phil Sacco	K. Sanders		21									09-Sep	
Sept. 2003	CNC SWMU 607 CMS	D. Williamson	K. Sanders		80	14	1-inch				R			09-Sep	
Sept. 2003	AFP 6 Bedrock Tech Memo	S. Schultz	K. Sanders	cover	50		1.5-inch binder		R					10-Sep	
Aug. 2003	AFP 6 Bedrock Tech Memo RtC	S. Schultz	K. Sanders	cover	10		clipped			R				10-Sep	
Sept. 2003	Anniston Army Depot Training Document	B. Lawlor	K. Sanders		70		spiral							11-Sep	
Aug. 2003	CNC AOC 551 RtC	S. Naik	K. Sanders			14	clipped					R		12-Sep	
Sept. 2003	Joint Venture (Navy) Cost Proposal	S. Tsangaris	K. Sanders		~25									10-Sept.	
Aug. 2003	Jax FANG Final RI/FS Site 3E	Dan Marion	K. Sanders	cover, figures	270+		GBC							25-Aug.	
Aug. 2003	CNC - Dann Spariosu	D. Williamson	K. Sanders			1	CD-ROM		W					ongoing	need CD-ROM with PDFs of recent reports
Aug. 2003	AFP 6 Draft ICM Optimatization	S. Schultz	K. Sanders	cover			TBD							Sep	
Aug. 2003	AFP 6 Areal Thermography TM	S. Schultz	K. Sanders		10		TBD							Sept.	
Aug. 2003	Jax FANG Final SA Reports for Sites 10 and 11	Dan Marion	K. Sanders	cover											waiting on Response to Comments revisions
Aug-2003	City of Atlanta CSO	M. Rawls	McClintock	archives										15-Aug	Label CDs when Stacy is done.
Aug-2003	Menwith Hill Commanders Summary	K. Zender	McClintock	layout										19-Sep	making final revisions
Sep-2003	MCLB Albany	J. Orrell	McClintock	poster											shop poster to promote EMS. Use as template for Anniston
Sep-2003	Anniston Army Depot	J. Orrell	McClintock	poster											shop poster to promote EMS.
Sep-03	Camp Pendleton A76	Leens	Patterson	JA Jones has lead										15-Sep	Step 1 due Sept 15 Part 2 due Dec 3
Aug-03	Fort Polk Privatization FPR	Sorenson	Patterson	Yes - Revised covers, spines, CD labels and covers (McClintock)	100	TBD	none, just 3 hole punched				R	R		15-Sep	Prepare final proposal revisions
Sep-03	Badger AAP O&M	Leens	Patterson	Yes - TBD										03-Dec	Letter of interest submitted this week
Aug-03	Guam BOSS	Leens	Patterson	Yes - TBD	TBD									03-Dec	RFP coming out in October
Apr-04	Cape Canaveral LOSC	Leens	Patterson	Yes - TBD										April 30 2004	RFP coming out in December
Dec-03	Fort Bragg Privatization	Sorenson	Patterson	Cover, Tab										Dec 11 03	
Dec-03	Fort Riley Privatization	Sorenson	Patterson	Cover, Tabs										Dec 15 03	
Dec-03	Fort Drum Privatization	Sorenson	Patterson	Yes - TBD	TBD		Binder							Dec 16 03	
Feb-04	MCAS Cherry Point Privatization	Sorenson	Patterson	Cover, Tabs, support graphics	TBD									Feb 5 2004	
Feb-04	MCB Camp Lejeune Privatization	Sorenson	Patterson	Cover, Tabs, support graphics	TBD									Feb 5 2004	
	MCB Quantico Privatization	Sorenson	Patterson	Cover, Tabs, support graphics	TBD									Feb 5 2004	
Sep-2003	Nestle Waters TM	S. Johnson	Peek					R						09-Sep	
Sep-2003	ACT Summary Report and EIS		Peek												small doc this fall; EIS in the spring
Sep-2003	Hurlburt Field Planning 255	A. Davis	Peek / Wright	cover, tabs, graphics	100	10	spiral							19-Sep	

R = Repro
W = Word Processing

September 2003

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5	6
7	8 Cascade Rd Sarah E Confederate Rd - Sarah	9 Begin Gwinnett EA (D2) McGregor OU4 Area S CCR (bev) Bedrock Tech Memo (Karen)	10 Finish Gwinnett EA (D2) Start Augusta IT Master Plan (D2) Louisville IMR (bev) Holloman (bev) Bedrock Tech Memo RtC (Karen)	11 Fort Polk – jeanne Finish Augusta IT Master Plan (D2) CNC AOC 607 (Karen)	12 Fort Polk – jeanne Whiting Field CTO11 PCC (bev) CNC AOC 551 RtC (Karen)	13
14	15	16	17 Hurlburt Proposal (Sally)	18	19	20
21	22 USACE Mobile Design 255 - Rhonda	23	24	25	26	27
28	29	30	1	2	3	4

Supplemental Information

North Advanced Water Reclamation Facility Expansion and Reclaimed Water Pipeline

GWINNETT COUNTY
Department of Public Utilities
(678) 376-6700

October 24, 2000

Mr. Alan Hallum
Chief, Water Protection Branch
Georgia Environmental Protection Division
4220 International Parkway – Suite 101
Atlanta, Georgia 30354

RE: Modeling for New Diffuser Location in Lake Lanier

Dear Mr. Hallum:

Enclosed is the modeling analysis for the revised diffuser location in Lake Lanier, as requested. We believe that this analysis shows that the water quality standards for Lake Lanier will be met with the new diffuser location.

If you have any questions, please call me at 678.376.7154 or Frank Stephens at 678.376.7133.

Sincerely,

James H Scarbrough

James H. Scarbrough
Deputy Director
Planning, Permitting & Stormwater

Attachment

C: Chairman Hill
Charlotte Nash
Tommy Furlow
Frank Stephens

Memorandum

TO: Gwinnett County Department of Public Utilities

DATE: October 24, 2000

PROJECT: LANIC2

FROM: Dave Dilks
Dale Jones/CH2M HILL

COPIES:

SUBJECT: Modeling Analysis for the North Advanced Water Reclamation Facility: Revised Lake Lanier Outfall Location

SUMMARY

The Gwinnett County Department of Public Utilities (DPU) has applied for an NPDES permit to expand the 20 million gallons per day (mgd) North Advanced Water Reclamation Facility (North AWRF) to a capacity of 60 mgd. Treatment processes at this facility produce a high quality effluent suitable for indirect reuse. The current release location for the North AWRF is the Chattahoochee River, where the effluent is combined with effluent from the Crooked Creek Water Reclamation Facility (WRF). The proposed outfall location for the 40 mgd expansion of the North ARWF is a return to Lake Lanier.

Three alternative deep water discharge locations to Lake Lanier were previously evaluated (CH2M-Hill, 1999), and projected to cause no measurable effect on water quality in Lake Lanier. This memorandum documents the evaluation of a new discharge location. This location was selected through coordination with Georgia Department of Natural Resource's (GA DNR) Environmental Protection Division (EPD) and Wildlife Resources Division (WRD).

A suite of mathematical models was applied to evaluate the potential water quality impacts of this new outfall location. The new location was evaluated using the Lake Lanier Management Tool (LimnoTech 1998). Near-field water quality effects were also evaluated at the proposed outfall location using a dilution model (PLUMES). The following sections describe the modeling conducted for this evaluation and summarize the results of the water quality analysis.

The results of this analysis demonstrate that the new proposed location of the North AWRF outfall will maintain compliance with water quality standards for chlorophyll-a, total nitrogen (TN), total phosphorus (TP), dissolved oxygen (DO), and temperature within segment 19 of Lake Lanier. The discharge will have a negligible effect on the overall water quality of Lake Lanier.

APPLICATION OF MODELS

Outfall Location

The outfall location under consideration is located at approximately 1.2 miles upstream from Buford Dam, near the mouth of Shoal Creek. The diffuser will be located at the top of a submerged ridge at a depth of approximately 10 meters below the normal pool elevation of 1070 ft MSL.

Lake Lanier Management Tool: GWLF/CE-QUAL-W2

The Lake Lanier Management Tool was developed by LimnoTech, Inc. (LTI) as part of a study initiated by the Upper Chattahoochee Basin Group (UCBG) and has been reviewed by Georgia Environmental Protection Division (EPD) and the stakeholders associated with Lake Lanier. This model was selected for the evaluation of lake-wide water quality effects from the proposed discharge because it represents an established agency agreed upon model of conditions specific to Lake Lanier.

The Lake Lanier Management Tool is comprised of the watershed model GWLF and the water quality model CE-QUAL-W2 bundled into a single system. The watershed model component of the Lake Lanier Management Tool simulates pollutant contributions from the watershed based on factors such as land use, soils type, slopes, precipitation, septic systems and other wastewater treatment facilities located in the watershed. The lake water quality model component subsequently uses pollutant contributions predicted by the watershed model to simulate the response of these pollutant contributions in terms of in-lake water quality. The Lake Lanier Management Tool was applied to evaluate the effect on in-lake total phosphorus (TP) and chlorophyll-a concentrations of the proposed 40 mgd (monthly maximum) return of North AWRF reclaimed water to the lake.

GWLF (developed by Cornell University) is one of the watershed models included in the EPA's Compendium of Tools for Watershed Assessment and TMDL Development (EPA, 1997). This model mechanistically simulates water and sediment movement, and uses simple empirical relationships to describe chemical behavior (LTI, 1998). The model includes surface run-off, groundwater flow sources, and nutrient loads from both point sources and septic systems. The model uses simple transport routing, based on the delivery ratio concept. A version of GWLF is currently being distributed by EPA's Office of Wetlands, Oceans and Watersheds (EPA, 1997). In the Lake Lanier application, daily streamflow and daily nutrient loads are used to compute daily nutrient concentrations from the contributing watersheds.

CE-QUAL-W2 (developed by the U.S. Army Corps of Engineers) is also included in the EPA's Compendium of Tools for Watershed Assessment and TMDL Development (EPA, 1997). CE-QUAL-W2 is a two-dimensional, laterally averaged hydrodynamic and water quality model. The model predicts variations in water movement, temperature, and constituents both longitudinally and vertically. This model is suitable for stratified waterbodies like reservoirs and narrow estuaries where large variations in lateral velocities and constituents do not occur (EPA, 1997). The model was specifically

adjusted to address the unique characteristics of Lake Lanier such as lateral segmentation around mid-lake islands, and changes to water quality kinetics.

Both models were successfully calibrated and verified (LTI, 1998). Detailed information on the development and application of the GWLF and CE-QUAL-W2 models is documented in the report Development of Linked Watershed and Water Quality Models for Lake Lanier (LTI, 1998). These two models were combined in the user-friendly interface of the Lake Lanier Management Tool to facilitate their use in assessing management alternatives, including watershed protection and the addition of new outfalls to the lake.

For the purpose of evaluating Gwinnett's proposed permit application, the Lake Lanier Management Tool was used to determine the effect of the proposed North AWRF reclaimed water release on the TP, chlorophyll-a, TN, and DO concentrations in Lake Lanier. The model was applied using the 1984 to 1988 five-year meteorological period. This meteorological period was previously selected as the critical environmental design period for the application of the Lake Lanier Management Tool (LTI, 1998). The critical meteorological record resulted in lake surface water elevations that oscillated between 1,063 feet MSL and 1,074 feet MSL with an average of 1069 feet MSL. Point source discharge loads used in the model are conservatively estimated (i.e. higher than the actual loads), since they do not consider reductions in permit limits that will be required by GA EPD for several point source discharges to Lake Lanier as a part of the planned wasteload allocation.

Input Data and Assumptions

Two scenarios were simulated to evaluate the proposed outfall location and assess relative changes in lake quality with and without the proposed Gwinnett outfall. These correspond to the first two scenarios described in the Environmental Information Document (CH2M-Hill 1999). Scenario 1 represents Current Conditions, while Scenario 2 includes Gwinnett's 40 mgd outfall at Segment 19 with a TP concentration of 0.13 mg/L.

In addition, the CE-QUAL-W2 model requires specification of the depths of water over which the discharged effluent will initially mix. The specific depth of mixing that will occur will depend upon final diffuser design. Multiple CE-QUAL-W2 simulations were conducted, corresponding to different assumptions regarding the degree of initial mixing.

NEAR FIELD MODEL: PLUMES

A dilution model was applied to aid in the evaluation and design of a diffuser for the North AWRF outfall. The model was used to evaluate the effects in the immediate vicinity of the outfall. The model computes the effective dilution achieved by the diffuser configuration at a monthly maximum flow of 40 mgd. In addition, the model was used to simulate changes in ambient temperature due to the influences of the reclaimed water in the near-field zone.

The near-field zone refers to an area close to the diffuser where the mixing or dilution processes are mainly dictated by the buoyancy and momentum of the reclaimed water plume. The far-field zone refers to the area, farther away from the outfall, where the ambient current velocity largely controls the mixing and dilution processes.

PLUMES is a dilution model supported by EPA and designed to conduct near-field modeling analyses. This model is widely accepted as a tool in evaluating and designing outfall diffusers. PLUMES is included in the EPA's Compendium of Tools for Watershed Assessment and TMDL Development (EPA, 1997). The PLUMES model is composed of sophisticated mathematical models that analyzes and predict the initial dilution behavior of aquatic plumes (EPA, 1997).

Input Data and Assumptions

The configuration of the diffuser consists of a 60-inch diameter pipe with eighteen 8-inch ports, spaced every 5 feet. The ports are oriented horizontally, flowing in the direction of the stream flow in the lake.

Ambient currents were obtained from previous modeling efforts conducted by LimnoTech in Lake Lanier in 1998 (LTI, 1998). Temperature profiles were obtained from data collected in 1996 and 1997 in support of LimnoTech's 1998 lake modeling efforts (LTI, 1998). The depth of discharge was approximated based on topographic maps as 10 meters. Reclaimed water temperature data were obtained from average summer reclaimed water temperatures observed at Gwinnett's Crooked Creek WRF from July 1993 to March 1996 (CH2M HILL, 1996), adjusted to account for heat exchange that will occur while the effluent is carried more than 8 miles via underground pipeline before it reaches the proposed outfall location. Seasonal temperature distribution for the effluent is given in Table 1, along with the information used to define the temperature.

Table 1. Estimated Effluent Temperature by Month

Month	Average Soil Temperature (°C)	Effluent Temperature (°C)	Effluent Temperature (°F)	Pipe Length Required to Reach Thermal Equilibrium (miles)
January	11.6	11.6	52.9	1.21
February	10.6	10.6	51.1	1.21
March	10.6	10.6	51.1	1.21
April	12.6	12.6	54.7	1.20
May	15.2	15.2	59.4	1.19
June	18.4	18.4	65.1	1.18
July	20.9	20.9	69.6	1.11
August	22.1	22.1	71.8	1.10
September	21.9	21.9	71.4	1.10
October	20.4	20.4	70.2	1.17
November	17.7	17.7	64.0	1.18
December	15.2	15.2	59.4	1.19

The model was applied to the worst case scenario of stratified summer conditions in Lake Lanier as well as winter conditions. Stratified conditions reduce the ability of the discharge plume to mix with the upper layers of the water column due to density gradients. A review of the temperature profiles for the lake, provided by LTI, indicated that the lake stratifies for most of the year (April-November), with the most significant stratification occurring during July and August. During this pronounced stratification period, the temperature gradient changes from 28 °C in the upper layers of the water column to 8 °C in the bottom of the lake. The ambient data indicated that the lake is unstratified from December to March when the water column temperatures average approximately 8 °C.

MODEL RESULTS

Lake Lanier Management Tool: GWLF/CE-QUAL-W2

The results of the water quality modeling indicate that water quality standards for chlorophyll-a, TN, and DO are not violated (Tables 2 and 3). Chlorophyll-a and TP results for the two scenarios are provided in Table 2, both for the segment receiving the discharge (segment 19) and for the Lake as a whole. Predicted concentrations in segment 19 are of interest due to the presence of a water quality standard for chlorophyll-a of 5 μg/l, expressed as a summer average (April to October) in the photic zone. Whole lake results are provided to give an indication of the affect of the discharge on overall water

quality. The results presented in Table 2 show the summer average for 1984 to 1988 in bold and the range of each summer average between 1984 to 1988 in parentheses.

Table 2. Summary of Simulated TP and Chlorophyll-a Concentrations Average (Range)

Scenario	Segment 19/ (LN1) Photic Zone		Whole Lake Photic Zone	
	Chl_a (µg/L)	TP (µg/L)	Chl_a (µg/L)	TP (µg/L)
1	**3.0** (2.4-3.5)	**6.5** (4.9-8.1)	**5.0** (4.5-5.6)	**14.4** (13.3-15.9)
2	**4.3** (3.9-4.4)	**8.3** (7.5-9.6)	**5.2** (4.8-5.7)	**14.7** (13.7-16.2)

For segment 19, compliance with the water quality standard is achieved for both scenarios. This analysis demonstrates that water quality standards can be maintained with the horizontal diffuser design.

The model also demonstrates that the release from the proposed North AWRF expansion would not significantly increase the whole lake summer average TP and chlorophyll-a concentrations. This conclusion is based on the comparison of current conditions with any of the simulations that include the proposed North AWRF outfall. The slight differences between the chlorophyll-a levels in the Lake for scenarios with and without the North AWRF outfall are not only small (0.3 µg/L or less) but are near the detection limit (0.2 µg/L).

Again, these conservative model results do not reflect the fact that TP from other point sources will be reduced concomitantly with the North AWRF expansion.

Table 3 presents the TN and DO modeling results for segment 19. Compliance with the water quality standard is achieved for both scenarios and for both parameters. The minimum value for DO for both scenarios is well above the state standard of 4 mg/L as well as the daily average of 5 mg/L. TN in the photic zone is also well below the state standard of 4 mg/L. This analysis demonstrates that water quality standards can be maintained with the horizontal diffuser design.

Table 3. Summary of Modeled DO and TN Concentrations for Segment 19

Scenario	DO (mg/L) [a]		TN (mg/L)
	Minimum	Daily Average	Photic Zone
1	5.72	5.73	1.30
2	5.62	5.68	1.58

[a] These model results are based on a permit limit of 6.0 mg/L

Near-Field Model: PLUMES

The model predicts that the difference between the effluent and the ambient temperature is less than 5 $^{\circ}$ F within 0.57 feet (0.17 meters) of the diffuser. The change in temperature with distance from the diffuser is presented in Figure 1. The model predicts that the plume will remain within a plane of 2 m from buoyancy forces (Figure 2). The model also predicts that a very high level of dilution is achieved within a short distance from the diffuser. A dilution factor of 2 (i.e., effluent is diluted with ambient water by half) is achieved in approximately 0.8 feet (0.25 meters). Effective dilution factors larger than 13 (i.e., effluent is diluted with more than 13 volumes of ambient water) are reached at a distance 9.9 feet (3.03 meters) from the discharge point (Figure 3).

Figure 1. Gwinnett/Lake Lanier Plume Excess Temperatures for the Diffuser Configuration for both Winter and Summer Conditions

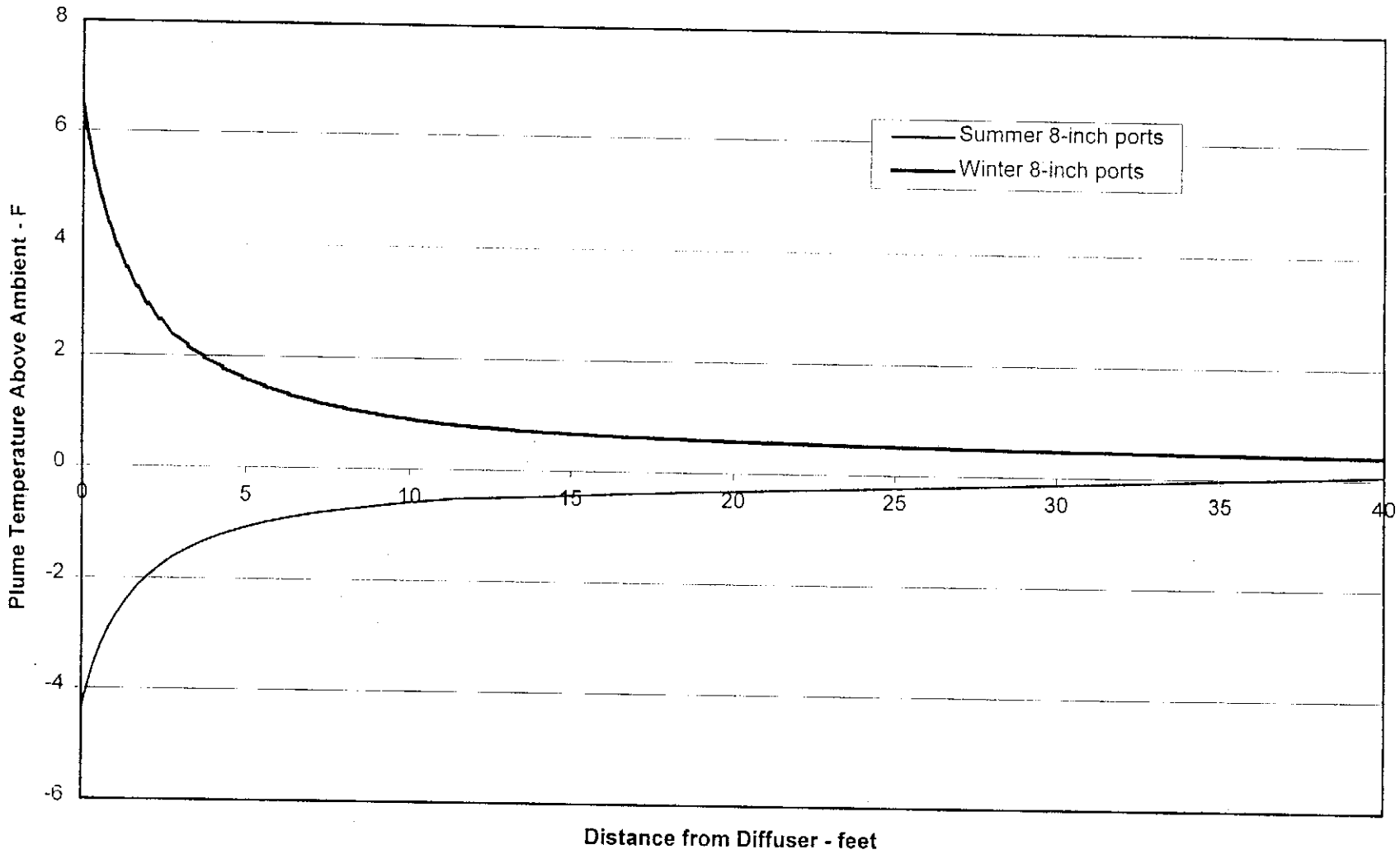


Figure 2. Gwinnett/Lake Lanier Outfall Mixing Zone Analysis Plume Trajectory - Summer and Winter Conditons - Horizontal Discharge

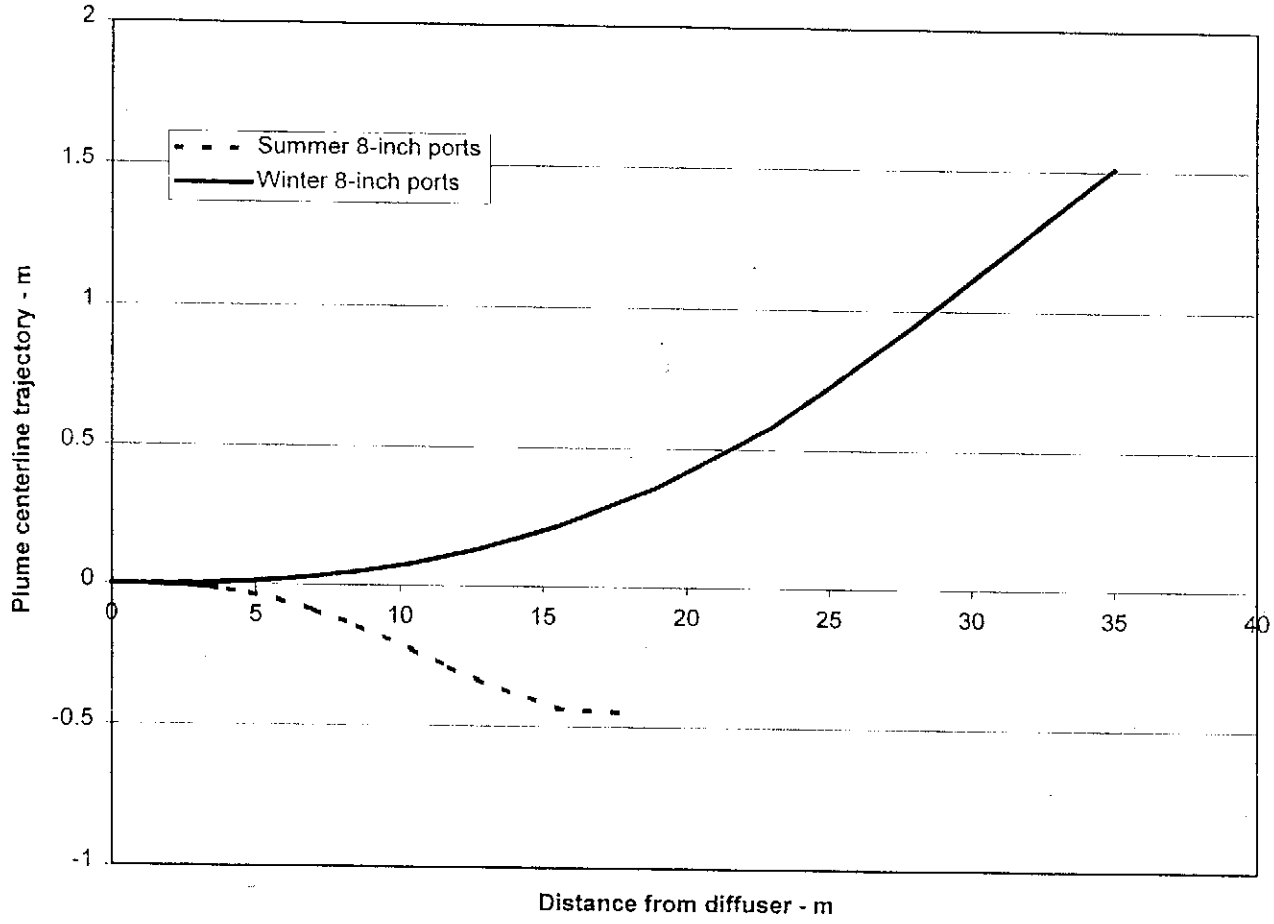
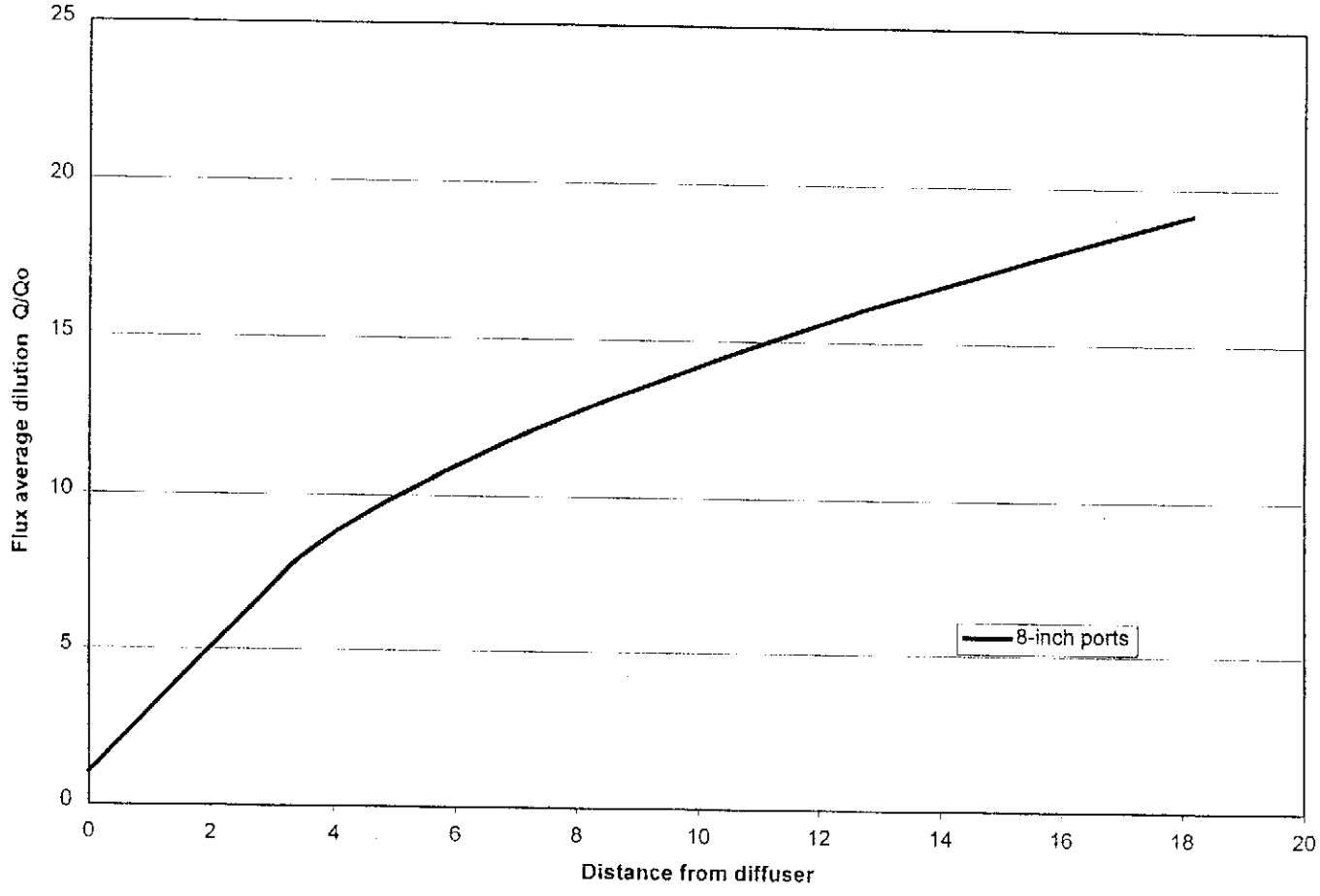


Figure 3. Gwinnett/Lake Lanier Outfall Dilution Factors
Plot is the same for both Summer and Winter



CONCLUSIONS

Lake Lanier Management Tool: GWLF/CE-QUAL-W2

- The addition of the proposed North AWRF discharge of reclaimed water at the new location does not significantly affect overall water quality in Lake Lanier. This conclusion is based on comparison of the model results for simulations both without and with the North AWRF outfall (see Table 2).

- Compliance with chlorophyll-a standard (5 μg/L) in segment 19 is attained with the proposed diffuser design. Average summer chlorophyll-a for 1984 to 1988 in the photic zone is predicted to be 4.3 μg/L with the maximum summer average predicted to be 4.4 μg/l.

- Both DO and TN concentrations were well within the state standard for segment 19 for the entire modeled period. Minimum DO concentrations were predicted to be 5.62 mg/l for scenario 2, well above the state standard of 4 mg/L. TN concentrations were predicted to be 1.58 mg/L, this was also well below the standard of 4 mg/L.

Near-Field Model: PLUMES

- The proposed diffuser configuration achieves a high level of dilution within a short distance of the outfall location. A dilution factor of 2 is achieved approximately 0.8 feet from the diffuser. A dilution factor of 13 is achieved approximately 9.9 feet from the diffuser.

- The proposed diffuser configuration provides rapid mixing of the effluent temperature with the ambient temperature such that within 0.57 feet of the diffuser, the change in temperature is less than 5 °F.

REFERENCES

CH2M HILL, 1996. Technical Memorandum: Evaluation of Temperature Effects of the North AWRF Discharge. Atlanta, Georgia.

CH2M HILL, 1999. North Advanced Water Reclamation Facility Expansion and Reclaimed Water Pipeline, Environmental Information Document. Gwinnett County Department of Public Utilities, Gwinnett County, GA.

CH2M HILL, 2000. Technical Memorandum: Temperature Effects of Proposed Gwinnett Discharge on Chattahoochee River below Lake Lanier. Atlanta, Georgia.

EPA, 1997. Compendium of Tools for Watershed Assessment and TMDL Development. Washington, DC (EPA841-B-97-006).

LimnoTech, Inc.(LTI), 1998. Development of Linked Watershed and Water Quality Models for Lake Lanier. Ann Arbor, Michigan.

Appendix B

Georgia NPDES

Permit No. GA0038130

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Georgia Department of Natural Resources

2 Martin Luther King, Jr. Drive, S.E., Suite 1152 East Tower, Atlanta, Georgia 30334-9000
Noel Holcomb, Commissioner
Carol A. Couch, Ph.D., Director
Environmental Protection Division
404/656-4713

November 3,2006

Honorable Charles Bannister, Chairman
Gwinnett County Board of Commissioners
75 Langley Drive
Lawrenceville, Georgia 30045-6900

RE: Gwinnett County – F. Wayne Hill
Water Resources Center
NPDES Permit No. GA0038130

Dear Chairman Bannister:

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. We have included an attachment which addresses the issues presented during the hearing and public notice comment period.

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,

Carol A. Couch, Ph.D.
Director

CAC/emj

ATTACHMENT

cc: Environmental Protection Agency

PERMIT NO. GA0038130

STATE OF GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

AUTHORIZATION TO DISCHARGE UNDER M E
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,**

Gwinnett County - F. Wayne **Hill** Water Resources Center

is authorized to discharge from a facility located at

3220-B Financial Center Way
Buford, Georgia **30519**

to receiving waters

Lake Sidney Lanier approximately **1.1** miles upstream from Buford Dam, near the mouth of the Shoal Creek embayment, at a depth of approximately **105** feet below the **normal** pool elevation of **1070** feet mean sea level.

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 November 3,2006

This permit and the authorization to discharge shall expire at midnight, November 2, 2011.

Signed this 3rd day of November **2006.**

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

fire 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 chemical oxygen demand (COD) 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 coliforrn bacteria, is the arithmetic mean of values obtained for samples collected during a 7 day period. The week begins **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 chlorination with written EPD approval.

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

h. The permittee shall have a primary flow measuring device that is correctly installed and operable. Secondary flow measurements must be made using a continuous totalizer and an indicating recorder. The flow measurement and flow recording may be done electronically utilizing the plant controls system. Calibration of secondary instruments will be maintained to

± 10% of the actual flow. Manufacturer's recommendations shall be followed to insure that the flow reading is accurate at all times.

i. If secondary flow instruments malfunction or fail to maintain calibration as required in **I.A.1.h.**, the flow shall be either directly read from or computed using other flow meters installed in the plant effluent discharge header system.

j. Quarterly analyses required in **I.B.**, with the exception of the priority pollutant scan 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. Analytical results below the detection limit shall be reported as "less than detection limit" using the analytical laboratory's numerical detection limit for the specific parameter being reported. For each result reported as 'less than detection limit", a value of zero shall be used in the calculation of monthly and weekly averages.

l. 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. For all values reported at the detection limit.except Fecal Coliform a value of zero shall be utilized for averaging. For Fecal Coliform the values to be used in **averaging** shall be one. 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.

6. MAINTENANCE – Point Source Discharge

The permittee shall conduct an inspection of the subaqueous outfall and diffuser to determine their physical condition and operating performance annually. The persons conducting this inspection shall be certified divers. A written report shall be submitted to the Division within forty-five days of the inspection.

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** for up to 10 MGD effective the date EPD provides written approval of construction completion and EPD provides written authorization to discharge up to 10 MGD. In addition, conditions under PartI.C.IO. of the permit must be met and obtain EPD's written concurrence prior to initiation of discharge up to 10 MGD:

Parameter	Discharge Limitations mg/l (kg/day) unless otherwise specified		Monitoring Requirements		
	Monthly Avg.	Weekly Avg.	Measurement Frequency	Sample Type	Sample Location
Flow-m^3/day (MGD)	37850 (10)	47313 (12.5)	Seven/Week	Continuous Recording	Effluent
Chemical Oxygen Demand	18 (682)	27 (853)	Seven/Week	Composite	Influent and Effluent
Total Suspended Solids (TSS)	3 (114)	4.5 (142)	Seven/Week	Composite	Influent and Effluent
Ammonia (as N)	0.4 (15)	0.6 (19)	Seven/Week	Composite	Effluent
Fecal Coliform Bacteria (#/100 ml)	2/100 ml	NA (NA)	Seven/Week	Grab	Effluent
Total Phosphorus as P	0.08 (3)	NA (NA)	Seven/Week	Composite	Effluent
Turbidity (NTU)	0.5	NA (NA)	Seven/Week	Continuous Recording	Effluent
Priority Pollutants[a]			Quarterly	Grab	Effluent
Chronic Whole Effluent Toxicity (WET) Testing[b]			Quarterly	Composite	Effluent
Temperature[c]			Seven/Week	Continuous Recording	Effluent and below Buford Dam

The effluent sampling location shall be as specified in Part 1.C.14.

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 a week.

The minimum effluent dissolved oxygen shall be 7.0 mg/l or higher and shall be monitored on the final effluent by a continuous recorder.

[a]Refer to Part 1.C.8.
[b]Refer to Part 1.C.9. For monitoring purposes the Instream Wastewater Concentration is 17% effluent.
[c]Refer to Part I.C.12.

8.2. 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 for wastewater volumes greater than 10 MGD and equal to or less than 20 MGD effective the date EPD provides written approval of construction completion and EPD provides written authorization to discharge up to 20 MGD. In addition, conditions under Part1.C.10. of the **permit** must be met and obtain **EPD's** written concurrence prior to initiation of discharge up to 20 MGD:

Parameter	Discharge Limitations mg/l (kg/day) unless otherwise specified		Monitoring Requirements		
	Monthly Avg.	Weekly Avg.	Measurement Frequency	Sample Type	Sample Location
Flow-m^3/day (MGD)	75700 (20)	94625 (25)	Seven/Week	Continuous Recording	Effluent
Chemical Oxygen Demand	18 (1365)	27 (1706)	Seven/Week	Composite	Influent and Effluent
Total Suspended Solids (TSS)	3 (227)	4.5 (284)	Seven/Week	Composite	Influent and Effluent
Ammonia (as N)	0.4 (30)	0.6 (38)	Seven/Week	Composite	Effluent
Fecal Coliform Bacteria (#/100 ml)	2/100 ml	NA (NA)	Seven/Week	Grab	Effluent
Total Phosphorus as P	0.08 (6.1)	NA (NA)	Seven/Week	Composite	Effluent
Turbidity (NTU)	0.5	NA (NA)	Seven/Week	Continuous Recording	Effluent
					Effluent
Priority Pollutants[a]			Quarterly	Grab	Effluent
Chronic Whole Effluent Toxicity (WET) Testing[b]			Quarterly	Composite	Effluent
Temperature[c]			Seven/Week	Continuous Recording	Effluent and below Buford Dam

The **effluent** sampling location shall be as specified in Part 1.C.14.

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 a week.

The minimum effluent dissolved oxygen shall be 7.0 **mg/l** or higher and shall be monitored on the final effluent by a continuous recorder.

[a]Refer to Part 1.C.8.
[b]Refer to Part 1.C.9. For monitoring purposes the **Instream** Wastewater Concentration is 17% effluent.
[c]Refer to Part I.C.12.

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 for wastewater volumes greater than 20 MGD and equal to or less than 30 MGD effective the date EPD provides written approval of construction completion and EPD provides written authorization to discharge up to 30 MGD. In addition, conditions under Part1.C.10. of the permit must be met and obtain EPD's written concurrence prior to initiation of discharge up to 30 MGD:

Parameter	Discharge Limitations mg/l (kg/day) unless otherwise specified		Monitoring Requirements		
	Monthly Avg.	Weekly Avg.	Measurement Frequency	Sample Type	Sample Location
Flow-m^3/day (MGD)	113550 (30)	141938 (37.5)	Seven/Week	Continuous Recording	Effluent
Chemical Oxygen Demand	18 (2047)	**27 (2559)**	Seven/Week	Composite	Influent and Effluent
Total Suspended Solids (TSS)	3 (341)	4.5 (426)	Seven/Week	Composite	Influent and Effluent
Ammonia (as N)	0.4 (45)	0.6 (57)	Seven/Week	Composite	Effluent
Fecal Coliform Bacteria (#/100 ml)	2/100 ml	NA (NA)	Seven/Week	Grab	Effluent
Total Phosphorus as P	**0.08** (9.1)	NA (NA)	Seven/Week	Composite	Effluent
Turbidity (NTU)	***0.5***	NA (NA)	Seven/Week	Continuous Recording	Effluent
Priority Pollutants[a]			Quarterly	Grab	Effluent
Chronic Whole Effluent. Toxicity (WET) Testing			Quarterly	Composite	Effluent
Temperature[c]			Seven/Week	Continuous Recording	Effluent and below Buford Dam

The effluent sampling location shall be as specified in Part 1.C.14.

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 a week.

The minimum effluent dissolved oxygen shall be 7.0 mg/l or higher and shall be monitored on the final effluent by a continuous recorder.

[a]Refer to Part 1.C.8.
[b]Refer to Part 1.C.9. For monitoring purposes the Instream Wastewater Concentration is 17% effluent.
[c]Refer to Part I.C.12.

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 for wastewater volumes greater than 30 MGD and equal to or less than 40 MGD effective the date EPD provides written approval of construction completion and EPD provides written authorization to discharge up to 40 MGD. In addition, conditions under **Part1.C.10.** of the permit must be met and obtain **EPD's** written concurrence prior to initiation of discharge up to 40 MGD:

Parameter	Discharge Limitations **mg/l (kg/day)** unless otherwise specified		Monitoring Requirements		
	Monthly Avg.	Weekly Avg.	Measurement Frequency	Sample Type	Sample Location
Flow-m^3/day (MGD)	151400 (40)	189250 (50)	**Seven/Week**	Continuous **Recording**	Effluent
Chemical Oxygen Demand	18 (2729)	27 (3412)	**Seven/Week**	Composite	Influent and Effluent
Total Suspended Solids (TSS)	3 (455)	4.5 (569)	**Seven/Week**	Composite	Influent and Effluent
Ammonia (as N)	0.4 (61)	0.6 (76)	**Seven/Week**	Composite	Effluent
Fecal Coliform Bacteria (#/100 ml)	**2/100 ml**	NA (NA)	**Seven/Week**	Grab	Effluent
Total Phosphorus as P	0.08 (12)	NA (NA)	**Seven/Week**	Composite	Effluent
Turbidity (NTU)	0.5	NA (NA)	**Seven/Week**	Continuous Recording	Effluent
riority **Pollutants**[a]			Quarterly	Grab	Effluent
Chronic Whole Effluent Toxicity (WET) **Testing**[b]			Quarterly	Composite	Effluent
Temperature[c]			**Seven/Week**	Continuous Recording	Effluent and below Buford Dam

The effluent sampling **location** shall be as specified in Part 1.C.14.

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 a week.

The minimum effluent dissolved oxygen shall be 7.0 mg/l or higher and shall be monitored on the final effluent by a continuous recorder.

[a]Refer to Part 1.C.8.
[b]Refer to Part 1.C.9. For monitoring purposes the Instream Wastewater Concentration is 17% effluent.
[c]Refer to Part I.C.12.

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;

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. **PRIORITY POLLUTANTS**

The permittee must conduct a scan of priority pollutants, induding mercury, measured at least to EPD's detection limits, beginning the first quarter after initiation of discharge and quarterly thereafter. 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.

This testing is to be performed during the months of January. April. July and October.

9. CHRONIC WHOLE EFFLUENT TOXICITY

The permittee shall begin to conduct quarterly chronic whole effluent toxicity (WET) testing beginning the first quarter after initiation of discharge, and quarterly thereafter. The testing must incorporate the most current U.S. Environmental Protection Agency chronic aquatic toxicity testing manuals. The referenced document is entitled 'Short-Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Water to Freshwater Organisms, 4th Edition, EPA-821-R42-013,

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.

10. TOTAL PHOPHORUS LOADING

The permittee SHALL NOT COMMENCE DISCHARGES OF TREATED WASTEWATER UNDER Part **I.B.1., I.B.2., I.B.3.,** or I.B.4. until the **combined** permitted annual point source phosphorus loads being discharged to Lake Lanier from other permittees are reduced to the following **amounts:**

I.B.1. – 34,910 pounds or less
I.B.2. – 30,910 pounds or less
I.B.3. – 26,910 pounds or less
1.B.4. – 22,910 pounds or less

The other permittees are all permittees with NPDES permits which allow **direct** discharges into Lake Lanier and the City of **Gainesville's** Flat Creek Water Pollution Control Plant.

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 will provide for the following:

a. The watershed protection plan will 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 pmtection 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 for a period of five years.

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.

12. TEMPERATURE MONITORING

Effluent Temperature Monitoring

Effluent temperature monitoring shall commence upon initiation of operation under Part **I.B.1**, B.2 , B.3, or B.4 of this permit. The effluent temperature shall be monitored at least hourly seven days per week. Temperature shall be monitored on the plant site. Daily minimum, maximum and average effluent temperature data are to be reported on the monthly report "long form" or daily sheets submitted with the monthly discharge monitoring reports. The hourly effluent temperature data are to be archived using a digital format such as a spreadsheet developed in coordination with EPD. The data shall be maintained by the permittee for a period of five years and the data for the previous year shall be submitted to EPD by January 31st. In addition, the permittee shall make the data available to EPD upon request.

Buford Dam Release Water Temperature Monitoring

Beginning January 1, 2007, the water temperature of Buford Dam releases shall be monitored at least hourly seven days per week by the permittee or its contractor unless the monitor is not operational due to malfunction or maintenance. The monitoring location, methods, and procedures must be approved by EPD. The hourly release water temperature data are to be archived using a digital format such as a spreadsheet developed in coordination with EPD. The data shall be maintained by the permittee or its contractor for a period of **five** years and the data for the previous year shall be submitted to EPD by January 31st. In addition, the permittee shall make the data available to EPD upon request.

13. LAKE MONITORING AND MODELING

Lake Monitoring

The permittee shall develop a lake monitoring plan for water quality data for parameters supplied by EPD. **The** plan shall be submitted within six months of the final permit issuance date for approval by EPD. The permittee shall execute the monitoring plan with approval and coordination from EPD.

Lake Model Development

The permittee will, in conjunction with EPD and the other dischargers to Lake Lanier, develop a proposed plan and approach for development and application of a three dimensional hydrodynamic and water quality model for Lake Sidney Lanier. The objective of the modeling will be to assess the potential future effects of the anticipated wastewater loadings to the lake from all discharges, tributary and non-point source pollutant loadings. It is anticipated that the input files for Gwinnett wastewater loadings will be provided to EPD. The plan shall be submitted within one year of the

final permit issuance date for approval by EPD. The plan shall include the tasks and schedule for completing the development of the lake model.

EFFLUENT SAMPLING LOCATION

Discharge monitoring for all parameters shall be at the effluent sampling station at the facility.

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.

"Gonsistently 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 P O W shall report the incident to the local media (television, radio, and print media). The report shall include the same information required in 11(b)(l -4) above.

e. Within five (5) **days (of** the date of the spill or major spill), the owner of a P O W 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.

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.

12. .PREVIOUS PERMITS

All previous State water quality permits issued to this facility for construction or operation are revoked by the issuance of this permit. The permit governs discharges from this facility under the National Pollutant Discharge Elimination System (NPDES).

PART III

A. APPROVED INDUSTRIAL PRETREATMENT PROGRAM FOR PUBLICLY. OWNED TREATMENT WORKS (POTWs)

The permittee's approved pretreatment program shall be enforceable through this permit.

The permittee shall administer the approved pretreatment program by:

a. Maintaining records identifying the character and volume of pollutants contributed by industrial users to the POTW.

b. Enforcing and obtaining appropriate remedies for noncompliance by any industrial user with any applicable pretreatment standard or requirement defined by Section 307(b) and (c) of the Federal Act, 40 CFR Part 403.5 and 403.6 or any State or local requirement, whichever is more stringent.

c. Revising the adopted local limits based on technical analyses to ensure that the local limits continue to prevent:

1. Interference with the operation of the POW;
2. Pass-through of pollutants in violation of this permit;
3. Municipal sludge contamination; and
4. Toxicity to life in the receiving stream.

Within 180 days of the effective date of this permit issuance or reissuance (excluding permit modifications), the permittee shall review the local limits of the program and submit to EPD a written technical evaluation of the need to revise the local limits.

d. Ensuring that industrial wastewater discharges from industrial users are regulated through discharge permits or equivalent individual control mechanisms. Compliance schedules will be required of each industrial user for the installation of control technologies to meet applicable pretreatment standards and the requirements of the approved program.

e. Inspecting. surveying, and monitoring to determine if the industrial user is in compliance with the applicable pretreatment standards.

f. Equitably maintaining and adjusting revenue levels to ensure adequate and continued pretreatment program implementation.

g. Preparing a list of industrial users which, during the previous twelve months, have been in significant noncompliance with the pretreatment requirements enumerated in 40 CFR Part 403.8 (f)(2)(vii). This list will be published annually in the newspaper with the largest circulation in the service area during January, with the first publication due January 2005.

B. APPROVED PRETREATMENT PROGRAM ANNUAL REPORT

1. Within 30 days of the close of the reporting period January through December, with the first report due January after the permit issuance date and each January thereafter, the permittee shall submit a report to the EPD that includes:

a An updated list of POTW industrial users;

b. The results of **POTW** sampling and analyses required by the **EPD;**

c. A summary of POTW industrial user inspections;

d. A summary of **POTW** operations including information on upsets, interferences, pass through events, or violations of the permit related to industrial user discharges;

e. A summary of all activities to involve and inform the public of pretreatment requirements;

f. A summary of the annual pretreatment program budget;

g. A descriptive summary of any compliance activities initiated, ongoing, or completed against industrial users which shall include the number of administrative orders, show cause hearings, penalties, civil actions, and fines;

h. A list of contributing industries using the treatment works, divided into Standard Industrial Classification Code (SIC) categories, which have been issued permits or similar enforceable individual control mechanisms, and a status of compliance for each industrial user. The list should also identify the industries that are categorical or significant industrial users;

i. The name and address of each industrial user that has received ***a*** conditionally revised discharge limit;

j. **A** list of all industrial users who were in significant noncompliance with applicable pretreatment standards and requirements;

k. A list of all industrial users showing the date that each was notified that a categorical pretreatment standard had been promulgated by **EPA** for their industrial category and the status of each industrial user in achieving compliance within the 3 year period allowed by the Federal Act; and

l. A description of all substantial changes proposed for the program. All substantial changes must first be approved by the **EPD** before formal adoption by the POW. Substantial changes shall include but not be limited to:

1. Changes in legal authority;
2. Changes in local **limits;**
3. Changes in the control mechanisms;
4. Changes in the method for implementing categorical pretreatment standards.
5. A decrease in the frequency of self-monitoring or reporting required of industrial users;
6. A decrease in the frequency of industrial user inspections or sampling by the POTW;
7. **Significant** reductions in the program resources including personnel commitments, equipment, and funding levels;
8. Changes in confidentiality procedures; and
9. Changes in the **POTW** sludge disposal and management practices.

2 Reports submitted by an industrial user will be retained by the permittee for at least 3 years and shall be available to the **EPD** for inspection and copying. This period shall be extended during the course of any unresolved litigation concerning the discharge of pollutants by an industrial user or concerning the operations of the program or when requested by the Director.

C. INDUSTRIAL PRETREATMENT STANDARDS

Effluent timitations for the permittee's discharge are listed in Part I. Other pollutants attributable to industrial ***users*** may also be present in the discharge. When sufficient information becomes available, this permit may be revised to specify effluent limitations for these pollutants based on best practicable technology or water quality standards. Once the specific nature of industrial contributions has been identified, data collection and reporting may be required for parameters not specified in Part I.

D. REQUIREMENTS FOR EFFLUENT **LIMITATIONS** ON POLLUTANTS ATTRIBUTABLE TO INDUSTRIAL USERS

1. The **permittee** shall require all industrial dischargers to the ***POW*** to meet State pretreatment regulations promulgated in response to Section **307(b)** of the Federal Act. Other information about new industrial discharges may be required and will be requested from the permittee after the EPD has received notice of the discharge.

2. The permittee may be required to supplement the requirements of the State and Federal pretreatment regulations to ensure compliance with all applicable effluent limitations listed in Part I. Supplemental actions by the permittee concerning some or all of the industries discharging to the POTW may be necessary.

E. RETAINER

The EPD may require the permittee to amend an approved pretreatment program to incorporate revisions in State Pretreatment Regulations or other EPD requirements. Any required revision must be incorporated into the program within one year of notification by the EPD. Implementation of any revision or amendments to the program shall be described in the subsequent annual report to the EPD.

Comments Received regarding the draft NPDES permit for Gwinnett County - F. Wayne Hill GA0038130

COMMENTS	EPD RESPONSE
The temperature of the discharge may have an adverse effect on the trout fishery in the tailwaters of Buford Dam.	Regarding the trout fishery, Gwinnett County provided modeling information to show that the water temperature standard would not be violated.
The Lake modeling and monitoring are critical elements of the permit and the permit should include a deadline for the development and implementation of the modeling and monitoring plan.	The modeling and monitoring are to be conducted with EPD as the lead with funding coming from the permittees. The modeling and monitoring are efforts that are not just expected of Gwinnett County, but are activities that are to be conducted by other municipalities who are users of the lake. With other parties involved in this effort, it would be inappropriate to include a deadline in Gwinnett's permit.
The modeling and monitoring plan should be made available for public notice and comment	Any information submitted to EPD regarding the modeling and monitoring plan will be available to the public for review at EPD offices. While modeling and monitoring plans are not efforts that have historically been public noticed, EPD will ensure that files are made readily available to those seeking review and comment, and that comments will be considered in plan development.
EPD should incorporate by reference the three plans required by the Metro District, and a violation of any of those plans shall be violation of the permit. Also, state in the permit that "upon the updating or modification of any....of the plans, the permit shall be modified to comply with the plans."	The Metro District plans are developed based on requirements found in Georgia Law. With respect to Gwinnett County, EPD conducted an audit of the required plans and documented that Gwinnett County was in compliance with law requirements. While plans are critical to ensuring that Metro District requirements are complied with, they are not required as conditions for NPDES permits. The plans can be dynamic documents, subject to changes, and as such should not be held as enforceable conditions through NPDES permits. Similarly, it would not be practical to reopen a permit any time a modification was made to one of the plans.
EPD should lead in the development of the Lake Model with Gwinnett and others around the Lake and region acting as funding partners. Gwinnett's prorated share of development of the model should not exceed **$1,000,000.00** over the life of the study and that these understandings be included in the body of the permit.	The fact sheet of the draft permit was used to discuss funding issues regarding development of the study. As noted above, EPD will be the lead agent in the study with various stakeholders providing funding. EPD acknowledges that as part of the funding, Gwinnett County's portion would not exceed **$1,000,000.00** and the funding expectations would be rationed equitably among the participants. Gwinnett County has acknowledged that this procedure does not need to be included in the permit.
Permits for future discharges to the Lake should be at least as clean as this permit and avoid the photic zone.	EPD will handle any future discharge requests to the Lake on a case-by-case basis and they will be evaluated in accordance with Georgia's Rules and Regulations to ensure that effluent limits are protective of water quality.

Legal Notices

GEORGIA DEPARTMENT OF
NATURAL RESOURCES
ENVIRONMENTAL PROTECTION
DIVISION

PUBLIC NOTICE NO. 2006-13

NOTICE OF APPLICATION FOR A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT TO DISCHARGE TREATED WASTEWATER INTO WATERS OF THE STATE OF GEORGIA

NPDES Permits are valid for a maximum of five years. Prior to expiration of an existing permit, a new application must be submitted and evaluated.

An antidegradation review process is conducted for all applicable, for new or expanded point sources discharges that are proposed. An alternative analysis comparing the proposed discharge alternative to a non-discharge land application or other reuse alternative is conducted in all cases existing instream water uses and the level of water quality necessary to protect the existing uses is maintained and protected.

Having reviewed such applications, the Environmental Protection Division is considering the issuance NPDES permits to the following applicants, subject to specific pollutant limitations and monitoring conditions.

NPDES PERMIT ISSUANCE

GWINNETT COUNTY: Notice of Draft Permit and Hearing

Gwinnett County Department of Water Resources, 684 Winder Highway, Lawrenceville, Georgia 30045-5012, NPDES Permit No. GA0037130 for its F. Wayne Hill Water Resources Center located at 3200-B Pleasant Grove Road, in Suwanee. The County is proposing to discharge up to 40 MGD of treated wastewater to Lake Sidney Lanier in the Chattahoochee River Basin. The discharge will be located approximately 1.1 miles upstream from Buford Dam near the mouth of the Shoal Creek embayment, at a depth of approximately 100 feet below the normal pool elevation of 1070 feet mean sea level.

In addition, EPD will be holding a public meeting at 7:00 p.m. on September 21, 2006 to be followed by a public hearing at 8:00 p.m. The meeting and hearing will be held at the Gwinnett County Justice and Administrative Center Auditorium at 75 Langley Drive, Lawrenceville, Ga 30045.

The purpose of the public meeting will be to present and receive comments on the draft NPDES permit for the Gwinnett County F. Wayne Hill Water Resources Center which includes a proposed discharge of up to 40 MGD into Lake Sidney Lanier.

The purpose of the public hearing will be to receive comments on the public report of the draft NPDES permit referenced above. Hearing participants will not be subject to questions from the audience, but may be questioned by the Hearing Officer for clarification of technical points or to develop a better understanding of statements.

THE PUBLIC MEETING AND HEARING WILL BE CONFINED TO WATER QUALITY ISSUES. THE PUBLIC MEETING AND HEARING WILL NOT CONSIDER LAND USE OR ZONING ISSUES.

Participants in the hearing are requested to register upon arrival and include their intent to give oral or written statements. Lengthy statements or statements of a considerable technical or economic nature must also be submitted in writing for the official record. During the hearing, oral statements shall be limited to five minutes to permit everyone an opportunity to be heard. Written comments are welcomed. To ensure their consideration, written comments should be received by close of business September 28, 2006. Address comments to: Director, Environmental Protection Division, Department of Natural Resources, 2 Martin Luther King, Jr. Drive, S.E., Floyd Towers East, Atlanta, Georgia 30334. The permit application, draft permit, comments received and other information are available for review at 4220 International Parkway, Suite 101, Atlanta, Georgia 30354 between the hours of 8:30 a.m. and 4:00 p.m. Monday through Friday and during normal business hours at the Gwinnett County Department of Water Resources main office located at 684 Winder Highway, Lawrenceville, Georgia 30045-5012. For additional information contact: Jeffrey M. Uinsone, Permitting, Compliance, and Enforcement Program, Phone (404) 363-2693. Please bring this notice to the attention of the interested persons.

OCONEE COUNTY: Notice of Draft Permit

Oconee County Board of Commissioners, 1291 Greensboro Highway, Watkinsville, Georgia 30677, NPDES Permit No. GA0032808 for the Rocky Branch Water Reclamation Facility located on Rocky Branch Road in Watkinsville, Georgia 30677. The permit is to provide for a discharge flow of 1.0 MGD of treated wastewater to Barber Creek in the Oconee River Basin.

NPDES PERMIT ISSUANCE

GLYNN COUNTY

Brunswick, City of, Post Office Box 1486, Brunswick, Georgia 31521, NPDES Permit No. GA0000884 for its facility located at 1400 West Ninth Street in Glynn County, Brunswick, GA. Approximately 32 MGD of pulp and paper manufacturing process wastewater, after the Turtle River, in the Satilla River Basin. This is for the reissuance of the permit without changes to the discharge limits.

NPDES PERMIT REISSUANCE

GWINNETT COUNTY

Gwinnett County Department of Water Resources, 684 Winder Highway, Lawrenceville, Georgia 30045-5012, NPDES Permit No. GA0022373 for its Mill Branch Creek water reclamation facility located on 2725 Springdale Road in Snellville. The facility is no longer discharging and the NPDES permit is no longer necessary.

NPDES PERMIT MODIFICATION

BEN HILL COUNTY

City of Fitzgerald Water, Light and Bond Commission, Post Office Drawer F, Fitzgerald, Georgia 31750, NPDES Permit No. GA0047236 for several pollution control ponds [illegible] Rd. Worm Road in

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Appendix C

Clean Water Act

Section 404 Permit Application

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Pre-Construction Notification (PCN) for Nationwide Permits 12 and 7 for the Gwinnett County F. Wayne Hill Water Resources Center Water Reuse Line and Diffuser to Lake Lanier

Prepared For:

GWINNETT COUNTY DEPARTMENT OF WATER RESOURCES

GWINNETT COUNTY, GEORGIA

Prepared By:

PARSONS

Atlanta, Georgia
February 2007

Pre-Construction Notification (PCN) for Section 404/10 Nationwide Permits 12 and 7 for the Gwinnett County F. Wayne Hill Water Resources Center Water Reuse Line and Diffuser to Lake Lanier

1. Name, Address and Phone/Fax Number of Applicant

Name:	James H. Scarbrough, P.E.
Company Affiliation:	Gwinnett County Department of Water Resources
Mailing Address:	684 Winder Highway Lawrenceville, Georgia 30045
Telephone Number:	(678) 376-7154 Fax: (678) 376-6717
E-mail Address:	scarbrji@co.gwinnett.ga.us

2. Name, Address and Phone/Fax Number of Agent

Name:	Dr. Steven Bach
Company Affiliation:	Parsons
Mailing Address:	5390 Triangle Parkway, Suite 100 Norcross, Georgia 30092
Telephone Number:	(678) 969-2468
Fax:	(770) 446-4910
E-mail Address:	Steven.Bach@parsons.com

3. Proposed Activity and Permits, Project Purpose, & Intended Use

3.1 Proposed Activity and Permits

As part of the initiative to provide additional capacity for the F. Wayne Hill Water Resources Center (FWHWRC), Gwinnett County has secured a National Pollutant Discharge Elimination System (NPDES) permit to return up to 40 MGD of reclaimed water to Lake Lanier. The F. Wayne Hill Water Resources Center is located between Interstate 85 on the East and Interstate 985 on the West. Reclaimed water discharged from this facility must flow through undeveloped properties, developed residential properties, and developed commercial properties to its destination, Lake Lanier. To complete this project, Gwinnett County Department of Water Resources initiated the design of two critical elements of the return system: a reuse pipeline approximately 9 miles in length and a sub-aqueous diffuser in Lake Lanier.

Conversations were conducted with the US Army Corps of Engineers, Savannah District regarding the type of permit that would be acceptable for this project (please refer to attached letter dated December 2, 2003). In this letter, the Corps of Engineers concluded that Section 404 Clean Water Act (33 U.S.C. 1344) Nationwide Permit (NWP) 12 (Utility Line Activities) and NWP 7 (Outfall Structures and Maintenance) could be used to authorize the proposed activities outside of lake Lanier assuming compliance with all applicable NWP and Regional NWP

Conditions. The US Army Corps of Engineers also concluded that part of the NWP definition "… no change in preconstruction contours", only applies to "that length of the reuse line between Lake Lanier and the F. Wayne Hill Water Resources Center" (navigable waters). Permits for activities in navigable waters (lake Lanier) are covered by Section 10 of the Rivers and Harbor Act of 1899 (33 U.S.C. 403).

The US Army Corps of Engineers, Savannah District, requested that the Environmental Assessment (EA) being completed by the Mobile District on the decision to allow the reuse line to cross the federal easement around Lake Lanier be finalized before the Section 10 permit issues would be resolved. The EA is therefore being submitted with this PCN as an attachment. Because it considers all aspects of the proposed project in detail according to the requirements of the National Environmental Policy Act, the EA is referenced throughout the PCN as a means of defining project purpose and need, available alternatives, existing conditions, and impacts of the proposed project.

3.1.1 Pipeline

Figure 1 is a vicinity map that shows the general location of the proposed project. Figures 2.1 to 2.3 show the features along the pipeline corridor. From the FWHWRC, the project proceeds northeast along Ridge Drive for approximately 2,000 feet to the intersection of Satellite Boulevard Extension. The alignment turns north to follow Satellite Boulevard Extension for approximately 1,400 feet to Woodward Mill Road. At this junction, the pipeline trends northwest along Woodward Mill Road for approximately 5,750 feet to the Old Suwanee Road Intersection, where it turns north to follow the alignment of Old Suwannee Road for approximately 7,000 feet to Railroad Avenue.

The alignment proceeds north for approximately 1,950 feet to the intersection at Lanier Avenue, where it crosses the Southern Railroad and continues north for approximately 1,650 feet along Lanier Avenue, which dead ends just south of State Route (SR) 20 (Cumming Highway). From here, the pipeline crosses northeast under SR 20 to the east side of the Southern Railroad where it parallels the rail bed for approximately 1,200 feet to the intersection at R.H. Smith Boulevard and East Broad Street. At this junction, the alignment continues west along R.H. Smith Boulevard for approximately 1,000 feet, crossing Peachtree Industrial Boulevard and just west of Peachtree Industrial Boulevard.

The project then proceeds northwest for approximately 1,750 feet to Hillcrest Drive. The alignment continues north for approximately 5,500 feet along maintained and closed portions of Hillcrest Drive to the intersection at South Richland Creek Road. At South Richland Creek Road, the corridor turns west for approximately 5,250 feet to Sycamore Road. The project proceeds north for approximately 6,950 feet on Sycamore Road to the intersection at Buford Dam Road. The alignment then turns northeast on Buford Dam Road for approximately 1,950 feet to the intersection at Shoal Creek P.S. Road, where it turns northwest for approximately 1,000 feet before entering Lake Lanier.

3.1.2 Lake Lanier Portion of Pipeline and Diffuser

Once the pipeline enters the lake, it heads 1,557 feet west, and then 4,978 feet north to a point near the intersection of the Gwinnett, Forsyth, and Hall County boundaries, directly north of the main "point" of Lanier Park (Figure 2.3). The total length of the pipeline in Lake Lanier would therefore be 6,535 feet. The diffuser structure would be constructed as part of the last 720 feet of the 6,535 foot pipeline. The diffuser structure would be located approximately 1.2 miles upstream from Buford Dam, near the mouth of Shoal Creek, at a depth of approximately 32 meters (i.e. 105 feet) below the normal pool elevation of 1070 feet mean sea level, of Lake Lanier and at a latitude of 34 DEG 09 MIN 54.4 SEC and longitude of 84 DEG 03 MIN 22.4 SEC. The diffuser would be designed to efficiently mix advanced tertiary-treated effluent with the lake water.

Off-shore construction will require the use of four typical cross sections for proper placement of the pipeline:

- Near Shore Trench and Fill Conditions – Figure 3
- Fill Conditions – Figure 4
- Daylight Condition Side-Hill Excavation –Figure 5
- Trench Condition Side-Hill Excavation –Figure 6

These cross sections will be provided in the Contract Documents at 100 feet intervals to identify the placement conditions.

One requirement of this project is that the pipeline be buried if the crown is greater than an elevation of 1,045 feet, mean sea level. A total of 300 feet, or 5% of the total length of the pipeline to be placed in the lake, will be buried. Near shore installation may be constructed with a combination of on-shore and off-shore equipment. The near shore trench and fill detail illustrates the required installation (Figure 3). The slope of the trench walls will be selected to minimize the potential for slope failure, resulting in the hill slumping into the excavation. A stone bed (typically 1.5 feet thick) will be placed in the trench to support the pipeline. After the trench has been partially backfilled with stone, the remainder of the trench will be filled with excavated material. The Contractor will excavate the trench and side-cast the material within a turbidity curtain as illustrated in Figure 7. The pipeline segments will be welded together on-shore into strings and floated to the site.

Much of the pipeline will be placed on stone bedding with an average disturbed lake bottom width of approximately 30 feet as illustrated in Figures 5 and 6. The pipe is first floated to the site and lowered into place. Bedding stone would then be placed to the spring line. The stone bedding will be placed along the bottom of the lake to cradle the pipeline and to accommodate fill areas. The footprint of the stone bedding will occupy approximately 4.3 acres of the lake bottom.

At certain stations, the pipeline will require excavation. The two types of excavation to be used are the daylight condition side-hill and the trench condition side-hill as illustrated in Figures 5 and 6. For the daylight condition side-hill excavation shown in Figure 5, the Contractor will bench into the side-hill to create a level surface to receive approximately 18-inches of pipeline bedding stone. The material excavated to create the bench will be side-cast downslope by the Contractor. Once the pipe has been placed and adjusted to the proper line and grade, stone would be placed around the pipe to the spring line.

In the typical trench condition side-hill excavation shown in Figure 6, the soils will be removed to create the trench and side-cast downslope. Bedding stone will be placed as shown above and the pipe string lowered into place. Stone will then be placed to the spring line and the remainder of the trench backfilled with the excavated material. Thrust mounds will be placed at the horizontal changes in direction as seen in Figure 8.

Excavated material would be sidecast to a width of approximately 50 feet. The extent of the excavated area would be approximately 10 acres, with an additional 7.5 acres minimally impacted with side-cast material. Suspended solids released during excavation and backfilling will be contained within the turbidity curtain placed around the trench construction which is shown in Figure 7 and described in Section 7.4. Figures 9.1 and 9.2 contain preliminary plan and profile views of the pipeline as it would be installed in Lake Lanier.

3.2 Project Purpose and Intended Use

The purpose of the Reuse Pipeline and Diffuser to Lake Lanier project is to implement a reuse water transport system to reliably transport water to reuse customers and return flow from the FWHWRC to Lake Lanier. The decision to undertake a reuse project with a discharge to Lake Lanier is defined in detail in the attached EA prepared for the leasing of US Army Corps of Engineers Fee Property at Lake Lanier. As stated in the EA, ..."Previous investigations identified a discharge to Lake Lanier as the most suitable option at this time for returning reclaimed water to the Chattahoochee Basin. That option was acted on when the Georgia Environmental Protection Division (EPD) issued NPDES Permit No. GA0038130 on November 9, 2000." This project will therefore allow for the return of reclaimed water to Gwinnett County's water source – Lake Lanier – which is consistent with the State's goal of reducing net water loss in the Chattahoochee Basin. The overall purpose of the proposed project is to meet this goal. The project is therefore a critical factor that will enable the County to meet future water supply demands (Page 1-2 of the attached EA).

Important specific objectives of the reuse water transport system are as follows:

- Provide a reliable, easy to operate, easy to maintain, and cost-effective pipeline for transport of pumped reuse water in accordance with the issued permit;

- Maximize the potential for future reuse water consumption and provide for future connections at key locations along the route. The project will provide an additional 40 mgd of water in Lake Lanier that would be available for "retention to maintain lake levels, discharge for peak demand power production, or release to meet the downstream

needs for water supply, minimum flows, or other project purposes"(Page 1-4) of the attached EA);

- Minimize short-term environmental and public impacts during construction;
- Minimize long-term environmental and public impacts associated with operation;
- Maximize the use of existing capital facilities;
- Complete the project within the proposed schedule;
- Minimize initial capital costs as much as possible consistent with other project constraints; and
- Minimize long term operation and maintenance costs.

3.3 Project Design and Construction Techniques

Construction will consist of trenching and backfilling operations required for the installation of a 72" diameter pipeline. Figure 10 shows a typical plan and profile view for the pipeline at a typical stream crossing. The following construction techniques will be employed:

- Prior to all land disturbing activities, Best Management Practices (BMPs) to control erosion will be implemented.
- Excavations will be backfilled daily and disturbed areas will be grassed, and stream crossings would be restored as the construction process allows. All stream crossings will be stabilized with rip-rap and live stakes.
- In no case would disturbed areas remain idle and un-restored for more than seven consecutive days.
- Spoil material will be removed from the site.
- Erosion control measures would be inspected daily and after rainfall events. Any measures found to be inadequate to control erosion will be reevaluated and additional measures will be installed.
- After final restoration of disturbed areas, temporary erosion control devices will be removed from the site.

4. Proposed Activity Commencement and Completion Dates

The following is a summary of the proposed project construction schedule:

Table 1. Proposed Activity Commencement and Completion Dates

Activity	Start	Finish
Advertise Project	September 2007	October 2007
Contract NTP	---	January 2008
Install/maintain sediment erosion control devices	January 2008	November 2009
Pipeline/diffuser construction	January 2008	July 2009
Temporary Vegetation	March 2008	September 2008
Final landscaping	February 2009	November 2009

5. Location of Proposed Project and Directions

Project Location: The proposed nine-mile pipeline corridor is located in Gwinnett County. The project begins at the FWHWRC and runs north to Lake Lanier at the Shoal Creek Pump Station (Figure 1).

Directions: Travel north on I-85 out of Atlanta to I-985. Take I-985 north to Buford Drive NE (Route23) and turn left. Go to Buford Highway NE and turn south. Go to Woodward Mill Road and turn left. Go to Ridge Road and turn right. Go to the open pipeline corridor north of the FWHWRC. This is the beginning of the corridor.

6. Project Coordinates, (UTM or Lat/Long): See Figure 1 for overall project start and stop points (Figures 2.1 – 2.3 show start and stop points and wetland/upland boundaries).

The overall project start and stop coordinates are as follows:

	UTM	**Lat and Long**
Start	N: 1476428.12	Lat: N 34° 03’ 31.1”
	E: 2341166.26	Long: W 84°01’ 10.1”
Stop	N: 1515156.1493	Lat: N 34° 09’ 54.4”
	E: 2329990.9800	Long: W 84° 03’ 22.4”

7. Impact Assessment

The attached NEPA EA prepared for the crossing of the easement by the pipeline provides a complete assessment of all of the impacts of the proposed project on natural and cultural resources. The following is a summary of the effects of the construction and operation of the project on wetlands, floodplains, streams, rare, threatened and endangered species, water quality, and cultural resources. Please refer to the attached EA for a detailed assessment of the project and all potentially affected natural and cultural resources.

7.1 Impacts on Waters of the United States, Including Wetlands

The project would temporarily impact approximately 510 feet of 11 intermittent stream crossings, and 170 feet of 5 perennial stream crossings (Figures 2.1 to 2.3). Table 2 summarizes the features and locations of each stream impacted (from Moreland Altobelli, 2002).

Table 2 – Summary of Riverine System Characteristics

Site ID	Name	Order	Subsystem	Class	Subclass	Watershed Name	Hydrologic Map Cataloging Unit	Streambed Width	Estimated Depth at Bankfull	Length of Stream Impact	
										Perennial	Intermittent
Stream 1	Unnamed Tributary of Suwanee Creek	1st	Intermittent	Streambed	Mud & Bedrock	Upper Chattahoochee	03130001	4-6 Feet	1 foot	--	-0(1)
Stream 2	Suwanee Creek	3rd	Perennial	Unconsolidated Bottom	Mud	Upper Chattahoochee	03130001	45 Feet	3 Feet	30	--
Stream 3	Unnamed Tributary of Suwanee Creek	1st	Intermittent	Streambed	Mud	Upper Chattahoochee	03130001	6-10 Feet	1 foot	--	30(2)
Stream 4	Unnamed Tributary of Suwanee Creek	1st	Intermittent	Streambed	Sand & Mud	Upper Chattahoochee	03130001	3 Feet	1 foot	--	30(2)
Stream 5	Unnamed Tributary of Suwanee Creek	1st	Intermittent	Streambed	Sand & Gravel	Upper Chattahoochee	03130001	30 Feet	3 foot	--	0(1)
Stream 6	Unnamed Tributary of Richland Creek	1st	Intermittent	Streambed	Sand	Upper Chattahoochee	03130001	4 Feet	2 foot	--	60

(1) Pipeline crosses stream culvert pipe under road.
(2) Stream has been disturbed from road construction prior to this pipeline installation.

Table 2 – Summary of Riverine System Characteristics (Completed)

Site ID	Name	Order	Subsystem	Class	Subclass	Watershed Name	Hydrologic Map Cataloging Unit	Streambed Width	Estimated Depth at Bankfull	Length of Stream Impact	
										Perennial	Intermittent
Stream 7	Unnamed Tributary of Richland Creek	1st	Intermittent	Streambed	Sand & Gravel	Upper Chattahoochee	03130001	4 Feet	2 foot	--	60
Stream 8	Unnamed Tributary of Richland Creek	1st	Intermittent	Streambed	Sand & Gravel	Upper Chattahoochee	03130001	4 Feet	2 foot	--	30
Stream 9	Richland Creek	3rd	Perennial	Unconsolidated Bottom	Sand & Gravel	Upper Chattahoochee	03130001	20 Feet	3 Feet	40	--
Stream 10	Unnamed Tributary of Richland Creek	1st	Intermittent	Streambed	Sand & Gravel	Upper Chattahoochee	03130001	4 Feet	2 foot	--	45
Stream 11	Unnamed Tributary of Richland Creek	1st	Intermittent	Streambed	Sand & Gravel	Upper Chattahoochee	03130001	4 Feet	2 foot	--	45
Stream 12	Richland Creek	3rd	Perennial	Unconsolidated Bottom	Sand & Gravel	Upper Chattahoochee	03130001	20 Feet	3 Feet	50	--
Stream 13	Unnamed Tributary of Richland Creek	1st	Intermittent	Streambed	Sand & Gravel	Upper Chattahoochee	03130001	6 Feet	4 foot	--	60
Stream 14	Richland Creek	3rd	Perennial	Unconsolidated Bottom	Sand & Gravel	Upper Chattahoochee	03130001	20 Feet	3 Feet	50	--

Table 2 – Summary of Riverine System Characteristics (Completed)											
Site ID	**Name**	**Order**	**Subsystem**	**Class**	**Subclass**	**Watershed Name**	**Hydrologic Map Cataloging Unit**	**Streambed Width**	**Estimated Depth at Bankfull**	**Length of Stream Impact**	
										Perennial	**Intermittent**
Stream 15	Unnamed Tributary of Richland Creek	3rd	Perennial	Unconsolidated Bottom	Sand & Gravel	Upper Chattahoochee	03130001	15 Feet	3 foot	0(1)	--
Stream 16	Unnamed Tributary of Lake Lanier	1st	Intermittent	Streambed	Sand & Mud	Upper Chattahoochee	03130001	2 Feet	8 Inches	--	150(3)
									TOTAL	170	510

(1) Pipeline crosses stream culvert pipe under road.

(3) Stream Channel into Lake.

A total of 0.04 acres of Wetland 1, 0.345 acres of Wetland 1A, 0.047 acres of Wetland 2, 0.272 acres of Wetland 3, and 0.051 acres of Wetland 4 (Figures 2.1 through 2.3 and Figures 11 through 18) would be impacted by pipeline construction and operation (Table 3). No other wetlands would be impacted by the proposed project.

Table 3. Impacts on Wetlands

Wetland Impact Site Number (indicate on map)	Type of Impact[1]	Area of Impact (acres)	Located within 100-year Floodplain (yes/no)	Distance to Nearest Stream (linear feet)	Type of Wetland
Wetland 1	MCGF	0.04	Yes	At Stream	PFO1A
Wetland 1A	MCGF	0.345	Yes	At Stream	PEM1E
Wetland 2a (Fig. 5)	MCGF	0.024	Yes	At stream	PSS1A
Wetland 2b (Fig. 5)	MCGF	0.023	Yes	At stream	PSS1A
	Subtotal Wetland 2:	0.047			
Wetland 3a (Fig. 6.1)	MCGF	0.013	Yes	120	PFO1A
Wetland 3b (Fig. 6.1)	MCGF	0.008	Yes	10	PFO1A
Wetland 3c (Fig. 6.1)	MCGF	0.007	Yes	10	PFO1A
Wetland 3d (Fig. 6.2)	MCGF	0.126	Yes	At stream	PFO1A
Wetland 3e (Fig. 6.3)	MCGF	0.033	Yes	400	PFO1A
Wetland 3f (Fig. 6.4)	MCGF	0.034	Yes	200	PFO1A
Wetland 3g (Fig. 6.5)	MCGF	0.006	Yes	200	PFO1A
Wetland 3h (Fig. 6.6)	MCGF	0.045	Yes	200	PFO1A
	Subtotal Wetland 3:	0.272			
Wetland 4	MCGF	0.051	Yes	At stream	PSS1C
	Total Wetlands 1, 2, 3 and 4:	0.755			

[1]Mechanized Clearing, Grading, Filling

The following are descriptions of Wetlands 1, 2, 3, and 4 (from Moreland Altobelli Associates, Inc. 2002) and Wetland 1A (from Moreland Altobelli Associates, Inc. 2007):

- Wetland 1: "This wetland is an approximately 6.0 acre palustrine, forested wetland (PFO1A) located approximately 100 feet northeast of Woodward Mill Road and approximately 2,750 feet southeast of Old Suwanee Road. The site is associated with Suwanee Creek".

  "Dominant vegetation includes box elder, river birch, tulip poplar, tag alder, green ash, buttonbush, bulrush, smartweed, pennywort, trumpet vine, and fox grape. Wetland hydrology indicators include saturation in the upper 12 inches, sediment deposits, drainage patterns, oxidized root channels, and water stained leaves. Hydric soil indicators include aquic moisture regime as evidenced by the presence of redoximorphic features. This wetland is considered moderate to low quality due to its size and location adjacent to current development. This site provides wildlife habitat and improvement to water quality through the retention and assimilation of pollutants from stormwater runoff.

- Wetland 1A: " This palustrine, emergent wetland is greater than five acres in size. Dominant vegetation includes water smartweed, arrowleaf tearthumb, rush, woolgrass, boxelder, sedges, and cattail. At the time of the field investigation, this wetland contained approximately 1-4 inches of standing water, and the soils were saturated in the upper 12 inches. The soils were low chroma with a matrix of 10YR 5/2 and evidence of mottling. Wetland hydrology can be attributed to the surrounding topography and proximity of Suwanee Creek. This wetland has been previously impacted by activities within the watershed including the construction of a sewer line, and would be considered low-medium quality. Based on the location of fencing and adjacent pasture land, it is evident that this site was also previously part of the pasture. It appears that the area had been ditched as part of an active agricultural area in order to drain the site and allow the lower areas of the site to be maintained as open pasture land for grazing or cultivating hay. With the construction of a sewer line across this field towards Suwanee Creek, this ditch has been blocked and the hydrology is returning to its pre-drained natural condition.

  With additional restoration, this wetland could be considered an important resource and capable of providing habitat for small mammals, reptiles, and amphibians; retention of floodwaters; and filtration of surface water. "

- Wetland 2: "This site is an approximately 0.1 acres palustrine, scrub/shrub wetland (PSS1A) located on new location adjacent to an unnamed tributary of Richland Creek. This wetland is approximately 300 feet west of Peachtree Industrial Boulevard and approximately 1,250 feet southeast of Hillcrest Drive. Dominant vegetation includes tag alder, black willow, microstegium, tearthumb smartweed, and clematis vine. Wetland hydrology indicators include saturation in the upper 12 inches, drainage patterns, and oxidized root channels. Hydric soil indicators include sulfidic odor and aquic moisture regime and evidenced by the presence of redoximorphic features. This wetland is considered to be poor quality due to its position between a large tract of undeveloped land to the west and Peachtree Industrial Boulevard to the east. This site provides

wildlife habitat and improvement to water quality through the retention and assimilation of pollutants from stormwater runoff".

- Wetland 3: "This site is approximately 50 acres of palustrine, forested wetland (PFO1A) located along an abandoned portion of Hillcrest Drive, paralleling South Richland Creek Road. Dominant vegetation includes river birch, tulip poplar, sycamore, box elder, black willow, broadleaved cattail, bulrush and soft rush. Wetland hydrology indicators include saturation in the upper 12 inches, drainage patterns, and oxidized root channels. Hydric coil indicators include sulfidic odor, aquic moisture regime and low chroma colors. This wetland is considered moderate quality due to its size and proximity to South Richland Creek Road. Upland forests adjacent to this site have been cleared in the last few years. This site provides wildlife habitat and improvement in water quality through the retention and assimilation of pollutants from stormwater runoff".

- Wetland 4: "This site is approximately 0.051 acres of palustrine, scrub-shrub wetland (PSS1C) located on the shore of Lake Sydney Lanier. It is approximately 300 feet west of Shoal Creek Road and is associated with a small tributary flowing out of a sediment pond and into Lake Lanier.

  Dominant vegetation includes tag elder, river birch, buttonbush, jewelweed, microstegium, and trumpet vine. Wetland hydrology indicators include saturation in the upper 12 inches, drainage patterns, and oxidized root channels. Hydric soil indicators include sulfidic odor and aquic moisture regime as evidenced by the presence of redoximorphic features. This wetland is considered low quality due to its small size and location adjacent to development. This site provides improvement to water quality through the retention and assimilation of pollutants from stormwater runoff."

7.2 Protected Species

A literature review was conducted using information available from the Georgia Natural Heritage Program and the Athens Office of the Fish and Wildlife Service (USFWS). A field survey of the corridor was also conducted to determine whether habitats for federally-listed, state-listed, or Heritage Program-listed species were present (Moreland Altobelli Associates, Inc., 2002). The attached EA includes an assessment of the presence of these species in the area and the potential of the project to impact these species based on all available information. For completeness, a search of records for the area was also conducted. Based on the literature review and assessment of habitats in the field survey, it was concluded that no federally- or state-listed species of plants or animals occur in the project therefore none of these species would be impacted by the proposed project.

7.3 Cultural Resources

A literature review, archival search and Phase 1 shovel testing of the entire corridor was conducted in 2002 by R. S. Webb & Associates, Inc. (R.S. Webb & Associates, Inc., 2002). No archeological or historical resources were located within the construction zone of the proposed pipeline. One resource was identified in an earlier alternative design, but this has been successfully avoided with the final design (a portion of the Southern Railroad). The attached

NEPA EA includes a detailed assessment of the potential impacts on cultural resources. The project would not have any impact on cultural resources.

7.4 Floodplains

The pipeline would cross the 100-year floodplain of several streams at 16 locations (Figures 2.1 – 2.3). No permanent fill would be placed in the floodplain at any of these locations. All construction in the floodplain would be limited to trenching and laying of pipeline. These areas would be restored to their natural contours. The project would not impact floodplain storage capacities as a result. The attached NEPA EA includes a detailed assessment of the potential impacts of the project on floodplains.

The amount of material excavated in the lake would depend on the contours of the lake bottom along the 6,535 ft. pipeline route. The preliminary plan and profile view and the lake bottom profile of the pipeline in Lake Lanier are displayed in Figures 9.1 and 9.2. The pipeline would be placed on stone bedding with an average disturbed lake bottom width of approximately 30 feet. The footprint of the stone bedding will occupy approximately 4.3 acres of the lake bottom. Excavated material would be sidecast to a width of approximately 50 feet, and a granular stone material would be used to provide a foundation and bedding for the pipeline in the lake. The extent of the excavated area would be approximately 10 acres, with an additional 7.5 acres minimally impacted with side-cast material. The diffuser earthwork and bedding details are found in Section 3.1.2 of the PCN.

During construction, the contractor would install, maintain and relocate the turbidity curtain along the length of the pipeline. The curtain would extend from the surface to the lake bottom, for the length of the pipeline route, and would remain in place as required to allow particulate material to settle. The curtain would not be removed until the water within the contained area exhibits a comparable turbidity with the surrounding water, as determined by visual inspection. The Contractor would relocate the turbidity curtain to coincide with pipeline construction progress. All activities would be contained within the 200 ft. construction easement. The work site turbidity curtain placement is detailed in Figure 7.

7.5 State 303(d) Listed Streams in the Project Area

The proposed pipeline would cross Richland Creek or its tributaries at several locations. All of Richland Creek from its headwaters to the Chattahoochee River is on the 303(d) list issued by the State of Georgia, Environmental Protection Division. The 303(d) list specifies that Richland Creek does not support the designated use for fishing because of violations of the fecal coliform bacteria standard caused by urban runoff/urban effects. Urban runoff is being addressed in the EPD Stormwater Management Strategy for metropolitan Atlanta. An areawide stormwater permit was reissued in 2004 (GaEPD 2007).

The proposed pipeline would cross Suwanee Creek or its tributaries at several locations. Suwanee Creek below Suwanee Creek Lake (near Buford) to Ivy Creek is on the 2006 303(d) list issued by the State of Georgia Environmental Protection Division. The 303(d) list specifies that this section of Suwanee Creek only partially supports the designated use for fishing because of violations of standards concerning effects on aquatic biota and toxicity. Discharges from the

Buford Southside municipal treatment facility and urban runoff/urban effects are listed as the potential cause for these violations. EPD is addressing nonpoint source (urban runoff) through a watershed protection strategy. An areawide stormwater permit was reissued in 2004.

7.6 State Stream Buffers

This project meets all the land-disturbing requirements regarding stream buffers contained in Erosion and Sedimentation Act (OCGA 12-7-1, as amended 2003) and therefore does not require a variance.

7.7 State Designated Trout Streams

The project would be constructed within the Suwanee Creek and Richland Creek watersheds. Neither of these creeks is a State designated trout stream or water.

8. Avoidance and Minimization

The selection of the preferred project alignment is based on the need for the recycling of water resources with emphasis on minimizing impacts upon sensitive areas. Other alternatives were considered early on in the design planning stage but were discarded for engineering, logistics, and cost factors. The attached EA contains a detailed summary of alternative collection, treatment and disposal technologies, pipeline and diffuser designs, and pipeline routes. No fill would be placed in Richland Creek or other creeks for any of the construction. All crossings would be restored to their original streambank configurations, and stabilized with rip-rap and live stakes to promote rapid revegetation.

Clay plugs would be used at the start and stop points of each impacted wetland to prevent them from draining during operation of the pipeline.

The width of the corridor has been reduced from the typical 60 feet in upland areas to lesser amounts at five perennial stream crossings respectively (see Table 2), in order to minimize the impacts of construction on waters of the United States. The original design would have impacted 300 feet of perennial streams at five locations. The final design reduced the amount of perennial stream impacted from 300 feet to 170, a reduction of 130 feet.

Similarly, impacts on wetlands were also achieved through avoidance in the latest design phase. The original design was examined in detail, and where impacts on wetlands were predicted, the width of the ROW was reduced as much as allowable to minimize further impacts. It was estimated that a 25% reduction in impacts on wetlands was achieved.

Impacts of construction on water quality would be minimized by the use of BMPs along cleared areas of the corridor. BMPs that would be implemented to minimize erosion during construction and operation include silt fencing, live stakes, rip-rap, silt curtains, and fiber matting. Figure 10 displays the BMP details for the project.

The preferred alternative, as defined by the 404(b)(1) Guidelines, is the “least environmentally damaging practicable” alternative. This is defined as the alternative that is determined to be the most feasible based on consideration of logistic, environmental; cost and

engineering factors. The preferred alternative would result in temporary impacts on 0.755 acres of wetlands, 510 linear feet of intermittent stream, and 170 feet of perennial stream. Suitable BMPs for mitigation of potential impacts of construction would be employed to minimize effects of soil erosion on water quality during construction. All stream areas would be stabilized with rip-rap and live stakes.

9. Compensation

The project would result in fill of 0.755 acres of wetlands. Since the project would impact more than 0.1 acres of wetlands, compensation would be required. We have calculated the number of required credits for the four wetlands using the USACE Savannah District Standard Operating Procedure 2004 abbreviated method, assuming the applicant would use a mitigation bank. A total of 6.04 credits would be purchased from a local bank for this purpose. This would be rounded up to 7 credits, since most banks do not issue partial credits for small projects.

The project would not result in any permanent impacts on streams. Therefore, no stream restoration credits would be required.

10. References

Moreland Altobelli Associates, Inc. 2002. Jurisdictional Waters and Protected Species Investigation. Gwinnett Reuse Pipeline Route. Gwinnett County, Georgia. December 2002.

Moreland Altobelli Associates, Inc. 2007. Jurisdictional Waters Investigation. Gwinnett Reuse Pipeline Route. Gwinnett County, Georgia. February 2007.

R.S. Webb & Associates, Inc. Cultural Resources Survey of the Proposed Gwinnett County Lake Lanier Water Reuse Line Project. Gwinnett County, Georgia. November 22, 2002.

Corps of Engineers 2003. Standard Operating Procedures for Compensatory Mitigation. Savannah District US Army Corps of Engineers. http://www.sas.usace.army.mil/permit/sect1.rtf

Corps of Engineers 2004. Standard Operating Procedures for Stream and Wetland Mitigation. Savannah District US Army Corps of Engineers.

Applicant/Agent's Signature February 13, 2007
Dr. Steven Bach

(Agent's signature is valid only if an authorization letter from the applicant is provided.)

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
NORTHERN SECTION
1590 ADAMSON PARKWAY, SUITE 200
MORROW, GEORGIA 30260-1777

REPLY TO
ATTENTION OF:

Regulatory Branch
200322640

DEC 2 2003

Gwinnett County Dept. Public Works
Attention: Mr. James H. Scarbrough
684 Winder Highway
Lawrenceville, Georgia 30045

Dear Mr. Scarbrough:

On November 4, 2003, you visited our office to discuss your plans to apply for a permit to install a reuse line and diffuser. The reuse line would begin at the F. Wayne Hill Water Resources Center and end after being buried a length beneath Lake Lanier. The diffuser would be attached to the extreme end of the reuse line. In your letter dated November 14, 2003, you requested that we provide our position on the use of Nationwide Permit No. 12(NWP 12), Utility Line Activities, and Nationwide Permit No. 7(NWP 7), Outfall Structures and Maintenance.

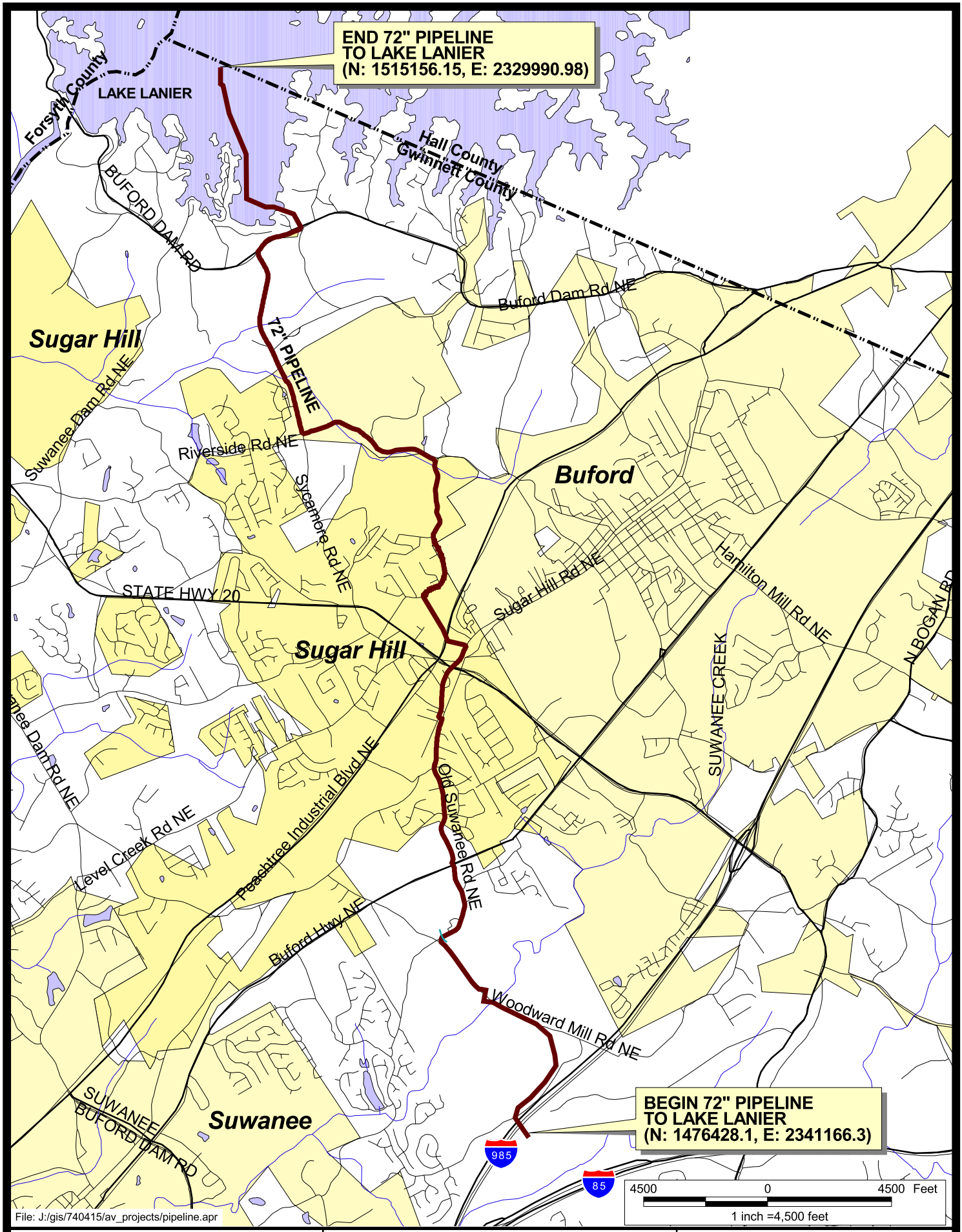
We determined that NWP 12 and NWP 7 could authorize the reuse reuse line and diffuser provided you comply with all applicable NWP Conditions and Regional Conditions. We also determined that part of the NWP 12 definition "... no change in preconstruction contours." only applies to that length of the reuse line between Lake Lanier and the F. Wayne Hill Water Resources Center.

When you apply for the Nationwide Permits include a copy of this letter and a copy of the Mobile District's Environmental Assessment for the installation of the reuse line and diffuser.

If I can answer any questions prior to December 5, 2003, contact me at 678-422-2728. After December 8, 2003, contact Edward Johnson, Section Chief, at 678-422-2722 with any questions.

Sincerely,

Gary L. Craig
Senior Project Manager

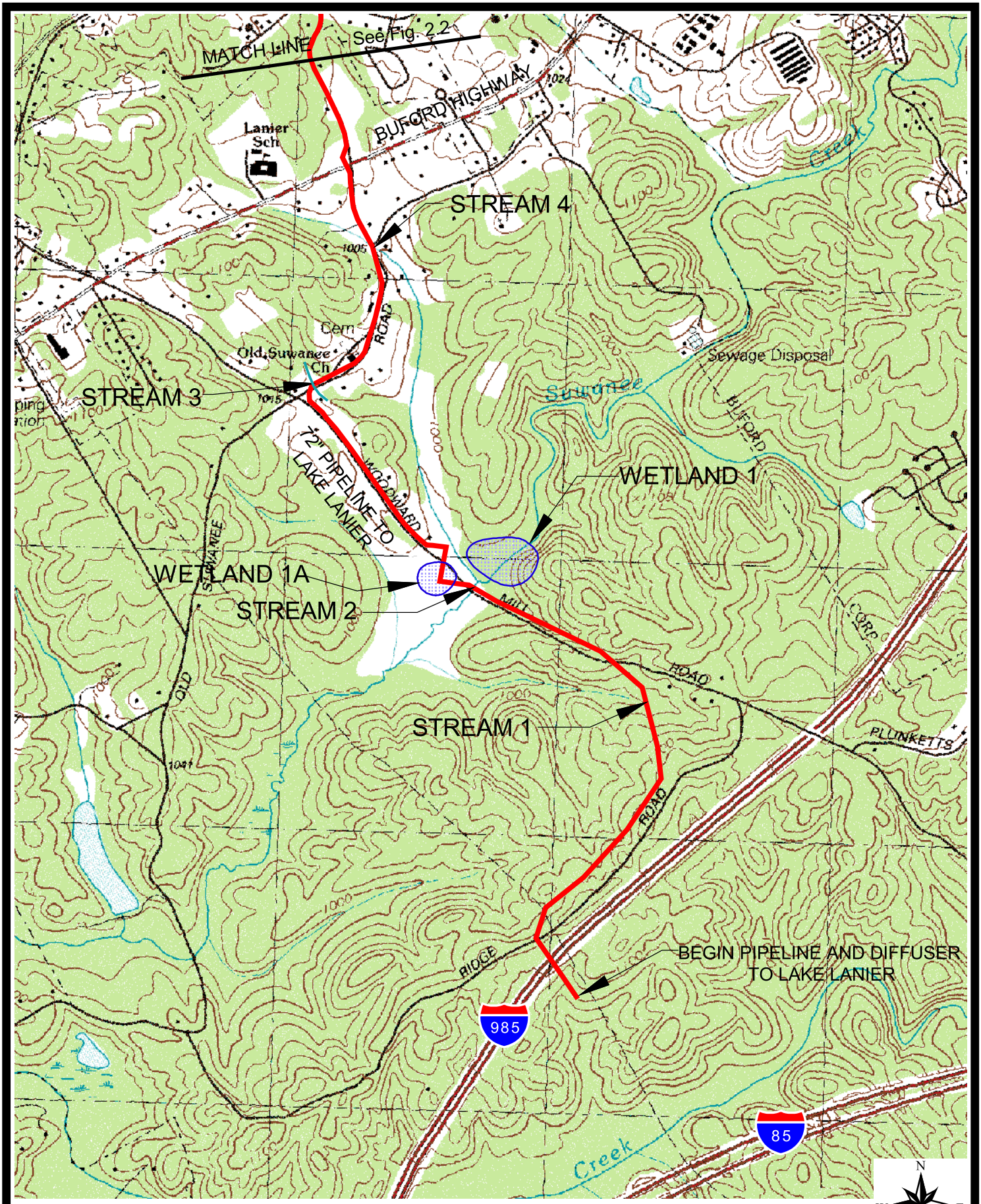


PARSONS

5390 Triangle Parkway, Suite 100, Norcross, Georgia, 30092
Phone: (770) 446-4900

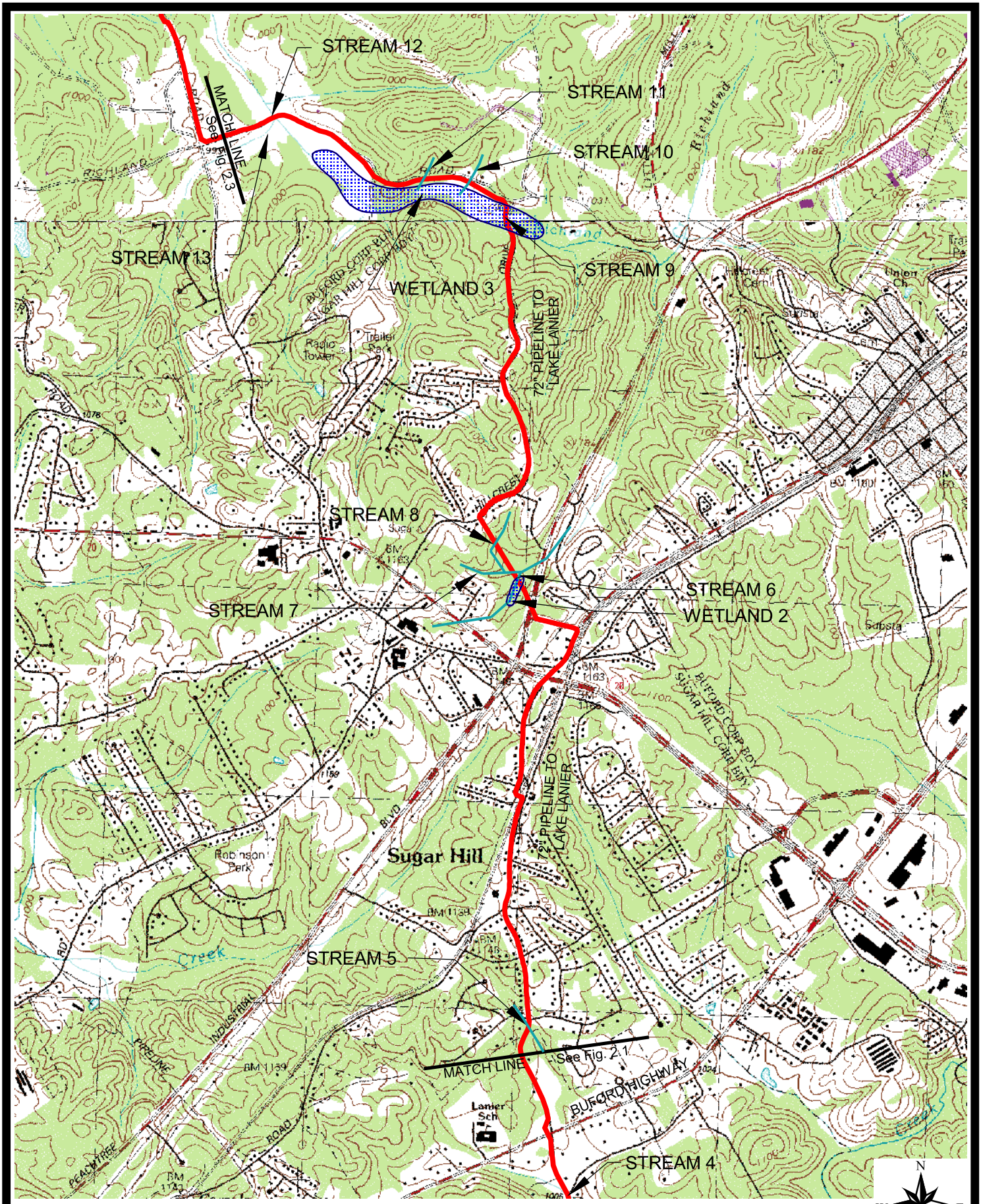
GWINNETT COUNTY DEPARTMENT OF PUBLIC UTILITIES
REUSE PIPELINE AND DIFFUSER TO LAKE LANIER
GWINNETT COUNTY, GEORGIA

FIGURE 1
VICINITY MAP



File: J:/gis/740415/av_projects/pipeline.apr

PARSONS 5390 Triangle Parkway, Suite 100, Norcross, Georgia, 30092 Phone: (770) 446-4900	GWINNETT COUNTY DEPARTMENT OF PUBLIC UTILITIES REUSE PIPELINE AND DIFFUSER TO LAKE LANIER GWINNETT COUNTY, GEORGIA	FIGURE 2.1 PIPELINE ROUTE MAP



File: J:/gis/740415/av_projects/pipeline.apr

1 inch =2,000 feet

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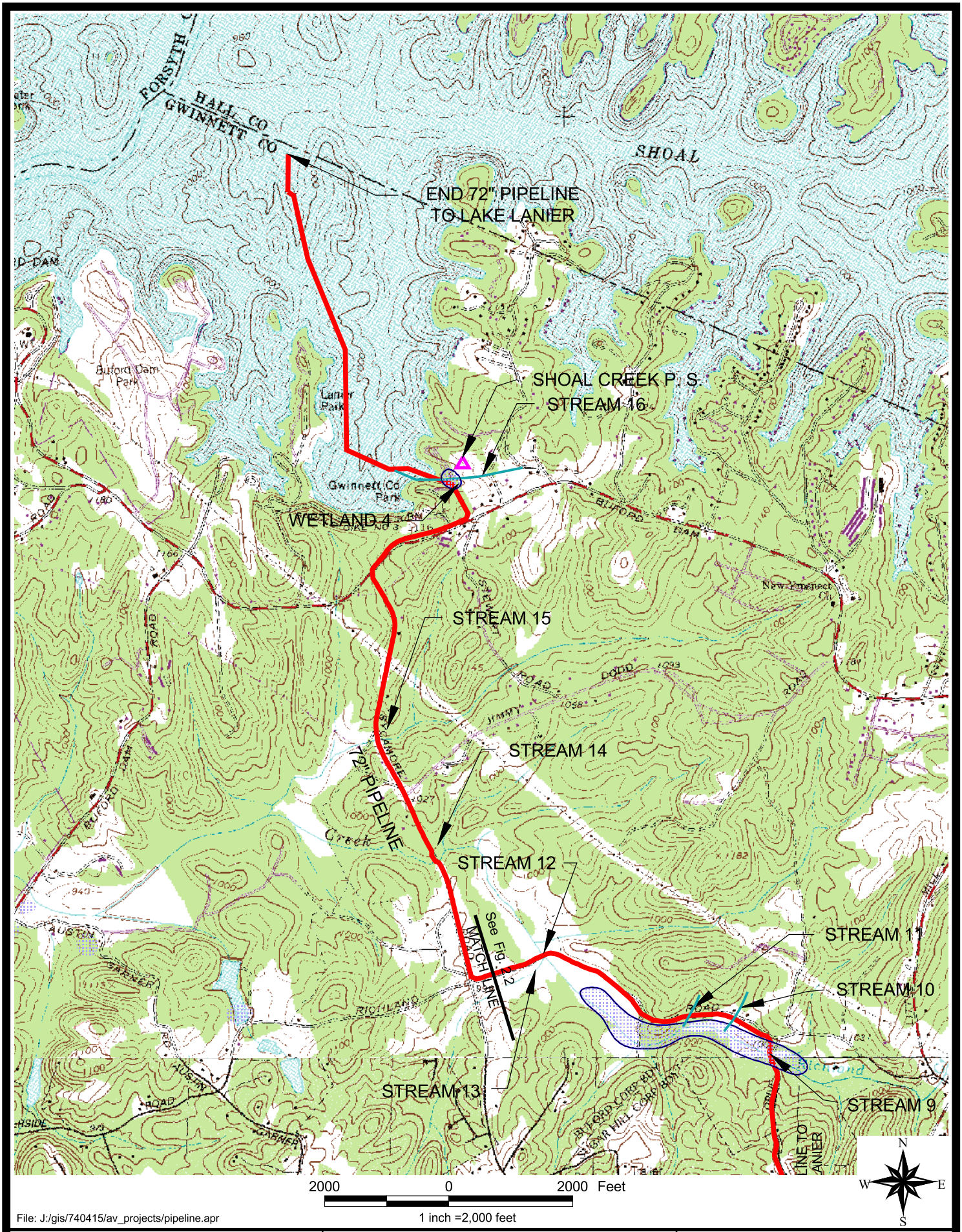
Phone: (770) 446-4900

GWINNETT COUNTY DEPARTMENT OF PUBLIC UTILITIES
REUSE PIPELINE AND DIFFUSER TO LAKE LANIER
GWINNETT COUNTY, GEORGIA

FIGURE 2.2
PIPELINE ROUTE MAP



File: J:/gis/740415/av_projects/pipeline.apr

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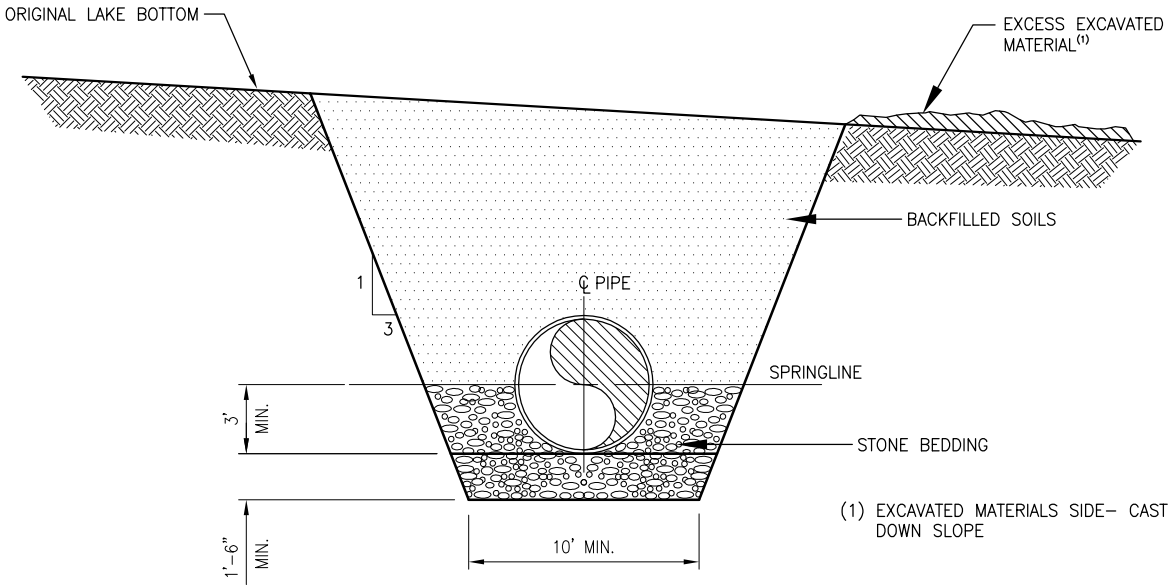
Phone: (770) 446-4900

GWINNETT COUNTY DEPARTMENT OF PUBLIC UTILITIES
REUSE PIPELINE AND DIFFUSER TO LAKE LANIER
GWINNETT COUNTY, GEORGIA

FIGURE 2.3
PIPELINE ROUTE MAP

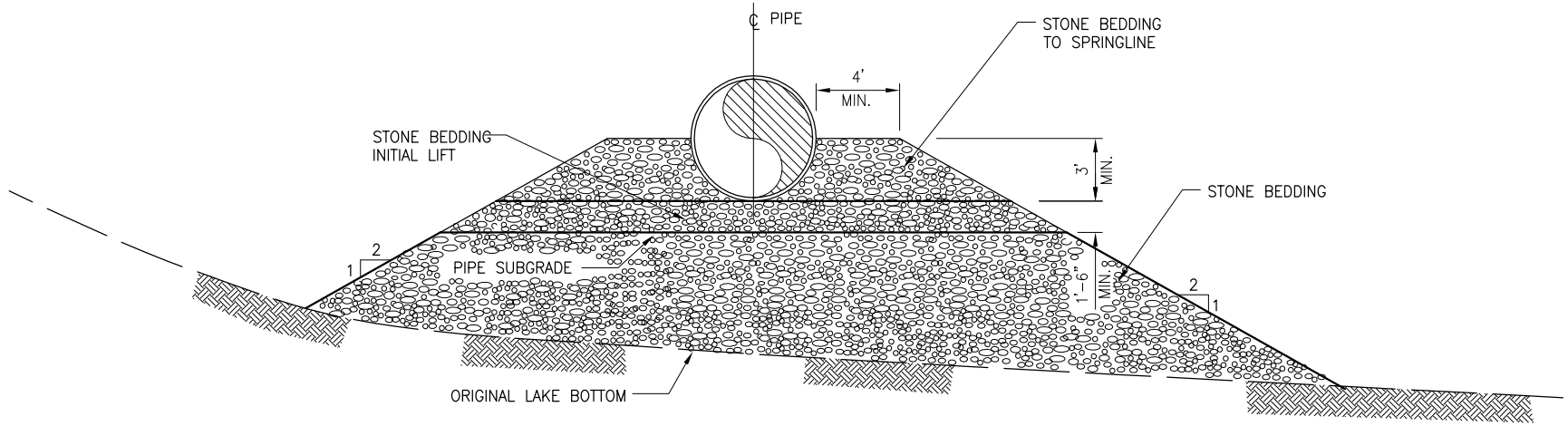


TRENCH AND FILL CONDITIONS WHERE PIPE CROWN EL. $\geq$ 1045

Figure 3 Near Shore Trench and Fill Conditions

NOT TO SCALE

PARSONS



FILL CONDITION
NOT TO SCALE

Figure 4 Fill Conditions

NOT TO SCALE

PARSONS

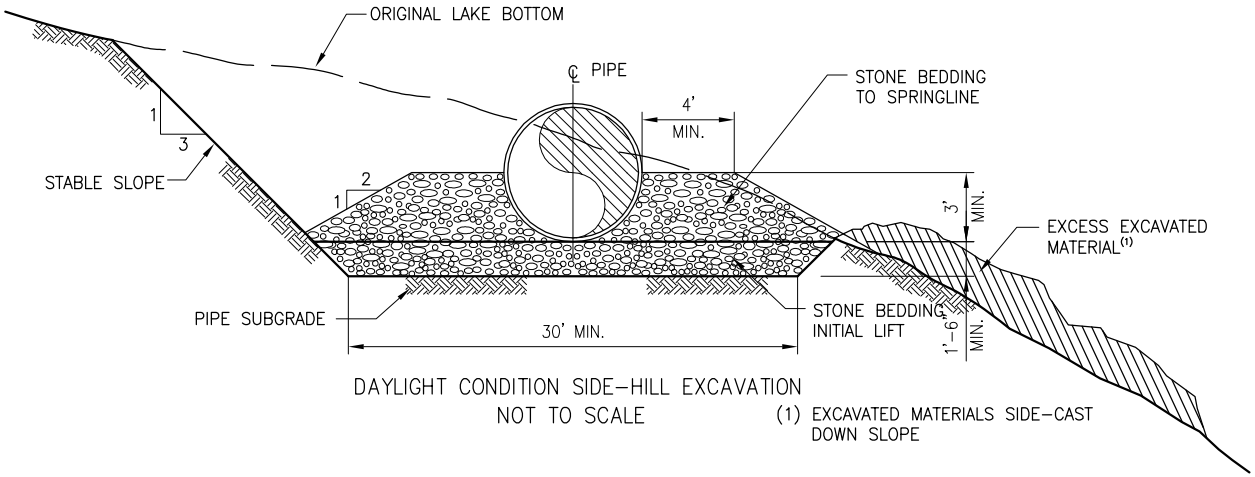
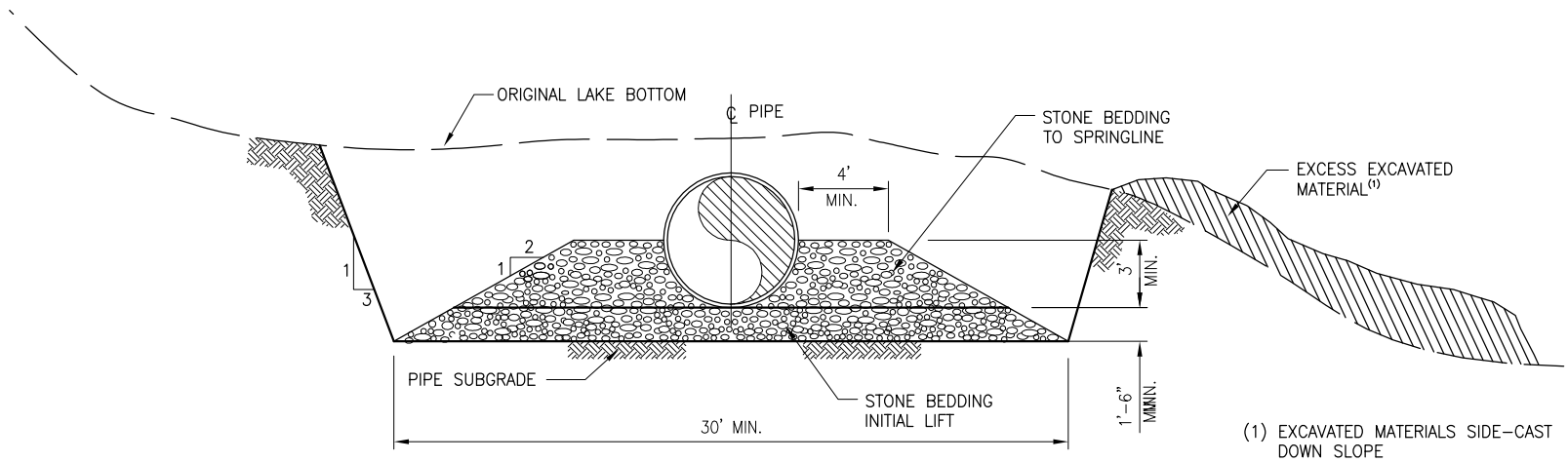


Figure 5 Daylight Conditions Side-Hill Excavation

NOT TO SCALE

PARSONS

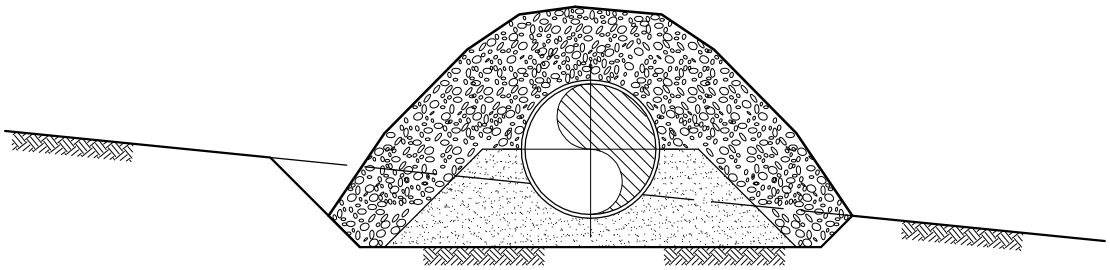


TRENCH CONDITION SIDE-HILL EXCAVATION
NOT TO SCALE

Figure 6 Trench Condition Side-Hill Excavation

NOT TO SCALE

PARSONS



THRUST MOUND SCHEDULE

STATION	TONS (IN AIR)
15+52.28	60
18+54.47	50
26+07.28	110
42+21.00	30
58+16.36	50
68+55.2	50 *

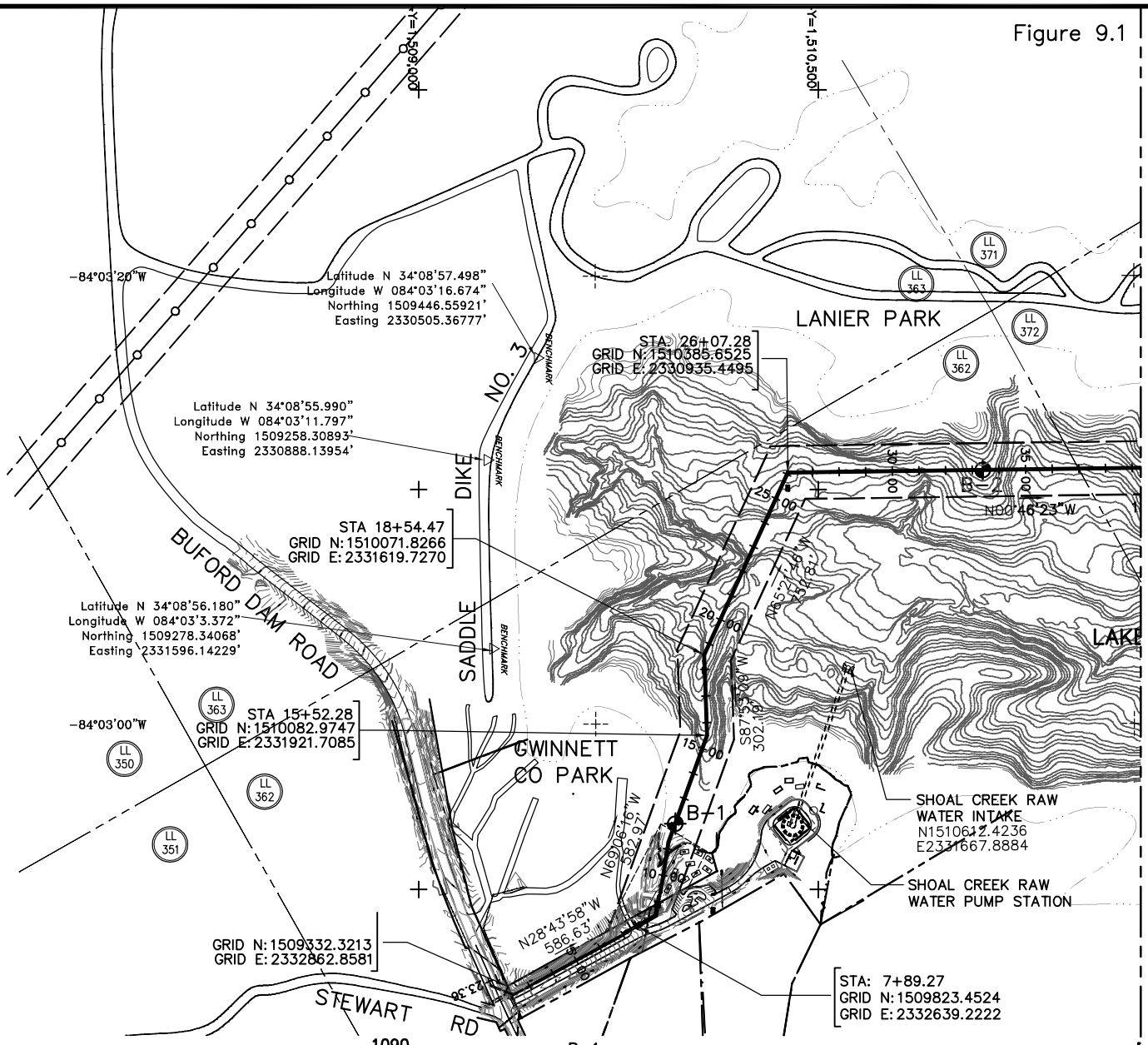
* ESTIMATED BASED ON PREVIOUS SCHEDULE

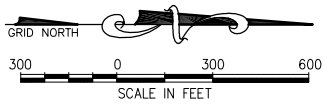
Figure 8 Thrust Mound Detail

NOT TO SCALE

PARSONS

Figure 9.1





GEODETIC DATUM: NAD83
ELLIPSOID: WGS84
GRID UNITS: U.S. SURVEY FEET
PROJECTION: LAMBERT
ZONE: GEORGIA WEST (1002)
CENTRAL MERIDIAN: 84°10' W
FALSE EASTING: 2,296,583.33 ft. at C.M.
FALSE NORTHING: 0.00 ft. AT 30°00' N

BATHYMETRIC SURVEY BY C&C TECHNOLOGIES, INC. CONDUCTED, SEPT 12–14, 2001 & JULY 18–20, 2005

* ANY PART OF PROFILE THAT HAS THE CROWN OF THE PIPE AT OR ABOVE ELEVATION 1045 MUST BE BURIED WITHIN THE EXISTING BOTTOM PROFILE.

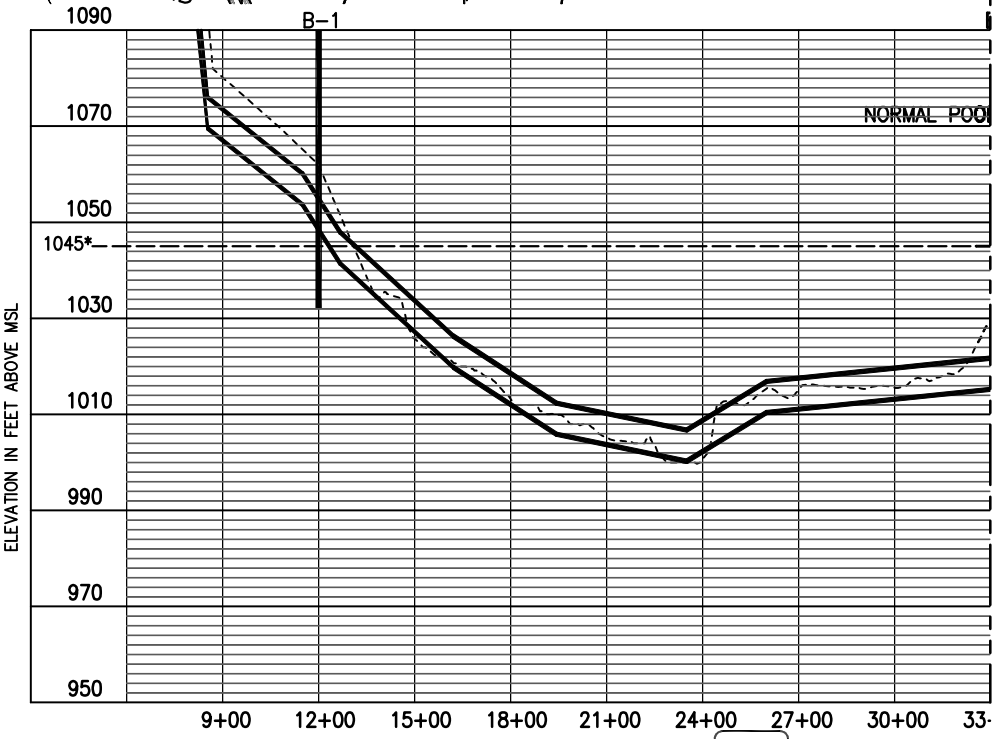


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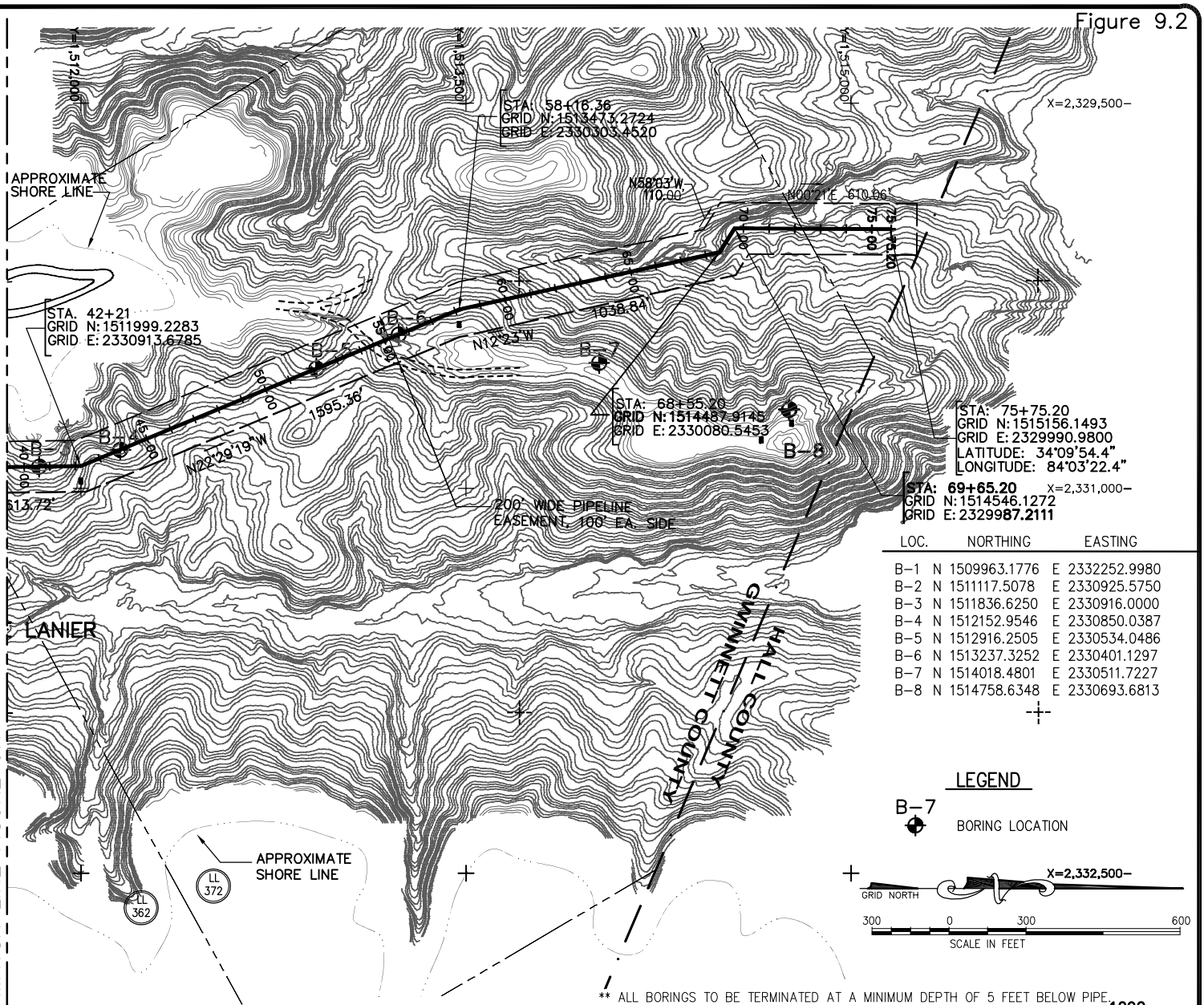
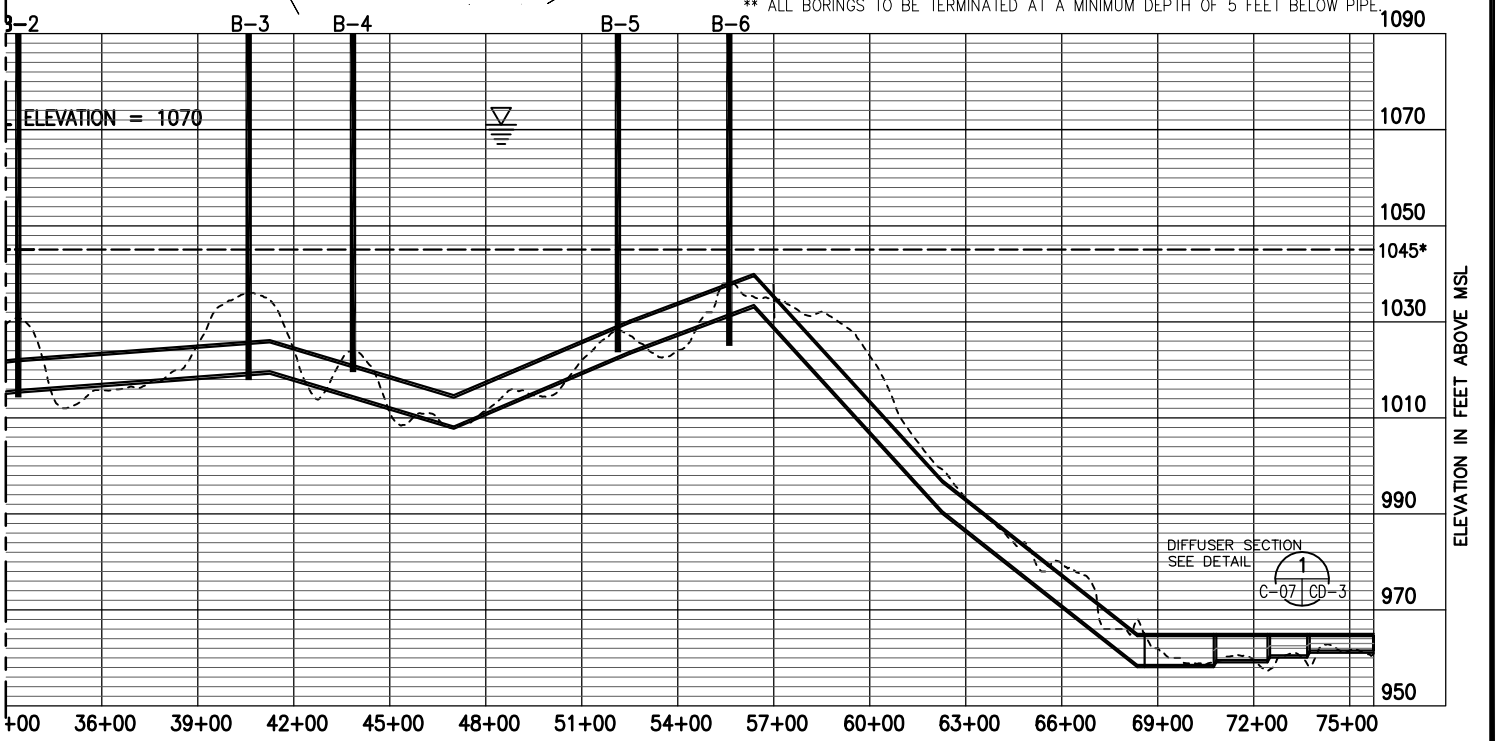
Figure 9.2



LOC.	NORTHING	EASTING
B-1	N 1509963.1776	E 2332252.9980
B-2	N 1511117.5078	E 2330925.5750
B-3	N 1511836.6250	E 2330916.0000
B-4	N 1512152.9546	E 2330850.0387
B-5	N 1512916.2505	E 2330534.0486
B-6	N 1513237.3252	E 2330401.1297
B-7	N 1514018.4801	E 2330511.7227
B-8	N 1514758.6348	E 2330693.6813

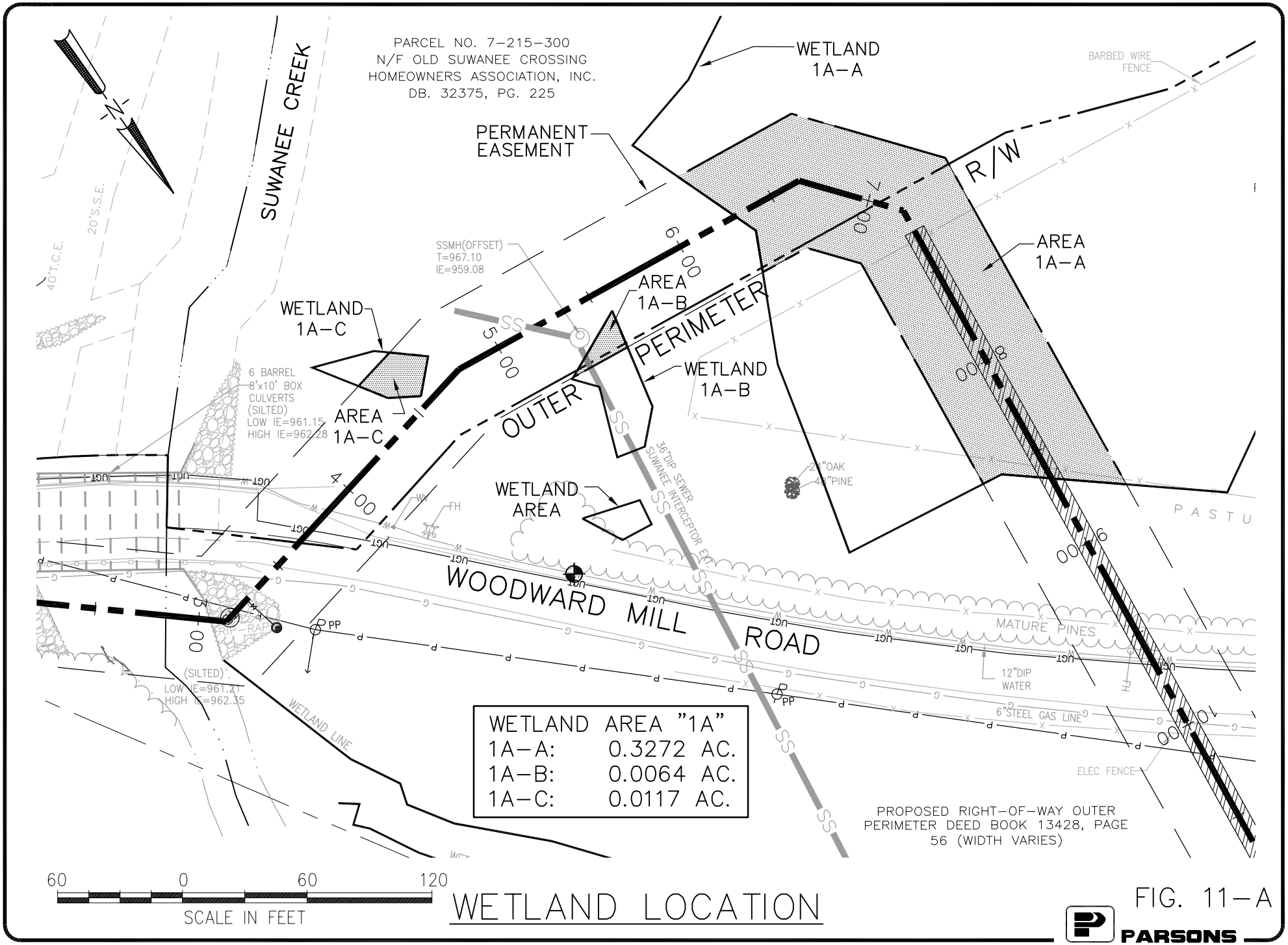
MATCH LINE FIGURE 9.1

** ALL BORINGS TO BE TERMINATED AT A MINIMUM DEPTH OF 5 FEET BELOW PIPE



* ANY PART OF PROFILE THAT HAS THE CROWN OF THE PIPE AT OR ABOVE ELEVATION 1045 MUST BE BURIED WITHIN THE EXISTING BOTTOM PROFILE.

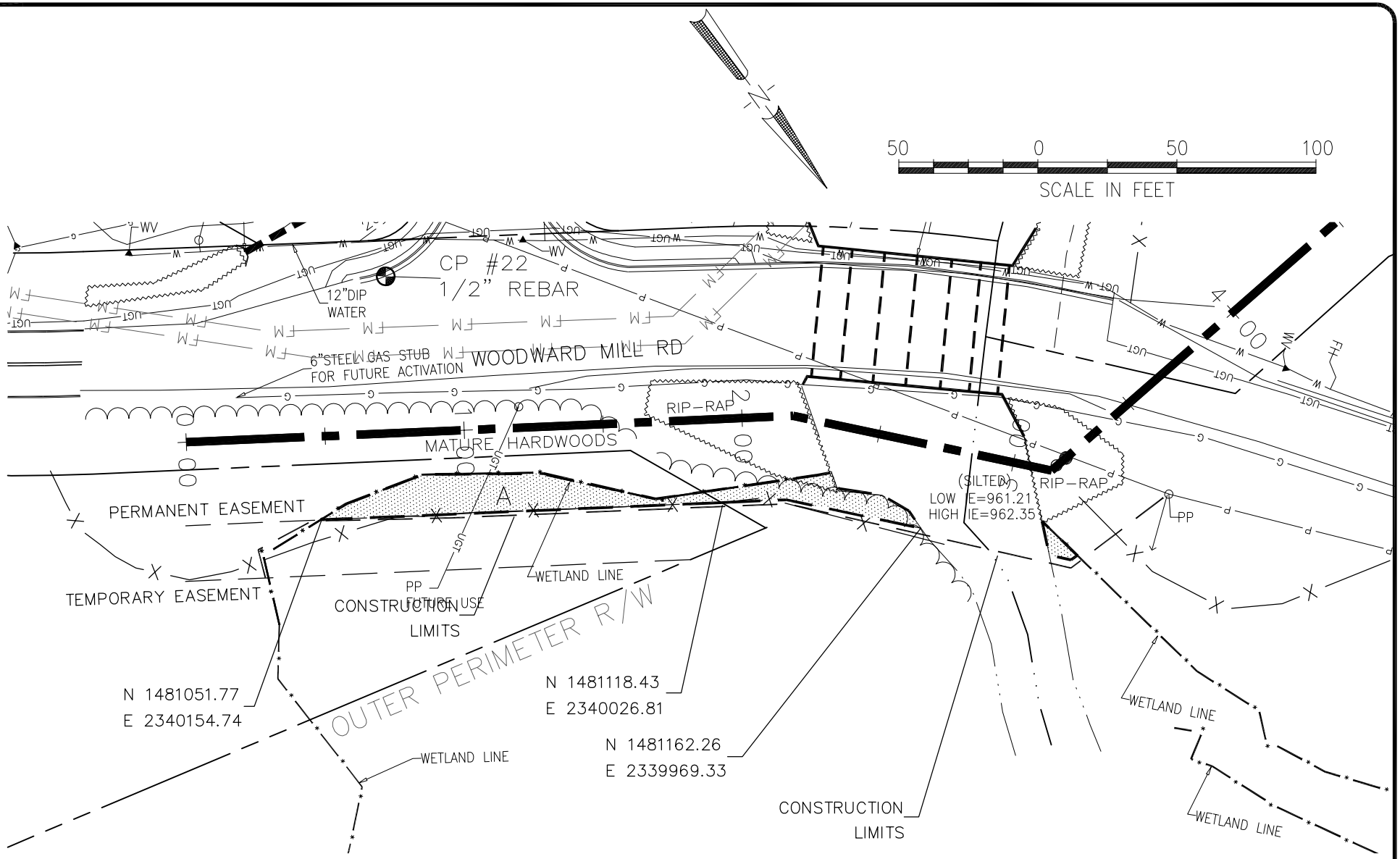
PARSONS



WETLAND AREA "1A"	
1A-A:	0.3272 AC.
1A-B:	0.0064 AC.
1A-C:	0.0117 AC.

WETLAND LOCATION

FIG. 11-A

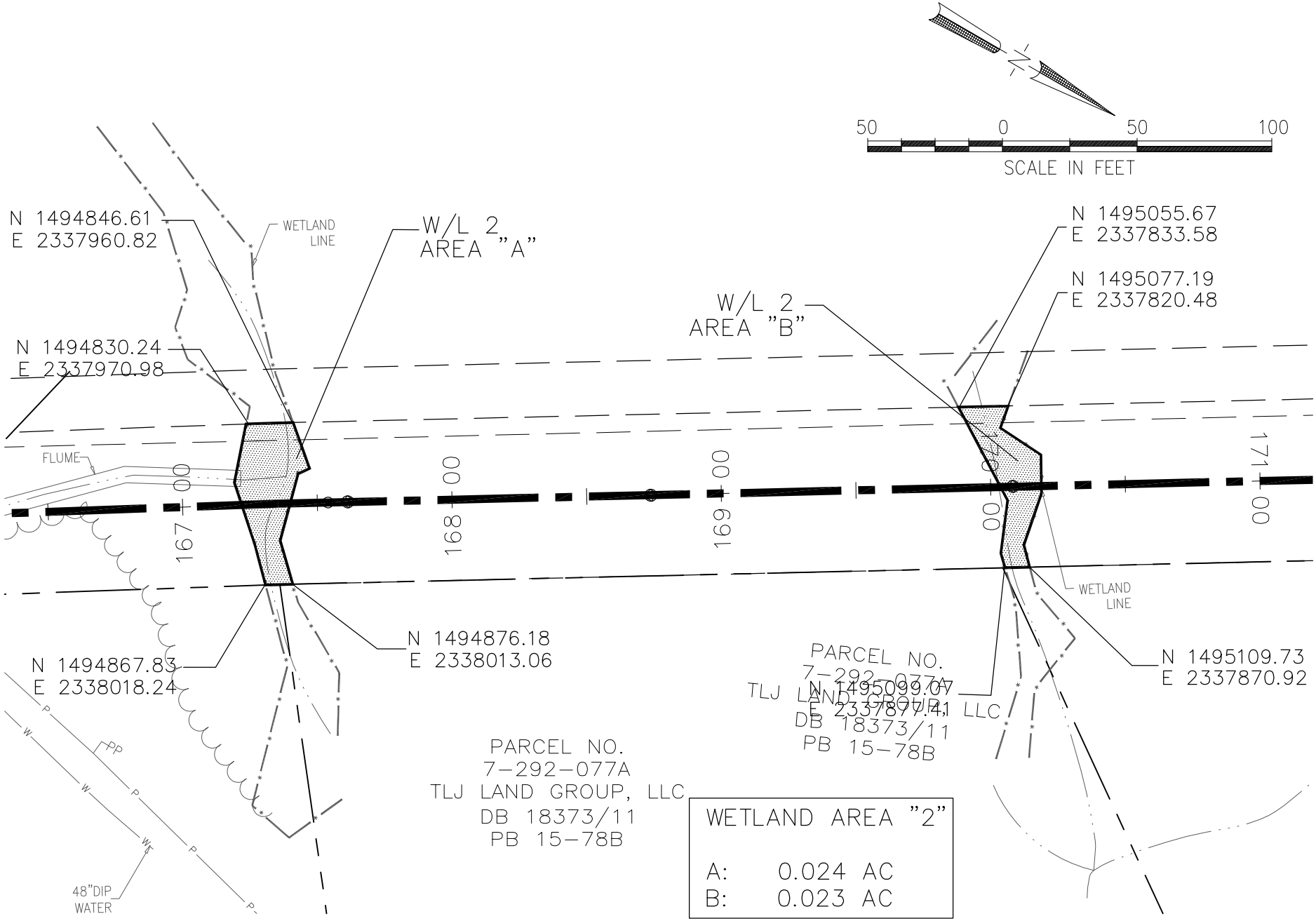


WETLAND AREA #1
A: 0.04 ac

WETLAND LOCATION

FIG. 11

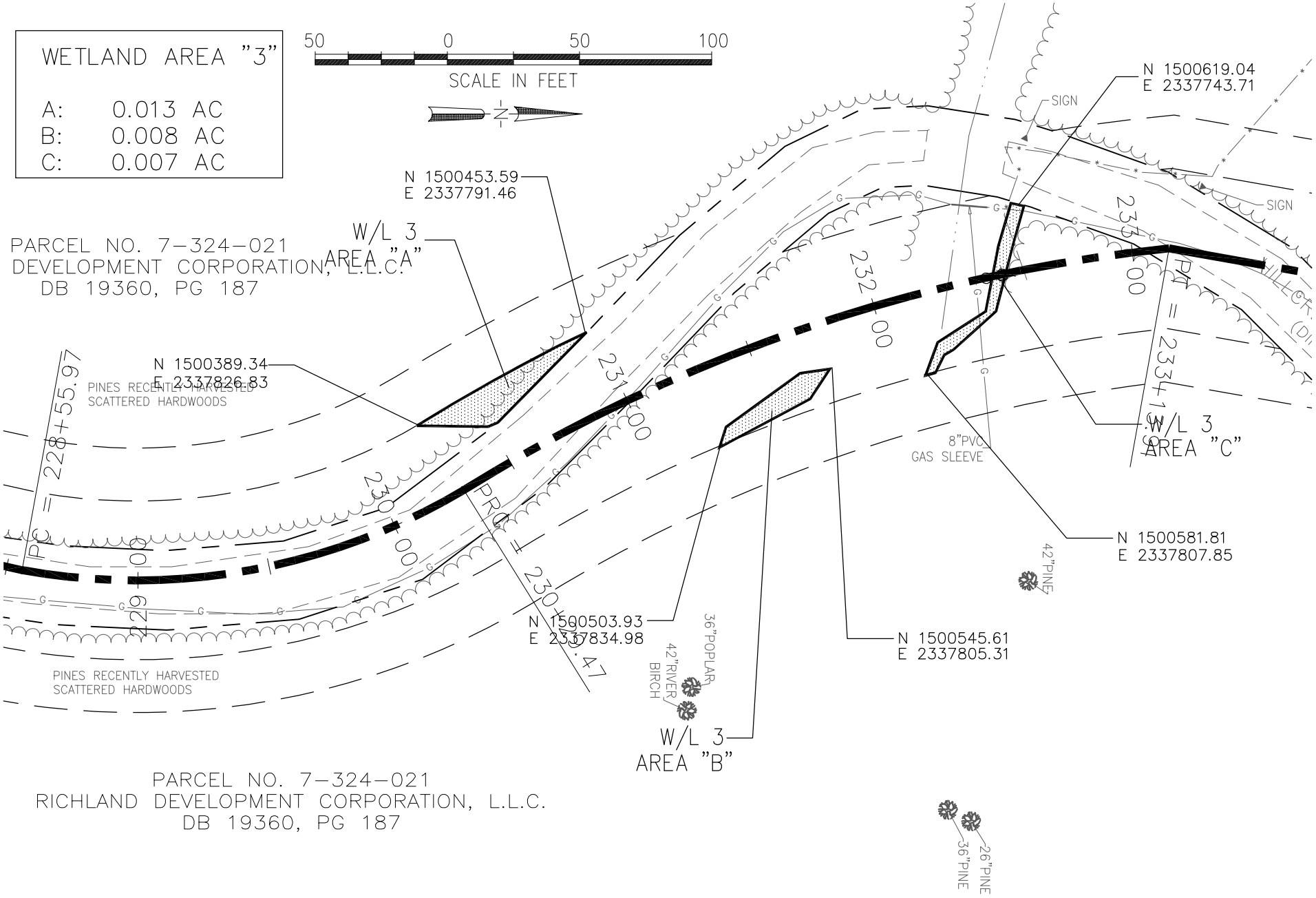
PARSONS



WETLAND LOCATION

FIG. 12

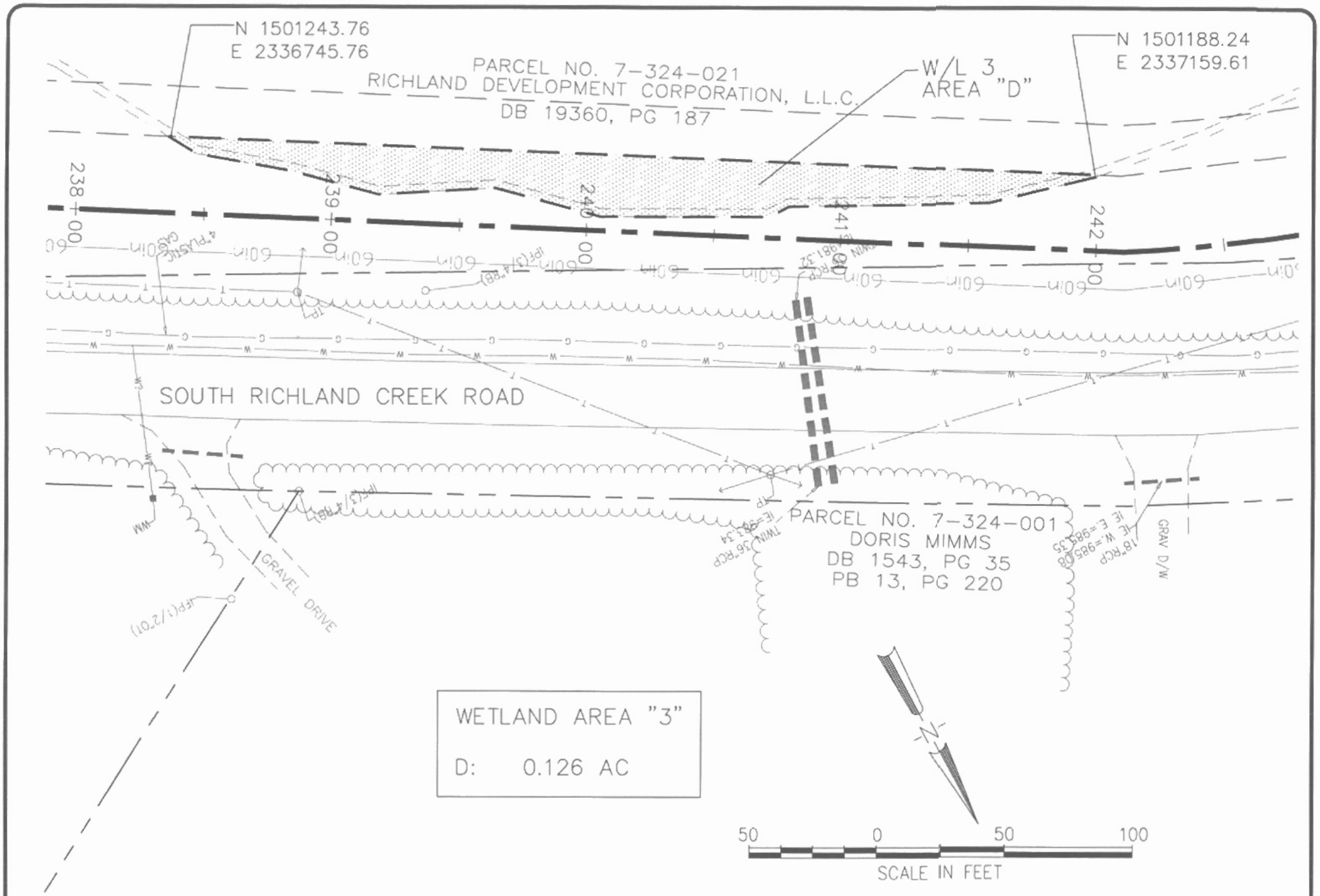
PARSONS



WETLAND LOCATION

FIG. 13

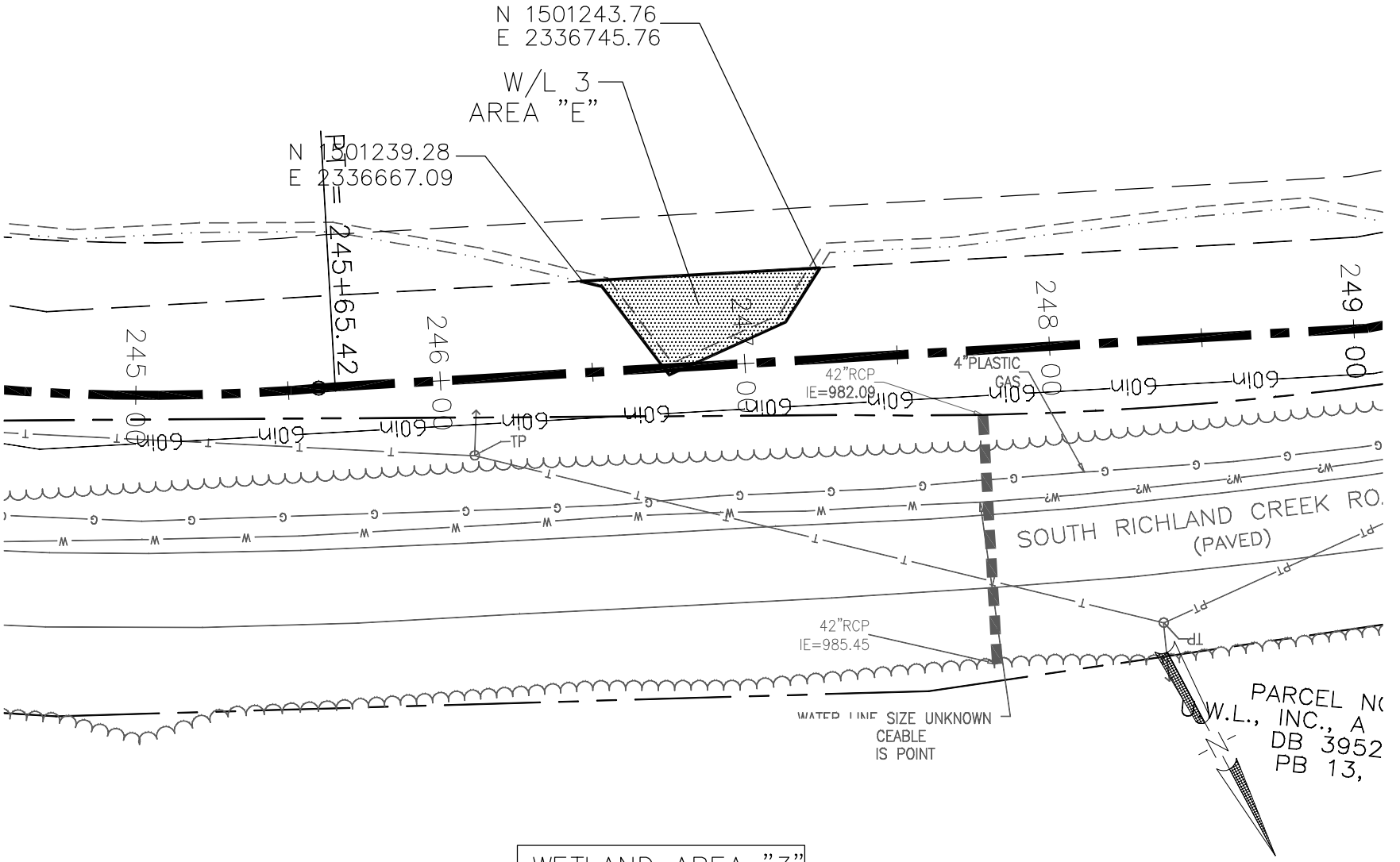
PARSONS



WETLAND LOCATION

FIG. 14

PARSONS



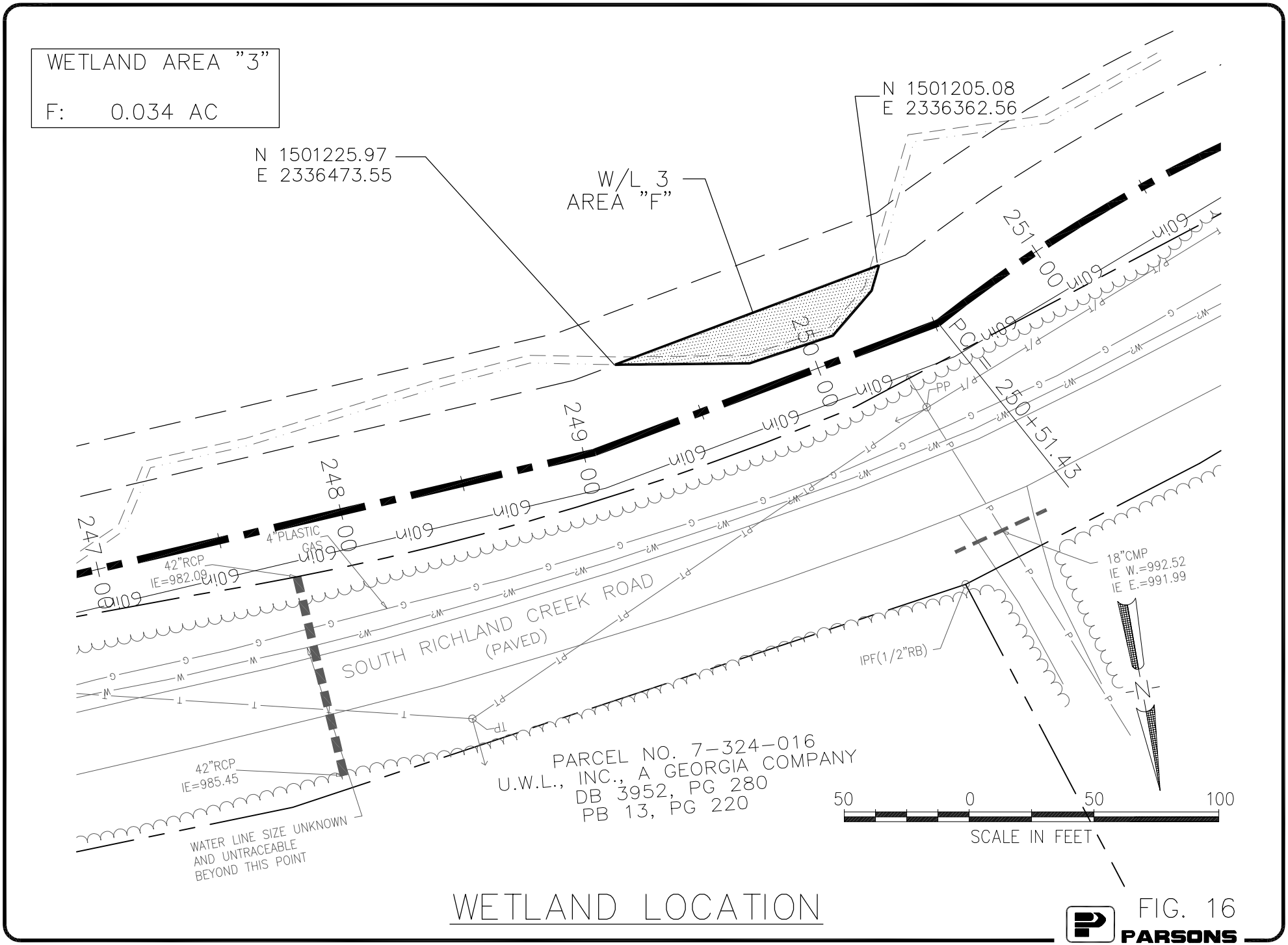
WETLAND AREA "3"

E: 0.033 AC

WETLAND LOCATION

FIG. 15

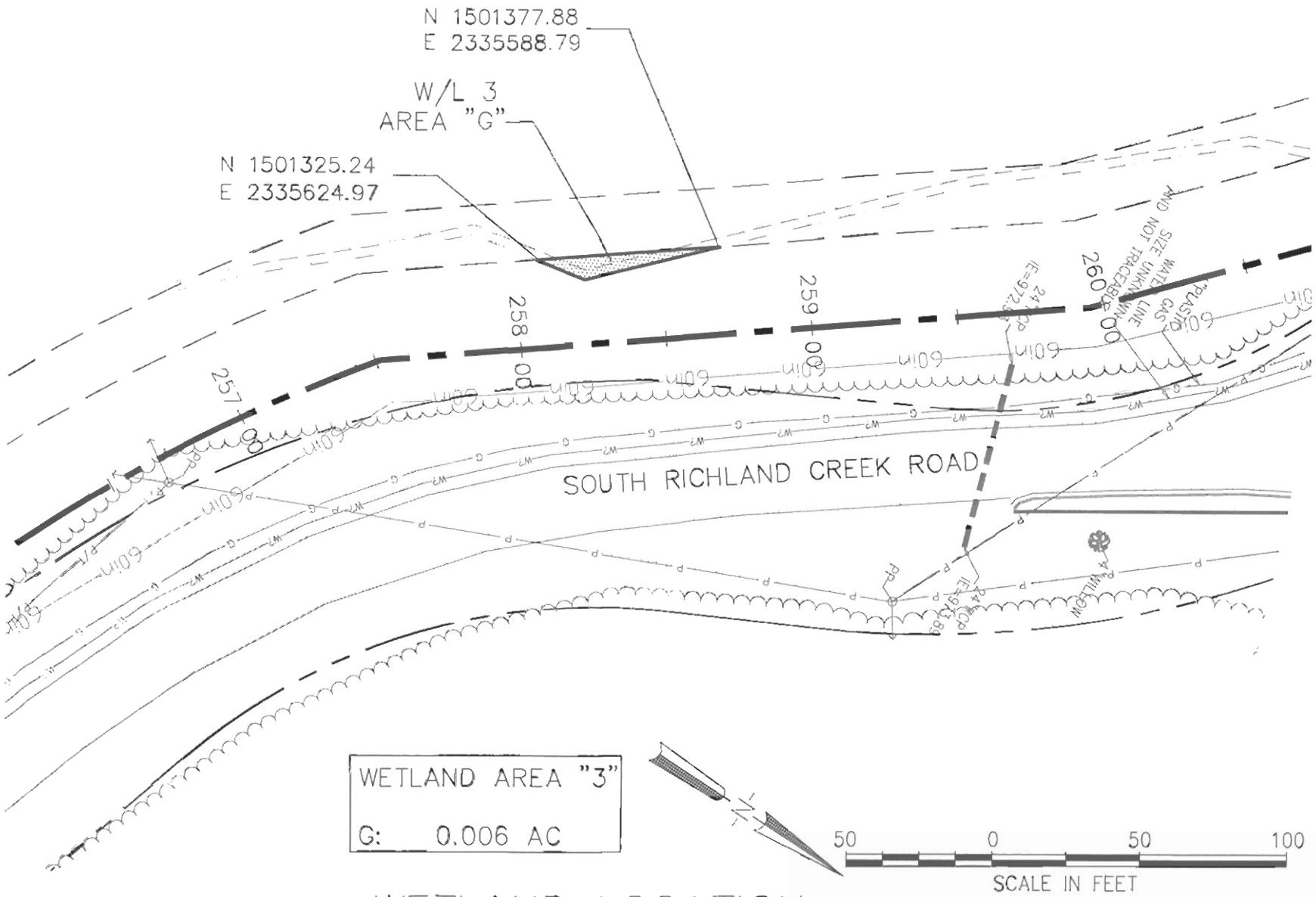
PARSONS



WETLAND LOCATION

FIG. 16

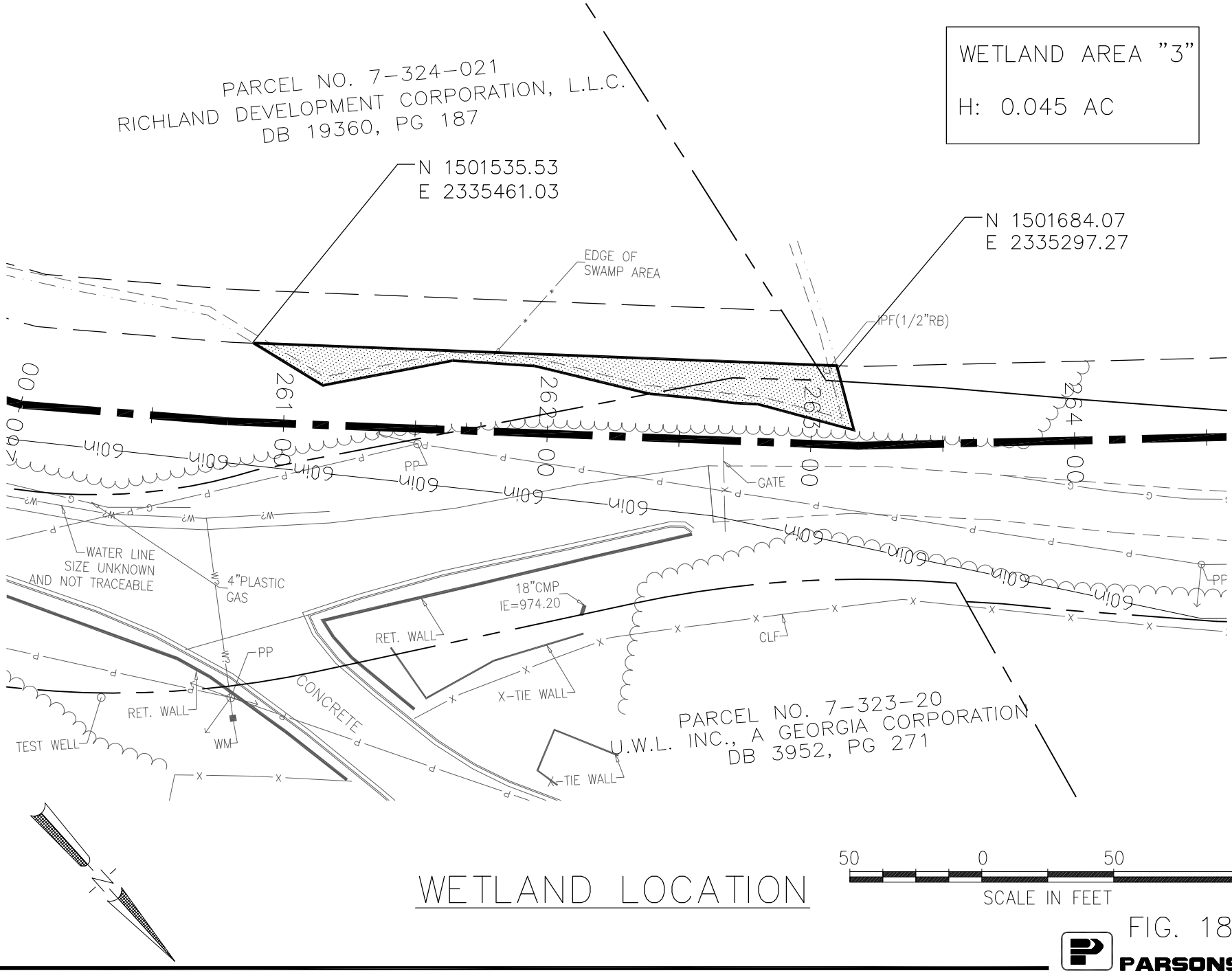
PARSONS



WETLAND LOCATION

FIG. 17

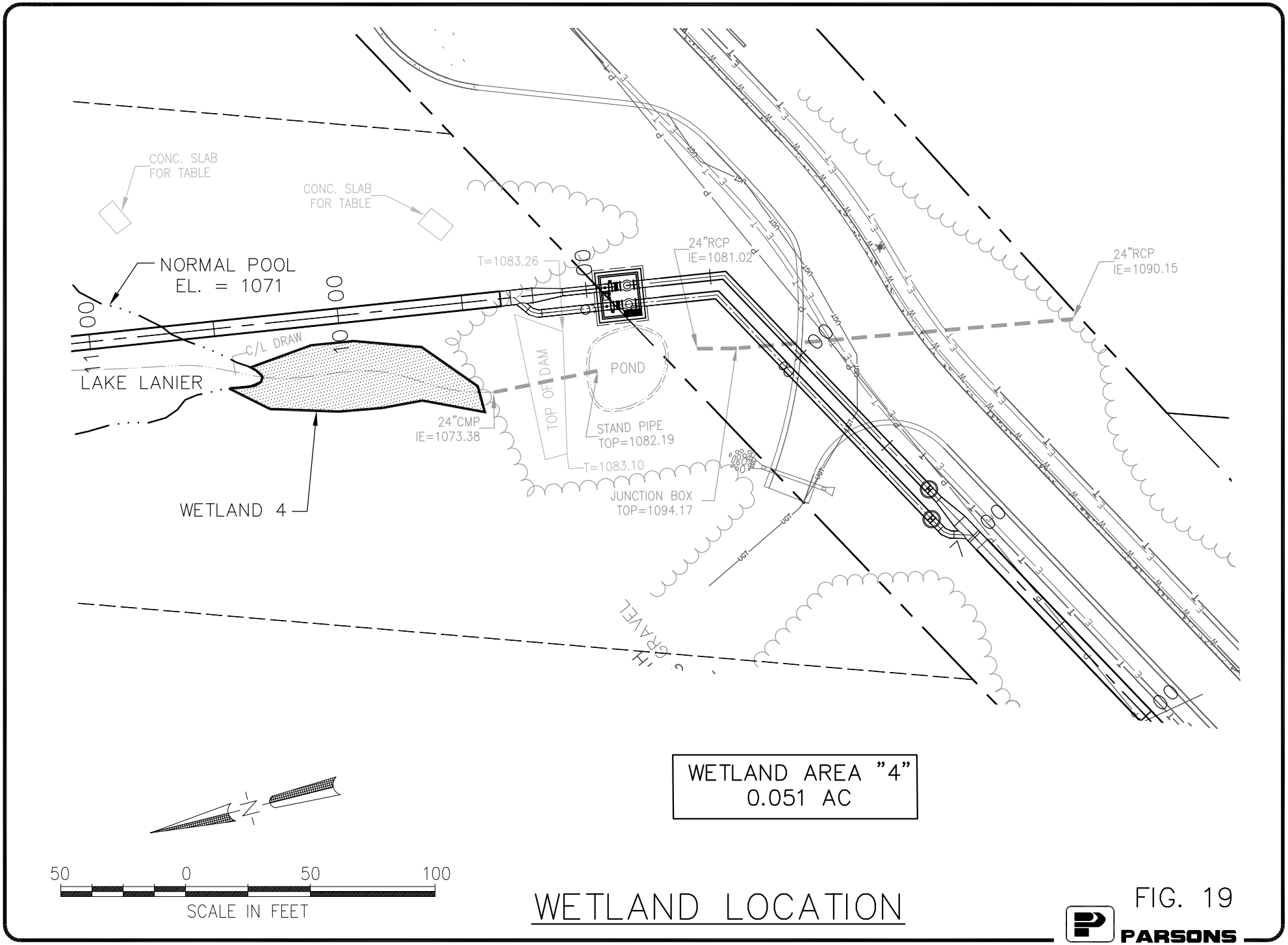
PARSONS



WETLAND LOCATION

FIG. 18

PARSONS



WETLAND LOCATION

FIG. 19

PARSONS

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DISCARDABLE PICTURES

STREAMS AND WETLANDS

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Stream 1. Looking to the east.

Stream 2. looking southeast along Woodward Mill Road.

Client: Gwinnett County Department of Water Resources	Field Photo Log	PARSONS
Project: Lake Lanier Water Reuse Line		
		DATE: February 2007

Stream 3. Looking to the southeast.

Stream 4. Looking to the southeast.

Client: Gwinnett County Department of Water Resources	Field Photo Log	PARSONS
Project: Lake Lanier Water Reuse Line		
		DATE: February 2007

Stream 5. Looking to the northeast.

Stream 6. Looking to the northeast.

Client: Gwinnett County Department of Water Resources	Field Photo Log	PARSONS
Project: Lake Lanier Water Reuse Line		
		DATE: February 2007

Stream 7. Looking to the north.

Stream 8. Looking to the north.

Client: Gwinnett County Department of Water Resources	Field Photo Log	PARSONS
Project: Lake Lanier Water Reuse Line		
		DATE: February 2007

Stream 9. Looking to the southwest.

Stream 10. Looking to the southwest..

Client: Gwinnett County Department of Water Resources	Field Photo Log	PARSONS
Project: Lake Lanier Water Reuse Line		
		DATE: February 2007

Stream 11. Looking to the southwest.

Stream 12. Looking to the southwest..

Client: Gwinnett County Department of Water Resources	Field Photo Log	PARSONS
Project: Lake Lanier Water Reuse Line		
		DATE: February 2007

Stream 13. Looking to the northwest.

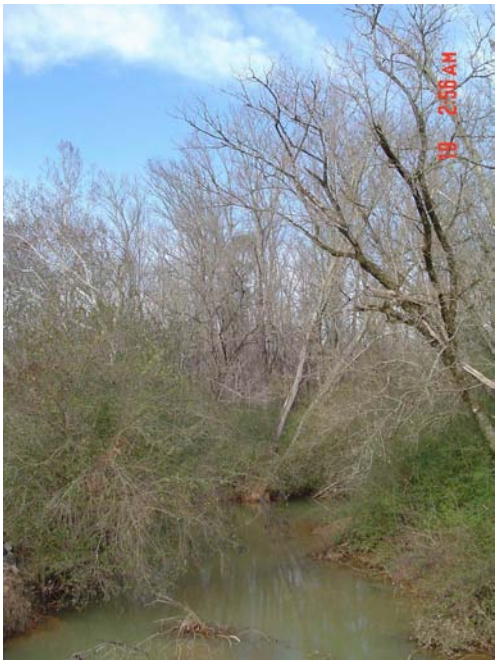
Stream 14. Looking to the southwest.

Client: Gwinnett County Department of Water Resources	Field Photo Log	PARSONS
Project: Lake Lanier Water Reuse Line		
		DATE: February 2007

Stream 15. Looking to the north.

Stream 16. Looking to the northwest..

Client: Gwinnett County Department of Water Resources	Field Photo Log	PARSONS
Project: Lake Lanier Water Reuse Line		
		DATE: February 2007



Wetland 1. Looking to the east.

Wetland 1A . Looking to the west.

Client: Gwinnett County Department of Water Resources	Field Photo Log	PARSONS
Project: Lake Lanier Water Reuse Line		
		DATE: February 2007

Wetland 2A/B. Looking to the northeast.

Wetland 3A/B/C . Looking to the east.

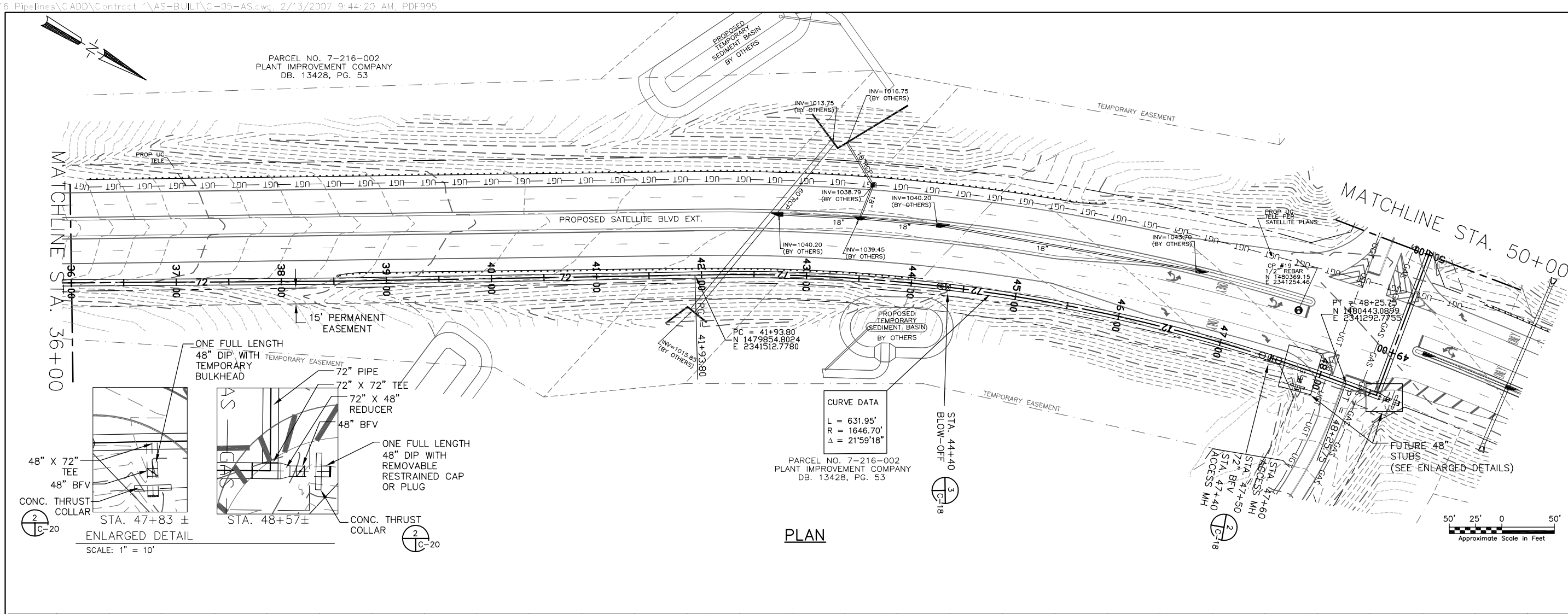
Client: Gwinnett County Department of Water Resources	Field Photo Log	PARSONS
Project: Lake Lanier Water Reuse Line		
		DATE: February 2007

Wetland 4. Looking to the northwest.

Client: Gwinnett County Department of Water Resources	Field Photo Log	PARSONS
Project: Lake Lanier Water Reuse Line		
		DATE: February 2007

DISCARDABLE
STREAM CROSSINGS

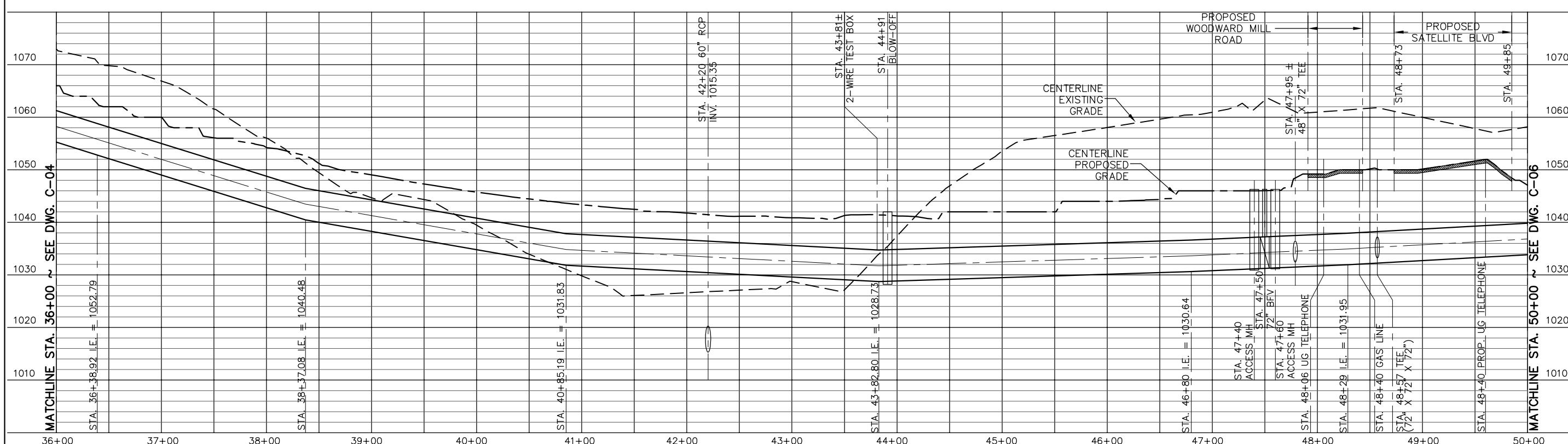
STREAM No.	DRAWING NO.
1	C-01C-4
2	C-02
3	C-04
4	C-06
5	C-08
6	C-14
7& 8	C-15
9	C-19
10	C-20
11	C-21
12 & 13	C-23
14	C-25
15	C-27
16	C-31



PLAN

ENLARGED DETAIL

SCALE: 1" = 10'



PROFILE

HORIZ. 1" = 50' VERT. 1" = 10'

Note:

Record drawing information provided by John D. Stephens, Inc.

Rev	Date	Description	By
	3/30/04	RECORD DWGS	

Issue Certification

Job No.	740416
Designed	TAC
Drawn	MWJ
Checked	DSF
Reviewed	DSF
Approved	TAC
Reg. No.	14380
Date	

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, GA 30092, (770) 446-4900
Surveying & Engineering Assistance

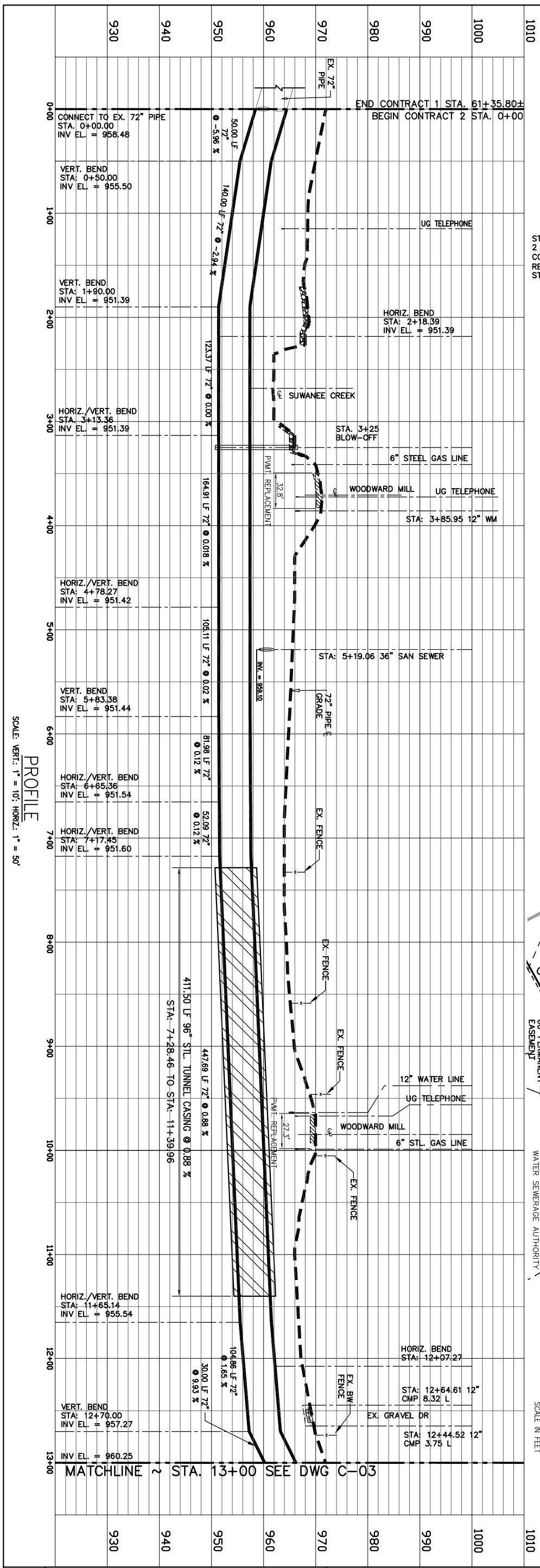
Moreland Altobelli Associates, Inc.
231 Bryan St. West
Marietta, Georgia 30060
Telephone (770) 426-2535

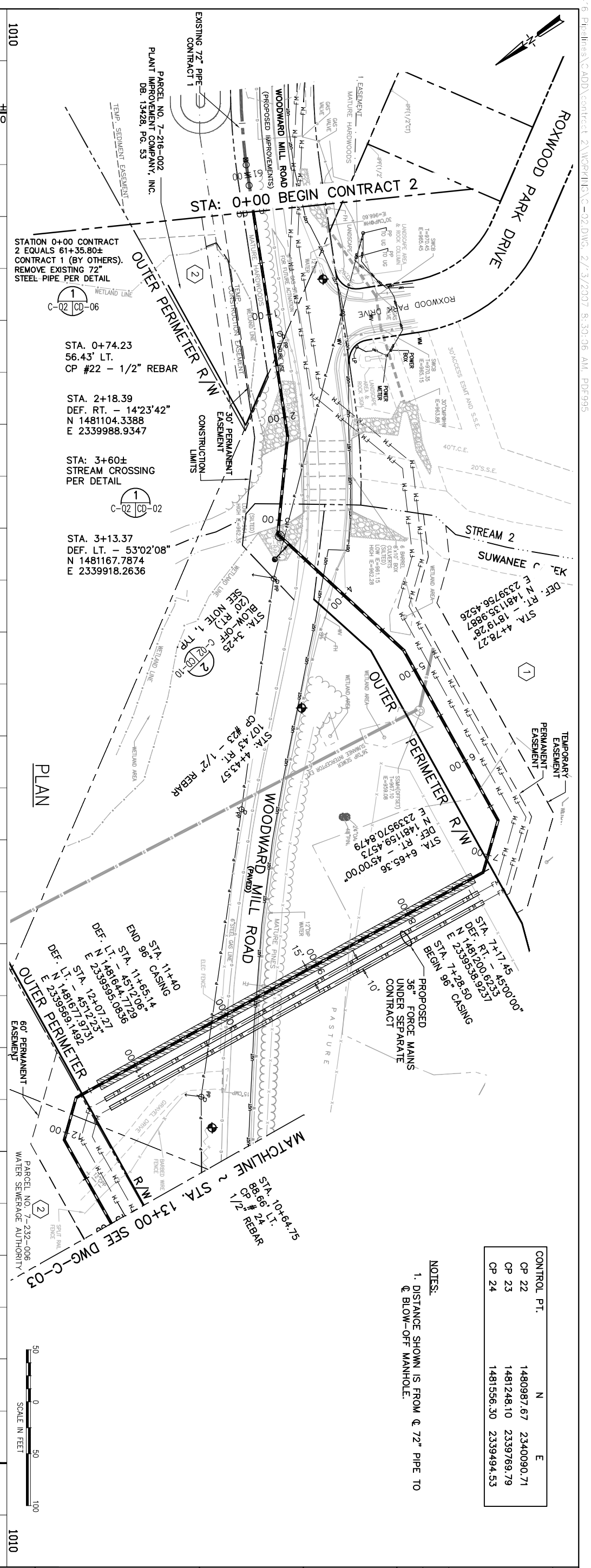
DEPARTMENT OF WATER RESOURCES
GWINNETT COUNTY, GEORGIA

EXISTING REUSE PIPELINE AND DIFFUSER
TO LAKE LANIER
(CONTRACT 1 – SATELLITE BLVD EXTENSION)
PROJECT #5697

PLAN AND PROFILE
FROM STATION 36+00 TO 50+00

DRAWING NO.
C-01C-4





CONTROL PT.	N	E
CP 22	1480987.67	2340090.71
CP 23	1481248.10	2339769.79
CP 24	1481556.30	2339494.53

NOTES:

1. DISTANCE SHOWN IS FROM ℄ 72" PIPE TO ℄ BLOW-OFF MANHOLE.

REUSE PIPELINE AND DIFFUSER
TO LAKE LANIER
(CONTRACT 2)
PROJECT #5697

72" PLAN AND PROFILE
STA. 0+00 TO 13+00

DRAWING NO. C-02

DEPARTMENT OF WATER RESOURCES
GWINNETT COUNTY, GEORGIA

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, GA 30092, (770) 446-4900

Surveying & Engineering Assistance
Moreland Altobelli Associates, Inc.
2211 Beaver Ruin Road
Suite 190
Norcross, Georgia 30071
Telephone (770) 263-5945

Issue Certification
GEORGIA REGISTERED No. 14380 PROFESSIONAL ENGINEER THOMAS A CORBIN

Job No.	740416
Designed	TAC/MWJ
Drawn	MWJ
Checked	DSF
Reviewed	DSF
Approved	TAC
Reg. No.	14380
Date	03/10/04

Rev	Date	Description	By
F	05/31/06	EPD COMMENTS	
E	03/10/04	95% SUBMITTAL	
D	11/24/03	LDP SUBMITTAL	
C	03/31/03	90% SUBMITTAL	
B	01/30/03	60% SUBMITTAL	
	10/22/02	PROPERTY LINE CLARIFICATION	
A	10/01/02	30% SUBMITTAL	TAC

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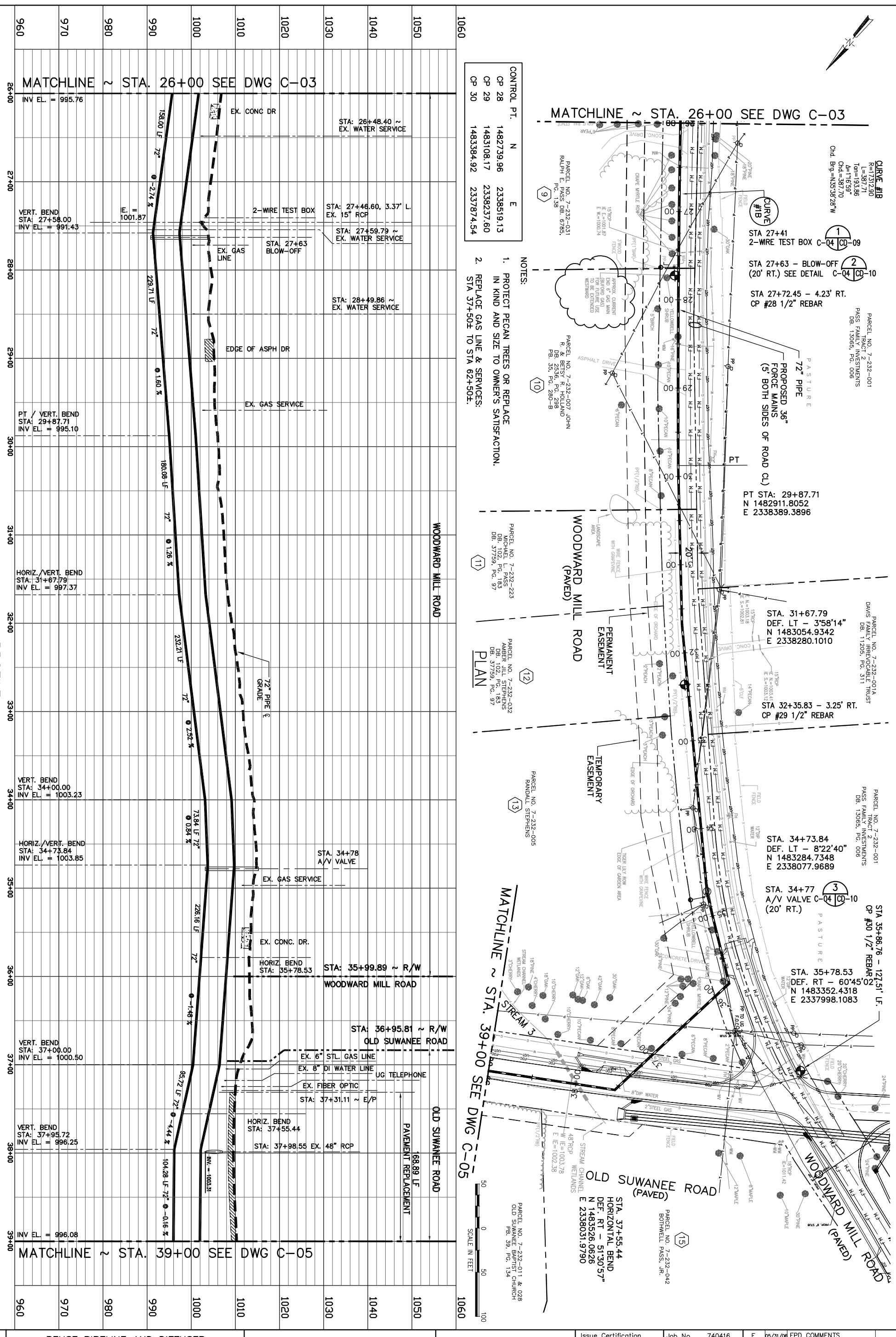

NOTES:

1. PROTECT PECAN TREES OR REPLACE IN KIND AND SIZE TO OWNER'S SATISFACTION.
2. REPLACE GAS LINE & SERVICES: STA 37+50± TO STA 62+50±.

DRAWING NO. C-04

REUSE PIPELINE AND DIFFUSER
TO LAKE LANIER
(CONTRACT 2)
PROJECT #5697

72" PLAN AND PROFILE
STA. 26+00 TO 39+00

DEPARTMENT OF WATER RESOURCES
GWINNETT COUNTY, GEORGIA

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, GA 30092, (770) 446-4900

Surveying & Engineering Assistance
Moreland Altobelli Associates, Inc.
2211 Beaver Ruin Road
Suite 100
Norcross, Georgia 30071
Telephone (770) 263-5945

Issue Certification
GEORGIA REGISTERED No. 14380 PROFESSIONAL ENGINEER THOMAS A CORBIN

Job No. 740416	F	05/31/06	EPD COMMENTS	
Designed TAC/MWJ	E	03/10/04	95% SUBMITTAL	
Drawn MWJ	D	11/24/03	LDP SUBMITTAL	
Checked DSF	C	03/31/03	90% SUBMITTAL	
Reviewed DSF	B	01/30/03	60% SUBMITTAL	
Approved TAC		10/22/02	PROPERTY LINE CLARIFICATION	
Reg. No. 14380	A	10/01/02	30% SUBMITTAL	TAC
Date 03/10/04	Rev	Date	Description	By

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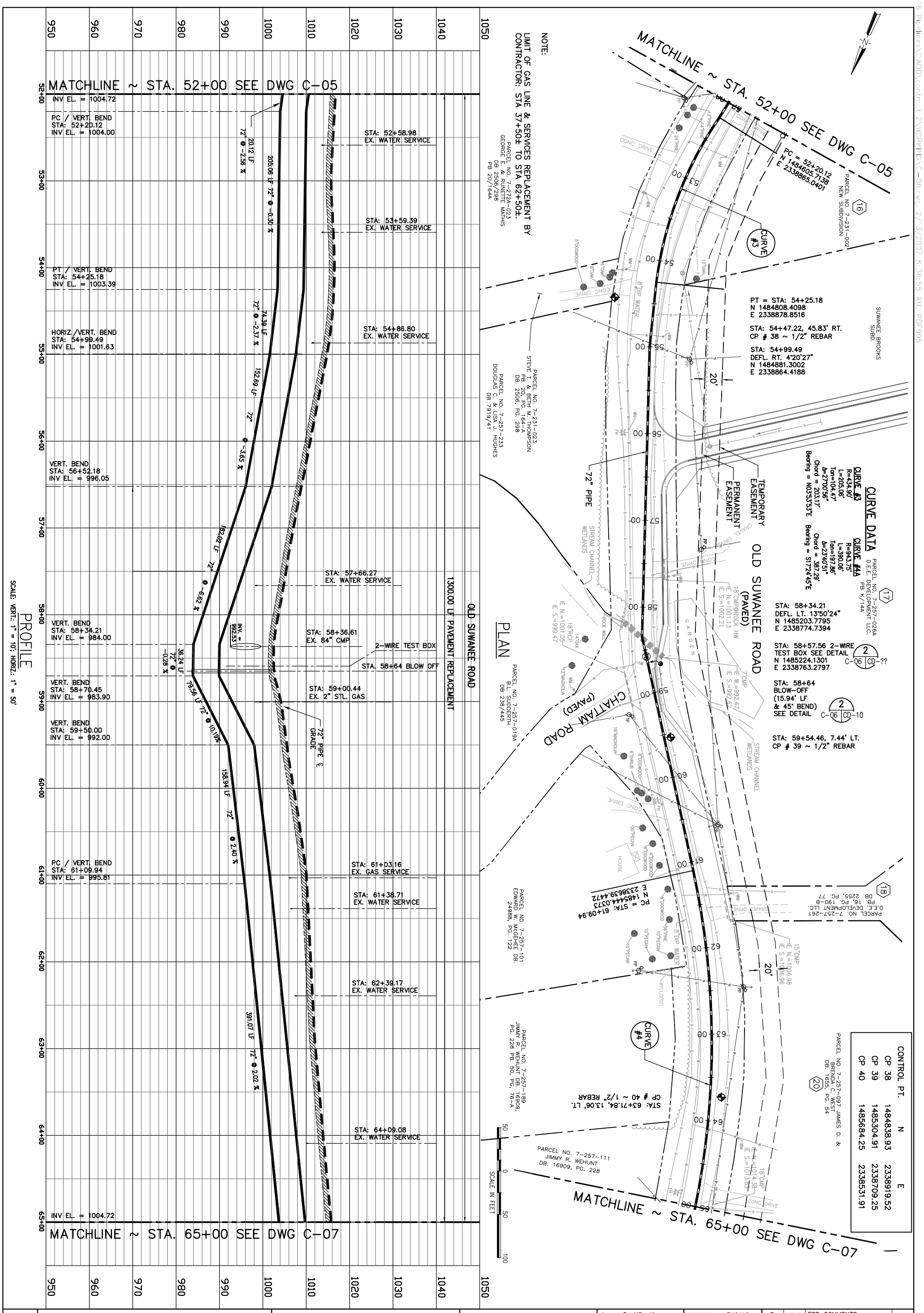

DRAWING NO. C-06	REUSE PIPELINE AND DIFFUSER TO LAKE LANIER (CONTRACT 2) PROJECT #5697	DEPARTMENT OF WATER RESOURCES GWINNETT COUNTY, GEORGIA	PARSONS 5390 Triangle Parkway, Suite 100 Norcross, GA 30092, (770) 446-4900	Issue Certification	Job No. 740416
	72" PLAN AND PROFILE STA. 52+00 TO 65+00		Surveying & Engineering Assistance: Moreland Altobelli Associates, Inc. 2211 Beaver Ruin Road Suite 190 Norcross, Georgia 30071 Telephone (770) 263-5945	GEORGIA REGISTERED No. 14380 PROFESSIONAL ENGINEER THOMAS A CORBIN	Designed TAC/MWJ
					Drawn MWJ
					Checked DSF
					Reviewed DSF
					Approved TAC
					Reg. No. 14380
					Date 03/10/04

Rev	Date	Description	By
F	05/31/06	EPD COMMENTS	
E	03/10/04	95% SUBMITTAL	
D	11/24/03	LDP SUBMITTAL	
C	03/31/03	90% SUBMITTAL	
B	01/30/03	60% SUBMITTAL	
	10/22/02	PROPERTY LINE CLARIFICATION	
A	10/01/02	30% SUBMITTAL	TAC

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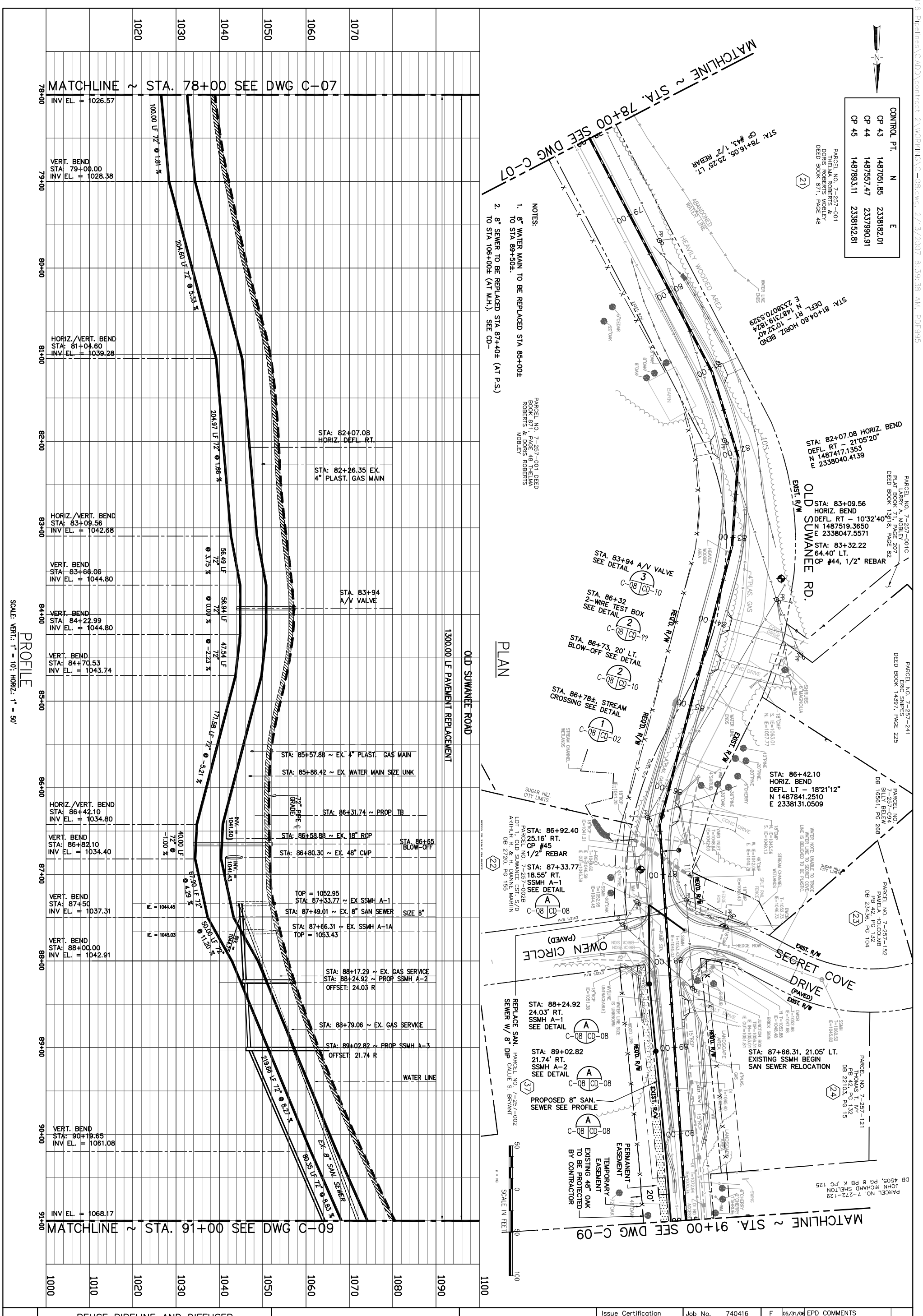

DRAWING NO. C-08

REUSE PIPELINE AND DIFFUSER TO LAKE LANIER (CONTRACT 2) PROJECT #5697

72" PLAN AND PROFILE STA. 78+00 TO 91+00

DEPARTMENT OF WATER RESOURCES
GWINNETT COUNTY, GEORGIA

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, GA 30092, (770) 446-4900

Surveying & Engineering Assistance
Moreland Altobelli Associates, Inc.
2211 Beaver Ruin Road Suite 190 Norcross, Georgia 30071 Telephone (770) 263-5945

Issue Certification
GEORGIA REGISTERED No. 14380 PROFESSIONAL ENGINEER THOMAS A CORBIN

Job No.	740416
Designed	TAC/MWJ
Drawn	MWJ
Checked	DSF
Reviewed	DSF
Approved	TAC
Reg. No.	14380
Date	03/10/04

Rev	Date	Description	By
F	05/31/06	EPD COMMENTS	
E	03/10/04	95% SUBMITTAL	
D	11/24/03	LDP SUBMITTAL	
C	03/31/03	90% SUBMITTAL	
B	01/30/03	60% SUBMITTAL	
	10/22/02	PROPERTY LINE CLARIFICATION	
A	10/01/02	30% SUBMITTAL	TAC

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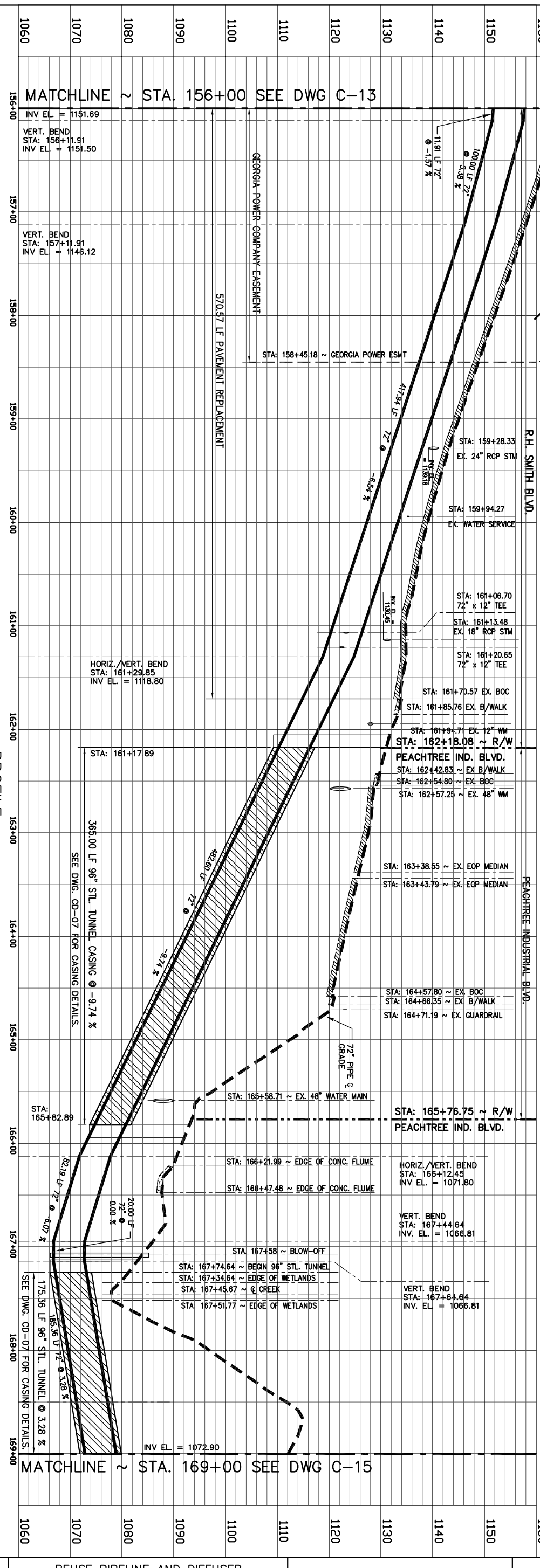
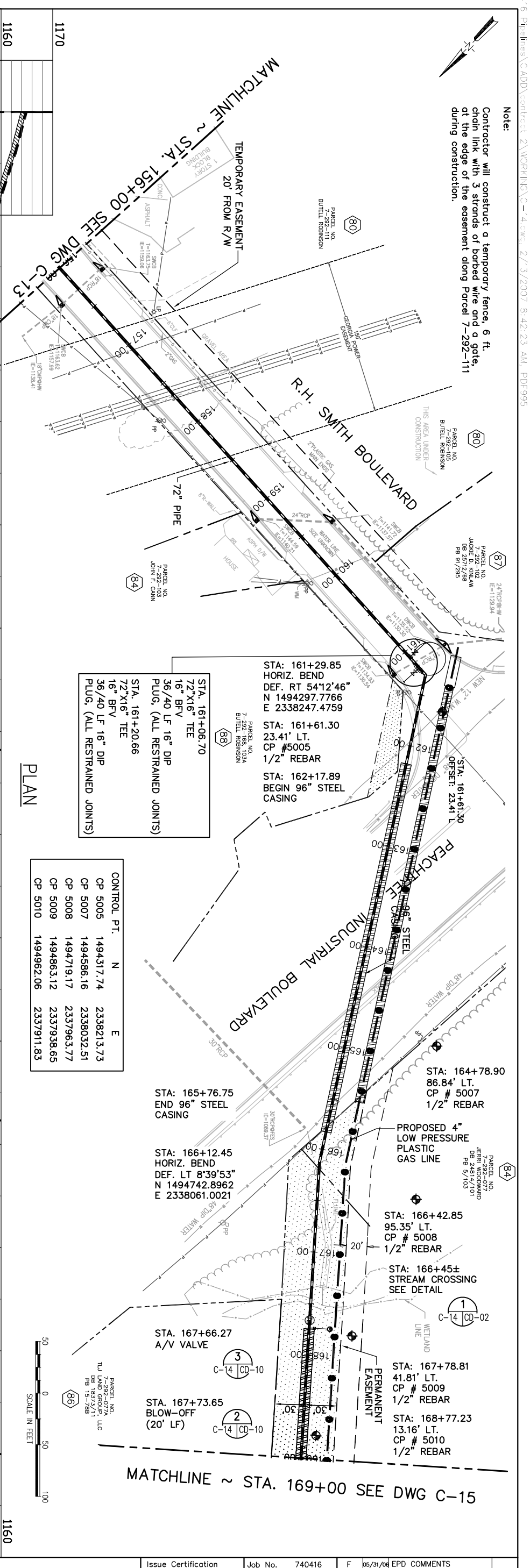
Note:
Contractor will construct a temporary fence, 6 ft. chain link with 3 strands of barbed wire and a gate, at the edge of the easement along Parcel 7-292-111 during construction.





CONTROL PT.	N	E
CP 5005	1494317.74	2338213.73
CP 5007	1494586.16	2338032.51
CP 5008	1494719.17	2337963.77
CP 5009	1494863.12	2337938.65
CP 5010	1494962.06	2337911.83

DRAWING NO. C-14

REUSE PIPELINE AND DIFFUSER
TO LAKE LANIER
(CONTRACT 2)
PROJECT #5697

72" PLAN AND PROFILE
STA. 156+00 TO 169+00

DEPARTMENT OF WATER RESOURCES
GWINNETT COUNTY, GEORGIA

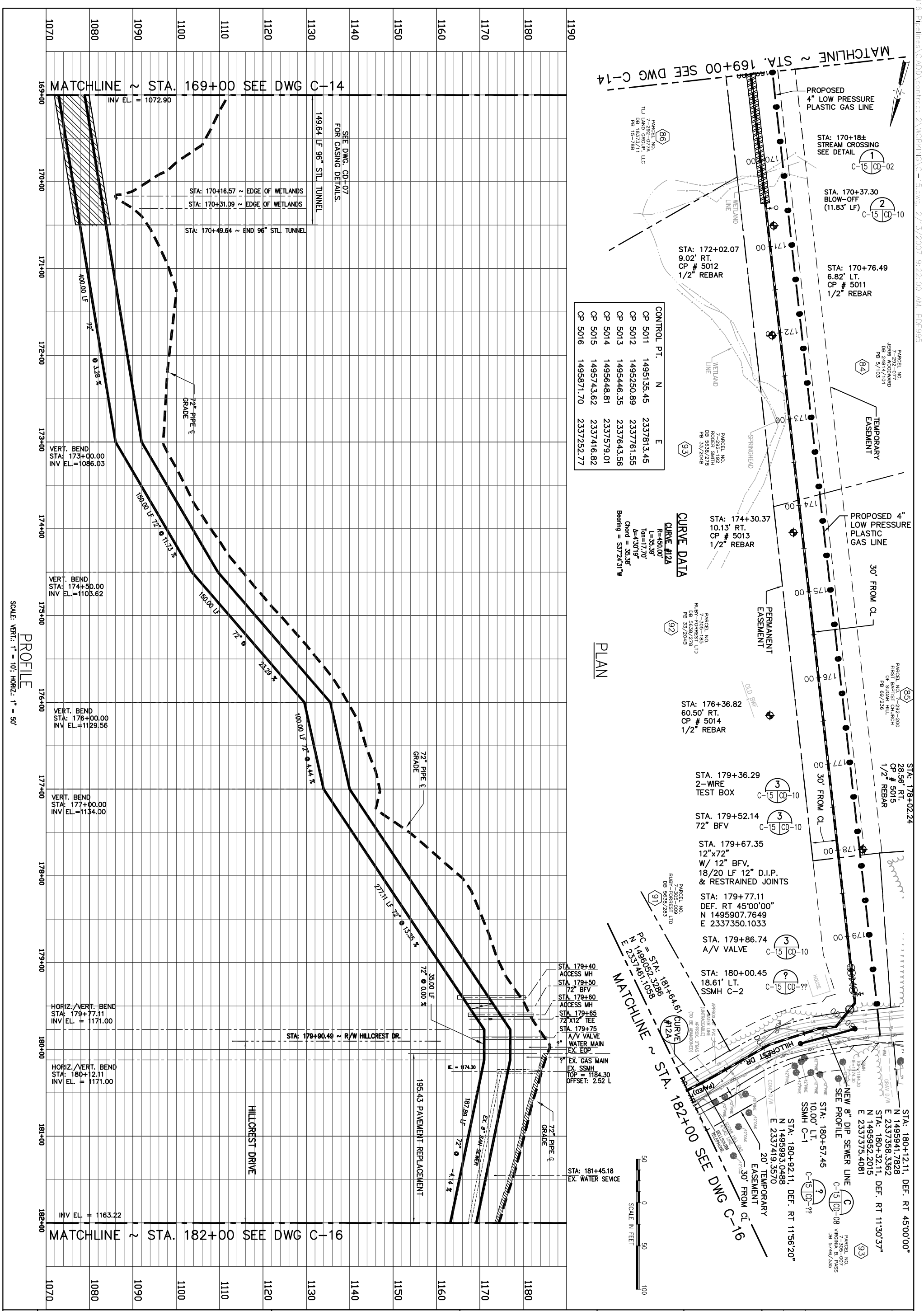
PARSONS
5390 Triangle Parkway, Suite 100
Norcross, GA 30092, (770) 446-4900

Surveying & Engineering Assistance
Moreland Altobelli Associates, Inc.
2211 Beaver Ruin Road
Suite 190
Norcross, GEORGIA 30071
Telephone (770) 263-5945

Issue Certification
GEORGIA REGISTERED No. 14380 PROFESSIONAL ENGINEER THOMAS A CORBIN

Job No.	740416
Designed	TAC/MWJ
Drawn	MWJ
Checked	DSF
Reviewed	DSF
Approved	TAC
Reg. No.	14380
Date	03/10/04

Rev	Date	Description	By
F	05/31/06	EPD COMMENTS	
E	03/10/04	95% SUBMITTAL	
D	11/24/03	LDP SUBMITTAL	
C	03/31/03	90% SUBMITTAL	
B	01/30/03	60% SUBMITTAL	
	10/22/02	PROPERTY LINE CLARIFICATION	
A	10/01/02	30% SUBMITTAL	TAC



CONTROL PT.	N	E
CP 5011	1495135.45	2337813.45
CP 5012	1495250.89	2337761.55
CP 5013	1495446.35	2337643.56
CP 5014	1495648.81	2337579.01
CP 5015	1495743.62	2337416.82
CP 5016	1495871.70	2337252.77

REUSE PIPELINE AND DIFFUSER
TO LAKE LANIER
(CONTRACT 2)
PROJECT #5697

72" PLAN AND PROFILE
STA. 169+00 TO 182+00

DEPARTMENT OF WATER RESOURCES
GWINNETT COUNTY, GEORGIA

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, GA 30092, (770) 446-4900

Surveying & Engineering Assistance
Moreland Altobelli Associates, Inc.
2211 Beaver Ruin Road
Suite 190
Norcross, Georgia 30071
Telephone (770) 263-5945

Issue Certification
GEORGIA REGISTERED No. 14380 PROFESSIONAL ENGINEER THOMAS A CORBIN

Job No.	740416
Designed	TAC/MWJ
Drawn	MWJ
Checked	DSF
Reviewed	DSF
Approved	TAC
Reg. No.	14380
Date	03/10/04

Rev	Date	Description	By
F	05/31/06	EPD COMMENTS	
E	03/10/04	95% SUBMITTAL	
D	11/24/03	LDP SUBMITTAL	
C	03/31/03	90% SUBMITTAL	
B	01/30/03	60% SUBMITTAL	
	10/22/02	PROPERTY LINE CLARIFICATION	
A	10/01/02	30% SUBMITTAL	TAC

DRAWING NO. C-15

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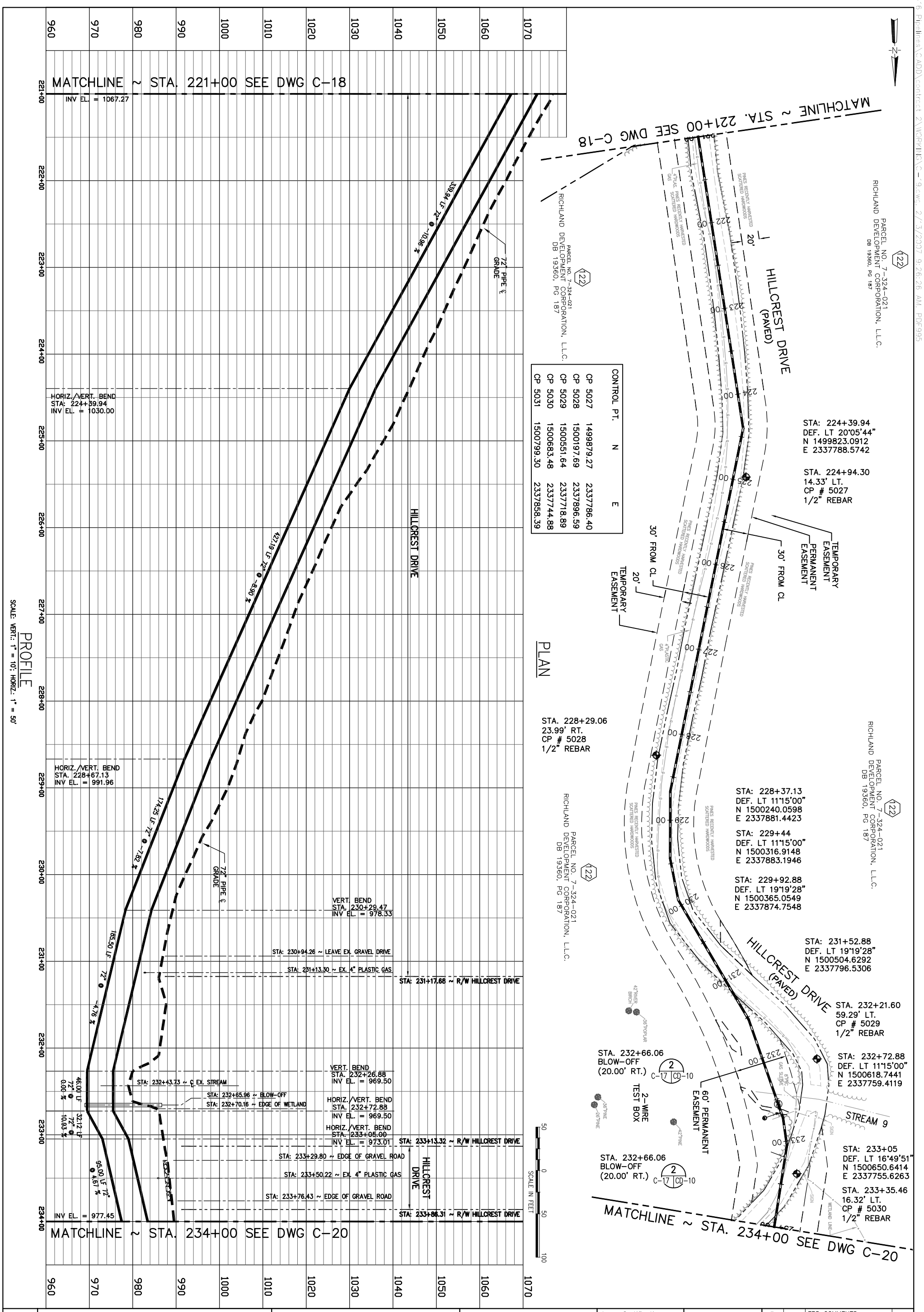

DRAWING NO. C-19	REUSE PIPELINE AND DIFFUSER TO LAKE LANIER (CONTRACT 2) PROJECT #5697	DEPARTMENT OF WATER RESOURCES GWINNETT COUNTY, GEORGIA	PARSONS 5390 Triangle Parkway, Suite 100 Norcross, GA 30092, (770) 446-4900	Issue Certification	
	72" PLAN AND PROFILE STA. 221+00 TO 234+00		Surveying & Engineering Assistance: Moreland Altobelli Associates, Inc. 2211 Beaver Ruin Road Suite 190 Norcross, Georgia 30071 Telephone (770) 263-5945	GEORGIA REGISTERED No. 14380 PROFESSIONAL ENGINEER THOMAS A CORBIN	

Job No. 740416
Designed TAC/MWJ
Drawn MWJ
Checked DSF
Reviewed DSF
Approved TAC
Reg. No. 14380
Date 03/10/04

Rev	Date	Description	By
F	05/31/06	EPD COMMENTS	
E	03/10/04	95% SUBMITTAL	
D	11/24/03	LDP SUBMITTAL	
C	03/31/03	90% SUBMITTAL	
B	01/30/03	60% SUBMITTAL	
	10/22/02	PROPERTY LINE CLARIFICATION	
A	10/01/02	30% SUBMITTAL	TAC

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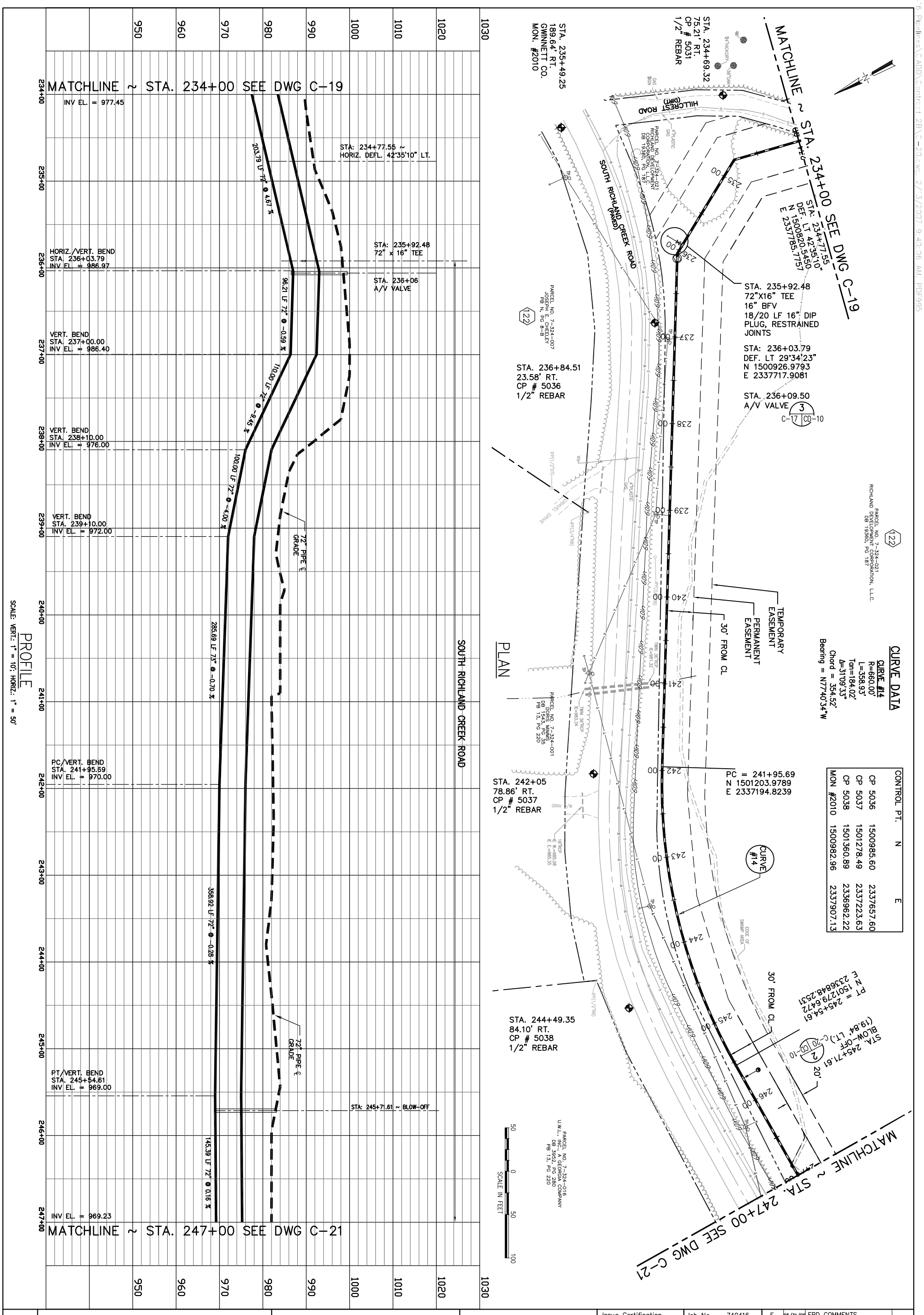

CURVE DATA

CURVE #14
R=660.00'
L=358.93'
Tan=184.02'
Δ=31°09'33"
Chord = 354.52'
Bearing = N77°40'34"W

CONTROL PT.	N	E
CP 5036	1500985.60	2337657.60
CP 5037	1501278.49	2337223.63
CP 5038	1501360.89	2336962.22
MON #2010	1500982.96	2337907.13

REUSE PIPELINE AND DIFFUSER
TO LAKE LANIER
(CONTRACT 2)
PROJECT #5697

72" PLAN AND PROFILE
STA. 234+00 TO 247+00

DEPARTMENT OF WATER RESOURCES
GWINNETT COUNTY, GEORGIA

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, GA 30092, (770) 446-4900

Surveying & Engineering Assistance
Moreland Altobelli Associates, Inc.
2211 Beaver Ruin Road
Suite 100
Norcross, Georgia 30071
Telephone (770) 263-5945

Issue Certification
GEORGIA REGISTERED No. 14380 PROFESSIONAL ENGINEER THOMAS A CORBIN

Job No.	740416
Designed	TAC/MWJ
Drawn	MWJ
Checked	DSF
Reviewed	DSF
Approved	TAC
Reg. No.	14380
Date	03/10/04

Rev	Date	Description	By
F	05/31/06	EPD COMMENTS	
E	03/10/04	95% SUBMITTAL	
D	11/24/03	LDP SUBMITTAL	
C	03/31/03	90% SUBMITTAL	
B	01/30/03	60% SUBMITTAL	
	10/22/02	PROPERTY LINE CLARIFICATION	
A	10/01/02	30% SUBMITTAL	TAC

DRAWING NO. C-20

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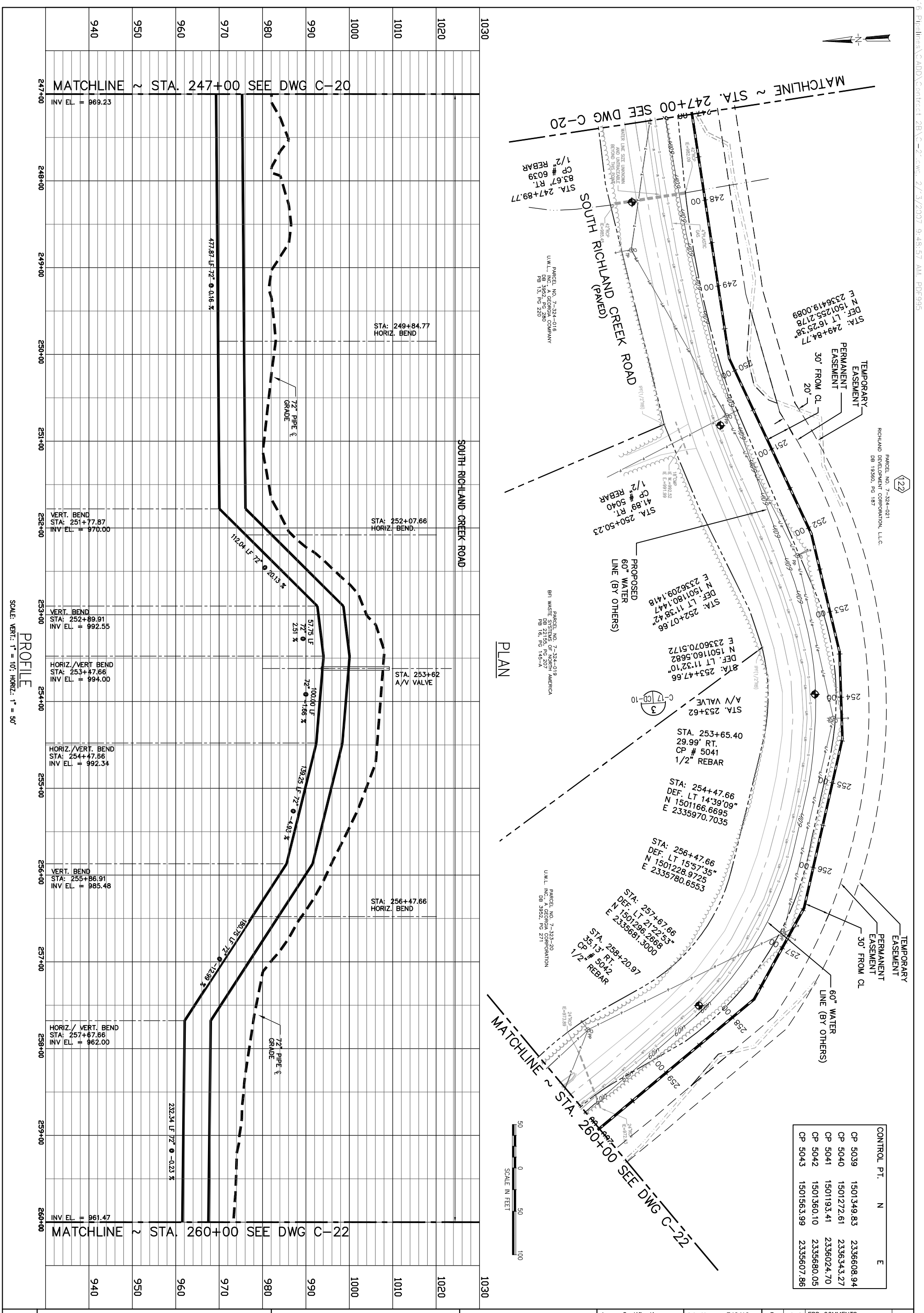


CONTROL PT.	N	E
CP 5039	1501349.83	2336608.94
CP 5040	1501272.61	2336343.27
CP 5041	1501193.41	2336024.70
CP 5042	1501360.10	2335680.05
CP 5043	1501563.99	2335607.86

REUSE PIPELINE AND DIFFUSER
TO LAKE LANIER
(CONTRACT 2)
PROJECT #5697

72" PLAN AND PROFILE
STA. 247+00 TO 260+00

DRAWING NO. C-21

DEPARTMENT OF WATER RESOURCES
GWINNETT COUNTY, GEORGIA

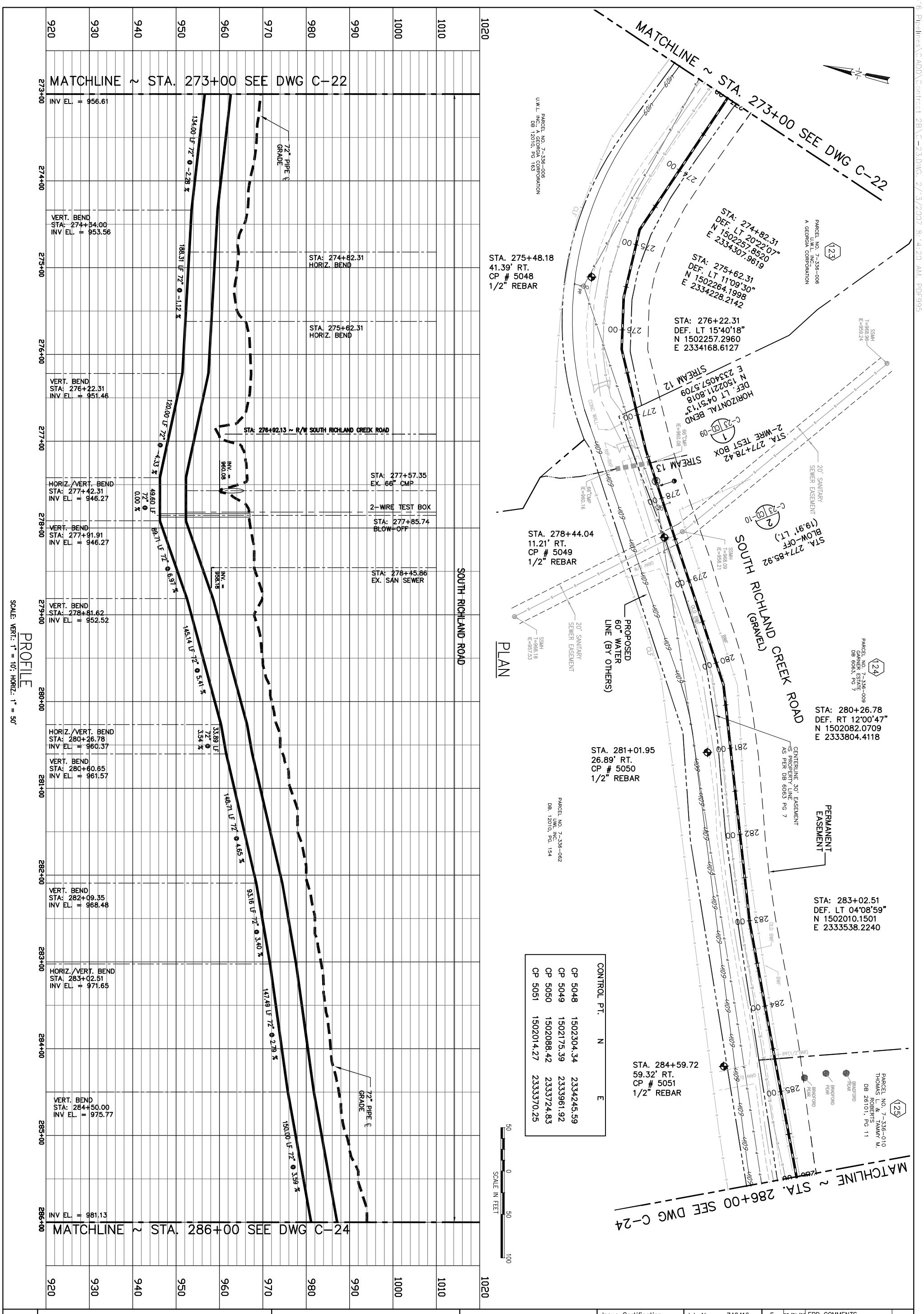
PARSONS
5390 Triangle Parkway, Suite 100
Norcross, GA 30092, (770) 446-4900

Surveying & Engineering Assistance
Moreland Altobelli Associates, Inc.
2211 Beaver Ruin Road
Suite 190
Norcross, GA 30071
Telephone: (770) 263-5945

Issue Certification
GEORGIA REGISTERED No. 14380 PROFESSIONAL ENGINEER THOMAS A CORBIN

Job No. 740416
Designed TAC/MWJ
Drawn MWJ
Checked DSF
Reviewed DSF
Approved TAC
Reg. No. 14380
Date 03/10/04

Rev	Date	Description	By
F	05/31/06	EPD COMMENTS	
E	03/10/04	95% SUBMITTAL	
D	11/24/03	LDP SUBMITTAL	
C	03/31/03	90% SUBMITTAL	
B	01/30/03	60% SUBMITTAL	
	10/22/02	PROPERTY LINE CLARIFICATION	
A	10/01/02	30% SUBMITTAL	TAC



CONTROL PT.	N	E
CP 5048	1502304.34	2334245.59
CP 5049	1502175.39	2333961.92
CP 5050	1502088.42	2333724.83
CP 5051	1502014.27	2333370.25

REUSE PIPELINE AND DIFFUSER TO LAKE LANIER (CONTRACT 2) PROJECT #5697

72" PLAN AND PROFILE STA. 273+00 TO 286+00

DEPARTMENT OF WATER RESOURCES
GWINNETT COUNTY, GEORGIA

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, GA 30092, (770) 446-4900

Surveying & Engineering Assistance
Moreland Altobelli Associates, Inc.
2211 Beaver Ruin Road Suite 190 Norcross, Georgia 30071 Telephone (770) 263-5945

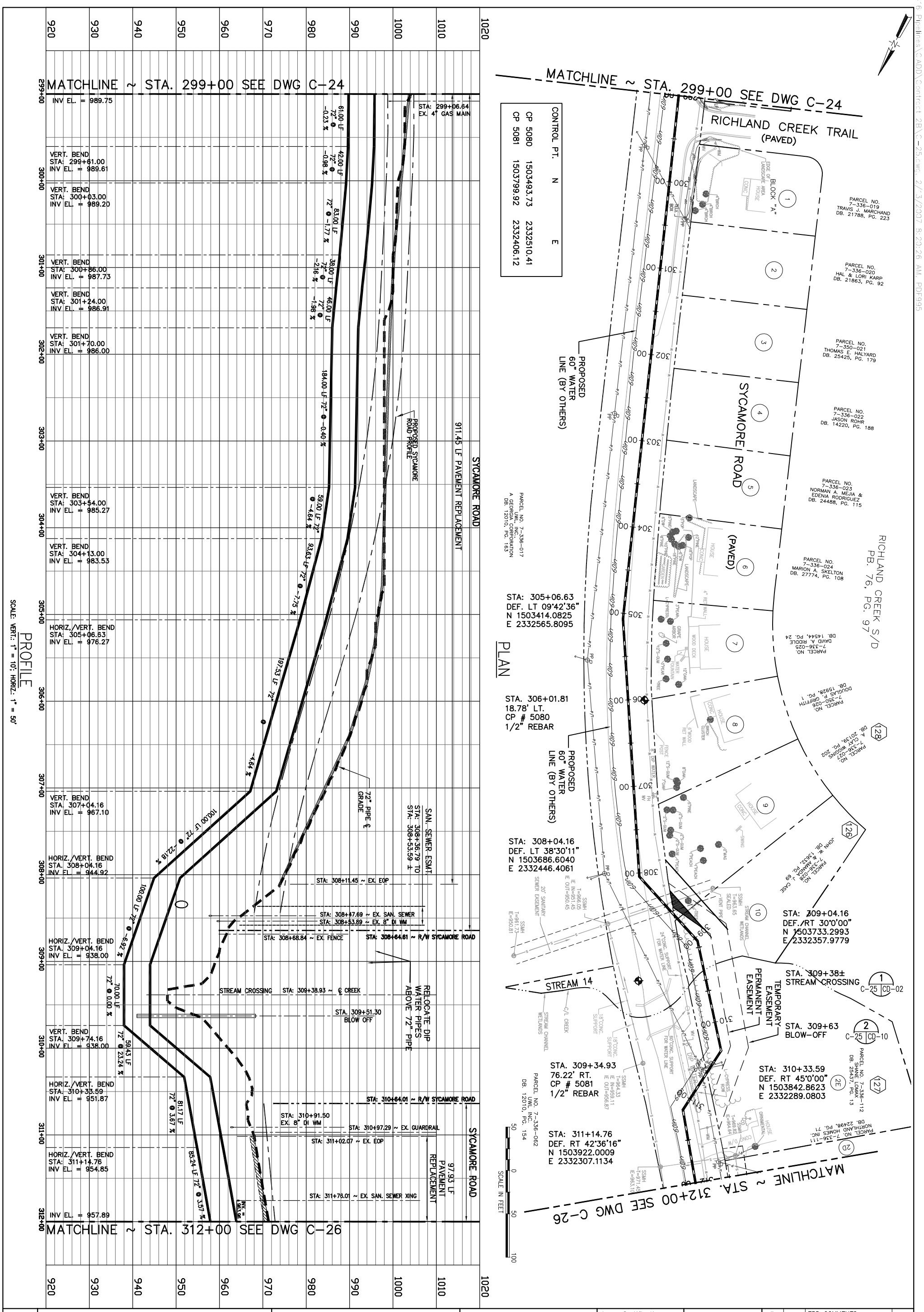
Issue Certification
GEORGIA REGISTERED No. 14380 PROFESSIONAL ENGINEER THOMAS A CORBIN

Job No.	740416
Designed	TAC/MWJ
Drawn	MWJ
Checked	DSF
Reviewed	DSF
Approved	TAC
Reg. No.	14380
Date	03/10/04

Rev	Date	Description	By
F	05/31/06	EPD COMMENTS	
E	03/10/04	95% SUBMITTAL	
D	11/24/03	LDP SUBMITTAL	
C	03/31/03	90% SUBMITTAL	
B	01/30/03	60% SUBMITTAL	
	10/22/02	PROPERTY LINE CLARIFICATION	
A	10/01/02	30% SUBMITTAL	TAC

DRAWING NO. C-23

J:\7404'6 Pipelines\CADD\Contract 2B\C-23.DWG, 2/13/2007 8:14:20 AM, PDF995



REUSE PIPELINE AND DIFFUSER TO LAKE LANIER (CONTRACT 2) PROJECT #5697

72" PLAN AND PROFILE STA. 299+00 TO 312+00

DEPARTMENT OF WATER RESOURCES
GWINNETT COUNTY, GEORGIA

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, GA 30092, (770) 446-4900

Surveying & Engineering Assistance
Moreland Altobelli Associates, Inc.
2211 Beaver Ruin Road Suite 190 Norcross, Georgia 30071 Telephone (770) 263-5945

Issue Certification
GEORGIA REGISTERED No. 14380 PROFESSIONAL ENGINEER THOMAS A CORBIN

Job No.	740416
Designed	TAC/MWJ
Drawn	MWJ
Checked	DSF
Reviewed	DSF
Approved	TAC
Reg. No.	14380
Date	03/10/04

Rev	Date	Description	By
F	05/31/06	EPD COMMENTS	
E	03/10/04	95% SUBMITTAL	
D	11/24/03	LDP SUBMITTAL	
C	03/31/03	90% SUBMITTAL	
B	01/30/03	60% SUBMITTAL	
	10/22/02	PROPERTY LINE CLARIFICATION	
A	10/01/02	30% SUBMITTAL	TAC

DRAWING NO. C-25

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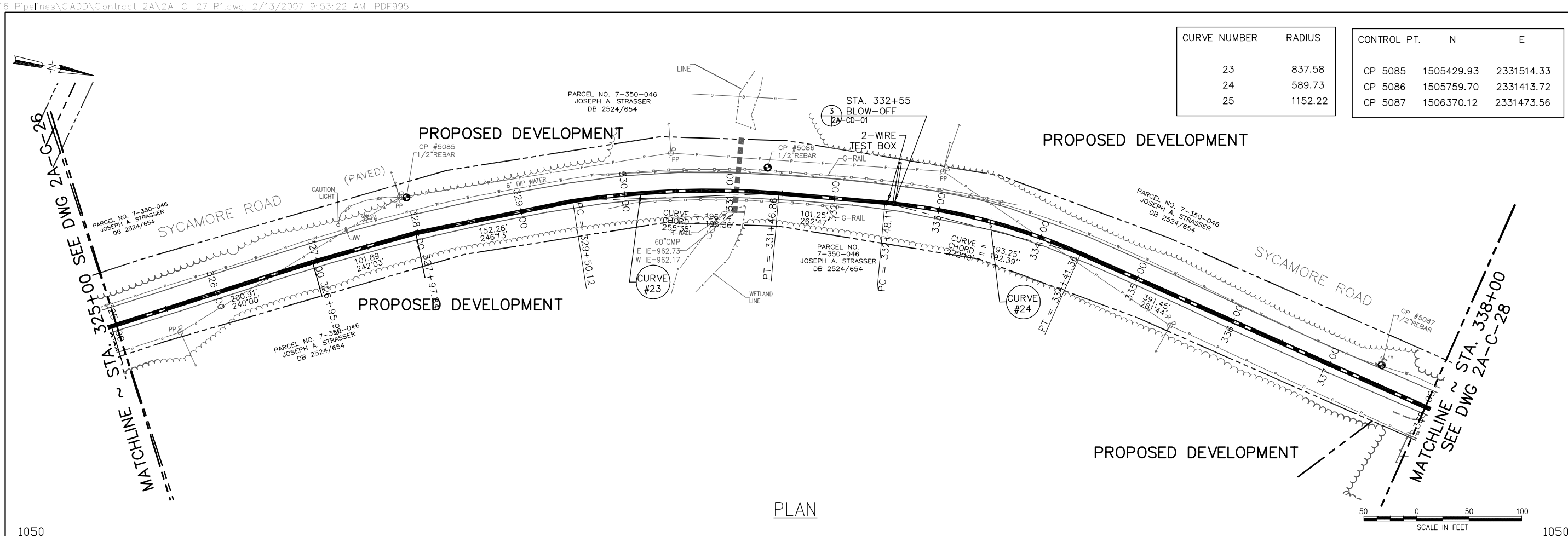
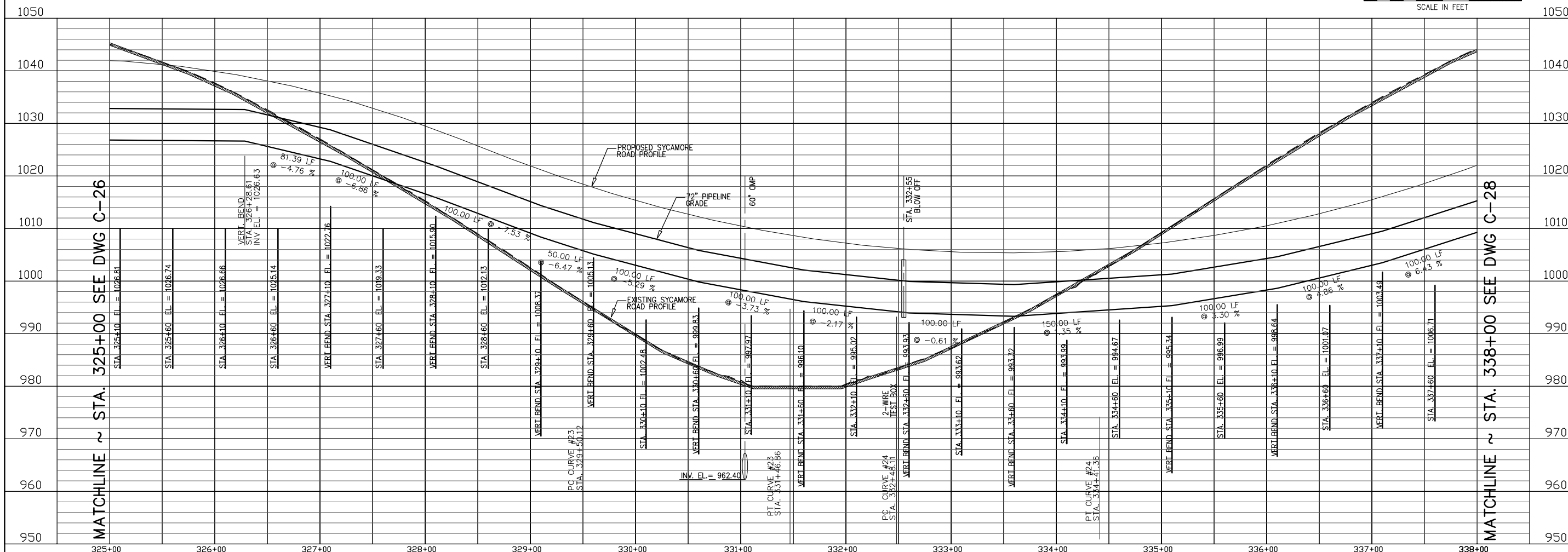
J:\7404'6 Pipelines\CADD\Contract 2A\2A-C-27 R'.dwg, 2/'3/2007 9:53:22 AM, PDF995

CURVE NUMBER	RADIUS
23	837.58
24	589.73
25	1152.22

CONTROL PT.	N	E
CP 5085	1505429.93	2331514.33
CP 5086	1505759.70	2331413.72
CP 5087	1506370.12	2331473.56



PLAN



PROFILE

SCALE: VERT.: 1" = 10'; HORIZ.: 1" = 50'

Rev	Date	Description	By
C	1/8/06	MODIFY PIPE PROFILE	TAC
B	11/11/05	DOT REVIEW SUBMITTAL	TAC
A	10/24/05	REVIEW SUBMITTAL	

Job No. 740416
Designed TAC/MWJ
Drawn MWL/BH
Checked TAC
Reviewed DSF
Approved TAC
Reg. No. 14380
Date 10/24/05

Issue Certification

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, GA 30092, (770) 446-4900
Surveying & Engineering Assistance
Moreland Altobelli Associates, Inc.
231 Peachtree St. NE
Atlanta, Georgia 30303
Telephone: (770) 395-2555

DEPARTMENT OF WATER RESOURCES
GWINNETT COUNTY, GEORGIA

REUSE PIPELINE AND DIFFUSER
TO LAKE LANIER
(CONTRACT 2/2A)
DPU PROJECT #5697

72" PLAN AND PROFILE
STA. 325+00 TO 338+00

DRAWING NO.
2A-C-27

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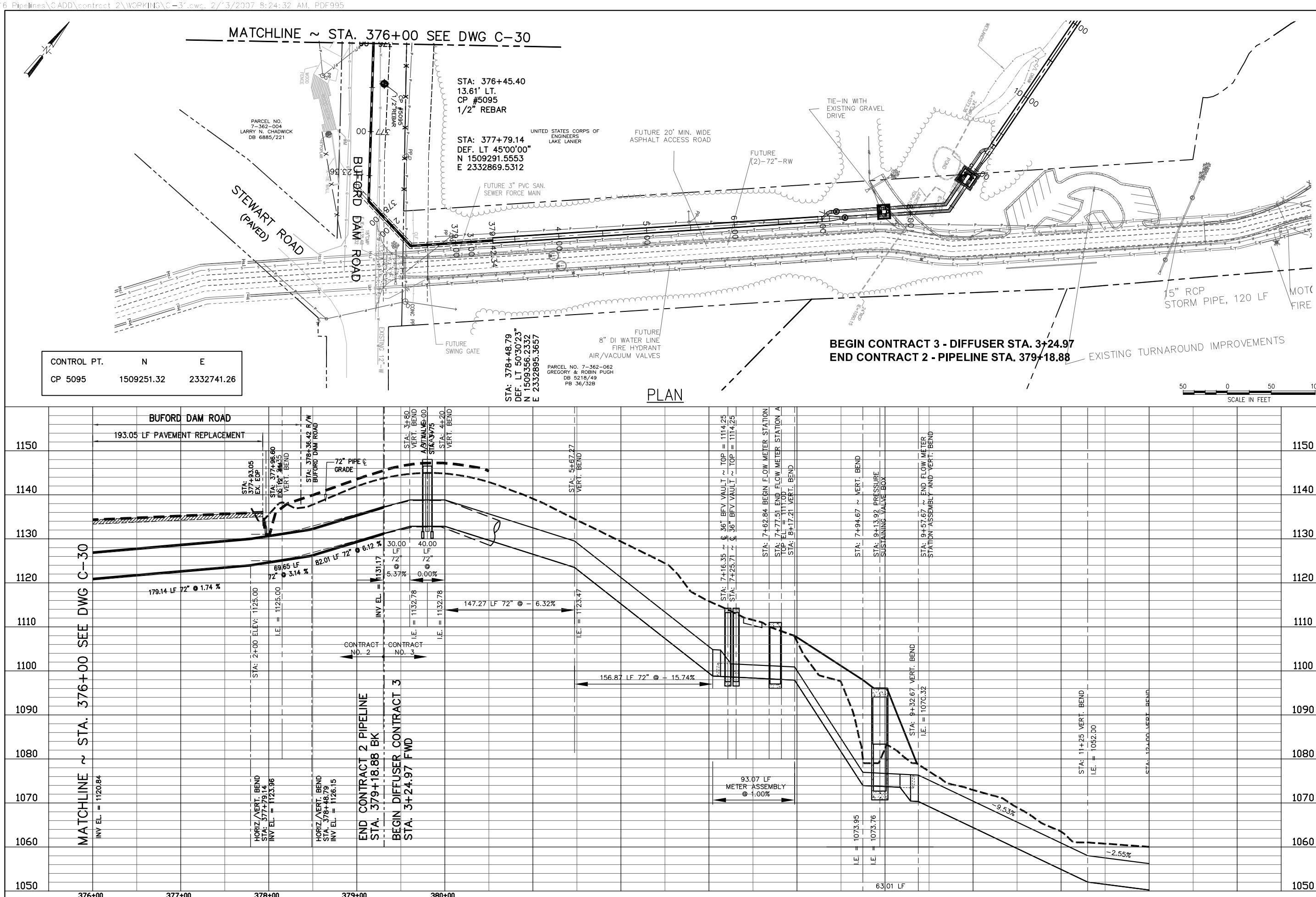

Rev	Date	Description	By
F	05/31/06	EPD COMMENTS	
E	03/10/04	95% SUBMITTAL	
D	11/24/03	LDP SUBMITTAL	
C	03/31/03	90% SUBMITTAL	
B	01/30/03	60% SUBMITTAL	
	10/22/02	PROPERTY LINE CLARIFICATION	
A	10/01/02	30% SUBMITTAL	TAC

Job No. 740416
Designed TAC/MWJ
Drawn MWJ
Checked DSF
Reviewed DSF
Approved TAC
Reg. No. 14380
Date 03/10/04

Issue Certification

GEORGIA REGISTERED No. 14380 PROFESSIONAL ENGINEER THOMAS A. CORBIN

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, GA 30092, (770) 446-4900

Surveying & Engineering Assistance
Moreland Altobelli Associates, Inc.
221 Roswell Street
Marietta, Georgia 30060
Telephone (770) 426-2525

DEPARTMENT OF WATER RESOURCES
GWINNETT COUNTY, GEORGIA

REUSE PIPELINE AND DIFFUSER TO LAKE LANIER
(CONTRACT 2)
PROJECT #5697

72" PLAN AND PROFILE
STA. 376+00 TO END

DRAWING NO.
C-31

Appendix D

Preliminary Project Engineering Drawings
and
Blasting Plan

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NOTES:

1. THIS PLAT WAS PREPARED IN CONFORMITY WITH THE MINIMUM STANDARDS AND REQUIREMENTS OF LAW, GEORGIA LAWS 1978.

2. THE NORTH MERIDIAN SHOWN IS BASED ON "1983 NORTH AMERICAN DATUM" (GEORGIA COORDINATE SYSTEM OF 1983 WEST ZONE). ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1929.

3. THE PUBLIC RECORDS REFERENCED ON THIS PLAT ARE ONLY THOSE USED AND/OR NECESSARY TO THE ESTABLISHMENT OF THE BOUNDARY OF THESE PARCELS. THEY ARE NOT AND DO NOT CONSTITUTE A TITLE SEARCH.

4. THIS PROPERTY IS ADJACENT TO, BUT DOES NOT LIE WITHIN A SPECIAL FLOOD HAZARD AREA ACCORDING TO THE F.E.M.A. FLOOD INSURANCE RATE MAP COMMUNITY-PANEL NUMBER 130322-0020 B. EFFECTIVE DATE JUNE 18, 1981 FOR GWINNETT COUTNY, GEORGIA.

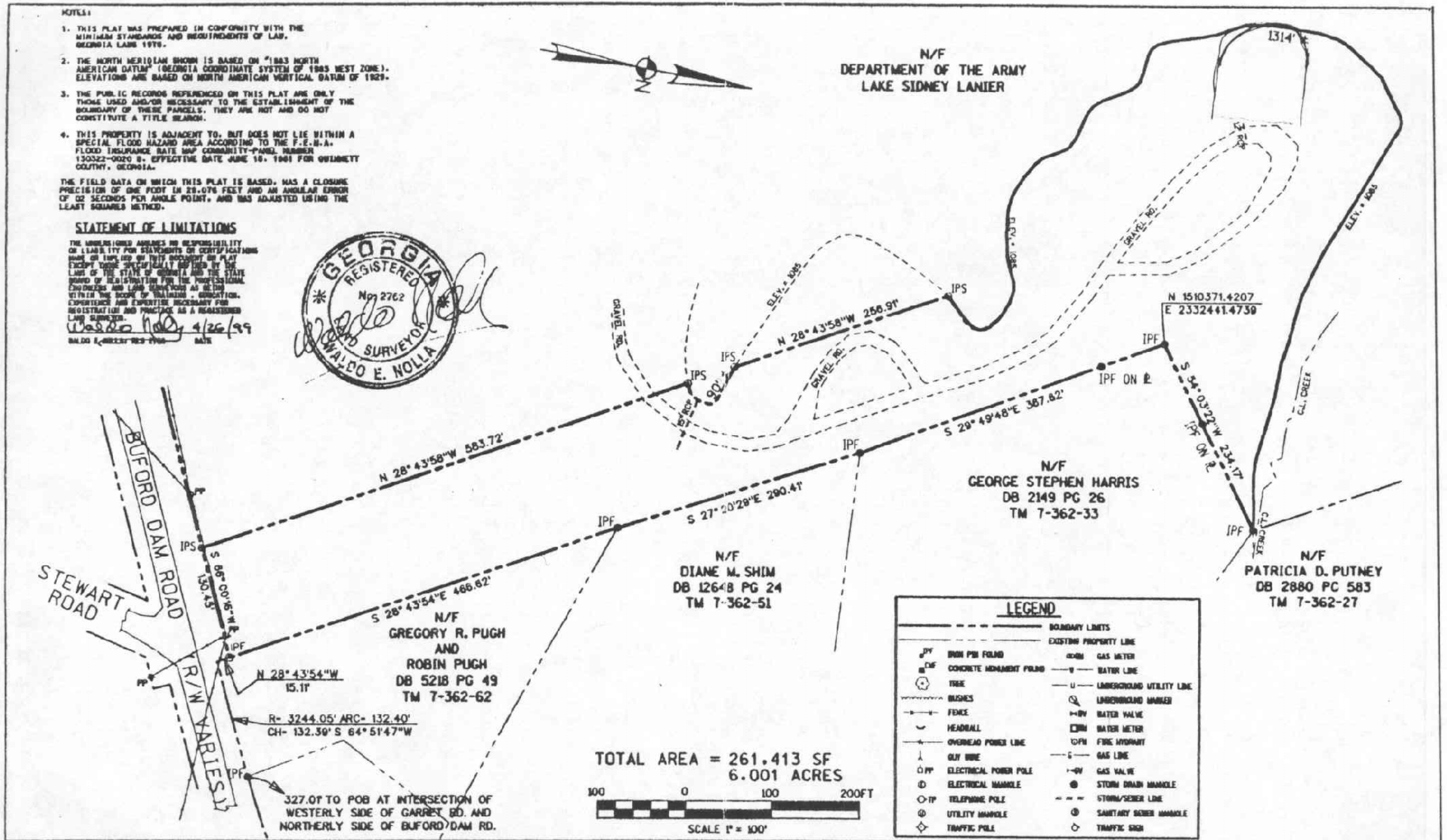
THE FIELD DATA ON WHICH THIS PLAT IS BASED, HAS A CLOSURE PRECISION OF ONE FOOT IN 28,076 FEET AND AN ANGULAR ERROR OF 02 SECONDS PER ANGLE POINT, AND WAS ADJUSTED USING THE LEAST SQUARES METHOD.

STATEMENT OF LIMITATIONS

THE UNDERSIGNED ASSUMES NO RESPONSIBILITY OR LIABILITY FOR STATEMENTS OR CERTIFICATIONS MADE OR IMPLIED ON THIS DOCUMENT OR PLAT EXCEPT THOSE SPECIFICALLY REQUIRED BY THE LAWS OF THE STATE OF GEORGIA AND THE STATE BOARD OF REGISTRATION FOR THE PROFESSIONAL ENGINEERS AND LAND SURVEYORS AS BEING WITHIN THE SCOPE OF TRAINING, EDUCATION, EXPERIENCE AND EXPERTISE NECESSARY FOR REGISTRATION AND PRACTICE AS A REGISTERED LAND SURVEYOR.

WALDO E. NOLLA 4/26/99
WALDO E. NOLLA REG. 2762 DATE

GEORGIA REGISTERED No. 2762 LAND SURVEYOR WALDO E. NOLLA



DRAWN BY:	WEN
CHECKED BY:	BDT
DATE:	4-26-1999
JOB NO.	98815A

REVISIONS

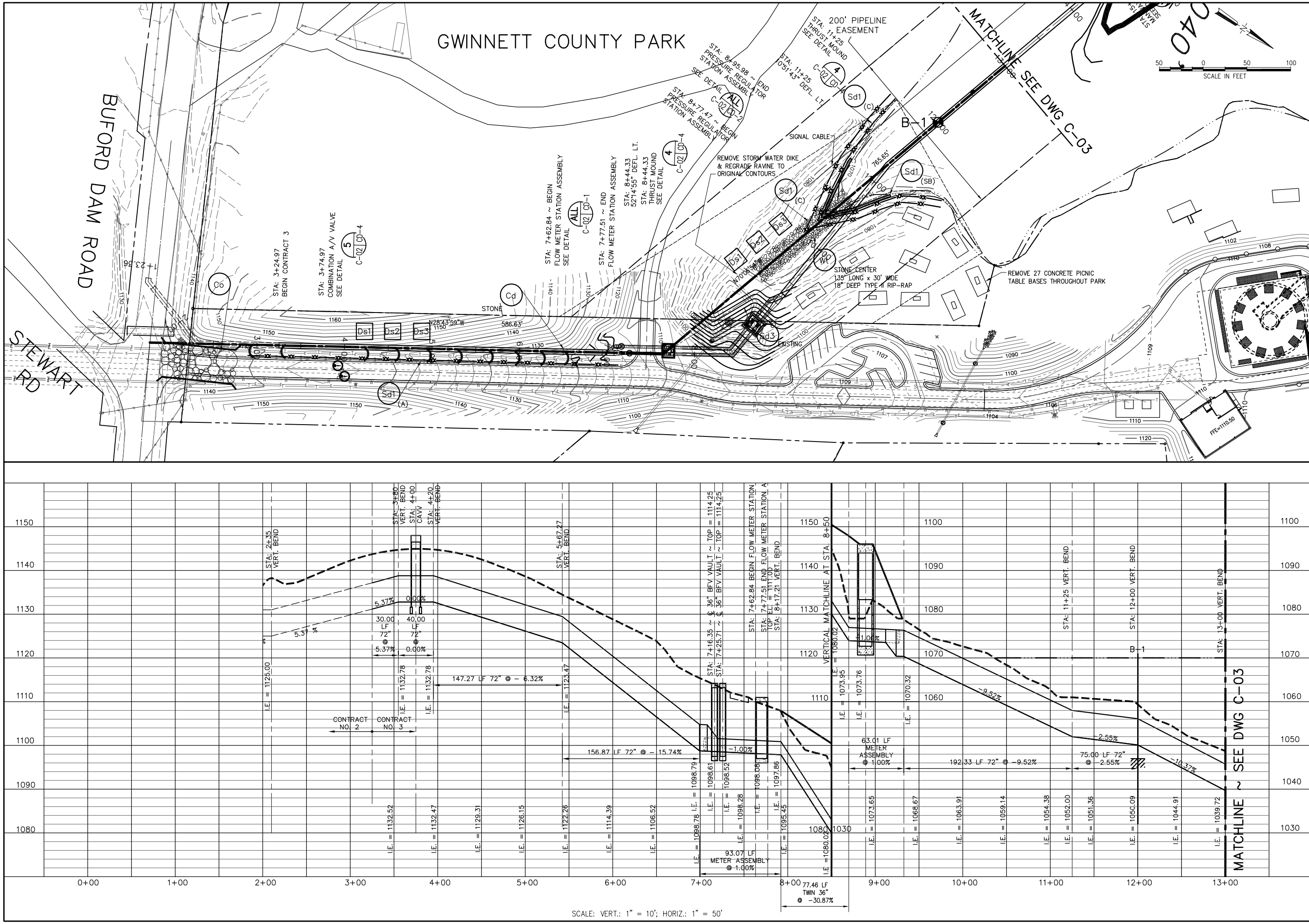
DATE	BY	DESCRIPTION

Moreland Altobelli Associates, Inc.

BOUNDARY SURVEY FOR:

GWINNETT COUNTY PARK
LAKE SIDNEY LANIER
7TH DISTRICT, LAND LOT 362, GWINNETT COUNTY, GEORGIA

DRAWING NUMBER 1



Rev	Date	Description	By
C	9/07/05	EA SUBMITTAL	
B	8/10/04	95% SUBMITTAL	JTS
A	12/16/03	LDP PERMIT SUBMITTAL	JTS

Job No. 740415
Designed WC/TJG
Drawn JM/TJG
Checked JTS
Reviewed —
Approved —
Reg. No. —
Date —

Issue Certification

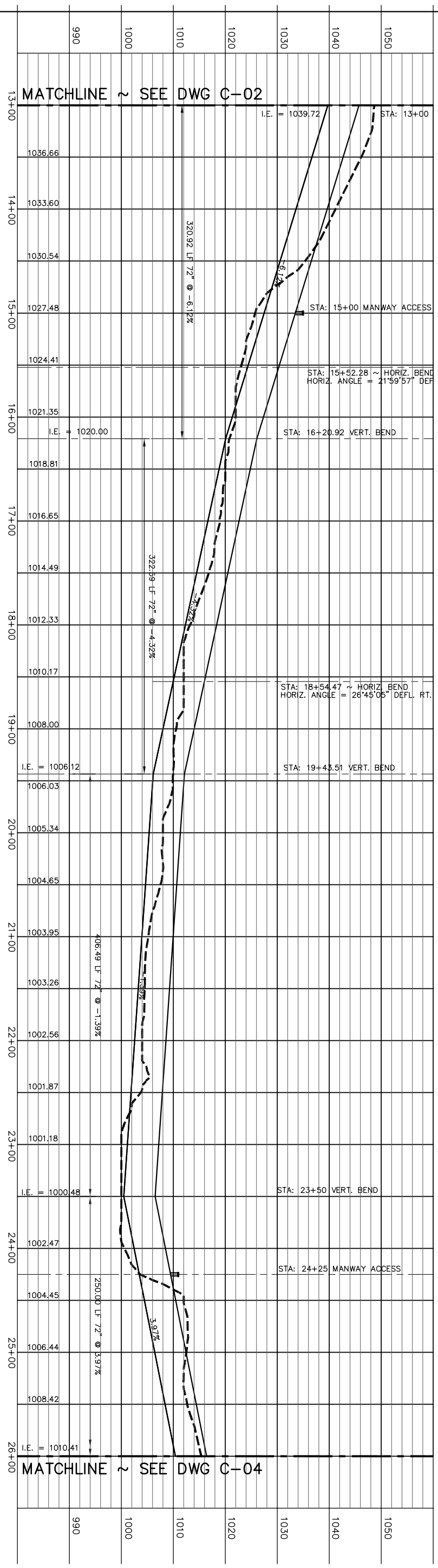
GWINNETT COUNTY
DEPARTMENT OF PUBLIC UTILITIES
GWINNETT COUNTY, GEORGIA

PARSONS
5390 Triangle Parkway, Suite 100, Norcross, GA 30092, (770) 446-4900

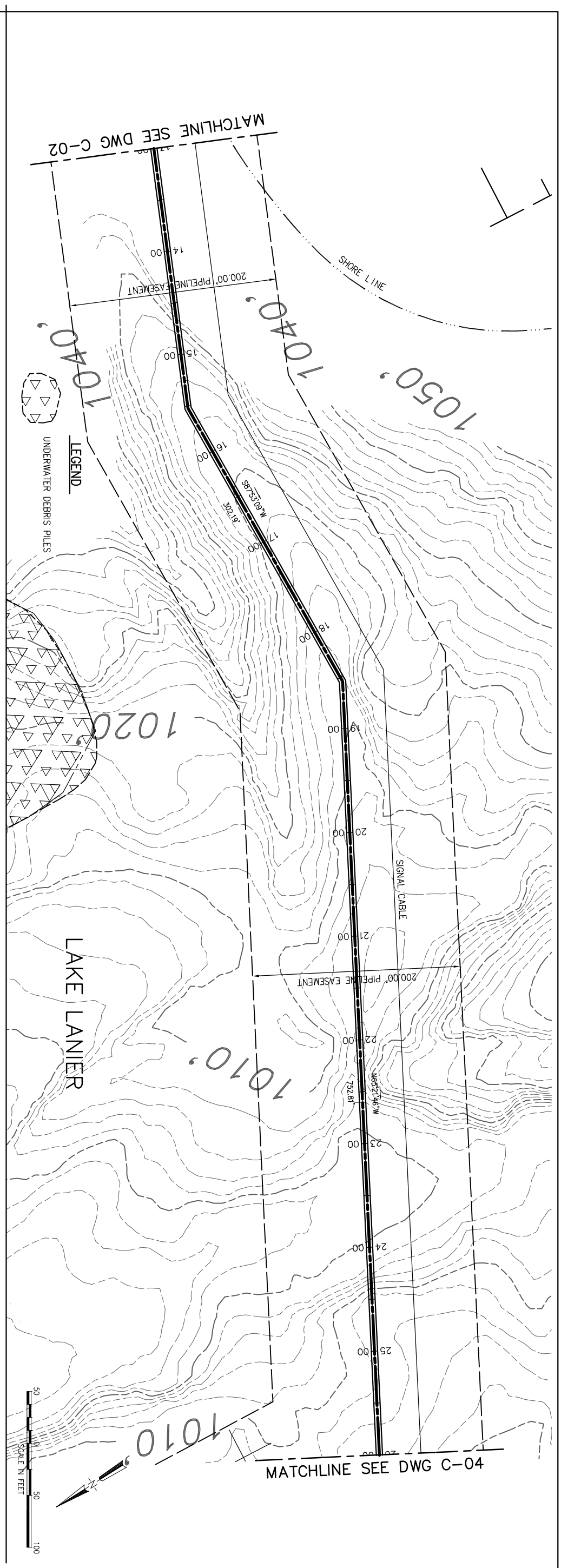
REUSE PIPELINE AND DIFFUSER TO LAKE LANIER
PROJECT # 5697

PLAN AND PROFILE
STA. 0+00 TO 13+00

DRAWING NO. C-02
REV. C

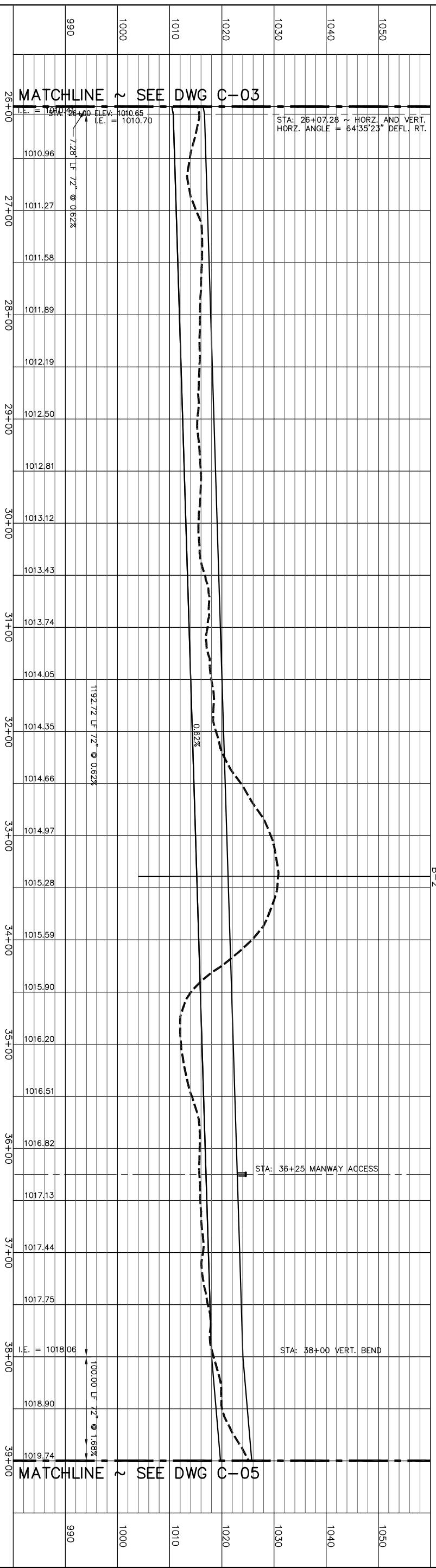


SCALE: VERT.: 1" = 10'; HORIZ.: 1" = 50'

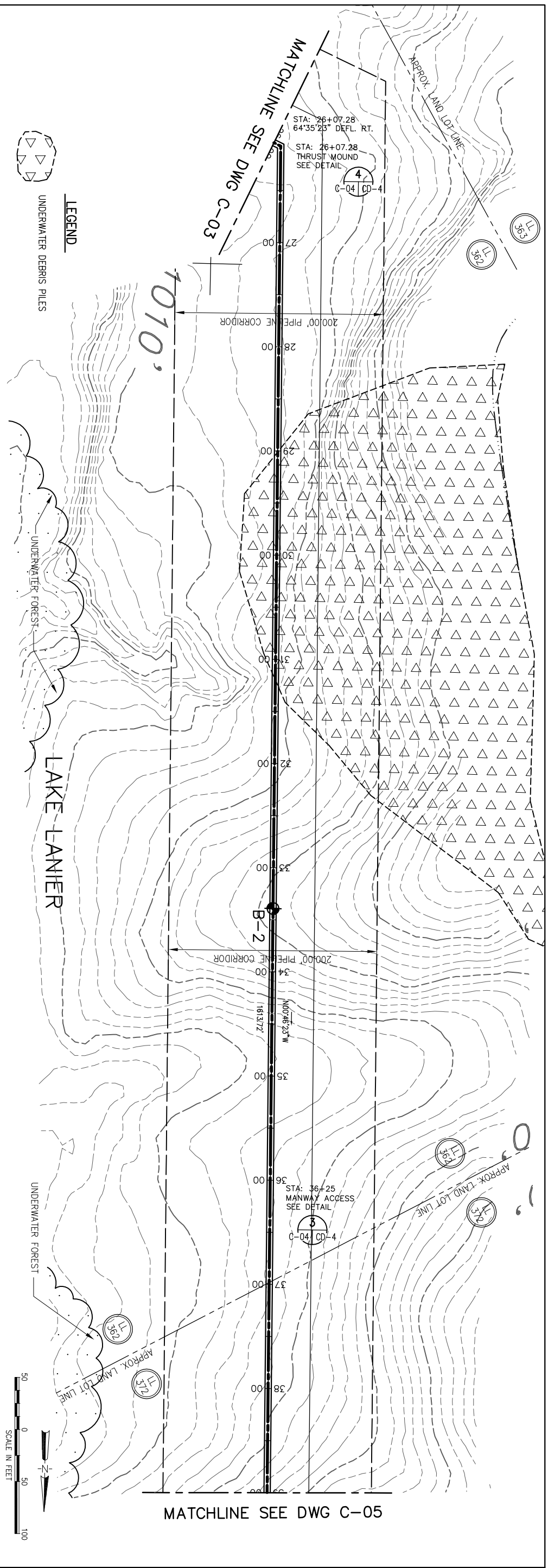


DRAWING NO. C-03	REUSE PIPELINE AND DIFFUSER TO LAKE LANIER PROJECT # 5697	GWINNETT COUNTY DEPARTMENT OF PUBLIC UTILITIES GWINNETT COUNTY, GEORGIA	Issue Certification	Job No. 740415			
				Designed WC/TJG			
				Drawn JM/TJG			
				Checked JTS			
				Reviewed –	C	9/07/05	EA SUBMITTAL
				Approved –	B	8/10/04	95% SUBMITTAL
				Reg. No. –	A	12/16/03	LDP PERMIT SUBMITTAL
				Date 1/30/03	Rev	Date	Description
REV. C	PLAN AND PROFILE STA. 13+00 TO 26+00	PARSONS 5390 Triangle Parkway, Suite 100, Norcross, GA 30092, (770) 446-4900					

By
JTS
JTS
JTS



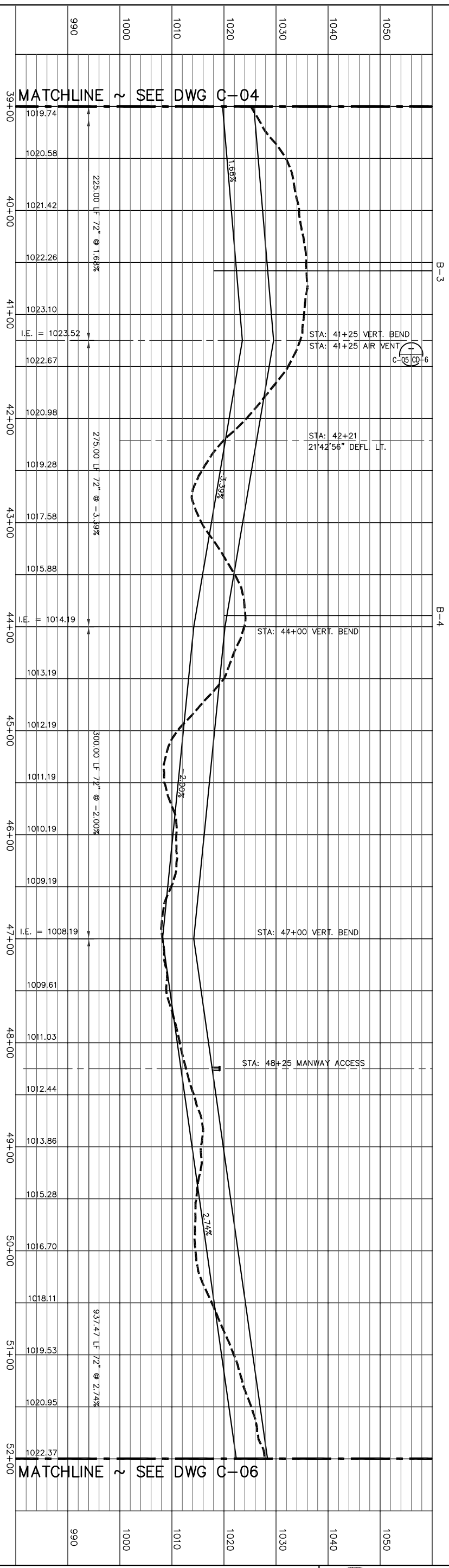
SCALE: VERT.: 1" = 10'; HORIZ.: 1" = 50'



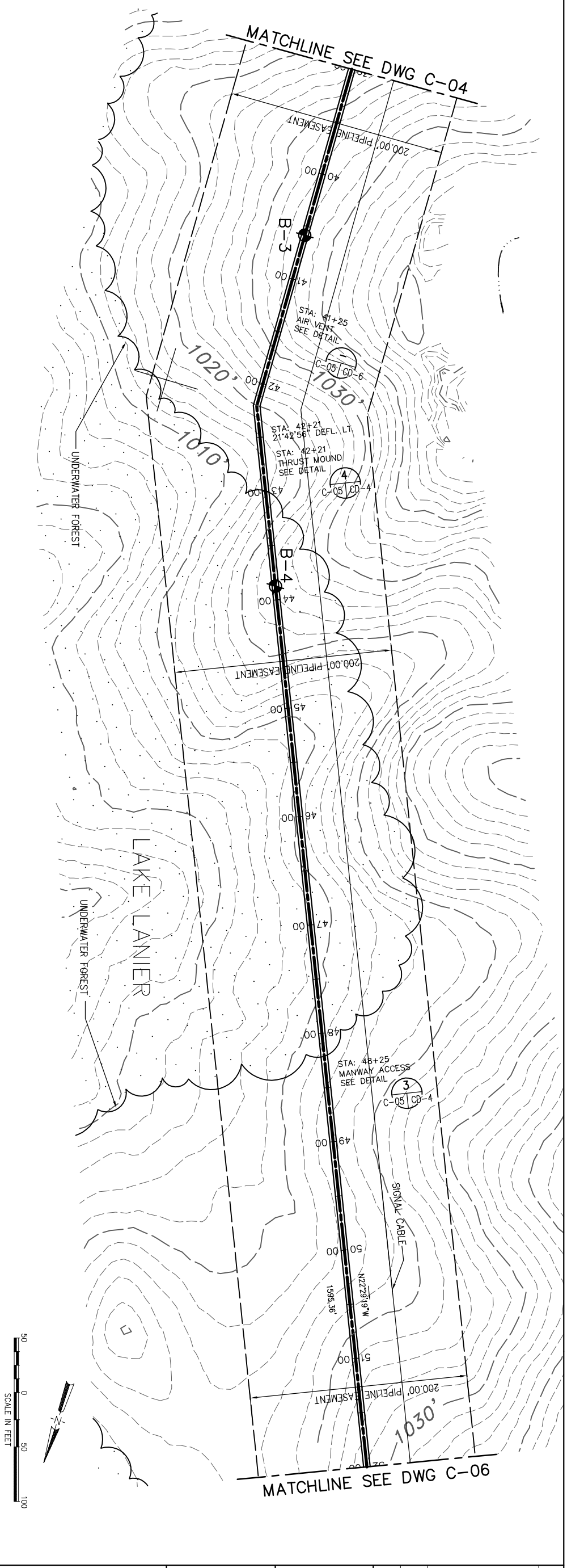
DRAWING NO. C-04	REUSE PIPELINE AND DIFFUSER TO LAKE LANIER PROJECT # 5697	GWINNETT COUNTY DEPARTMENT OF PUBLIC UTILITIES GWINNETT COUNTY, GEORGIA	Issue Certification
REV. C	PLAN AND PROFILE STA. 26+00 TO 39+00	**PARSONS** 5390 Triangle Parkway, Suite 100, Norcross, GA 30092, (770) 446-4900	

Job No.	740415
Designed	WC/TJG
Drawn	JM/TJG
Checked	JTS
Reviewed	–
Approved	–
Reg. No.	–
Date	1/30/03

Rev	Date	Description	By
C	9/07/05	EA SUBMITTAL	
B	8/10/04	95% SUBMITTAL	JTS
A	12/16/03	LDP PERMIT SUBMITTAL	JTS



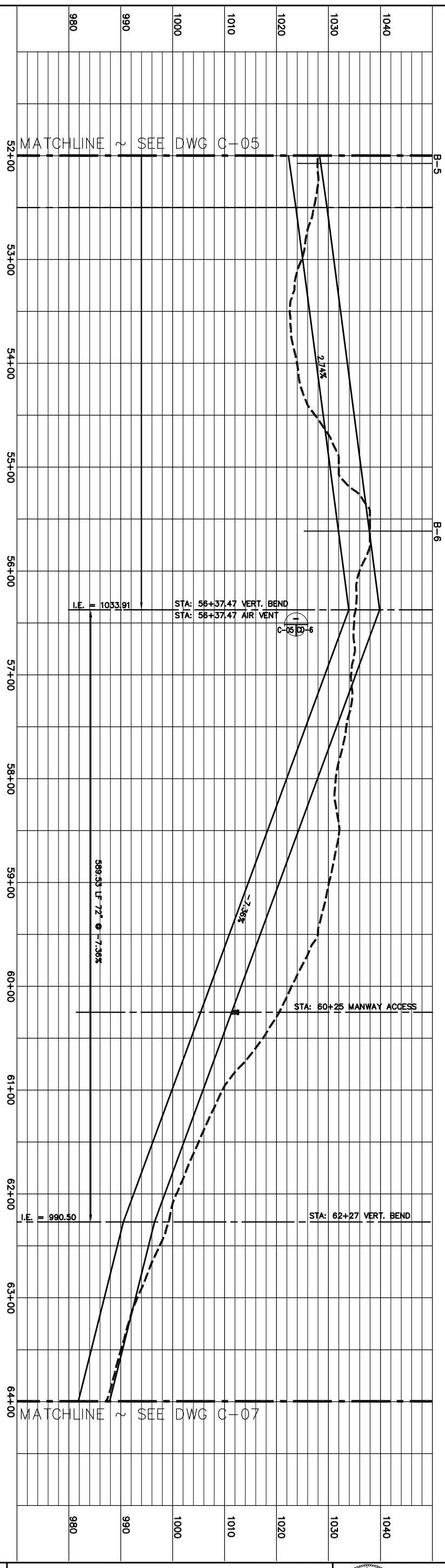
SCALE: VERT.: 1" = 10'; HORIZ.: 1" = 50'



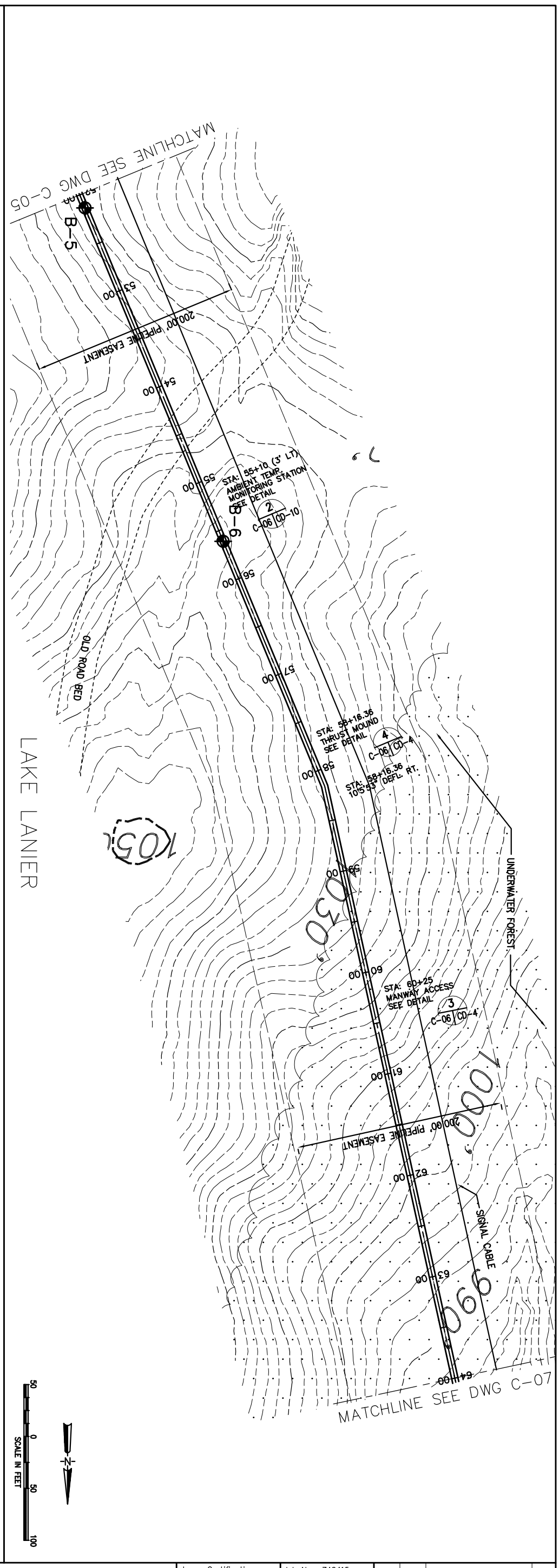
DRAWING NO. C-05	REUSE PIPELINE AND DIFFUSER TO LAKE LANIER PROJECT # 5697	GWINNETT COUNTY DEPARTMENT OF PUBLIC UTILITIES GWINNETT COUNTY, GEORGIA	Issue Certification
REV. C	PLAN AND PROFILE STA. 39+00 TO 52+00	**PARSONS** 5390 Triangle Parkway, Suite 100, Norcross, GA 30092, (770) 446-4900	

Job No.	740415
Designed	WC/TJG
Drawn	JM/TJG
Checked	JTS
Reviewed	–
Approved	–
Reg. No.	–
Date	1/30/03

Rev	Date	Description	By
C	9/07/05	EA SUBMITTAL	
B	8/10/04	95% SUBMITTAL	JTS
A	12/16/03	LDP PERMIT SUBMITTAL	JTS



SCALE: VERT.: 1" = 10'; HORIZ.: 1" = 50'



REUSE PIPELINE AND DIFFUSER TO LAKE LANIER
PROJECT # 5697

PLAN AND PROFILE
STA. 52+00 TO 64+00

DRAWING NO. C-06
REV. C

GWINNETT COUNTY
DEPARTMENT OF PUBLIC UTILITIES
GWINNETT COUNTY, GEORGIA

PARSONS
5390 Triangle Parkway, Suite 100, Norcross, GA 30092, (770) 446-4900

Issue Certification

Job No.	740415
Designed	WC/TJG
Drawn	JM/TJG
Checked	JTS
Reviewed	–
Approved	–
Reg. No.	–
Date	

Rev	Date	Description	By
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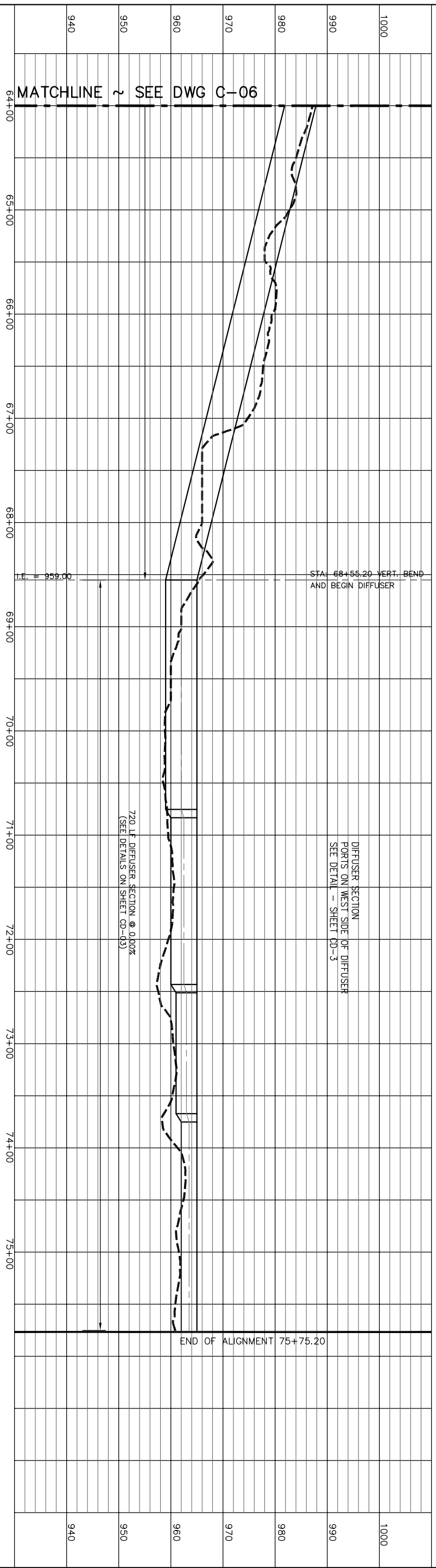
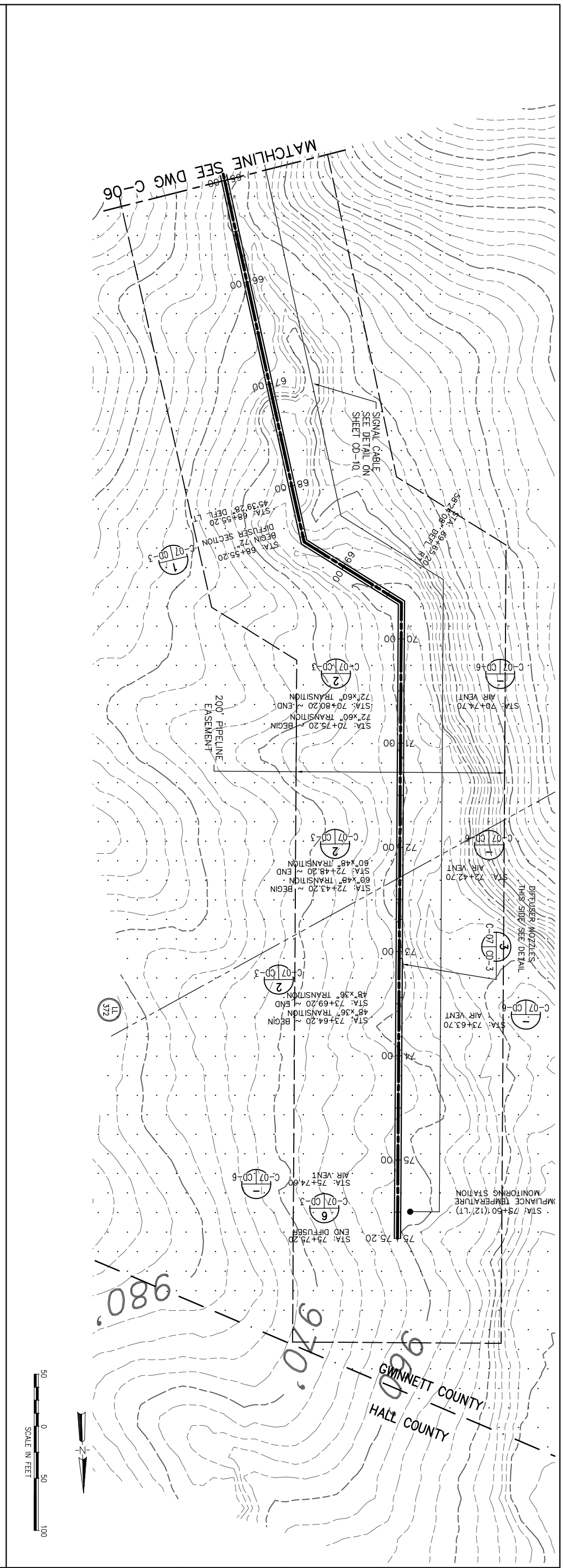
B	8/10/04	95% SUBMITTAL	JTS
A	12/16/03	LDP PERMIT SUBMITTAL	JTS



SCALE: VERT.: 1" = 10'; HORIZ.: 1" = 50'



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REV. C	PLAN AND PROFILE STA. 64+00 TO END	PARSONS 5390 Triangle Parkway, Suite 100, Norcross, GA 30092, (770) 446-4900			

Rev	Date	Description	By
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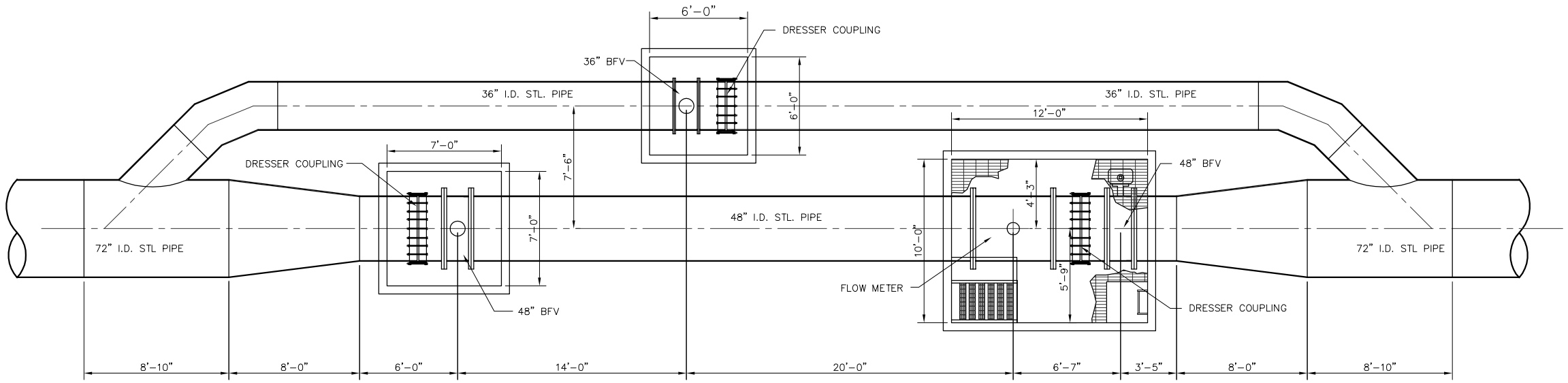
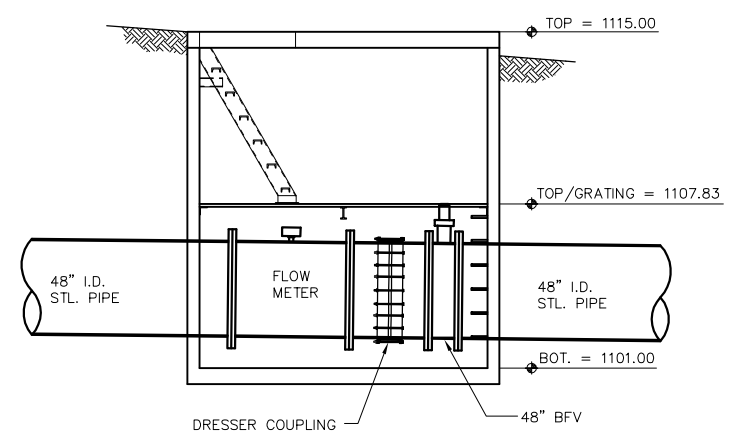
B	8/10/04	95% SUBMITTAL	JTS
A	12/16/03	LDP PERMIT SUBMITTAL	JTS



PLAN

* DeZURIK BUTTERFLY VALVES, RUBBER FACED VERTICAL DISC, TYPE 75B. 18" OUT TO OUT OF FLANGES.

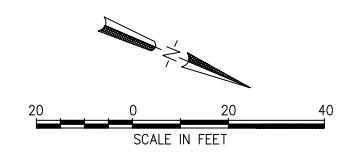


SECTION

FLOW METER STATION DETAIL

SCALE: 1/4" = 1'-0"

1
C-02 | CD-1



Rev	Date	Description	By
A	12/16/03	LDP PERMIT SUBMITTAL	JTS

Job No. 740415
Designed WC/TJG
Drawn JM/TJG
Checked JTS
Reviewed --
Approved --
Reg. No. --
Date 1/30/03

Issue Certification

GEORGIA REGISTERED No. 20069 PROFESSIONAL ENGINEER

GWINNETT COUNTY
DEPARTMENT OF PUBLIC UTILITIES
GWINNETT COUNTY, GEORGIA

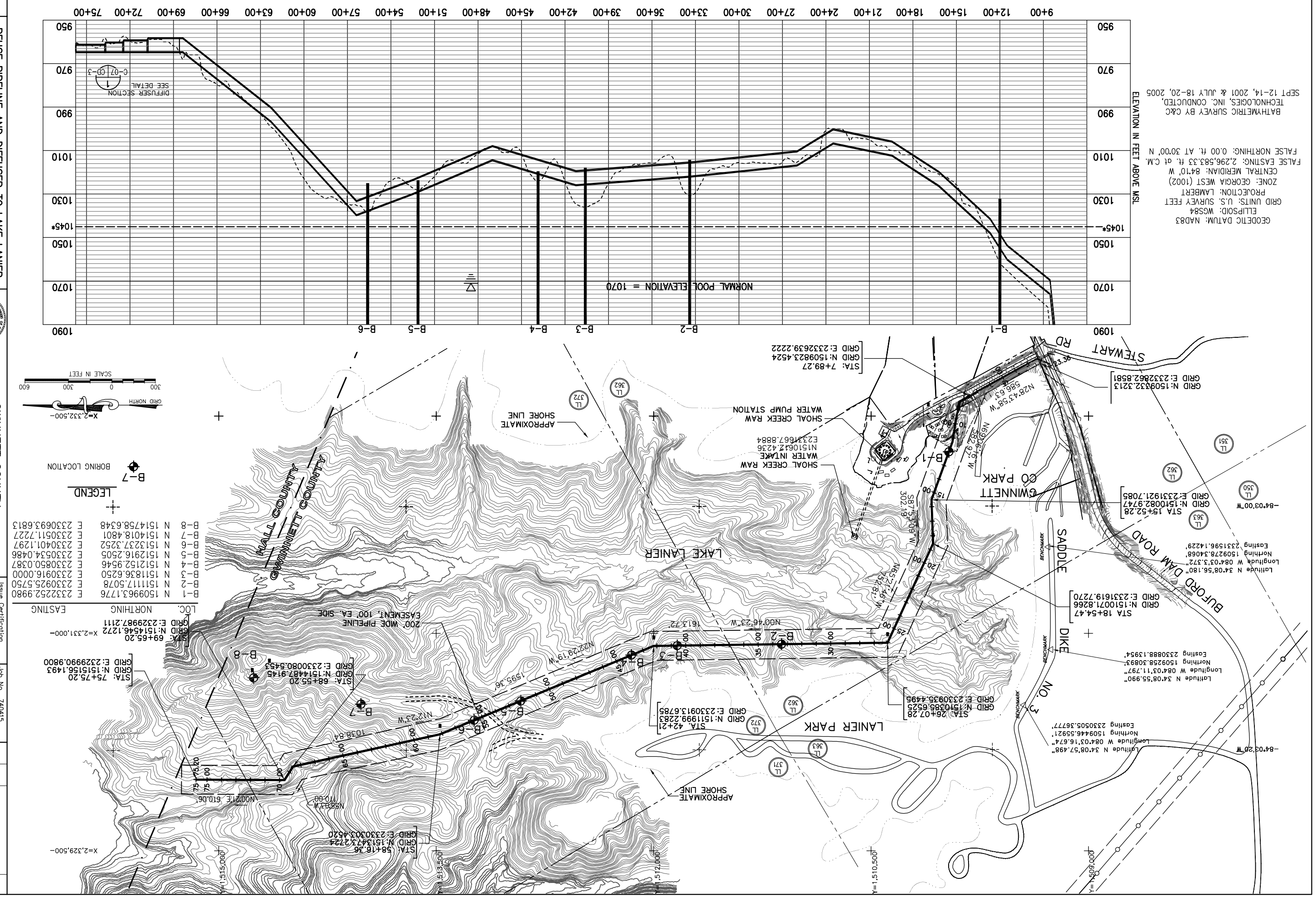
PARSONS
5390 Triangle Parkway, Suite 100, Norcross, GA 30092, (770) 446-4900

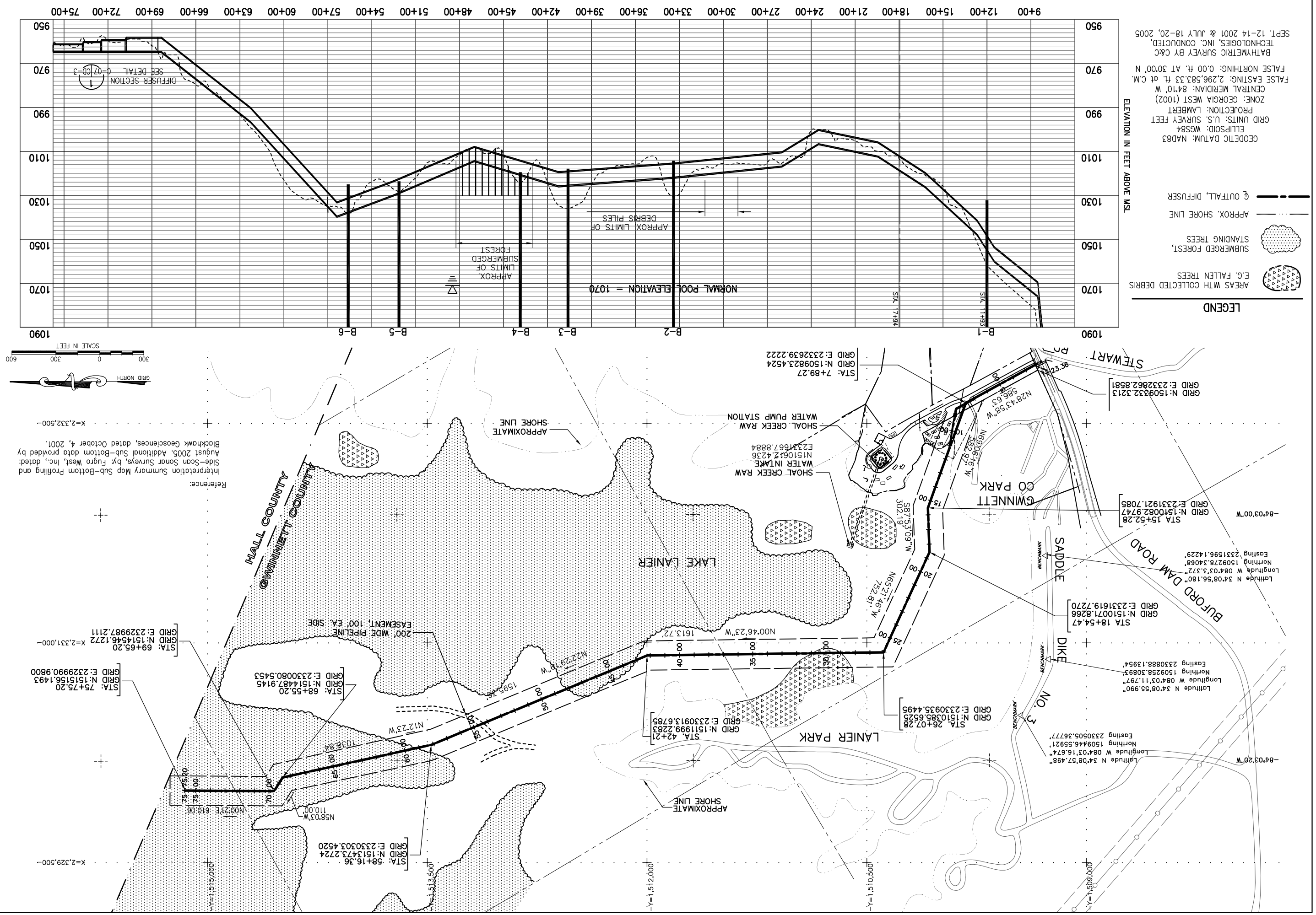
REUSE PIPELINE AND DIFFUSER TO LAKE LANIER
PROJECT # 5697

FLOW METERING STATION

DRAWING NO. CD-1

REV. A


* ANY PART OF THE PROFILE THAT HAS THE CROWN OF THE PIPE AT OR ABOVE ELEVATION 1045 MUST BE BURIED WITHIN THE EXISTING BOTTOM PROFILE
GEODETIC DATUM: NAD83
ELLIPSOID: WGS84
GRID UNITS: U.S. SURVEY FEET
PROJECTION: LAMBERT
ZONE: GEORGIA WEST (1002)
CENTRAL MERIDIAN: 84°10' W
FALSE EASTING: 2,296,583.33 ft. at C.M.
FALSE NORTHING: 0.00 ft. AT 30°00' N
BATHYMETRIC SURVEY BY C&C TECHNOLOGIES, INC. CONDUCTED, SEPT 12-14, 2001 & JULY 18-20, 2005
ELEVATION IN FEET ABOVE MSL
NORMAL POOL ELEVATION = 1070
1045*
B-1
B-2
B-3
B-4
B-5
B-6
DIFFUSER SECTION SEE DETAIL
C-07 CD-3
GWINNETT CO PARK
SADDLE DIKE
BUFORD DAM ROAD
LAKE LANIER
LANIER PARK
HALL COUNTY
GWINNETT COUNTY
SHOAL CREEK RAW WATER INTAKE
SHOAL CREEK RAW WATER PUMP STATION
APPROXIMATE SHORE LINE
STEWART RD
NO. 3
BENCHMARK
LEGEND
BORING LOCATION
SCALE IN FEET
GRID NORTH
REUSE PIPELINE AND DIFFUSER TO LAKE LANIER
PROJECT # 5697
BORING LOCATIONS AND OVERALL ALIGNMENT
GWINNETT COUNTY
DEPARTMENT OF PUBLIC UTILITIES
GWINNETT COUNTY, GEORGIA
PARSONS
5390 Triangle Parkway, Suite 100, Norcross, GA 30092, (770) 446-4900
DRAWING NO. G-03
REV. C
Issue Certification
Job No. 740415
Designed WC/TJG
Drawn JM/TJG
Checked JTS
Reviewed –
Approved –
Reg. No. –
Date
Rev. Date Description By
C 9/07/05 EA SUBMITTAL
B 8/10/04 95% SUBMITTAL JTS
A 12/16/03 LDP PERMIT SUBMITTAL JTS



Reference:
Interpretation Summary Map Sub-Bottom Profiling and Side-Scan Sonar Surveys, by: Fugro West, Inc., dated: August 2005. Additional Sub-Bottom data provided by Blackhawk Geosciences, dated October 4, 2001.

REUSE PIPELINE AND DIFFUSER TO LAKE LANIER
PROJECT # 5697

LAKE BOTTOM PLAN AND PROFILE

DRAWING NO. C-04 REV. C

GWINNETT COUNTY
DEPARTMENT OF PUBLIC UTILITIES
GWINNETT COUNTY, GEORGIA

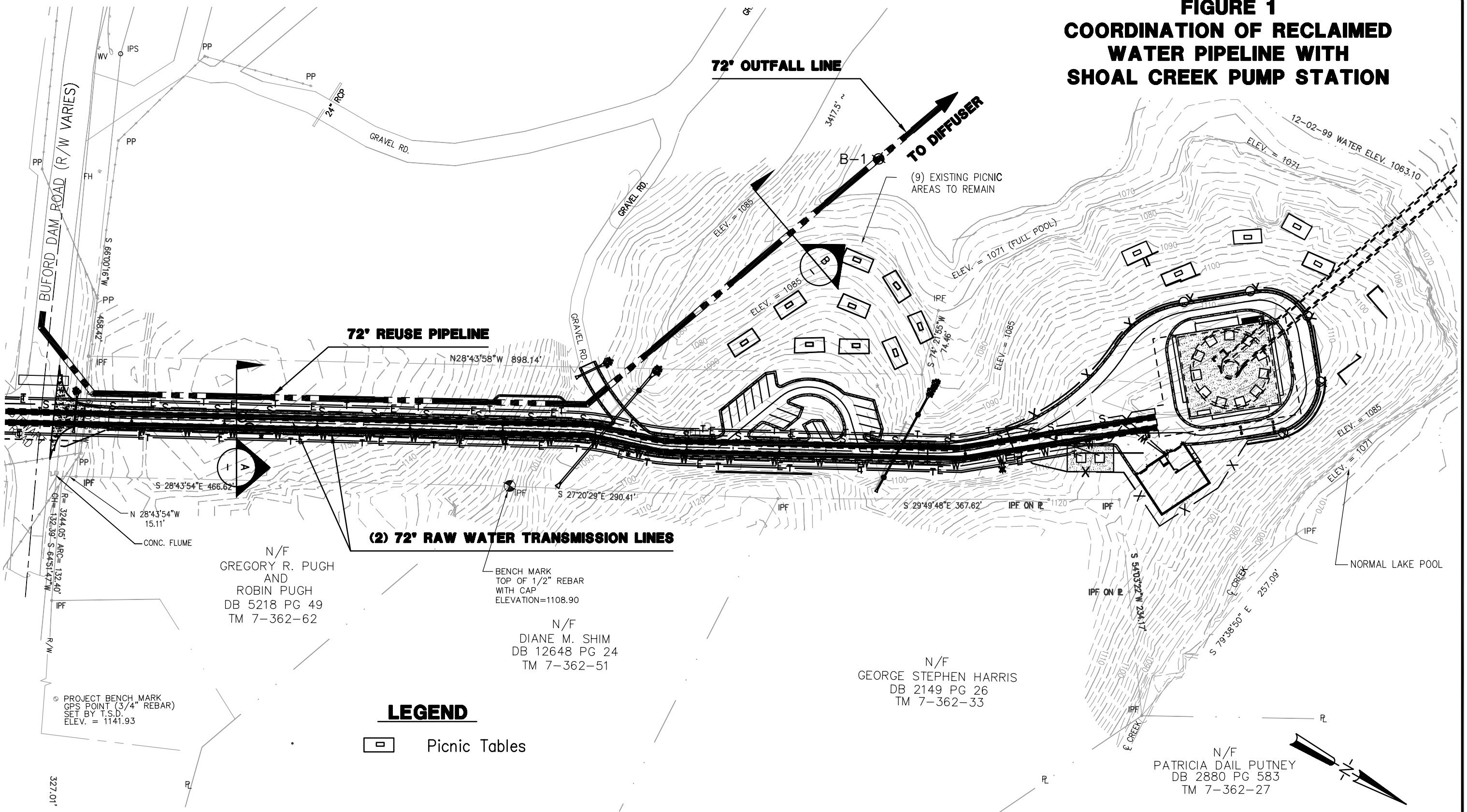
PARSONS
5390 Triangle Parkway, Suite 100, Norcross, GA 30092, (770) 446-4900

Issue Certification

Job No. 740415
Designed WC/TJC
Drawn JM/TJC
Checked JTS
Reviewed —
Approved —
Reg. No. —
Date —

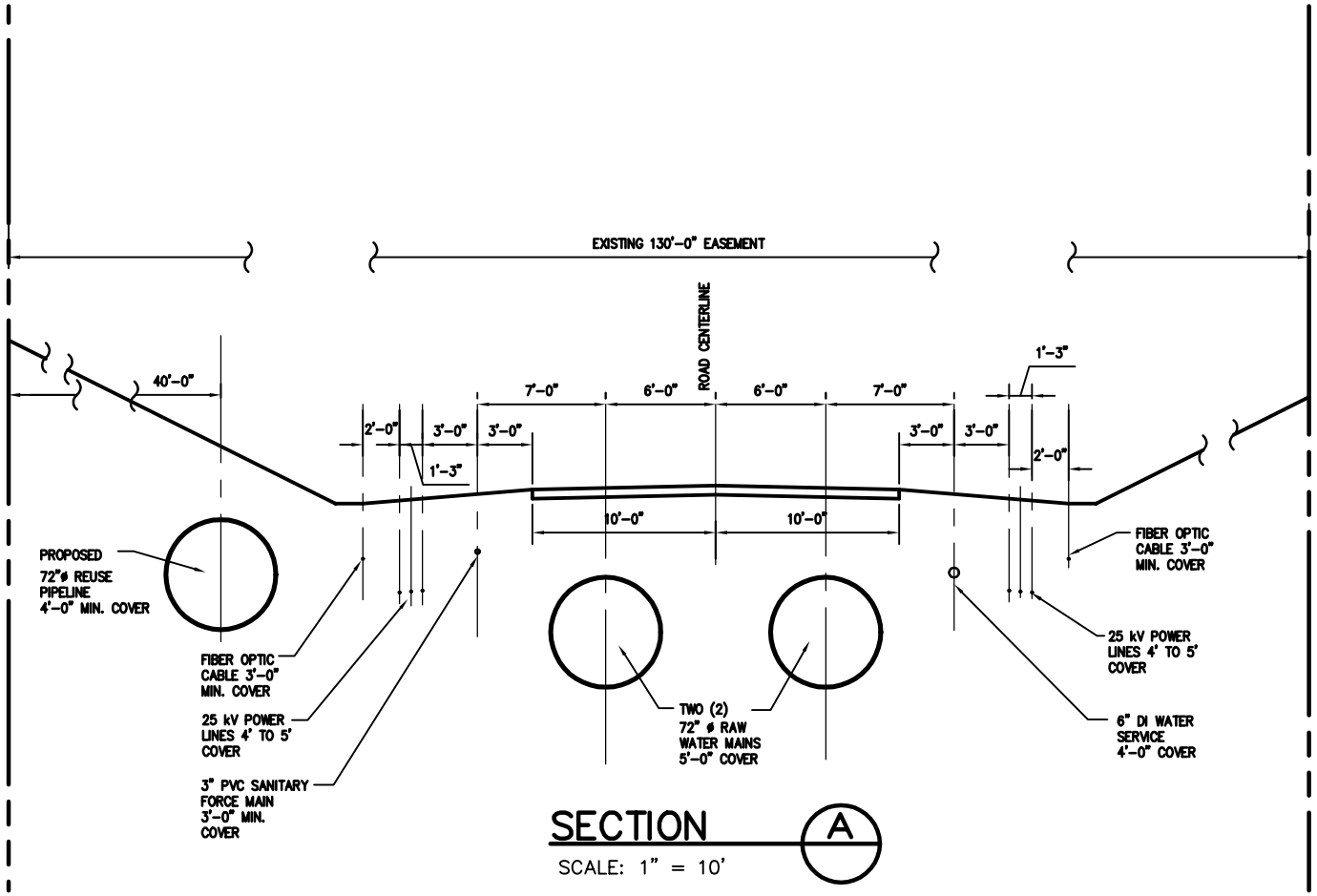
Rev	Date	Description	By
A	12/16/03	LDP PERMIT SUBMITTAL	JTS
B	8/10/04	95% SUBMITTAL	JTS
C	9/07/05	EA SUBMITTAL	

FIGURE 1
COORDINATION OF RECLAIMED WATER PIPELINE WITH SHOAL CREEK PUMP STATION



PRELIMINARY

PARSONS ENGINEERING SCIENCE, INC.



SECTION A

SCALE: 1" = 10'

PRELIMINARY

NOTES:

1. ALL UTILITIES SHOWN WITH THE EXCEPTION OF THE PROPOSED 72" ø REUSE PIPELINE ARE INCLUDED IN SHOAL CREEK CONTRACT PRESENTLY UNDER CONSTRUCTION.

FIGURE NO.	REUSE PIPELINE AND DIFFUSER TO LAKE LANIER PROJECT #5697	GWINNETT COUNTY DEPARTMENT OF PUBLIC UTILITIES GWINNETT COUNTY, GEORGIA	Issue Certification	Job No. 740415 Designed Drawn Checked Reviewed Approved Reg. No. Date	Rev / Date / Description / By
REV.	TYPICAL SECTION	PARSONS, INC. 5390 Triangle Parkway; Norcross, Georgia (770) 446-4900			

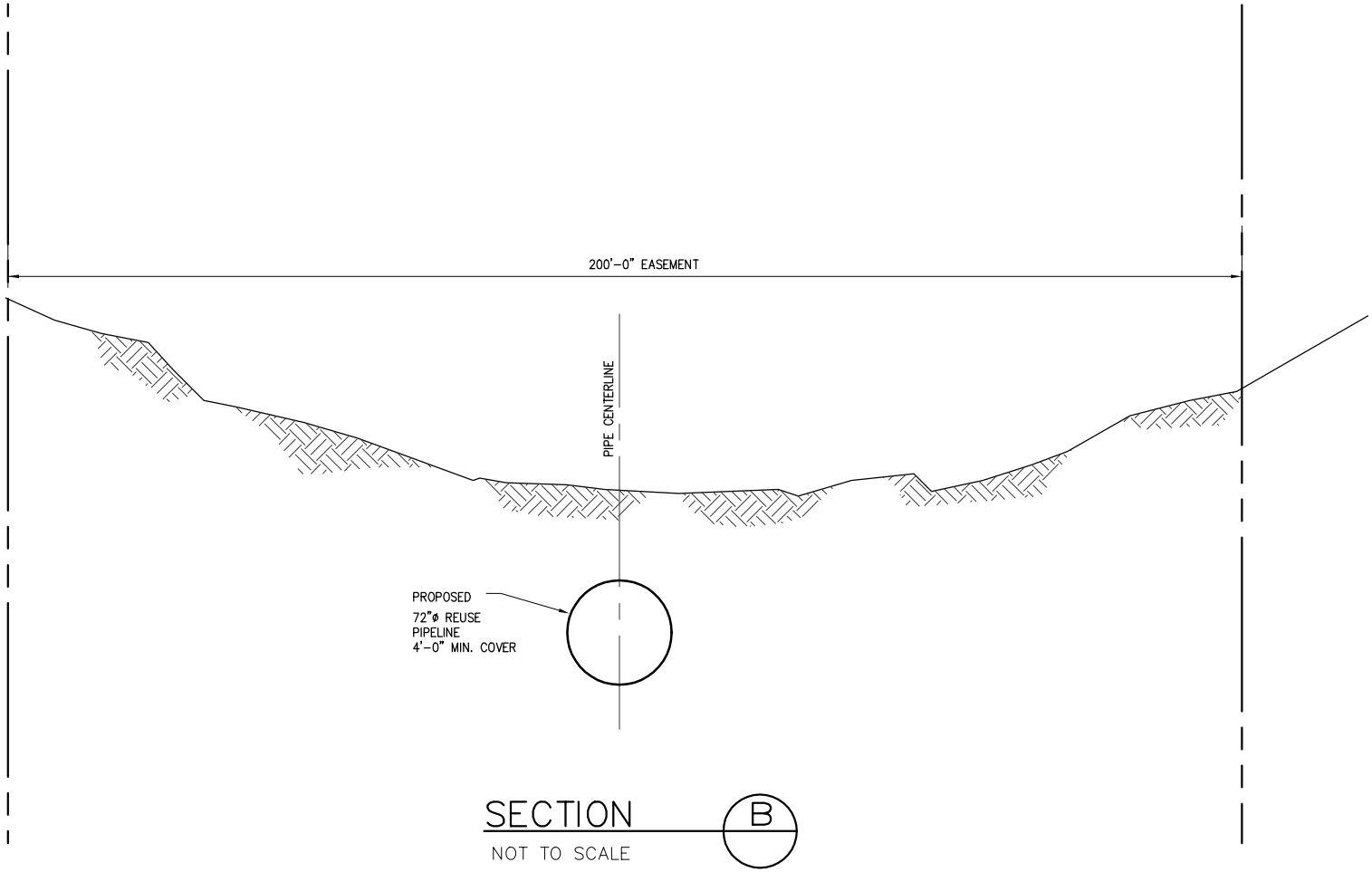


FIGURE NO. 3	REUSE PIPELINE AND DIFFUSER TO LAKE LANIER PROJECT #5697	GWINNETT COUNTY DEPARTMENT OF PUBLIC UTILITIES GWINNETT COUNTY, GEORGIA	Issue Certification	Job No. 740415 Designed Drawn Checked Reviewed Approved Reg. No. Date	Rev / Date / Description / By
REV. A	SECTION B	PARSONS, INC. 5390 Triangle Parkway; Norcross, Georgia (770) 446-4900			

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LETTER OF TRANSMITTAL

GWINNETT COUNTY DEPARTMENT OF PUBLIC UTILITIES
684 Winder Highway
Lawrenceville, Georgia 30045-5012
(678) 376-6700
(678) 376-6717 FAX

DATE: January 15, 2004

TO: Mr. Juan Payne, EN-GG
U.S. Army Corps of Engineers, Mobile District
109 Saint Josephs Street
Mobile, Alabama 36601

WE ARE SENDING YOU:

	Attached		Under Separate Cover
	Copy of Letter		Reports
X	Plans		Asbuilts
	Specifications		Other

COPIES	DESCRIPTION	DATE
1	Blast Plan - Driveway at the new Shoal Creek Raw Water Intake	1/12/2004
	Future Reuse Pipeline	

THESE ARE TRANSMITTED:

	For Approval		Approved as Noted
X	For Your Use		Approved as Submitted
	As Requested		Resubmit for Approval
	For Review		Other

COMMENTS:

Hi Juan, Please find enclosed the blast plan submitted by the subcontractor installing the twin 72" raw water pipelines along the driveway that extends from Buford Dam Road to the new intake.
In this case, we would like to drill and shoot the trench for a future pipeline that is parallel to these two new pipelines. This third pipeline is being designed as a 72" reuse pipeline. This pipeline is not scheduled to be installed at this time however, we would like to have the area cleared of the rock so that future blasts would not take place next to two live water lines. The blast plan for this area is almost identical to that used sucessfully for the twin raw water pipelines.
Should you have any questions, please contact me at (678) 376-7114.

FROM:

01/15/2004

Lynn A. Smarr — Date

COPY TO:

Mr. Erwin Topper - COE, Buford
File

W. L. Hailey and Company, Inc.

2971 Kraft Drive
PO Box 40646
Nashville, TN 37204

Phone: (615) 255-3161
Fax: (615) 256-1316

TRANSMITTAL
No. 00693

PROJECT: Shoal Creek Raw Water Intake

DATE: 1/12/04

TO: Parsons Engineering Science
5390 Triangle Parkway
Suite 100
Norcross, GA 30092

REF: Submittals

ATTN: Rod Hardeman

WE ARE SENDING:	SUBMITTED FOR:	ACTION TAKEN:
☑ Shop Drawings	☑ Approval	☐ Approved as Submitted
☐ Letter	☐ Your Use	☐ Approved as Noted
☐ Prints	☑ As Requested	☐ Returned After Loan
☐ Change Order	☐ Review and Comment	☐ Resubmit
☐ Plans		☐ Submit
☐ Samples	**SENT VIA:**	☐ Returned
☐ Specifications	☑ Attached	☐ Returned for Corrections
☑ Other: Made from Submittal	☐ Separate Cover Via: Mail	☐ Due Date:

ITEM	PACKAGE	SUBMITTAL	DRAWING	REV.	ITEM NO.	COPIES	DATE	DESCRIPTION	STATUS
SUB		02210-164		A		~~0~~ 5	1/12/04	Title: Reuse Pipeline Blasting Plan Desc: Reuse Pipeline Blasting Plan	NEW

Remarks:

CC:

Signed: _____
Ryan Gutridge

Expedition ®

JOHN D. STEPHENS, INC
PIPELINE CONTRACTORS & ENGINEERS

Blast Plan Submittal
Change Order for 72" Reuse Lines

W. L. HAILEY AND COMPANY, INC.

By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, material, dimensions, catalog numbers and similar data. I have checked and coordinated each item with other applicable approved Shop Drawings, Samples and/or Product Data and all pertinent Contract requirements.

Signature: _____ Date: 1-12-04

Submittal No: 02210-164-A

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Attachment A

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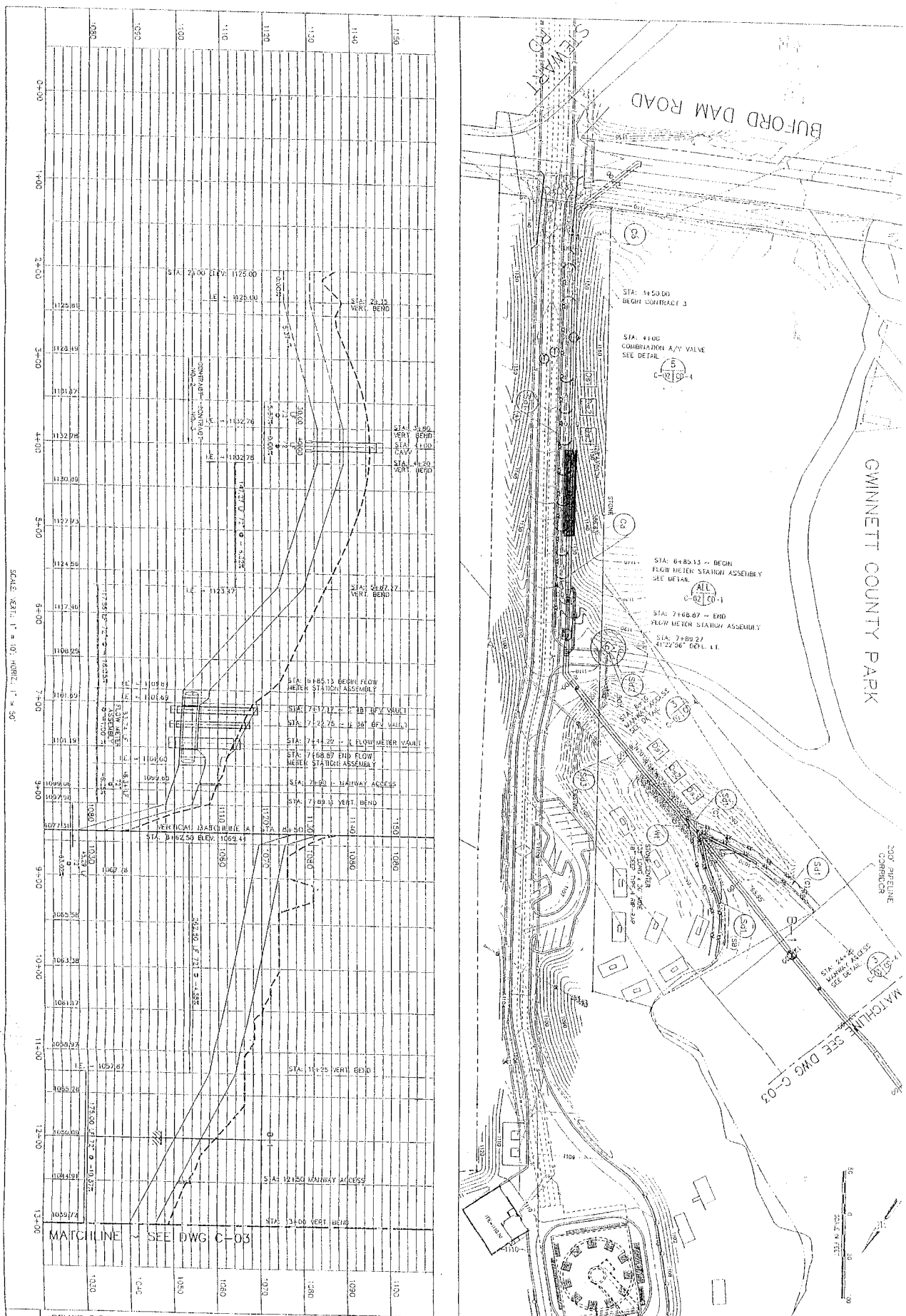


REUSE PIPELINE AND DIFFUSER TO LAKE LANIER
PROJECT # 5697

PLAN AND PROFILE
STA. 0+00 TO 13+00

DRAWING NO. C-02 REV. A

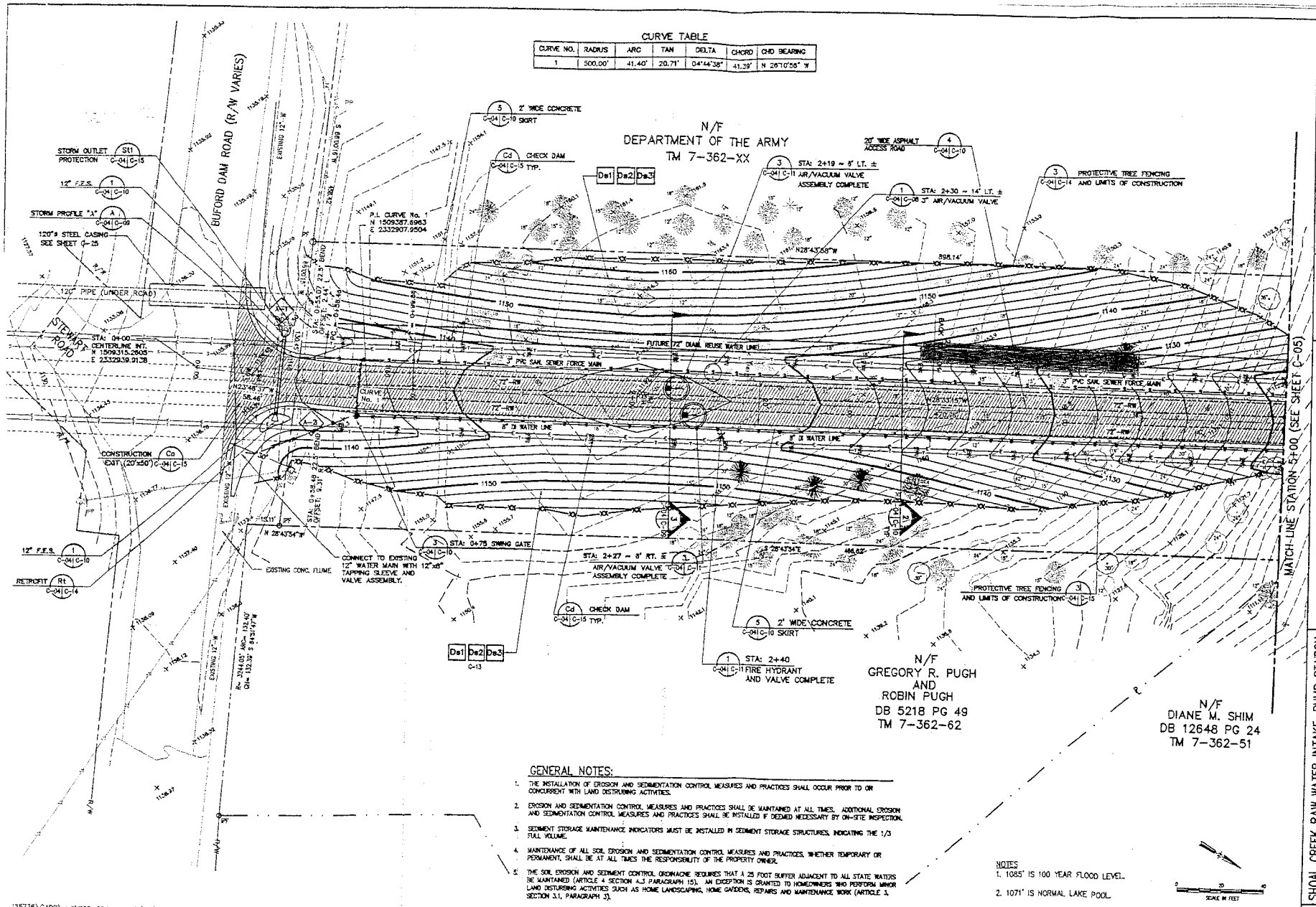
GWINNETT COUNTY
DEPARTMENT OF PUBLIC UTILITIES
GWINNETT COUNTY, GEORGIA

PARSONS
5360 Triangle Parkway, Suite 100, Norcross, GA 30092, (770) 446-4900

Issue Certification

Job No. 240419
Designed WC/TJG
Drawn JJ/TJG
Checked JTS
Reviewed
Approved
Reg. No.

A 12/16/03 IGP PERMIT SUBMITTAL



GENERAL NOTES:

1. THE INSTALLATION OF EROSION AND SEDIMENTATION CONTROL MEASURES AND PRACTICES SHALL OCCUR PRIOR TO OR CONCURRENT WITH LAND DISTRUBING ACTIVITIES.
2. EROSION AND SEDIMENTATION CONTROL MEASURES AND PRACTICES SHALL BE MAINTAINED AT ALL TIMES. ADDITIONAL EROSION AND SEDIMENTATION CONTROL MEASURES AND PRACTICES SHALL BE INSTALLED IF DEEMED NECESSARY BY ON-SITE INSPECTION.
3. SEDIMENT STORAGE MAINTENANCE INDICATORS MUST BE INSTALLED IN SEDIMENT STORAGE STRUCTURES, INDICATING THE 1/3 FULL VOLUME.
4. MAINTENANCE OF ALL SOIL EROSION AND SEDIMENTATION CONTROL MEASURES AND PRACTICES, WHETHER TEMPORARY OR PERMANENT, SHALL BE AT ALL TIMES THE RESPONSIBILITY OF THE PROPERTY OWNER.
5. THE SOIL EROSION AND SEDIMENT CONTROL ORDINACNE REQUIRES THAT A 25 FOOT BUFFER ADJACENT TO ALL STATE WATERS BE MAINTAINED (ARTICLE 4 SECTION 4.3 PARAGRAPH 15). AN EXCEPTION IS GRANTED TO HOMEOWNERS WHO PERFORM MINOR LAND DISTURBING ACTIVITIES SUCH AS HOME LANDSCAPING, HOME GARDENS, REPAIRS AND MAINTENANCE WORK (ARTICLE 3, SECTION 3.1, PARAGRAPH 3).

NOTES

1. 1085' IS 100 YEAR FLOOD LEVEL.
2. 1071' IS NORMAL LAKE POOL.
3. 1035' IS MINIMUM LAKE POOL.

CURVE TABLE

CURVE NO.	RADIUS	ARC	TAN	DELTA	CHORD	CHD BEARING
1	500.00'	41.40'	20.71'	04°44'38"	41.39'	N 26°10'56" W

Rev	Date	Description	By
D	3/7/01	Bid	WC
C	1/25/01	90% DESIGN SUBMITTAL	WC
B	9/22/00	60% DESIGN SUBMITTAL	WC
A	5/1/00	DDR CONCEPTUAL	WC

Job No. 735736.01
Designed TJG
Drawn TJG
Checked
Reviewed
Approved
Reg. No.
Date

Issue Certification

EDIT IS FOR ISSUE FOR BID

DEPARTMENT OF PUBLIC UTILITIES
WATER SYSTEM IMPROVEMENTS
GWINNETT COUNTY, GEORGIA

PARSONS ENGINEERING SCIENCE, INC.
5390 Triangle Parkway, Suite 100, Norcross, GA 30092, (770) 448-4900

SHOAL CREEK RAW WATER INTAKE, PUMP STATION, AND WATER LINE AT LAKE LANIER

ACCESS ROAD – GRADING, DRAINAGE AND EROSION CONTROL PLAN
STATION 0+00 TO 5+00

DRAWING NO. C-04

REV. D

735736\CADD\civil\736-C04.dwg, 10/13/00 at 15:29, TJG 1:1
Fs: E-GRADE.DWG, FG-20.DWG, E-TREES.DWG, PLAYOUT5.DWG, TBLK.DWG, E-BDY-1.DWG

Attachment B

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Blast Monitoring Report

417.20

SEISMIC IMAGING
1266 Old Norcross Road • Lawrenceville, Georgia 30045-4328 • PHONE 770.513.1002 • FAX 770.513.1019

PROJECT:

Client: John D. Stephens Inc.
Project: Dam Crack
Blast Location: Mass Corr. 1002

Date: 7/30/03
Time: 11:57
Page: 7 of 2

DRILLING & EXPLOSIVES DATA Shot #1

Holes _____ Burden _____ ft.
Diameter _____ in. Spacing _____ ft.
Depth(s) _____ ft. Pattern _____
Stemming _____ ft. Cover _____
Decked Holes _____ Charges/hole _____ Separation _____ ms

Products
1. _____ _____ lbs.
2. _____ _____ lbs.
3. _____ _____ lbs.
4. _____ _____ lbs.
Total _____ lbs.

Initiation System _____ Shot duration _____ ms Max holes / delay _____
Non-electric: In-hole delays _____ Surface delays _____ Electric periods _____ Max pounds / delay _____
Blaster _____ of _____

MONITORING:

	Station 4	Station ___
Property	Construction Site	
Address	Buford Dam Rd	
City / County	Gwinnett	
Geophone location	on East Property Boundary	
Distance/Direction	420 ft./ North	ft./
Scaled Distance	146.2	
Seismograph	S/N 1129 Calibration 11/02 MS	S/N ___ Calibration ___
Event # / Triggers	NJ 057/053 / 0.03 IPS 15 dBl	/ IPS dBl
Peak Particle Velocity	T 0.03 V ___ R ___ IPS	T ___ V ___ R ___ IPS
Frequency	T ___ V ___ R ___ Hz	T ___ V ___ R ___ Hz
Air Overpressure	<115 dBl ___ mB ___ Hz	dBl ___ mB ___ Hz

Closest inhabitable structure: Sta 1 Shot #1 Distance _____ ft. Scaled Distance _____
Distances obtained by: Wheel / Tape [ ] Pace [ ] Laser [✓] GPS [ ] Plan/aerial photo [ ] Acoustic [ ] Estimated [ ]
Weather _____ Next scheduled blast _____
Comments _____

TIME AND MILEAGE Shot #1

Time scheduled: _____ Arrival: _____ Travel RT _____ + On Site _____ = _____ Total time (2 hr. Minimum)
Mileage (odometer) _____ to _____ = _____ x 2 = _____ RT Miles

AUTHORIZATION: _____ for John D. Stephens, Inc.

_____ SEISMIC IMAGING, INC. **Reviewed by:** _____

Blast Monitoring Report

SEISMIC IMAGING
1266 Old Norcross Road • Lawrenceville, Georgia 30045-4328 • PHONE 770.513.1002 • FAX 770.513.1019

PROJECT:

Client: JOHN D. STEPHENS, INC
Project: [illegible]
Blast Location: [illegible] FOR [illegible]

Date: 7/3/03
Time: 11:57
Page: 1 of 2

DRILLING & EXPLOSIVES DATA

Holes: 67 | Burden: [illegible] ft.
Diameter: 3 in. | Spacing: [illegible] ft.
Depth(s): [illegible] ft. | Pattern: STAGGER
Stemming: [illegible] ft. | Cover: [illegible]
Decked Holes: N/A | Charges/hole: ____ | Separation: ____ ms

Products
1. [illegible] [illegible] lbs.
2. ____ lbs.
3. ____ lbs.
4. ____ lbs.
Total: [illegible] lbs.

Initiation System: NONELS | Shot duration: ____ ms | Max holes / delay: 1
Non-electric: In-hole delays: [illegible] | Surface delays: [illegible] | Electric periods: ____ | Max pounds / delay: [illegible]
Blaster: [illegible] | of: JOHN D. STEPHENS, INC

MONITORING:

	Station 1	Station 2	Station 3
Property	[illegible]	[illegible]	[illegible]
Address	1630 BUFORD DAM RD	1979 SUGAR RD	BUFORD DAM RD
City / County	GWINNETT	GWINNETT	GWINNETT
Geophone location	ON SOIL [illegible]	ON SOIL [illegible]	ON SOIL [illegible]
	BASE [illegible]	CRANK	END OF SHOP [illegible]
Distance/Direction	[illegible] ft./ [illegible]	330 ft./ SW	[illegible] ft./ [illegible]
Scaled distance	78.3	149	417.8
Seismograph	SN [illegible] Calibration 12/02 MS	SN 1046 Calibration 7/03 MS	SN 254 Calibration [illegible] MS
Event # / Triggers	116 / 0.13 IPS 115 dBl	258 / 0.03 IPS 115 dBl	[illegible] / 0.015 IPS 115 dBl
Particle Velocity	T 0.14 V 0.09 R 0.12 IPS	T 0.09 V 0.05 R 0.16 IPS	T 0.015 V ____ R ____ IPS
Frequency	T 15.0 V 15.0 R 17.6 Hz	T 12.0 V 4.6 R 12.8 Hz	T ____ V ____ R ____ Hz
Air Overpressure	118 dBl 0.11 mB 36.5 Hz	116 dBl 0.04 mB — Hz	115 dBl ____ mB ____ Hz

Closest inhabitable structure: STA 1 | Distance: ____ ft. | Scaled Distance: ____
Distances obtained by: Wheel / Tape [ ] Pace [ ] Laser [✓] GPS [ ] Plan/aerial photo [ ] Acoustic [✓] Estimated [✓]
Weather: CLEAR MILD, 78°F, WIND [illegible] | Next scheduled blast: FINISHED
Comments: ____

TIME AND MILEAGE

Time scheduled: 12:00 | Arrival: 10:45 | Travel RT 1.0 + On Site 2.0 = 3.0 Total time (2 hr. Minimum)
Mileage (odometer) ____ to ____ = 16 x 2 = 32 RT Miles

AUTHORIZATION: [signature] for JOHN D. STEPHENS, INC

[signature] SEISMIC IMAGING, INC. | Reviewed by: ____

1266 Old Norcross Road
Lawrenceville, Georgia 30045

770/513-1002
FAX: 770/513-1019
www.seismicimaging.com

SEISMIC IMAGING

Fax

To:	Donnie Bailey / John D. Stephens, Inc.	**From:**	John King
Fax:	770-979-3748	**Date:**	August 28, 2003
Phone:	770-972-8000	**Pages:**	1
Re:	Shoal Creek Blast Vibration Projections	**Copy:**	Wilson Cadle – 770-271-6001

Donnie,

As requested, we have calculated vibration levels from blast designs submitted by your office for work on the Shoal Creek Project. These estimates are based on standard transmission rates (a=160 and b=-1.6) and should be verified or modified through the use of a test blast program or during the initial production blasting by starting at the furthest distance from the nearest residence and measuring vibration levels at multiple locations.

Design #1: A peak particle velocity of 0.50 inches per second is calculated at a distance of 160 feet using the planned charge weight of 16.5 pounds per delay. We understand that this design will be used out to a distance at least 200 feet from the nearest residence.

Design #2: A peak particle velocity of 0.05 inches per second is calculated at a distance of 200 feet with a peak particle velocity of 0.35 inches per second being estimated 250 feet from the 30 pound per delay charge. At the saddle dike, approximately 750 feet away, a peak particle velocity of 0.06 inches per second is estimated. Frequencies below 85 hertz (anticipated at this distance) should yield an acceleration of 0.08g or less.

Design #3: A peak particle velocity of 0.5 inches per second is calculated at a distance of 120 feet using a 10.5 pound per delay charge weight. This design is planned to be used to a distance 150 feet beyond the nearest residence where design #1 will be implemented.

Seismic Imaging's calculations are limited to the information presented by the blaster and are based on standard values available. Any omission or error in providing relevant information which would significantly impact the analysis in this review is the responsibility of the contractor who assumes full liability for the safety and performance of the blasts. By employing this information, the user acknowledges the cursory nature of the data and agrees to hold Seismic Imaging, Inc. and its employees harmless from any claims arising from the work.

Please contact us if additional calculations are necessary or if we may be of further help.

John

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Attachment C

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GWINNETT COUNTY
Department of Fire and Emergency Services
Office of the Fire Marshal
(770)822-7690 (770)822-7697 FAX
Inspection Request (770)822-7679

BLASTING PERMIT

This permit issued by the Gwinnett County Department of Fire and Emergency Services, Office of the Fire Marshal, authorizes the use/storage of explosives in accordance with rules and regulations adopted by Gwinnett County.

ISSUED TO: John D Stephens, Inc.

305 Equipment Court

Lawrenceville, GA 30045

PHONE NUMBER: (770)972-8000 EMERGENCY NUMBER: (770)972-8000

STATE EXPLOSIVE LICENSE NUMBER: 14982

DURATION OF PERMIT: thru December 31, 2003

NAME OF INSURANCE COMPANY(S): American International Company

POLICY #9332379 INSURANCE $: 2,000,000

POLICY PERIOD: 01/01/03-01/01/04

INSURANCE AGENT'S NAME: BB & T Huffines Russell

NAME OF PERSON APPLYING FOR PERMIT: Glenda Mills

PHONE NUMBER: (770)972-8000 EMERGENCY NUMBER: (678)244-5632

NAME OF PERSON(S) RESPONSIBLE AT BLASTING SITE: Kavin Garrison 770/527-7048, Mike Stephens 770/356-8751, Mitch Stephens 770/361-8258

WILL EXPLOSIVES BE STORED IN GWINNETT COUNTY? X YES ___ No
STORAGE LOCATION(S): 305 Equipment Court, Lawrenceville

APPROVED BY: Timothy R. Eckenwiler
Fire Marshal Timothy R. Eckenwiler

DATE: January 13, 2002

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Attachment D

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STATE OF GEORGIA

OFFICE OF

GEORGIA SAFETY FIRE COMMISSIONER

No 14982

067-X-090

JOHN W. OXENDINE
COMMISSIONER OF INSURANCE
SAFETY FIRE COMMISSIONER

620 West Tower, 2 Martin Luther King, Jr. Drive
Atlanta, Georgia 30334

EXPLOSIVE LICENSE

John D Stephens, Inc.

305 Equipment Court
Lawrenceville, GA 30045

permission is granted **Purchase, Store, Use, Transport No More Than 49,000 lbs.** explosives in accordance with the Georgia Safety Fire Law and the Rules and Regulations promulgated pursuant thereto and the conditions of the approved application on file with the State Fire Marshal for the period from date hereof to and including the thirty-first day of December following:

THIS LICENSE IS NOT TRANSFERABLE AND IS REVOCABLE FOR CAUSE

Date Issued **December 13, 2002**

Regulatory Fee $100.00

STORAGE: 5,000 LBS.
305 EQUIPMENT COURT
LAWRENCEVILLE, GEORGIA

EXPIRES DECEMBER 31, 2003
SFD-2

By: John W. Oxendine
JOHN W. OXENDINE
INSURANCE AND SAFETY FIRE COMMISSIONER

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Attachment E

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DEPARTMENT OF THE TREASURY - BUREAU OF ALCOHOL, TOBACCO AND FIREARMS

LICENSE/PERMIT (18 U.S.C. CHAPTER 40, EXPLOSIVES)

In accordance with the provisions of Title XI, Organized Crime Control Act of 1970, and the regulations issued thereunder (27 CFR Part 55), you may engage in the activity specified in this license/permit within the limitations of Chapter 40, Title 18, United States Code and the regulations issued thereunder, until the expiration date shown. See "WARNING" and "NOTICES" on back.

DIRECT ATF CORRESPONDENCE TO

CHIEF, NATIONAL LICENSING CENTER
ATF
2600 CENTURY PARKWAY, SUITE 400
Atlanta, GA 30345

LICENSE/PERMIT NUMBER: 1-GA-135-33-6F-00202

EXPIRATION DATE: June 1, 2006

NAME

JOHN D STEPHENS INC

Premises Address

305 EQUIPMENT COURT
LAWRENCEVILLE, GA 30045-

TYPE OF LICENSE OR PERMIT

33-USER OF HIGH EXPLOSIVES

CHIEF, NATIONAL LICENSING CENTER

PURCHASING CERTIFICATION

I certify that this is a true copy of a license/permit issued to me to engage in the activity specified.

(SIGNATURE OF LICENSEE/PERMITTEE)

LICENSEE OR PERMITTEE MAILING ADDRESS-

JOHN D STEPHENS INC
305 EQUIPMENT COURT
LAWRENCEVILLE, GA 30045-

The licensee/permittee named herein shall use a reproduction of this license/permit to assist a transferor of explosives to verify the identity and status of the licensee/permittee as provided in 27 CFR Part 55. The signature on each reproduction must be an ORIGINAL signature.

ATF F 5400.14/5400.15, Part 1 (8/89)

l ureau of Alcohol, Tobacco, Firearms and Explosives
U.S. Department of Justice

National Licensing Center (NL
2600 Century Parkway NE, Suite 4
Atlanta, Georgia 30345

Customer Service Information

CHANGE OF ADDRESS REQUIRES AMENDED LICENSE / PERMIT

hroughout the year, ATF makes periodic mailings, including Newsletters, open letters, and renewal applications to yo mailing address." However, as many as 5,000 pieces of any one mailing are returned to the NLC as undeliverable; a approximately 70% of these "undeliverables" are due to the failure of licensees and permittees to notify ATF when the ove their premises address and/or change their mailing address.

- **FFLs.** If you intend to relocate your business and/or collection premises to a new location, or you have a new "mailing address," you are required to notify ATF at least 30-days prior to the change by submitting an ATF Form 5300.38, Application for Amended Federal Firearms License. (27 CFR 178.52)
  The form can be downloaded from ATF's website at: http://www.atf.gov/forms/pdfs/f530038.pdf.

- **Explosives licensees and permittees.** If you intend to relocate your business and/or operations to a new location, or you have a new "mailing address," you are required to submit a letter to the Chief, National Licensing Center, at least 10-days prior to the change. (27 CFR 55.54)

ease be advised that you may be subject to denial and/or revocation proceedings if you do not timely notify at you moved or have a change of mailing address.

CUSTOMER SERVICE HOURS

Available Monday - Friday, 8:00 am to 4:30 pm EST

1-404-417-2750 fax: **1-404-417-2751**

SEND AN E-MAIL OR VISIT US ON THE WEB!

e-mail: **NLC@atla.atf.treas.gov**
web: **www.atf.gov**

FFL eZ Check

http://199.196.145.75/FFLeZCheck
(to verify that a Federal Firearms License (FFL) is va

FBI / NICS Customer Service

1-877-444-NICS
a_nics@leo.gov
www.nicsezcheckfbi.gov

Please include your license/permit number on all correspondence with the Bureau.

WARNING

This license/permit does not confer the right or privilege to conduct explosives related activities contrary to State or of any other law. No person may ship, transport, or receive any explosive materials covered by Title XI of the Organized Crime Control Act of 1970 in interstate or foreign commerce who (1) is under indictment for, or has been convicted in any court of, a crime punishable by imprisonment for a term exceeding 1 year, (2) is a fugitive from justice, (3) is an unlawful user of, or addicted to, marijuana or any depressant or stimulant drug, or narcotic drug (as these terms are defined in the Controlled Substances Act; 21 U.S.C. 802), or (4) has been adjudicated as a mental defective or has been committed to a mental institution.

NOTICE

Any changes in name, trade name, address, or control of this business or activity must be PROMPTLY reported to the Chief, National Licensing Center from whom this license/permit was received. Failure to do so may result in administrative action against the licensee/permittee for failure to comply with applicable regulations.

Any person who fails to make application for renewal of this license/permit prior to the expiration date shown on the front is prohibited from engaging in the activity authorized at the time of issuance. If a renewal application is not received 30 days before the expiration date, the licensee/permittee should contact the Chief, National Licensing Center. Note, however, that the User-Limited permits are not renewable.

Explosive materials must be stored in conformance with requirements set forth in 27 CFR, Part 55. It is unlawful for any person to store any explosive materials in a manner not in conformity with these regulations.

This license/permit is conditional upon your compliance with the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. § 1341 (a).

TO REPORT LOST OR STOLEN EXPLOSIVES, YOU MUST IMMEDIATELY NOTIFY ATF:
CALL TOLL FREE - (800) 800-3855

LICENSE MUST BE POSTED AND KEPT AVAILABLE FOR INSPECTION (27 CFR 55.101)

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Attachment F

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June 16, 2003

Angela Williams
Office of Insurance and Safety Fire Commissioner
Hazardous Materials
Safety Fire Division
Seventh Floor, West Tower
Floyd Building
2 Martin Luther King Jr. Drive
Atlanta, GA 30334

Dear Angela:

Please find enclosed two pictures and the paperwork for Kavin Garrison for competency certification.

Very truly yours,

Glenda Mills

Glenda

ISEE CERTIFICATE PROGRAM LEVEL I

April 1, 2003

Kevin L. Garrison
John D Stephens
305 Equipment Court
Lawrenceville, GA 30045
USA

Dear Kevin:

Congratulations! You have successfully completed all eight lessons, Practical Blasting Fundamentals, Level I of the ISEE Certificate Program. We appreciate your participation in the program and trust you found it valuable.

The Certificate Program was developed in response to needs identified by professionals in the industry and was designed to coordinate with the ISEE Blasters Handbook. Levels Two and Three will complete the Certificate Program and are being developed now.

As an additional benefit, the ISEE Certificate Program administrator will permanently maintain your program file so that, throughout your career, you can rely on the availability of documentation of your level of achievement. Your actual test results, however, are confidential and will not be released without your written permission.

If you are not already a member of the ISEE, we encourage you to join the more than 4,000 blasters worldwide who are part of this dynamic organization. Just complete the membership form enclosed in your workbook to be a part of an association which is using all its resources to raise the level of professionalism within the explosives industry.

Again, congratulations! Enclosed please find your certificate demonstrating successful completion of the first level of the ISEE Certificate Program. We welcome your suggestions and look forward to your continued participation.

Sincerely,

Jeffrey L. Dean
Executive Director

PRACTICAL BLASTING FUNDAMENTALS™

LEVEL 1

INTERNATIONAL SOCIETY OF EXPLOSIVES ENGINEERS

Be it known that

Kevin L. Garrison

has completed Level One of Practical Blasting Fundamentals of the ISEE Certificate Program and has been awarded this certificate of attendance for

- Blasting Safety
- Geological Effects on Blasting
- Field Controls and Drilling Accuracy
- Explosives Products and Selection
- Detonators and Initiation Systems
- Blast Design
- Ground Vibrations and Airwaves
- Explosives Regulations and Compliance

by the Board of Directors of
the International Society of
Explosives Engineers

INTERNATIONAL SOCIETY OF EXPLOSIVES ENGINEERS ISEE

Executive Director

APRIL 7, 2003

Date

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Attachment G

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Client#: 385083 11JOHNSTE

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 12/31/03

PRODUCER
BB&T-Huffines Russell
P.O. Box 2190
Alpharetta, GA 30023
770 664-6818

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED
John D. Stephens, Inc.
305 Equipment Court
Lawrenceville, GA 30045

INSURERS AFFORDING COVERAGE	NAIC #
INSURER A: Twin City Fire Insurance	
INSURER B: Hartford Fire Insurance	
INSURER C: North River Insurance Co.	
INSURER D: Fireman's Fund Insurance Company	
INSURER E:	

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A		GENERAL LIABILITY X COMMERCIAL GENERAL LIABILITY CLAIMS MADE X OCCUR X XCU Included GEN'L AGGREGATE LIMIT APPLIES PER: POLICY PRO-JECT LOC	20CQT1051	01/01/04	01/01/05	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$1,000,000 $300,000 $10,000 $1,000,000 $2,000,000 $2,000,000
B		AUTOMOBILE LIABILITY X ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS X HIRED AUTOS X NON-OWNED AUTOS	20UENQT1052	01/01/04	01/01/05	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$1,000,000 $ $ $
		GARAGE LIABILITY ANY AUTO				AUTO ONLY - EA ACCIDENT OTHER THAN AUTO ONLY: EA ACC AGG	$ $ $
C		EXCESS/UMBRELLA LIABILITY X OCCUR CLAIMS MADE DEDUCTIBLE RETENTION $	5530853637	01/01/04	01/01/05	EACH OCCURRENCE AGGREGATE	$15,000,000 $15,000,000 $ $ $
A		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below	20WEQT1050	01/01/04	01/01/05	X WC STATU-TORY LIMITS OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $500,000 $500,000 $500,000
D		OTHER Equipment	MXI97505115	12/31/03	12/31/04	Leased/Rented $450,000 All Risk	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS
Job: State at Large - All Operations

CERTIFICATE HOLDER

Gwinnett County Public Utilities
75 Langley Drive
Lawrenceville, GA 30245-6900

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE
John M. Bo

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Attachment H

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Saddle Dam

DRILLING & EXPLOSIVE DATA

Type: Trench [✓] Mass [ ] Other [ ]

Hole Pattern: Square

No of Holes: 100 Hole Diameter: 3 inch Ave. Depth 18'

Burden: 4 Spacing: 4 Soil Overburden: 5-7

No. of Decks 1-5 Maximum Explosive Weight per Delay: 8.25 Maximum Explosive Weight per Hole: 19.25

Delay Time, MS: 25 Total Duration, MS: 2500 min

(Rock hardness, Groundwater, etc.)
Rock in layers, Soil between layers of Rock

Explosive - Type, Manufacturer & Brand Name: Magnum Ultra, ORICA, 2"x16
Diameter, Length, Density (g/cc): 1.22 g/cc

Booster - Type, Manufacturer & Brand Name: None
Weight:

Delay System - Type, Manufacturer & Brand Name: handidets ORICA, 25ms surface
500 ms Down hole

Initiation System - Type, Manufacturer & Brand Name:

Distance from Closest Bore Hole to Edge of Closest Pipeline: Homes 400

Scaled Distance = $\frac{\text{Distance}}{\sqrt{\text{Weight}}}$ = 1000 ÷ 2.87 = SD @ Saddle Dam 348.43

Closest Inhabitable Structure: Saddle Dam Distance: 1000 Scaled Distance: 348.43

Powder Factor = $\frac{\text{Weight for one line of holes}}{\text{Volume for one line of holes}}$ = $\frac{\text{Weight for one line of holes}}{\text{Burden x Trench Width x Break Depth}}$

= _____ = _____ lbs/yd3

12/29/2000

FORM 3005
ISSUE NO. 1

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Attachment I

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Homes

DRILLING & EXPLOSIVE DATA

Type: Trench [✓] Mass [ ] Other [ ]

Hole Pattern: Square

No of Holes: 100 Hole Diameter: 3 inch Ave. Depth 18

Burden: 4 Spacing: 4 Soil Overburden: 5 - 7

No. of Decks 1 & 5 Maximum Explosive Weight per Delay: 8.25 Maximum Explosive Weight per Hole: 19.25

Delay Time, MS: 25 Total Duration, MS: 2500 min

(Rock hardness, Groundwater, etc.)
Rock in layers, Soil between Layers

Explosive - Type, Manufacturer & Brand Name: Magnum Ultra, QRICA 2¼x16
Diameter, Length, Density (g/cc): 1.22 g/cc

Booster - Type, Manufacturer & Brand Name: None
Weight:

Delay System - Type, Manufacturer & Brand Name: handidets, QRICA, 25ms surface 500 Downhole

Initiation System - Type, Manufacturer & Brand Name:

Distance from Closest Bore Hole to Edge of Closest Pipeline: Homes 400

Scaled Distance = $\frac{\text{Distance}}{\sqrt{\text{Weight}}}$ = 400 ft ÷ 2.87 = 139.37

Closest Inhabitable Structure: Distance: 400' Scaled Distance: 139.37

Powder Factor = $\frac{\text{Weight for one line of holes}}{\text{Volume for one line of holes}}$ = $\frac{\text{Weight for one line of holes}}{\text{Burden x Trench Width x Break Depth}}$

= = lbs/yd3

12/29/2000

FORM 3005
ISSUE NO. 1

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Attachment J

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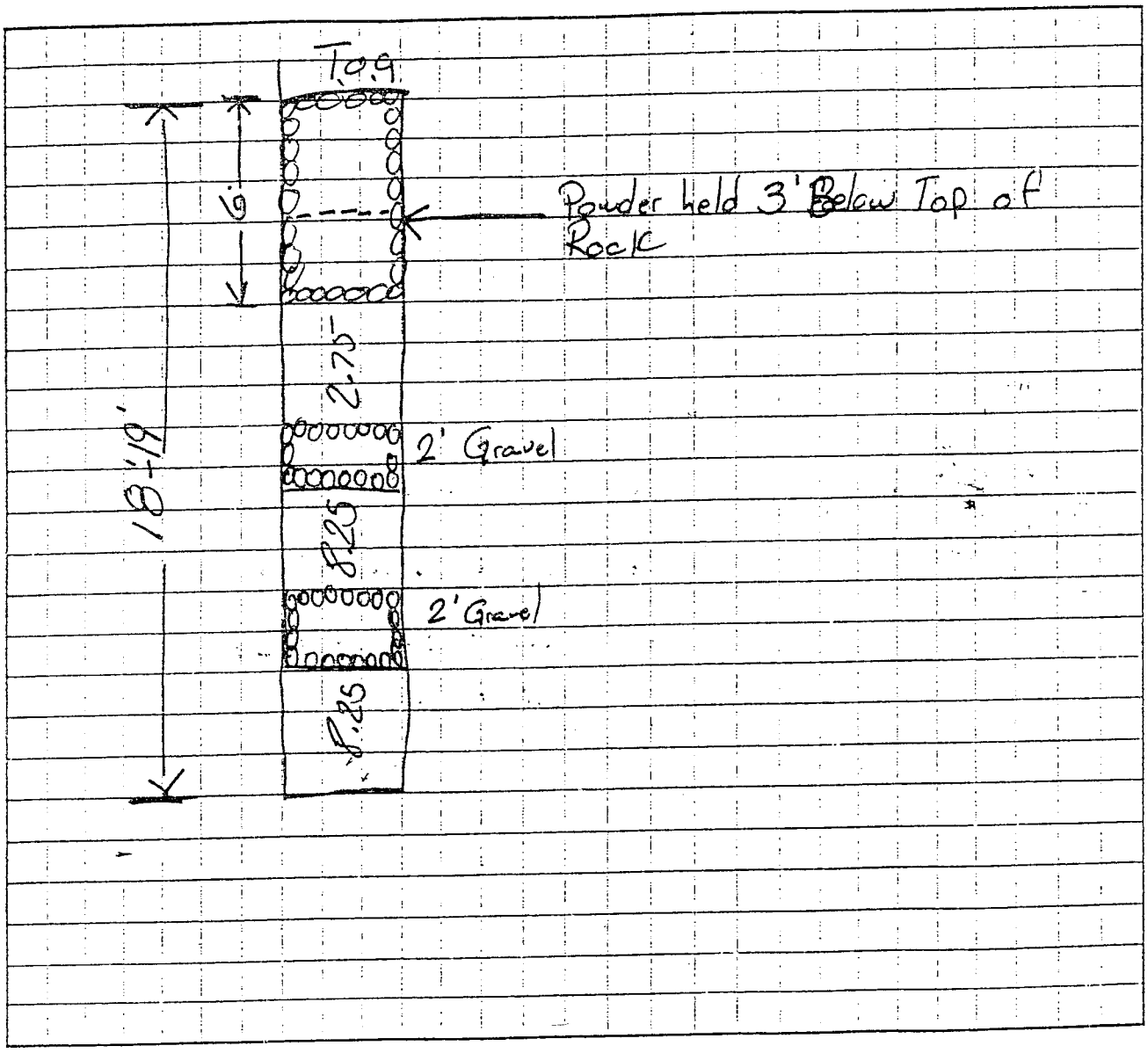
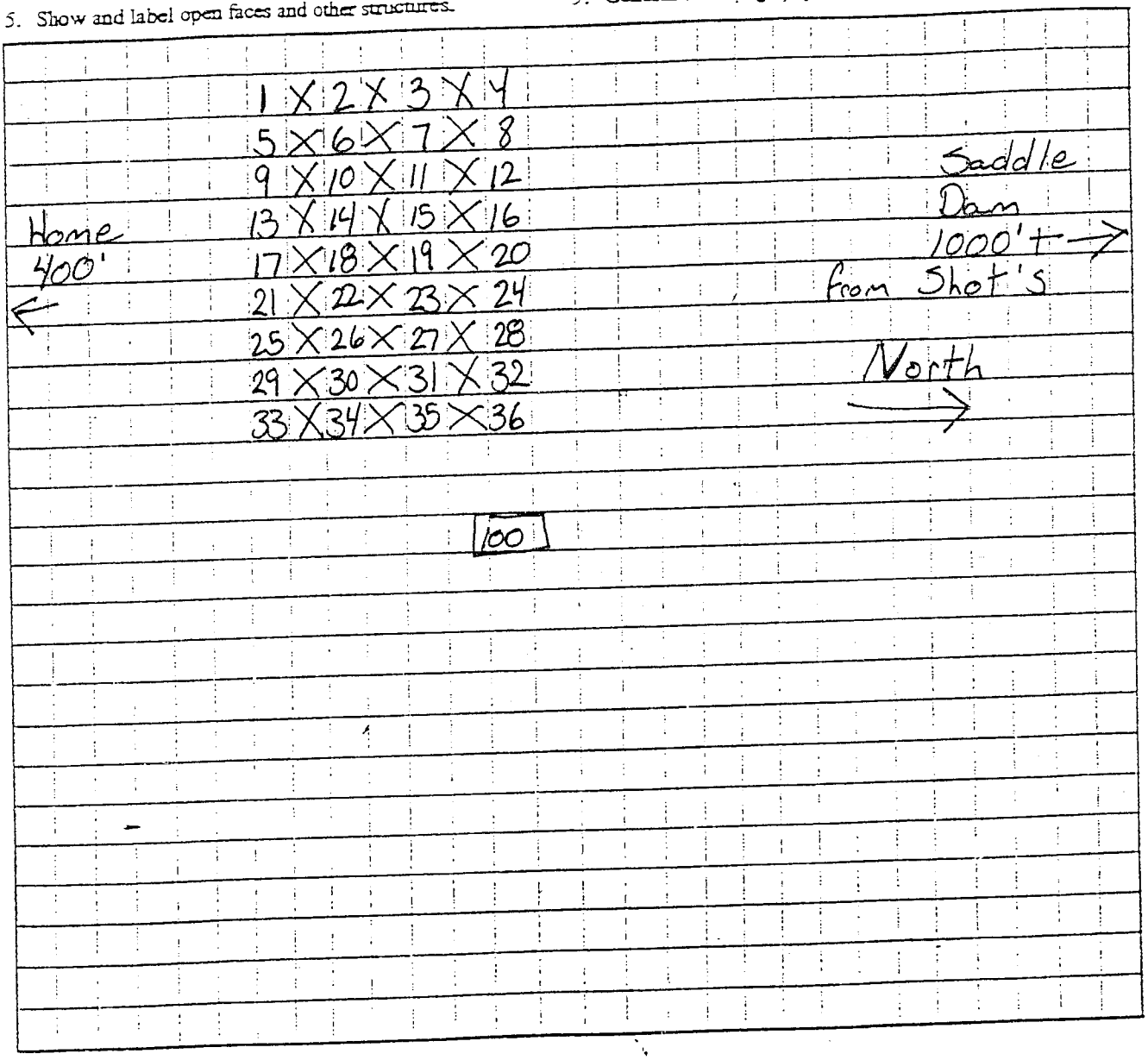
PROFILE SKETCH OF BORE HOLE

1. Show top of ground and bore hole.
2. Indicate total depth of borehole.
3. Indicate sub drill depth.
4. Indicate stemming depth.
5. Indicate depth of soil overburden and top of rock.
6. Indicate height of explosive column.
7. Indicate any decking and between deck stemming.
8. Indicate ground water level.
9. Show pipeline(s) and indicate depth of cover.



PLAN SKETCH OF DRILL PATTERN RELATIVE TO THE PIPELINE(S) Homes

1. Specify NORTH direction.
2. Show and label pipeline and borehole pattern.
3. Indicate the order of hole or deck detonations with numbers.
4. Indicate spacing & burden.
5. Show and label open faces and other structures.
6. Indicate distances from blast holes to pipeline(s) and open faces.
7. Indicate line or grid pattern angle to that of the pipeline(s).
8. Indicate direction and distance to nearest occupied structure.
9. General site topography and conditions



Appendix E

Bottom Core Samples Taken

along

Proposed Pipeline Route in Lake Lanier

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MACTEC

March 18, 2003

Ms. Stacey Fredenberg
Parsons Engineering Science, Inc.
5390 Triangle Parkway, Suite 100
Norcross, Georgia 30092

Subject: **Report of Subsurface Exploration**
72-inch Reuse Pipeline and Diffuser Project
Lake Lanier - Gwinnett County, Georgia
MACTEC Project No. 6137-03-0055

Dear Ms. Fredenberg:

MACTEC Engineering and Consulting, Inc. (MACTEC) has completed a subsurface exploration for the 72-inch Reuse Pipeline and Diffuser Project at Lake Lanier in Gwinnett County, Georgia. The objective of this study was to explore the subsurface conditions within the area of proposed construction at eight pre-determined boring locations provided by Parsons. This report discusses our understanding of the project, describes our exploratory procedures, and presents our results of testing conducted.

Project Information

We received the original project information during telephone conversations between Parsons Engineering Science, Inc. (Parsons) and MACTEC personnel on January 25, 2001. Additional project information was provided by Parsons in a revised RFP dated January 25, 2003. Information provided included anticipated number of borings, northings and eastings of each boring location (including controls for a benchmark located at Saddle Dike #3), and anticipated boring depths.

We understand that a 72-inch pipeline is planned for construction across a portion of Lake Lanier in Gwinnett County, Georgia. At this time, it is our understanding that the pipeline will be constructed on or near the lake bed. The purpose of our investigation is to determine the consistency of subsurface materials.

MACTEC Engineering and Consulting, Inc.
396 Plasters Avenue, NE
Atlanta, GA 30324
404-873-4761 • Fax: 404-817-0175

Geotechnical Exploration

Eight over-water soil test borings were advanced to termination elevations ranging from 1008.5 to 1040.5 feet above mean sea level (see Table 1). MACTEC set steel casing to aid the drilling process at each boring location. During drilling, standard penetration resistance testing (SPT) and split-spoon sampling was performed at 5-foot intervals in each of the borings. No rock was encountered in the borings. Each boring was grouted to the surface of the lake bottom upon completion of the boring. Drilling operations were supervised at all times by a MACTEC geotechnical engineer. Drilling and sampling was conducted in general accordance with applicable ASTM standards. A Boring Location Plan and Soil Test Boring Records are attached.

The borings were located within a 3-foot radius of the planned boring locations using a global positioning system. A MACTEC survey crew marked the locations using buoys approved by the U.S. Army Corps of Engineers. MACTEC utilized a barge setup consisting of a main barge and 3 sectional barges (pinned) to stage our CME-75 truck-mounted drill rig, drilling equipment, and drill crew at each boring location. The barge was stabilized over each location using winches connected to 5,000 lb anchors at each corner of the barge. For each boring, the respective buoy was removed prior to positioning the barge over the location, then the barge was positioned and anchors tightened, and finally the global positioning system was used to fine-tune the drill location to within the 3-foot tolerance. Pictures showing the boring operation are attached.

We appreciate the opportunity of working with you on this project and look forward to our continued association. Please contact us if you have any questions, or if we may be of further service.

Sincerely,

MACTEC ENGINEERING AND CONSULTING, INC

Jason A. Suber

Jason A. Suber, E.I.T.
Project Engineer

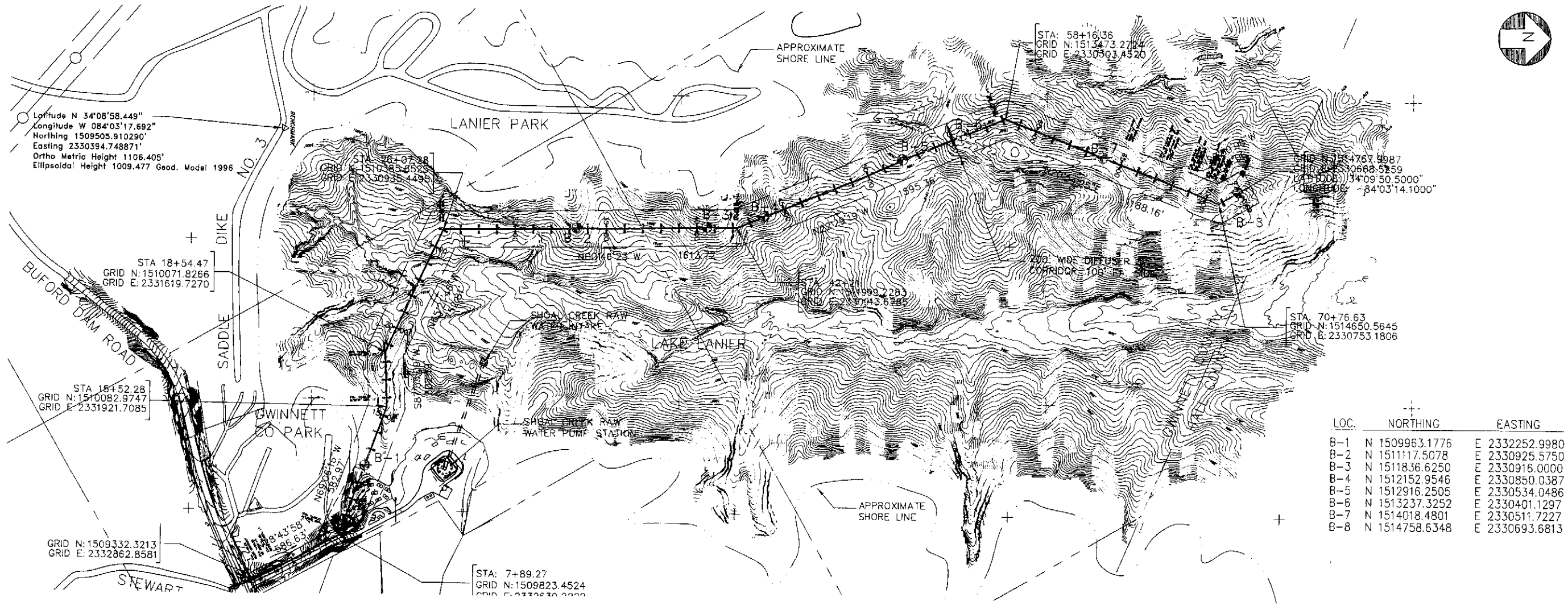
Geoffrey C. Hebner, P.E.
Principal Engineer

Attachments: Boring Location Plan
Table 1 – Boring Elevation Data
Key to Symbols and Descriptions
Soil Test Boring Records (8)
Site Photos of Fieldwork (5)

MACTEC

APPENDIX

groups/atlcad/2003 JOBS/3-0055/30055-BLP.dwg

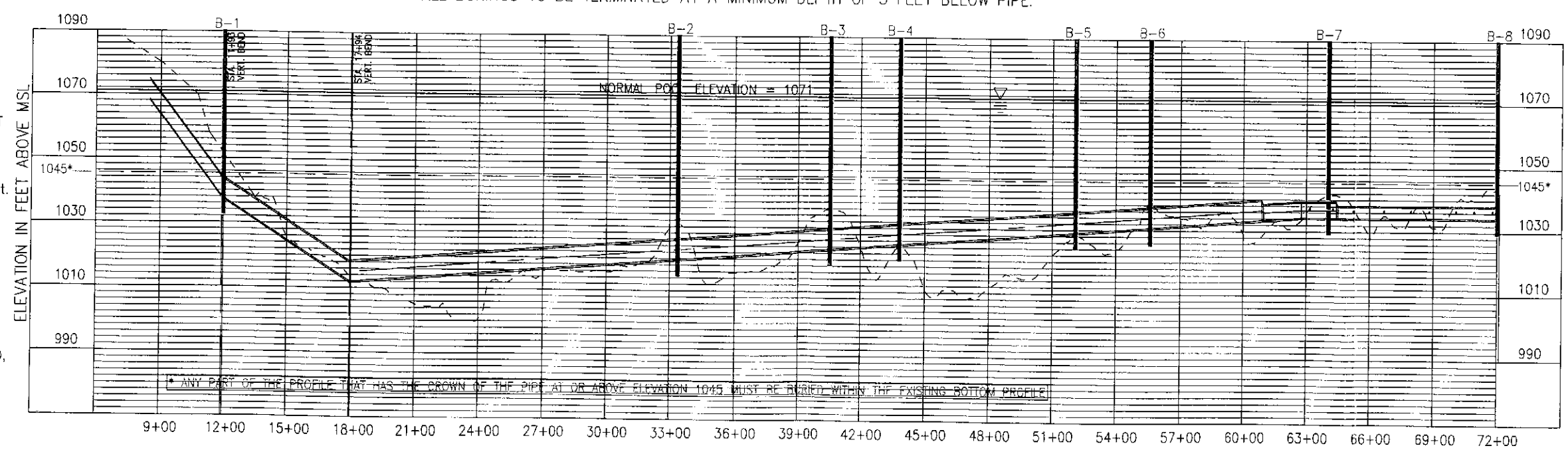


LOC.	NORTHING	EASTING
B-1	N 1509963.1776	E 2332252.9980
B-2	N 1511117.5078	E 2330925.5750
B-3	N 1511836.6250	E 2330916.0000
B-4	N 1512152.9546	E 2330850.0387
B-5	N 1512916.2505	E 2330534.0486
B-6	N 1513237.3252	E 2330401.1297
B-7	N 1514018.4801	E 2330511.7227
B-8	N 1514758.6348	E 2330693.6813

** ALL BORINGS TO BE TERMINATED AT A MINIMUM DEPTH OF 5 FEET BELOW PIPE.

GEODETIC DATUM: NAD83
ELLIPSOID: WGS84
GRID UNITS: U.S. SURVEY FEET
PROJECTION: LAMBERT
ZONE: GEORGIA WEST (1002)
CENTRAL MERIDIAN: 84°10' W
FALSE EASTING: 2,296,583.33 ft. at C.M.
FALSE NORTHING: 0.00 ft. AT 30°00' N

BATHYMETRIC SURVEY BY C&C TECHNOLOGIES, INC. CONDUCTED, SEPTEMBER 12-14, 2001



SOURCE: FIGURE CREATED USING SCANNED IMAGE OF DRAWING PROVIDED BY PARSON'S INC.

BORING LOCATION PLAN

72 in REUSE PIPELINE AND DIFUSER PROJECT
LAKE LANIER
GWINNETT COUNTY, GEORGIA

Job Number	Task	Date	Scale	Drawn	Approv.	Figure
6137-03-0055	01	MAR. 2003	1"=600'	RBT		1

MACTEC Engineering and Consulting
396 PLASTERS AVENUE NE.
ATLANTA, GEORGIA 30324
(404)873-4761

Table 1 - Boring Elevation Data

Boring #	Water Surface Elevation (ft)	Lake Bottom Elevation (ft)	Boring Termination Elevation (ft)	Boring Depth (ft)
1	1071	1061.5	1040.5	21
2	1071	1030	1008.5	21.5
3	1071	1035.5	1013.5	22
4	1071	1024.5	1013	11.5
5	1071	1028.5	1015.5	13
6	1071	1038.5	1020.5	18
7	1071	1041	1024.5	16.5
8	1071	1042	1026.5	15.5

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravels, gravel - sand mixtures, little or no fines.
			GP	Poorly graded gravels or grave - sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel - sand - silt mixtures.
			GC	Clayey gravels, gravel - sand - clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 Sieve Size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand - silt mixtures
			SC	Clayey sands, sand - clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts and with slight plasticity.
			CL	Inorganic lays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils.

	Undisturbed Sample		Auger Cuttings
	Split Spoon Sample		Bulk Sample
	Rock Core		Crandall Sampler
	Dilatometer		Pressure Meter
	Packer		No Recovery
	Water Table at time of drilling		Water Table after 24 hours

Correlation of Penetration Resistance with Relative Density and Consistency

SAND & GRAVEL		SILT & CLAY	
No. of Blows	Relative Density	No. of Blows	Consistency
0 - 4	Very Loose	0 - 2	Very Soft
5 - 10	Loose	3 - 4	Soft
11 - 30	Medium Dense	5 - 8	Firm
31 - 50	Dense	9 - 15	Stiff
Over 50	Very Dense	16 - 30	Very Stiff
		31 - 50	Hard
		Over 50	Very Hard

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

SILT OR CLAY	SAND			GRAVEL		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

No.200 No.40 No.10 No.4 3/4" 3" 12"

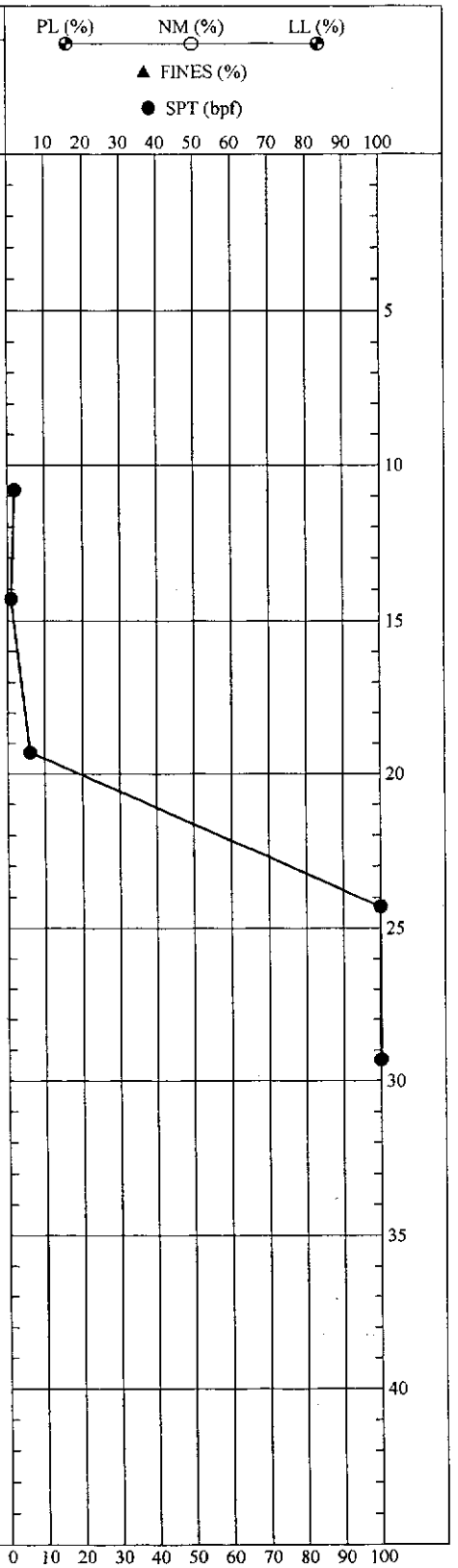
U.S. STANDARD SIEVE SIZE

Reference: The Unified Soil Classification System, Corps of Engineers, U.S. Army Technical Memorandum No. 3-357, Vol. 1, March, 1953 (Revised April, 1960)

KEY TO SYMBOLS AND DESCRIPTIONS

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	Water surface to lake bottom is approximately 9½ feet		1071			
5			1066			
10	Loose to very loose brown gray silty fine to coarse SAND		1061	SPT	X	5-1-1 (N = 2)
15			1056	SPT	X	0-0-1 (N = 1)
20	GRAVEL and WOOD (tree/stump/root) Loose to very loose brown gray silty fine to coarse SAND		1051	SPT	X	6-1-5 (N = 6)
25	**PARTIALLY WEATHERED ROCK** - Sampled as very dense gray brown silty fine to coarse SAND		1046	SPT	X	21-19-50/4"
30	Boring terminated at 30½ feet		1041	SPT	X	50/5"
35			1036			
40			1031			
45			1026			



SOIL TEST BORING PIPELINE.GPJ LAW_GIBB.GDT 3/18/03

DRILLER: Scott Towe (MACTEC)
EQUIPMENT: CME-75 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 3 inches
REMARKS: Boring grouted upon completion

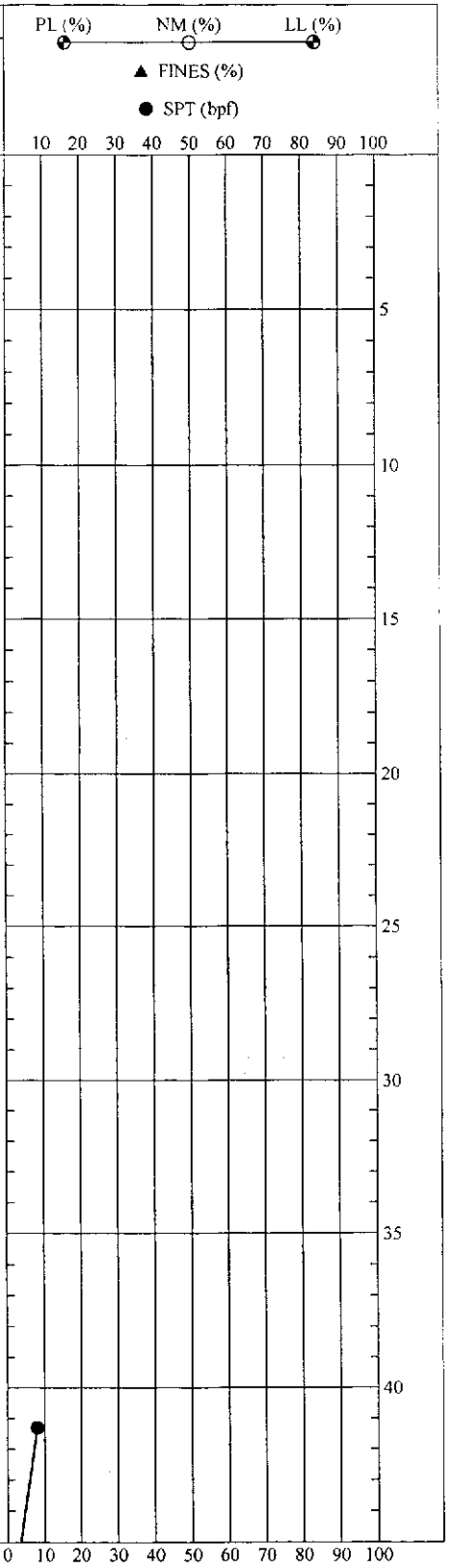
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-1
PROJECT: 72-inch Reuse Pipeline & Diffuser Project
LOCATION: Lake Lanier, Gwinnett County, Georgia
DRILLED: February 20, 2003
PROJECT NO: 6137-03-0055

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
0	Water surface to lake bottom is approximately 41 feet		1071				
5			1066				
10			1061				
15			1056				
20			1051				
25			1046				
30			1041				
35			1036				
40			1031				
	Firm red brown silty CLAY			SPT		0-4-4 (N = 8)	
	Very loose light brown micaceous clayey fine SAND						
45			1026				



SOIL TEST BORING PIPELINE.GPJ LAW GIBB.GDT 3/18/03

DRILLER: Scott Towe (MACTEC)
EQUIPMENT: CME-75 (Auto-Hammer)
METHOD: Rotary Wash with Water
HOLE DIA.: 3 inches
REMARKS: Boring grouted upon completion

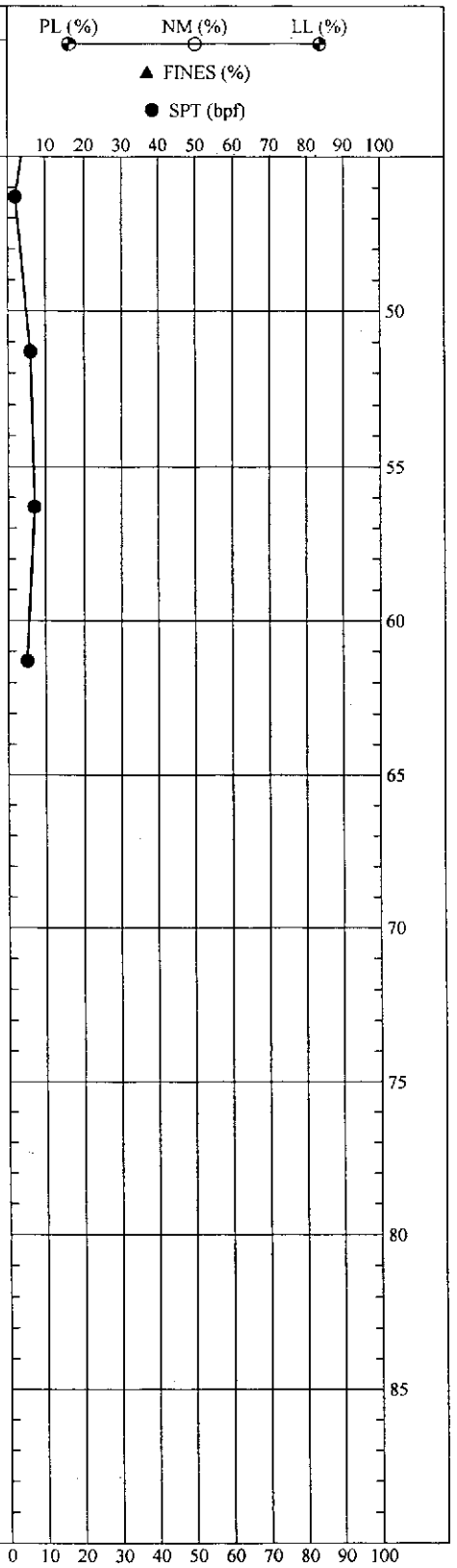
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-2
PROJECT: 72-inch Reuse Pipeline & Diffuser Project
LOCATION: Lake Lanier, Gwinnett County, Georgia
DRILLED: February 24, 2003
PROJECT NO: 6137-03-0055

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
45	Very loose light brown micaceous clayey fine SAND		1026	SPT	X	0-0-2 (N = 2)
50	Firm yellow brown sandy SILT		1021	SPT	X	2-3-3 (N = 6)
55			1016	SPT	X	2-3-4 (N = 7)
60			1011	SPT	X	2-2-3 (N = 5)
	Boring terminated at 62½ feet					
65			1006			
70			1001			
75			996			
80			991			
85			986			
90			981			



SOIL TEST BORING PIPELINE.GPJ LAW_GIBB.GDT 3/18/03

DRILLER:	Scott Towe (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Water
HOLE DIA.:	3 inches
REMARKS:	Boring grouted upon completion

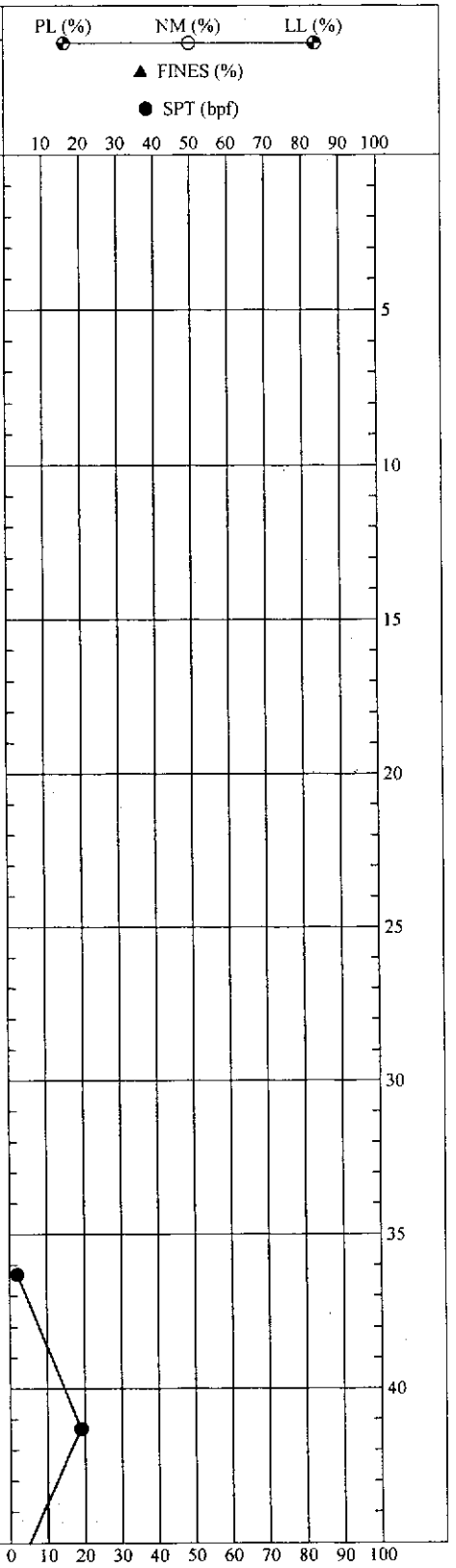
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	B-2
PROJECT:	72-inch Reuse Pipeline & Diffuser Project
LOCATION:	Lake Lanier, Gwinnett County, Georgia
DRILLED:	February 24, 2003
PROJECT NO:	6137-03-0055

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	Water surface to lake bottom is approximately 35 ½		1071			
5			1066			
10			1061			
15			1056			
20			1051			
25			1046			
30			1041			
35	Very soft red brown silty CLAY		1036	SPT		0-0-2 (N = 2)
40	Very stiff red brown silty CLAY		1031	SPT		6-8-11 (N = 19)
45	Very soft red brown micaceous sandy SILT		1026			



SOIL TEST BORING PIPELINE.GPJ LAW GIBB.GDT 3/18/03

DRILLER: Scott Towe (MACTEC)
EQUIPMENT: CME-75 (Auto-Hammer)
METHOD: Rotary Wash with Water
HOLE DIA.: 3 inches
REMARKS: Boring grouted upon completion

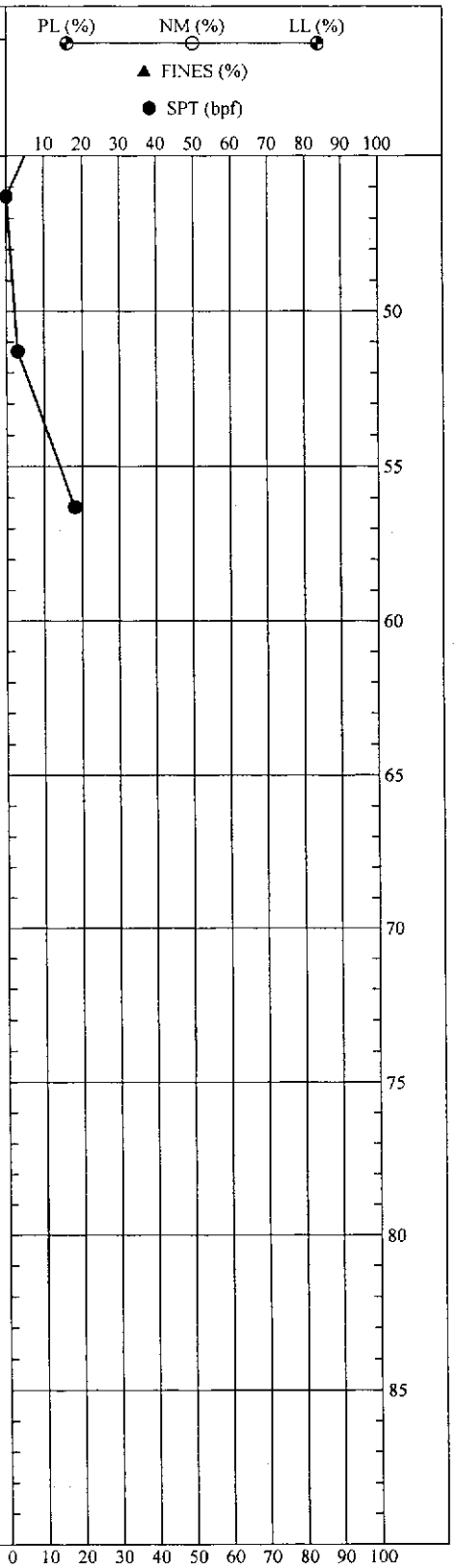
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-3
PROJECT: 72-inch Reuse Pipeline & Diffuser Project
LOCATION: Lake Lanier, Gwinnett County, Georgia
DRILLED: February 24, 2003
PROJECT NO: 6137-03-0055

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
45	Very soft red brown micaceous sandy SILT		1026	SPT	X	0-0-0 (N = 0)	
50	Very loose to medium dense red brown micaceous silty fine SAND		1021	SPT	X	1-1-2 (N = 3)	
55			1016	SPT	X	4-8-10 (N = 18)	
	Boring terminated at 57½ feet						
60			1011				
65			1006				
70			1001				
75			996				
80			991				
85			986				
90			981				



SOIL TEST BORING PIPELINE.GPJ LAW_GIBB.GDT 3/18/03

DRILLER:	Scott Towe (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Water
HOLE DIA.:	3 inches
REMARKS:	Boring grouted upon completion

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	B-3
PROJECT:	72-inch Reuse Pipeline & Diffuser Project
LOCATION:	Lake Lanier, Gwinnett County, Georgia
DRILLED:	February 24, 2003
PROJECT NO:	6137-03-0055

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100
0	Water surface to lake bottom is approximately 46 1/2		1071				
5			1066				
10			1061				
15			1056				
20			1051				
25			1046				
30			1041				
35			1036				
40			1031				
45			1026				

0 10 20 30 40 50 60 70 80 90 100

SOIL TEST BORING PIPELINE.GPJ LAW GIBB.GDT 3/18/03

DRILLER: Scott Towe (MACTEC)
EQUIPMENT: CME-75 (Auto-Hammer)
METHOD: Rotary Wash with Water
HOLE DIA.: 3 inches
REMARKS: Boring grouted upon completion

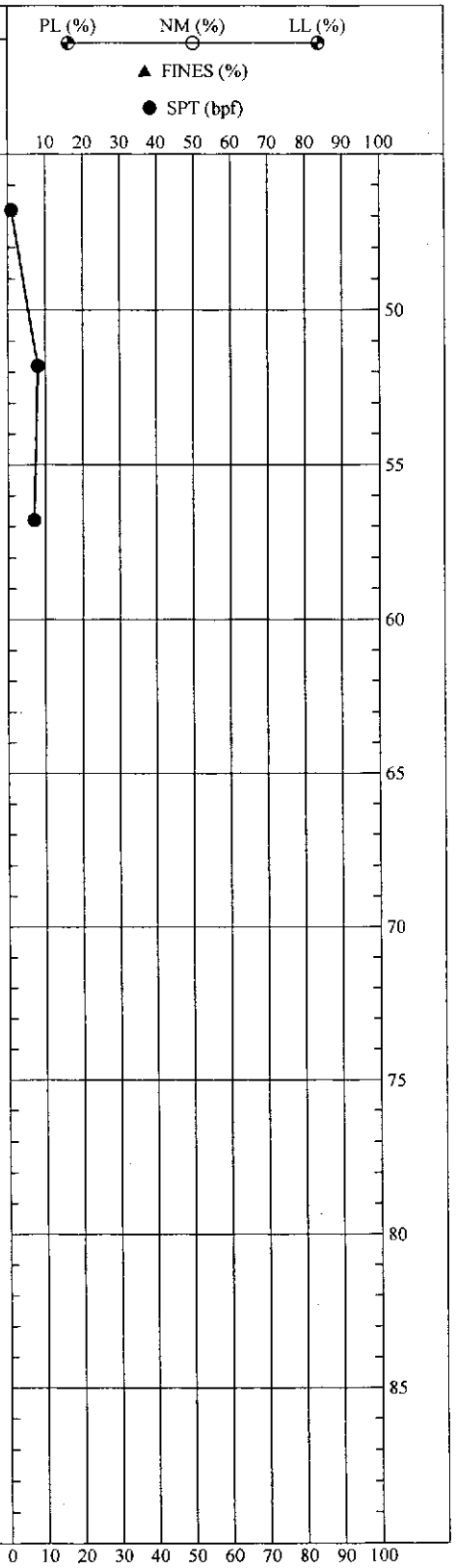
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-4
PROJECT: 72-inch Reuse Pipeline & Diffuser Project
LOCATION: Lake Lanier, Gwinnett County, Georgia
DRILLED: February 21, 2003
PROJECT NO: 6137-03-0055

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
45	Water surface to lake bottom is approximately 46 1/2		1026			
	Very soft red brown silty CLAY			SPT	X	0-0-1 (N = 1)
50	Loose brown micaceous silty fine SAND		1021	SPT	X	1-3-5 (N = 8)
55			1016	SPT	X	2-3-4 (N = 7)
	Boring terminated at 58 feet					
60			1011			
65			1006			
70			1001			
75			996			
80			991			
85			986			
90			981			



SOIL TEST BORING PIPELINE.GPJ LAW_GIBB.GDT 3/18/03

DRILLER:	Scott Towe (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Water
HOLE DIA.:	3 inches
REMARKS:	Boring grouted upon completion

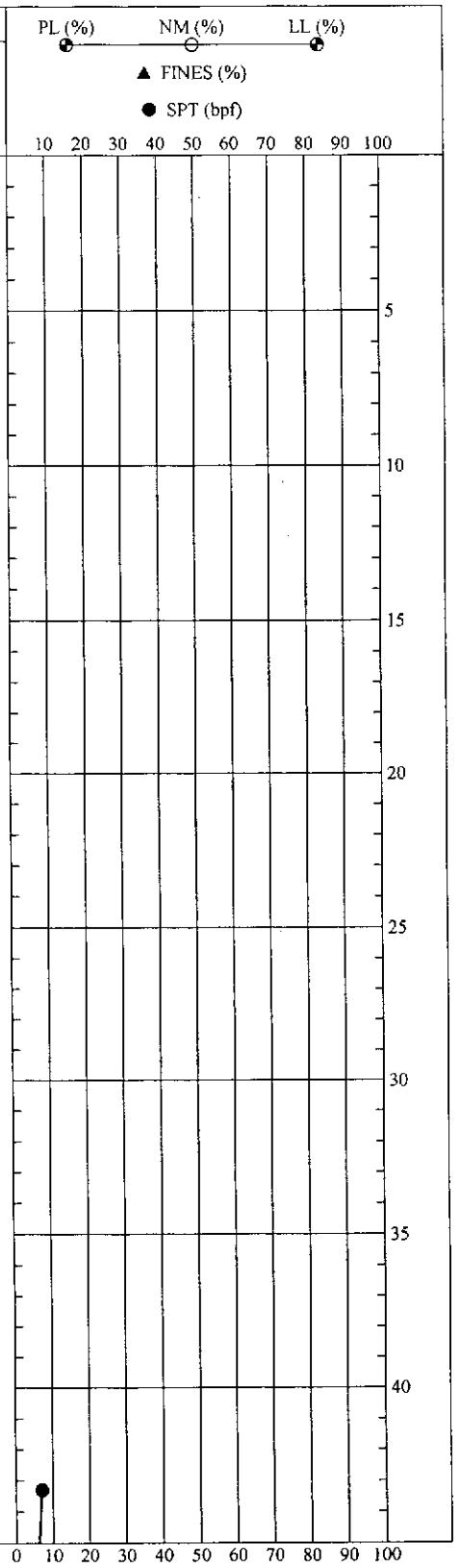
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	B-4
PROJECT:	72-inch Reuse Pipeline & Diffuser Project
LOCATION:	Lake Lanier, Gwinnett County, Georgia
DRILLED:	February 21, 2003
PROJECT NO:	6137-03-0055

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	SAMPLES N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
0	Water surface to lake bottom is approximately 42½		1071				
5			1066				
10			1061				
15			1056				
20			1051				
25			1046				
30			1041				
35			1036				
40			1031				
45	Firm red brown silty CLAY		1026	SPT		0-2-5 (N = 7)	



SOIL TEST BORING PIPELINE.GPJ LAW_GIBB.GDT 3/18/03

DRILLER:	Scott Towe (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Water
HOLE DIA.:	3 inches
REMARKS:	Boring grouted upon completion

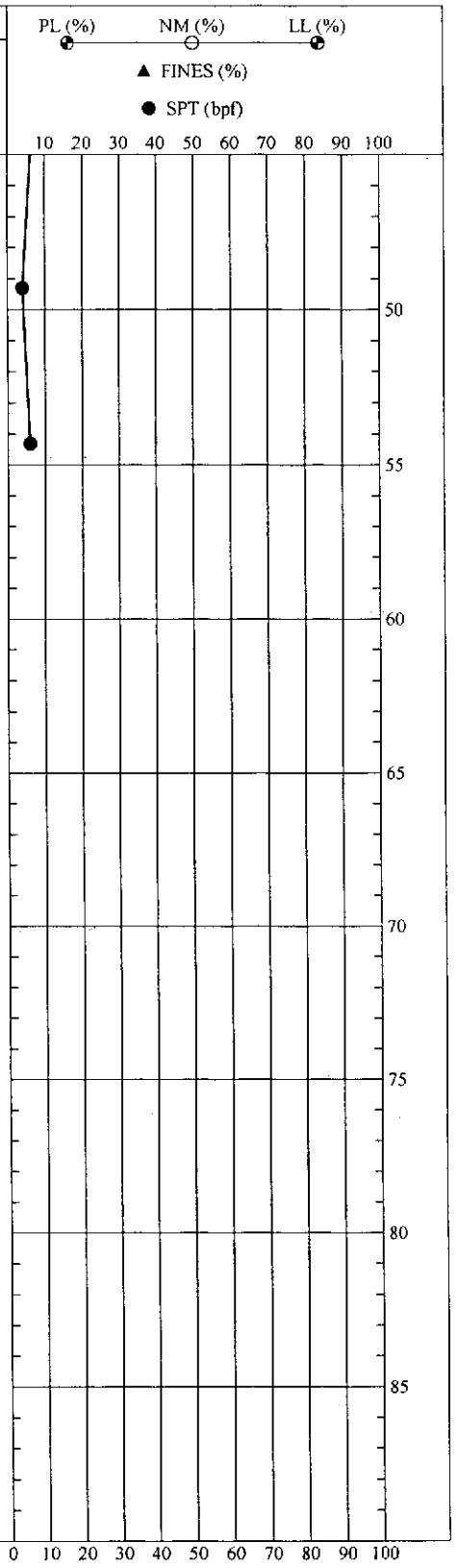
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-5
PROJECT: 72-inch Reuse Pipeline & Diffuser Project
LOCATION: Lake Lanier, Gwinnett County, Georgia
DRILLED: February 20, 2003
PROJECT NO: 6137-03-0055

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
45	Firm red brown silty CLAY		1026			
	Soft red brown micaceous sandy SILT					
50			1021	SPT	X	1-2-2 (N = 4)
	Loose red brown black micaceous silty fine SAND					
55			1016	SPT	X	1-3-3 (N = 6)
	Boring terminated at 55 1/2 feet					
60			1011			
65			1006			
70			1001			
75			996			
80			991			
85			986			
90			981			



SOIL TEST BORING PIPELINE.GPJ LAW GIBB.GDT 3/18/03

DRILLER:	Scott Towe (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Water
HOLE DIA.:	3 inches
REMARKS:	Boring grouted upon completion

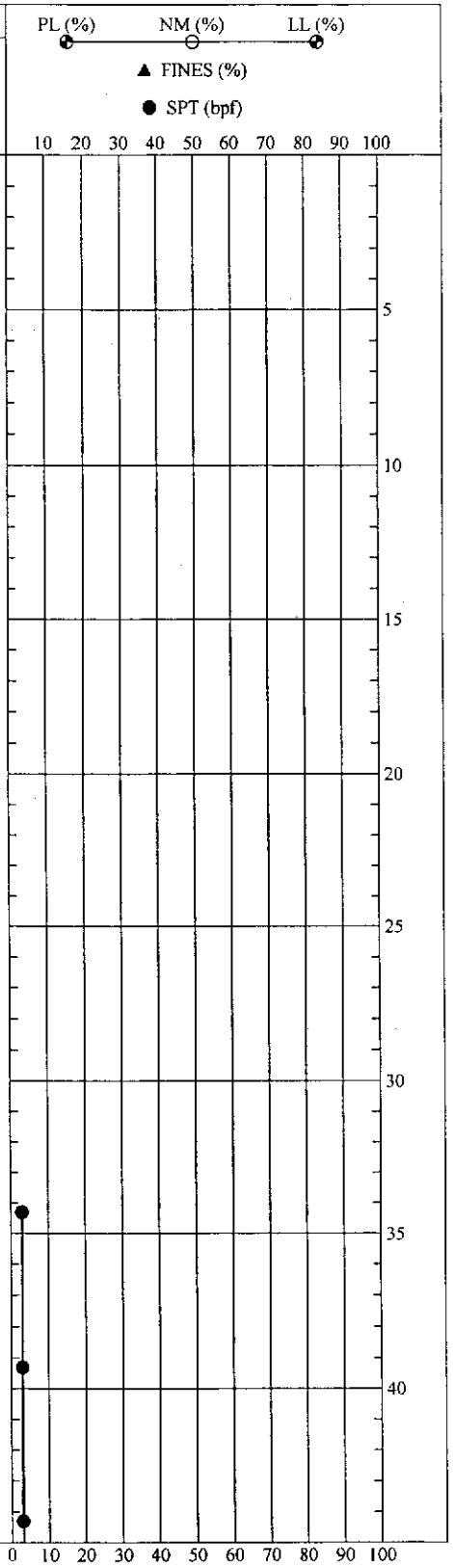
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-5
PROJECT: 72-inch Reuse Pipeline & Diffuser Project
LOCATION: Lake Lanier, Gwinnett County, Georgia
DRILLED: February 20, 2003
PROJECT NO: 6137-03-0055

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
0	Water surface to lake bottom is approximately 32½		1071				
5			1066				
10			1061				
15			1056				
20			1051				
25			1046				
30			1041				
35	Soft red brown micaceous sandy SILT		1036	SPT		0-1-2 (N = 3)	
40	Soft red brown micaceous sandy SILT		1031	SPT		1-1-2 (N = 3)	
45			1026				



SOIL TEST BORING PIPELINE.GPJ LAW_GIBB.GDT 3/18/03

DRILLER:	Scott Towe (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Water
HOLE DIA.:	3 inches
REMARKS:	Boring grouted upon completion

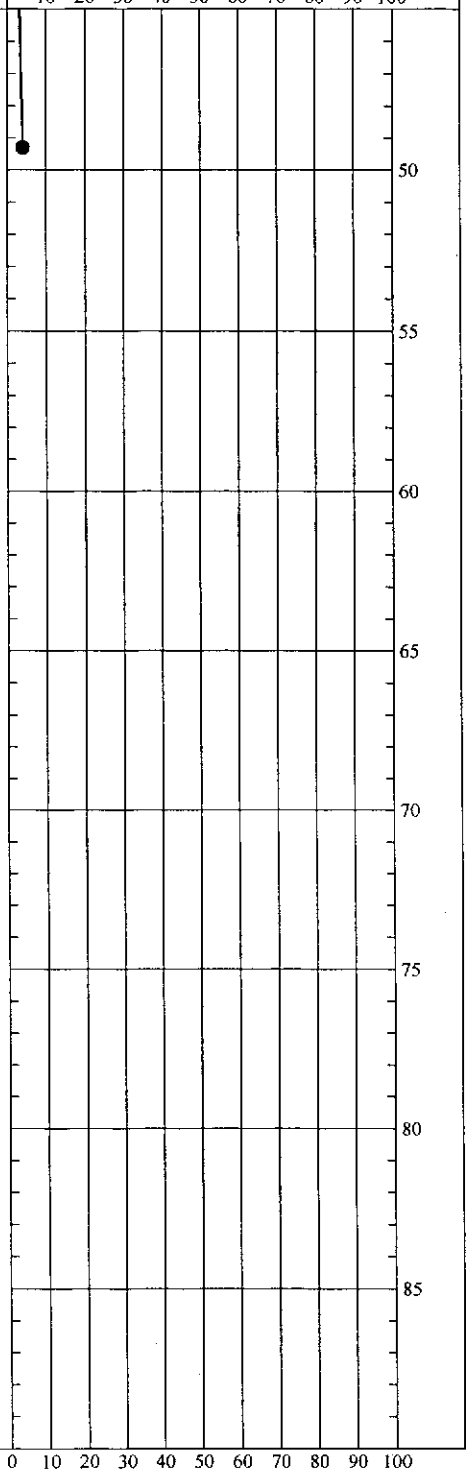
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-6
PROJECT: 72-inch Reuse Pipeline & Diffuser Project
LOCATION: Lake Lanier, Gwinnett County, Georgia
DRILLED: February 20, 2003
PROJECT NO: 6137-03-0055

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
45	Soft red brown micaceous sandy SILT		1026	SPT		1-1-2 (N = 3)	
50	Boring terminated at 50 1/2 feet		1021	SPT		1-2-2 (N = 4)	
55			1016				
60			1011				
65			1006				
70			1001				
75			996				
80			991				
85			986				
90			981				



SOIL TEST BORING PIPELINE.GPJ LAW_GIBB.GDT 3/18/03

DRILLER:	Scott Towe (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Water
HOLE DIA.:	3 inches
REMARKS:	Boring grouted upon completion

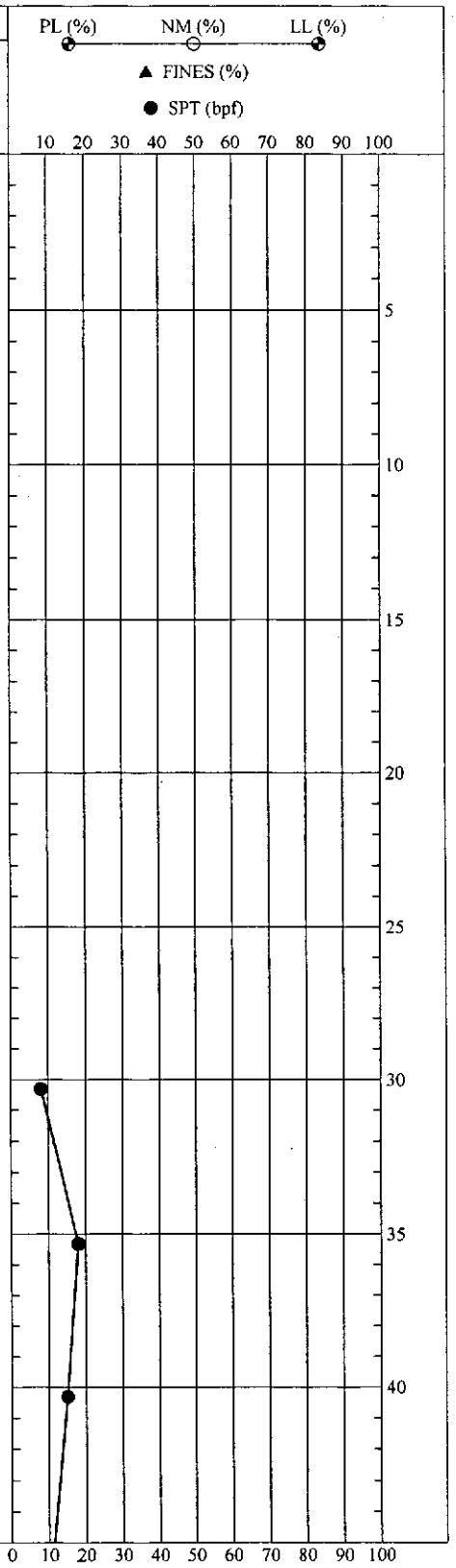
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-6
PROJECT: 72-inch Reuse Pipeline & Diffuser Project
LOCATION: Lake Lanier, Gwinnett County, Georgia
DRILLED: February 20, 2003
PROJECT NO: 6137-03-0055

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	Water surface to lake bottom is approximately 30 feet		1071			
5			1066			
10			1061			
15			1056			
20			1051			
25			1046			
30	Firm red brown micaceous sandy SILT		1041	SPT	X	4-4-4 (N = 8)
	Very stiff red brown micaceous sandy SILT with quartz fragments					
35			1036	SPT	X	23-12-6 (N = 18)
	Medium dense brown micaceous silty fine SAND with quartz fragments					
40			1031	SPT	X	4-6-9 (N = 15)
	Medium dense white brown micaceous silty fine to coarse SAND					
45			1026			



SOIL TEST BORING PIPELINE.GPJ LAW_GIBB.GDT 3/18/03

DRILLER:	Scott Towe (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Water
HOLE DIA.:	3 inches
REMARKS:	Boring grouted upon completion

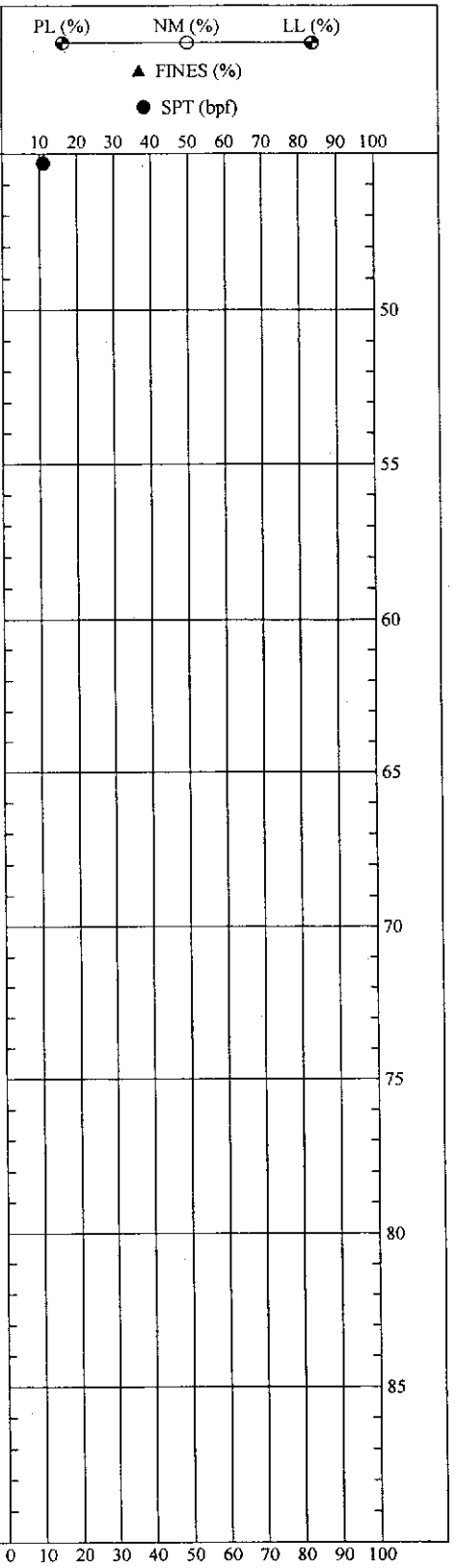
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-7
PROJECT: 72-inch Reuse Pipeline & Diffuser Project
LOCATION: Lake Lanier, Gwinnett County, Georgia
DRILLED: February 25, 2003
PROJECT NO: 6137-03-0055

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
45	Medium dense white brown micaceous silty fine to coarse SAND		1026	SPT	X	2-5-6 (N = 11)	
	Boring terminated at 46 1/2 feet						
50			1021				
55			1016				
60			1011				
65			1006				
70			1001				
75			996				
80			991				
85			986				
90			981				



SOIL TEST BORING PIPELINE.GPJ LAW_GIBB.GDT 3/18/03

DRILLER: Scott Towe (MACTEC)
EQUIPMENT: CME-75 (Auto-Hammer)
METHOD: Rotary Wash with Water
HOLE DIA.: 3 inches
REMARKS: Boring grouted upon completion

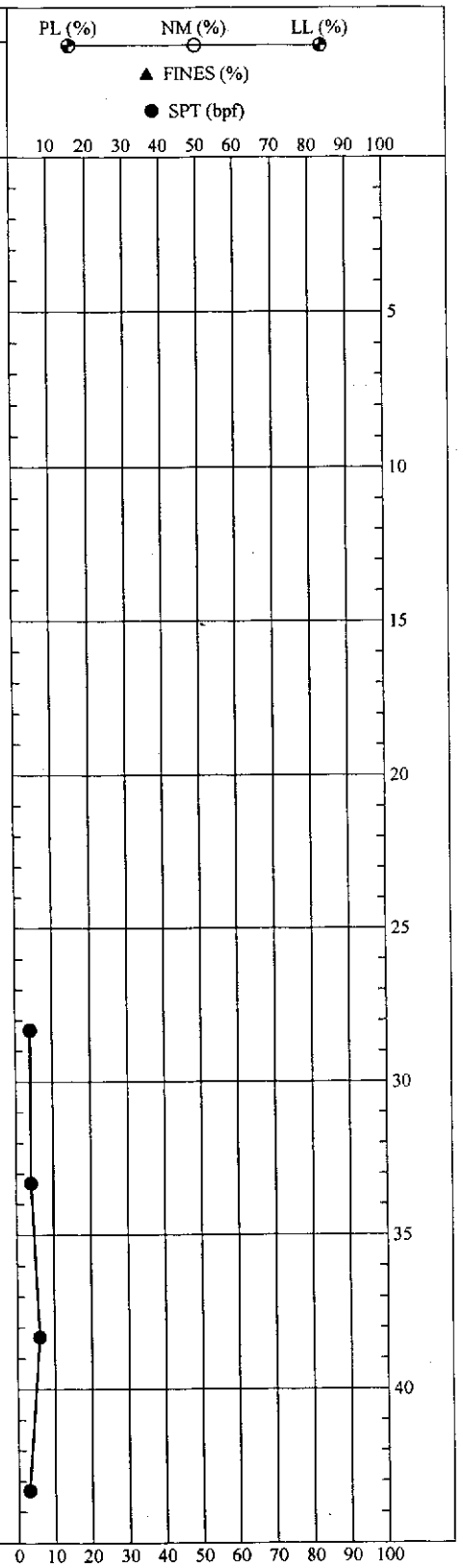
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-7
PROJECT: 72-inch Reuse Pipeline & Diffuser Project
LOCATION: Lake Lanier, Gwinnett County, Georgia
DRILLED: February 25, 2003
PROJECT NO: 6137-03-0055

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	Water surface to lake bottom is approximately 28 feet		1071			
5			1066			
10			1061			
15			1056			
20			1051			
25			1046			
	Soft red brown silty CLAY			SPT	X	1-2-2 (N = 4)
30	Soft red brown micaceous sandy SILT		1041			
				SPT	X	0-2-2 (N = 4)
35	**RESIDUUM**: Loose red brown micaceous silty fine to medium SAND		1036			
				SPT	X	2-3-3 (N = 6)
40	Soft yellow orange sandy SILT		1031			
	Boring terminated at $44^1/_2$ feet			SPT	X	0-1-2 (N = 3)
45			1026			



SOIL TEST BORING PIPELINE.GPJ LAW GIBB.GDT 3/18/03

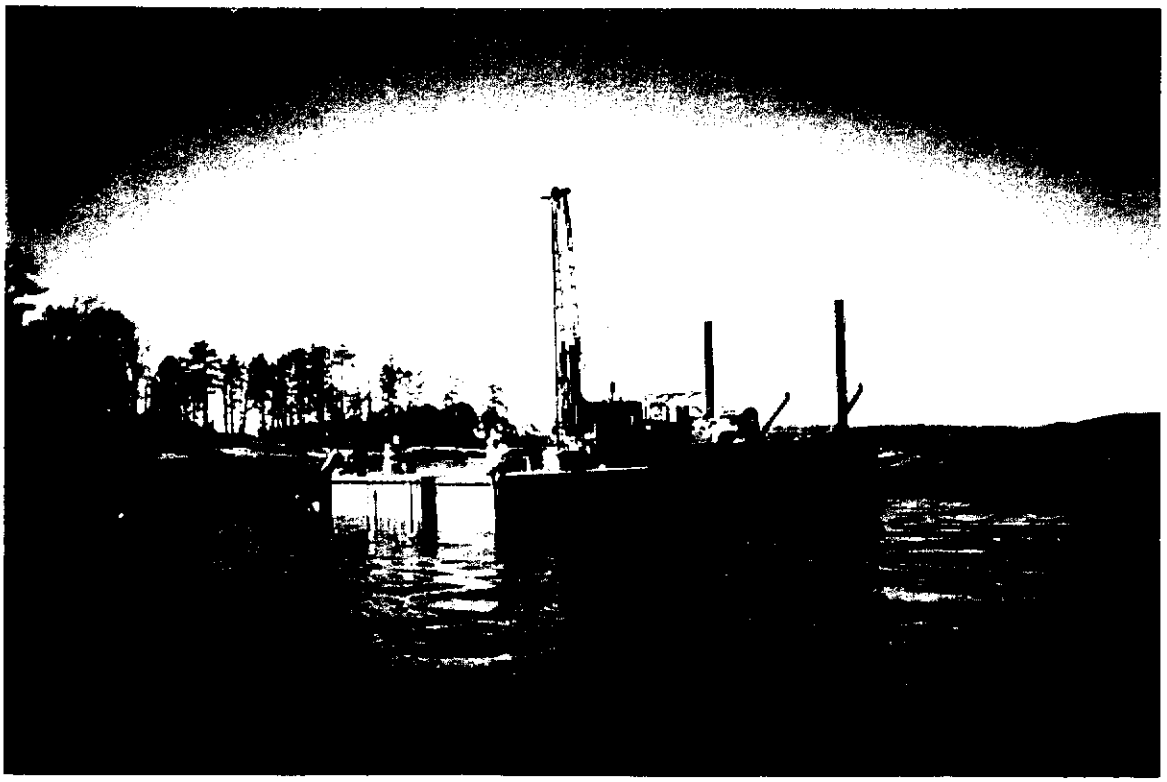
DRILLER:	Scott Towe (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Water
HOLE DIA.:	3 inches
REMARKS:	Boring grouted upon completion

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

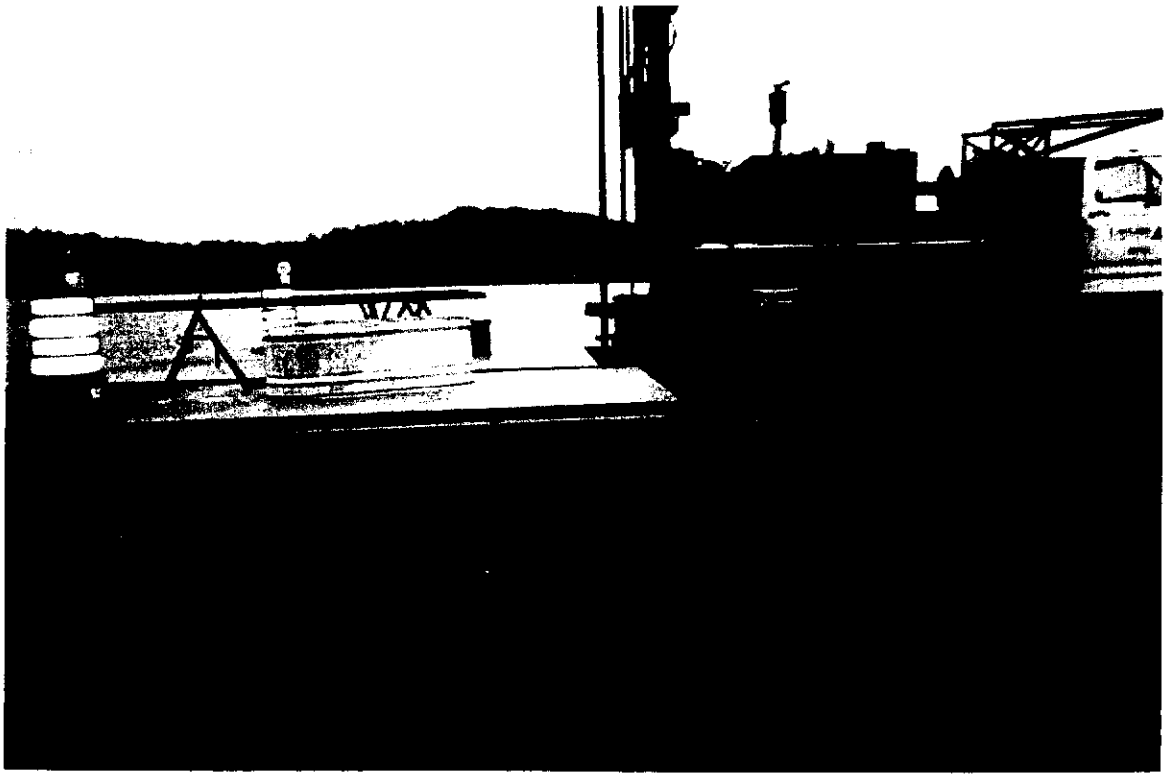
SOIL TEST BORING RECORD

BORING NO.: B-8
PROJECT: 72-inch Reuse Pipeline & Diffuser Project
LOCATION: Lake Lanier, Gwinnett County, Georgia
DRILLED: February 25, 2003
PROJECT NO: 6137-03-0055

MACTEC



Photograph 1 – Overall Barge Setup / Tightening Anchor Lines



Photograph 2 – Detail of Work Platform

Photograph 3 – Global Positioning System used to Locate Borings

Photograph 4 – Drill Crew setting Casing

Photograph 5 – Drill Crew attaching Split-Spoon Sampler

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Appendix F

Technical Memoranda Regarding Water Quality Modeling

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Technical Memorandum No. 6 **DRAFT**

Diffuser Dilution Modeling

Project: Gwinnett County DPU Project No. 5697
Reuse Pipe Line and Diffuser to Lake Lanier

Prepared by: Luciano Meiorin

Date: January 16, 2003

SUMMARY

This memorandum provides documentation of the dilution simulation modeling that was conducted on the proposed design of the outfall diffuser in order to determine whether the NPDES temperature requirements would be met. These requirements specify that at the compliance point, which is three meters from the diffuser," the temperature shall not exceed 90 degrees Fahrenheit nor increase the lake ambient temperature more than 5 degrees Fahrenheit".

Models – In this evaluation, the TSMERGE model was used to conduct the diffuser temperature dilution simulation. UMERGE3 was selected to perform the sensitivity analyses since it was easier to modify the input files using this model.

Model Input Data – The TSMERGE model input data files included three categories: diffuser design, effluent temperature and density, and receiving water characteristics.

- Diffuser Design- The proposed diffuser design used in the simulation was as follows: average design flow 83.3 MGD (3.65 m^3/sec), 180 3-inch (nominal) diameter ports, four foot spacing between ports, and horizontal discharge at port elevation 1037.2 ft. above sea level.

- Effluent Density – The effluent density is dependent on its temperature and Total Dissolved Solids (TDS). The effluent TDS is 21 mg/l. The effluent temperature in the diffuser before discharge was estimated by examining the historic temperature from F. Wayne Hill Water Resources Center (FWHWRC) and the discharge temperature after the effluent is pumped to the Crooked Creek discharge point. As the effluent moves through the pipeline, it loses temperature to the ground. The temperatures of the Lake Lanier discharge were then simulated using the ratio of the distance pumped from FWHWRC to Lake Lanier, to the distance pumped to Crooked Creek.

- Receiving Water Characteristics – Critical Lake Lanier receiving water characteristics included TDS. TDS values, which varied between 0 and 40 mg/l, were based on measurements that were part of an earlier study located in the general area of the

diffuser. Temperature measurements throughout the water column were conducted as part of this study. This data was recorded from a monitoring station located in 30+ meters of water and employing 15 temperature data loggers set at 15 different water depths. Current speed was estimated at 0.02 m/sec and at a direction of 90 degrees to the port discharge direction. As the direction of the Lake currents is not well defined and said to be quite variable, the direction of the Lake currents for the simulations was chosen to be perpendicular to the diffuser. As can be seen later in the sensitivity section, this direction results in conservative predictions of the achievable dilution.

Modeling Results – The dilution ratio achieved at the 3m compliance distance was a value of 16.8 to 1. The computed temperature in the diffuser plume at the compliance location varied between 47.7 and 82.5 degrees F, which are well below the 90 degree F requirement. The increase in ambient temperature resulted in a median of 0.59 degree F and a maximum of 1.08 degree F increase as compared to the 5-degree maximum increase specified in the permit.

Sensitivity Analysis – UMERGE3 was used to examine the sensitivity of the dilutions achieved at the 3m compliance point as various design parameters were varied.

- Discharge Rate – The discharge rates were varied between 1.0 and 7.0 m^3/sec (22.8 and 160 MGD). As the discharge rates decrease below 2.5 m^3/sec (57 MGD), the buoyancy effects take on a greater importance and increase the dilution noticeably. Dilutions do not vary noticeably between discharge rates of 2.5 and 7.0 m^3/sec.

- Port Spacing – Spacing between ports on the diffuser was 4 feet. To determine whether this was an optimum spacing, discharge rates were varied between 1.0 and 5.0 m^3/sec and the plume merging distance measured. The merging distance is the distance from the port to where the individual plumes merge from each port. At all discharge rates, the merging distance occurs very close to the 3m compliance point. Thus, 4 feet is the optimal design value to maximize the dilution at the 3m-point.

- Port Diameter and Axis – The proposed nominal port diameter is 3”. A 2” port diameter was investigated and found that the merging distance didn’t vary substantially. Although the dilution substantially increased, the higher resulting jet velocities required a five-fold increase in the hydraulic head. The increase in dilution was judged to be unnecessary to meet the discharge criteria.

- Effluent Density – About 10% of the time, the effluent discharge is colder than the ambient lake water and the plume will tend to settle rather than rise. The discharge permit regulates allowable temperature increase in the lake. When the effluent is colder than the ambient lake temperature, there is no temperature impact to the Lake.

Conclusion

The proposed diffuser design yields a predicted dilution ratio of 16.8 to 1 at the 3m compliance location. This dilution, when combined with the temperature of the effluent in the diffuser, yields a maximum temperature of the jet of discharged effluent of 82.5 degrees F, which is under the 90 degree F discharge criteria. The dilution ratio, when combined with the measured ambient temperatures of Lake Lanier water at that depth, yields plume temperatures at 3m that are also well within the 5-degree Fahrenheit maximum increase in the temperature requirement. The median temperature rise was 0.59 degree-F; the maximum (1 out of 8000+ simulations) was 1.08 degree-F.

In both cases, the predicted temperature at the 3m compliance point is well below the permitted criteria thus providing a very positive degree of protection for Lake Lanier.

INTRODUCTION

Effluent from the Gwinnett County – F. Wayne Hill Water Resources Center (FWHWRC) is presently discharged into the Chattahoochee River after being blended with effluent from the Crooked Creek Water Resources Center. In the future, the highly treated effluent will be discharged into Lake Lanier from a proposed outfall pipeline and multi-port, submerged diffuser. The State of Georgia Department of Natural Resources (DNR) has set temperature requirements for this discharge to ensure that the waters of Lake Lanier will be protected. The temperature discharge criteria are as follows – “At a sampling point 3 meters from the outfall diffuser, the temperature shall not exceed 90 degrees Fahrenheit nor increase the lake ambient temperature more than 5 degrees Fahrenheit” (State of Georgia DNR Permit No. GA0038130).

Temperature discharge criteria are attained using a multi-port diffuser by effectively employing natural conditions such as water depth above the diffuser port, and the density differences between the treated effluent and ambient lake water. In addition, the physical selection of the port sizes and port spacing are also instrumental in meeting temperature discharge criteria. The primary mechanism to evaluate whether the proposed diffuser will meet temperature criteria is to evaluate the effectiveness of the overall dilution mechanisms associated with the multi-port diffuser.

The purpose of this memorandum is to document that the proposed design of the outfall diffuser system will meet the temperature requirements by quantifying these dilution mechanisms. This memorandum is organized as follows:

- Effluent Dilution Mechanism(s)
- Proposed Diffuser Design
- Dilution Simulation Models
- Model Input Data
- Simulation Model Results
- Sensitivity Analysis
- Conclusions
- References

EFFLUENT DILUTION MECHANISMS

Effluent discharged from a diffuser port is diluted by the entrainment of ambient Lake water into the jet of discharged effluent. The entrainment is the result of shear between the jet and the surrounding Lake water, and is initially driven by the momentum of the effluent in the jet. This entrainment mechanism is illustrated in the schematic of the diffuser port shown in Figure 1. As the volumetric discharge rate of the jet increases so does the rate of entrainment. If the density of the effluent is different from that of the receiving water, there will also be a buoyancy force acting on the discharged plume of water that will drive additional shear and dilution of the plume. Buoyancy acts in the upward direction when the effluent temperature is warmer (less dense) than the Lake Lanier water. When the effluent temperature is lower than the Lake water, which occurs about 10 % of the time, the buoyancy force acts in a downward direction.

Therefore the dominant factors affecting the jet-associated dilution are the volumetric discharge rate (per port), the cross-sectional area of each port, and the details of the port itself such as the shape of the opening, orientation of the jet and spacing between ports. The dominant factors affecting any subsequent dilution due to buoyancy depend (additionally) on the density of the discharged effluent, and the density of the ambient water column in the receiving water (See Figure 1).

PROPOSED DIFFUSER DESIGN

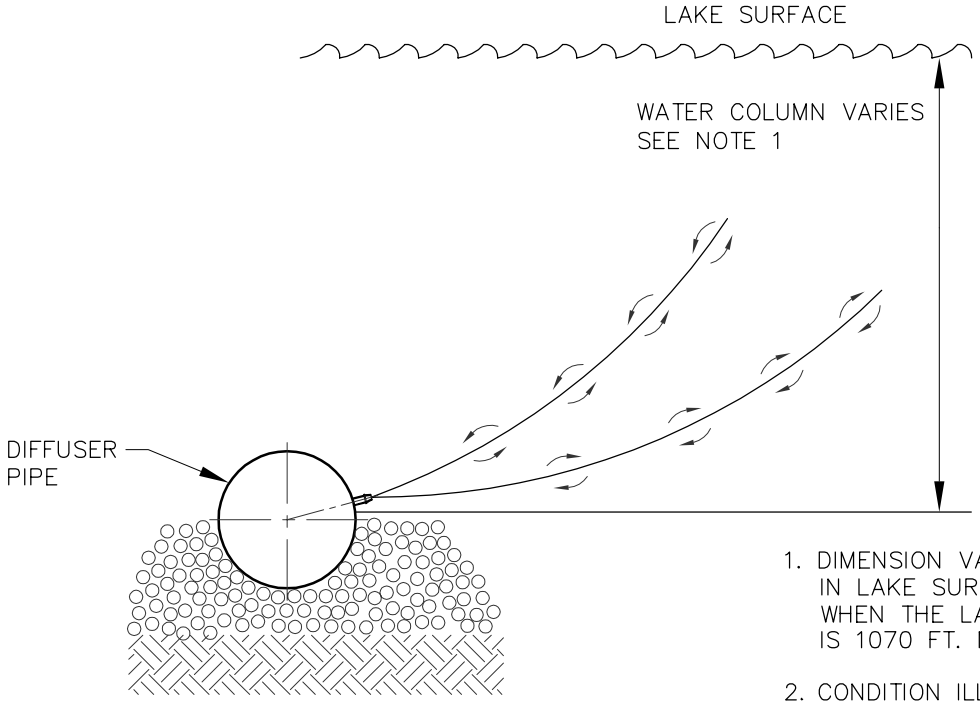
Based on Parsons design and operational experience on several other projects, the proposed outfall diffuser design contains 180 ports, each 3-inches in diameter (0.0762m), bell-mouthed, and spaced at 4-foot (1.22m) intervals on one side of the pipeline. The computer simulations, described below, were carried out using a design average discharge rate through the proposed outfall of 83.3 MGD (3.65 m^3/sec). Thus the average discharge rate per port is 0.0203 m^3/sec, and the initial jet velocity of the effluent is about 4.5 m/sec. The relative orientation of the ports is shown in Figure 2.

Based on permit requirements, the discharge ports in the diffuser will be set at an average elevation of 1037.2 feet above sea level. This corresponds to a discharge depth of 10m (32.8 ft) when the elevation of the lake surface is 1070 feet.

DILUTION SIMULATION MODELS

In this evaluation, effluent dilutions were computed using two versions of the EPA numerical simulation model UMERGE. The first is the TSMERGE version -- an adaptation of the EPA's UMERGE model in which the computational core of the model is the same as in UMERGE, but the input and output file structures have been customized to permit simulations to be computed for time-series observations of various discharge and receiving water characteristics (e.g. discharge rate, effluent density, density of the water column, ambient currents, etc.). It also allows generation of an output showing the characteristics of

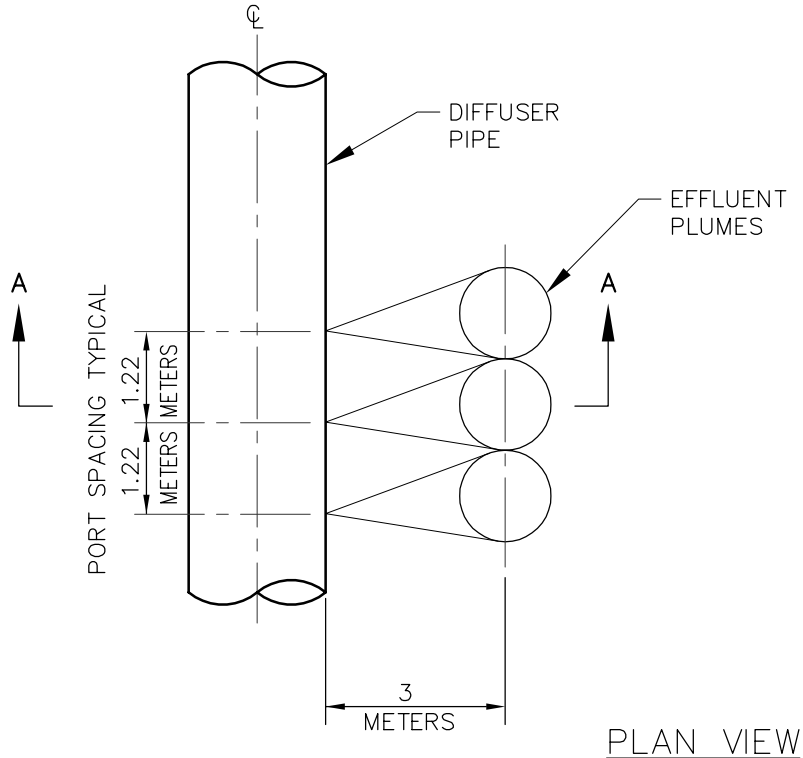
FIGURE 1
EFFLUENT DILUTION MECHANISMS



1. DIMENSION VARIES WITH CHANGES IN LAKE SURFACE. IT IS 10 METERS WHEN THE LAKE SURFACE ELEVATION IS 1070 FT. MSL.

2. CONDITION ILLUSTRATED IS WHERE EFFLUENT IS SLIGHTLY WARMER THAN RECEIVING WATER.

SECTION A–A
NTS



PLAN VIEW
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PARSONS

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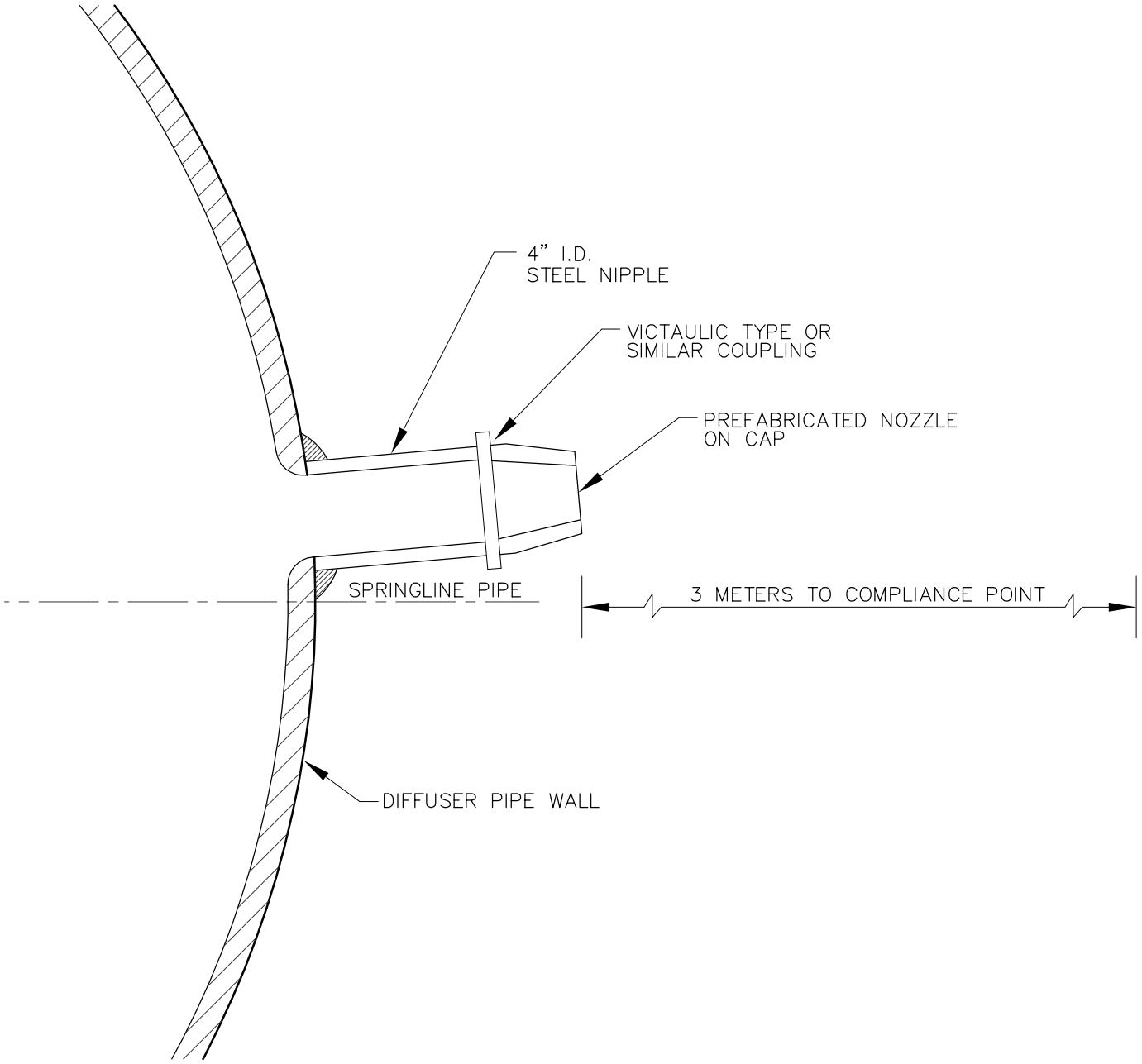
FIGURE 2
EFFLUENT DISCHARGE NOZZLE



NOT TO SCALE

PARSONS

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the jet or plume when some specified condition(s) are met. For example--in the present case--the 3m dilution, which is 3 meters from the discharge port. TSMERGE was used to process all the time-series data collected on the effluent from the treatment plant, and on the ambient water conditions of Lake Lanier.

The second model was UMERGE3, a new 3-dimensional version of UMERGE (and one component of the EPA's Visual Plumes simulation package--Release date: 04/08/2002). This model was used to carryout sensitivity analyses since changes to individual input values are more convenient than with TSMERGE, and the output generated has more detail.

As noted in the EPA Visual Plumes documentation (EPA, 2002), the results of simulations made with TSMERGE may differ slightly from the results generated with UMERGE3, since the details of the computational process differ slightly. Selected simulations for identical inputs were carried out with the two models for typical conditions for this project and found that UMERGE3 produced slightly larger values for the dilutions at a distance of 3m from the discharge port than did TSMERGE. Since TSMERGE was used to ascertain compliance with the regulatory requirements, the presented results will be on the conservative side.

MODEL INPUT DATA

Model input data was divided into three categories:

- Diffuser Design
- Effluent Density
- Receiving Water Characteristics

Diffuser Design

The input data for the proposed diffuser design was described previously.

Effluent Density

The density of the effluent is dependent on its temperature and TDS. The TDS of the effluent is low (about 21 mg/l), and relatively constant. Hence variations in the effluent density are primarily related to variation of its temperature. The effluent temperature has both seasonal and daily fluctuations. The present discharge into the Chattahoochee River is pumped about 22 miles (~36km) from the FWHWRC. With the pumped discharge into Lake Lanier, this distance will be reduced to about 9 miles (~15 km). In either case, there is an opportunity for the temperature of the effluent to decrease from the treatment plant to the discharge point.

To predict the magnitude of this temperature decrease, measurements of the effluent presently discharged from FWHWRC, and measurements as that effluent reaches the energy dissipation structure just before the point of discharge were used. To predict the temperature changes during the effluent flow to the Lake Lanier discharge point, the temperature decreases to Crooked Creek were scaled by a ratio of the length of the two pipelines. The effluent temperature at the FWHWRC was measured once per day; the

effluent temperature at Crooked Creek, twice a day (once in the morning, once in the afternoon). Since the model simulations were generated at hourly intervals, the differences between the morning and afternoon measurements were interpolated to estimate the changes over the corresponding twenty-four hour period.

Effluent temperature measurements at both FWHWRC and at Crooked Creek were available from prior to the start of the simulation period, which extended from October 18, 2001 to June 5, 2002. Beginning with June 6, temperature measurements were only available for effluent at FWHWRC. To estimate the effluent temperatures at the Lake Lanier proposed discharge for the remaining period of the study (June 6 to September 26, 2002), a temperature simulation approach was used (See Appendix A).

The resulting estimated effluent temperatures at the Lake Lanier point of discharge for the period of simulation are illustrated in Figure 3. Temperatures ranged from lows around 17 degrees C during the winter (January, February, early March) to highs around 27 degrees C during the late summer and early fall (August, September).

The highest effluent temperature at the discharge location was estimated to be 27.19 degrees C (80.94 degrees F). This is lower than the regulatory requirement of a maximum of 32.2 degrees C (90 degrees F) after dilution.

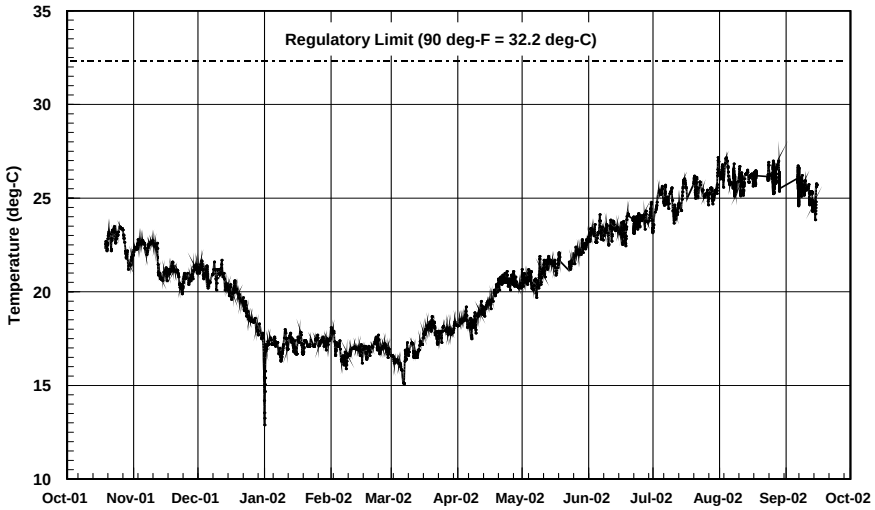
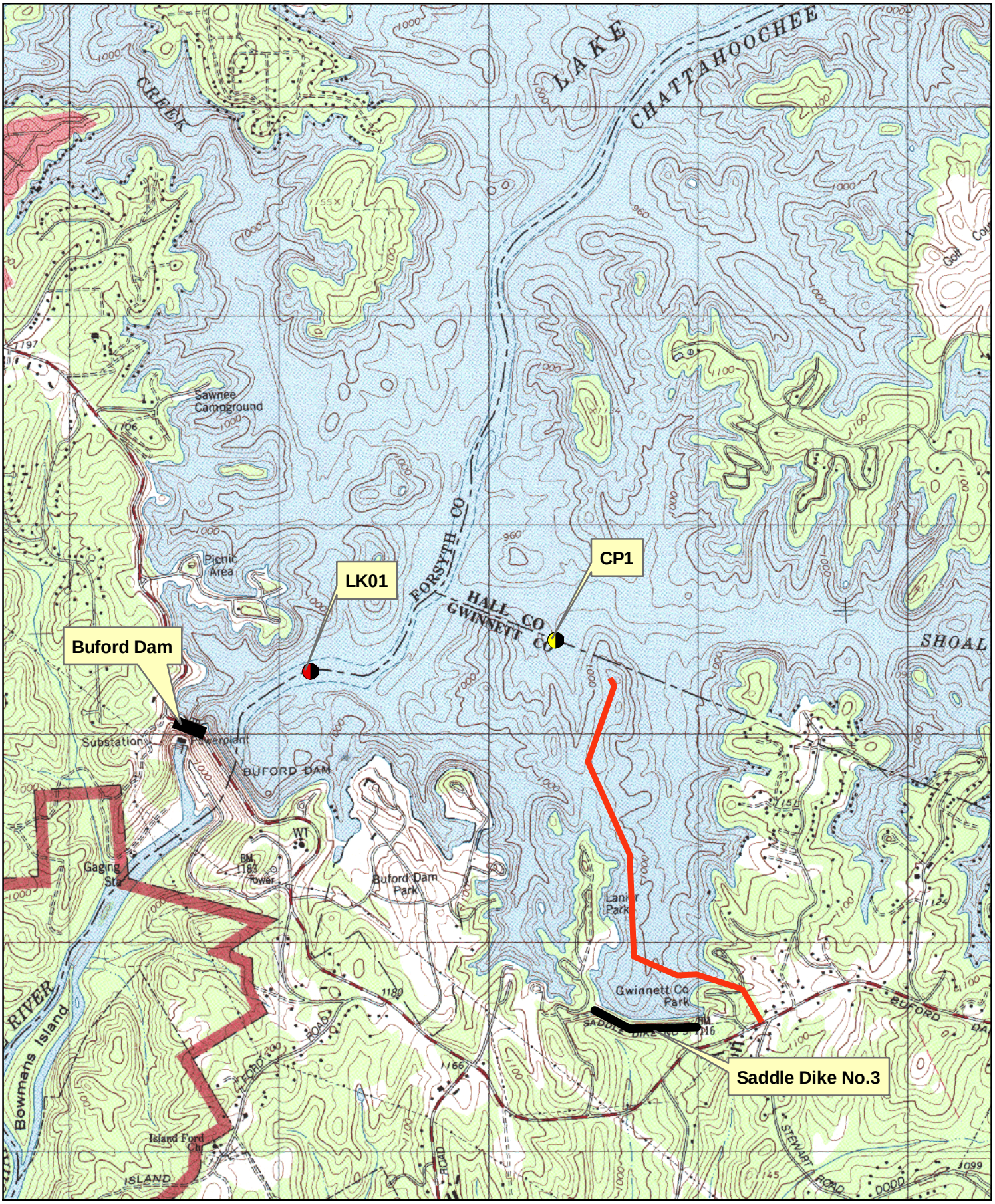


Figure 3. Estimated Effluent Temperature at Diffuser



0 1,000 2,000 3,000 Feet

Figure 4
Lake Lanier
Monitoring Stations

TDS Station

Ambient Temperature Monitoring Station

Proposed Outfall/Diffuser Location

PARSONS

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Receiving Water Characteristics

Total Dissolved Solids (TDS)

To estimate the effects of TDS on the density of Lake Lanier water, measurements carried out in Lake Lanier between March, 1996 and March, 1997 were used (LTI, 1998; Rasmussen, 2002). TDS measurements at station LK01, which is a monitoring station close to the proposed discharge, were used in the modeling (See Figure 4). The variations in the lake TDS at this station during the monitoring period are illustrated in Figure 5. Data were collected at a depth of one meter. Hourly values for the simulations were obtained by interpolation between the actual sampling times. As in the case of the FWHWRC effluent, the TDS of the Lake water is in the same concentration range; therefore the TDS has a minimal effect on overall lake density. The density of the lake is primarily determined by temperature.

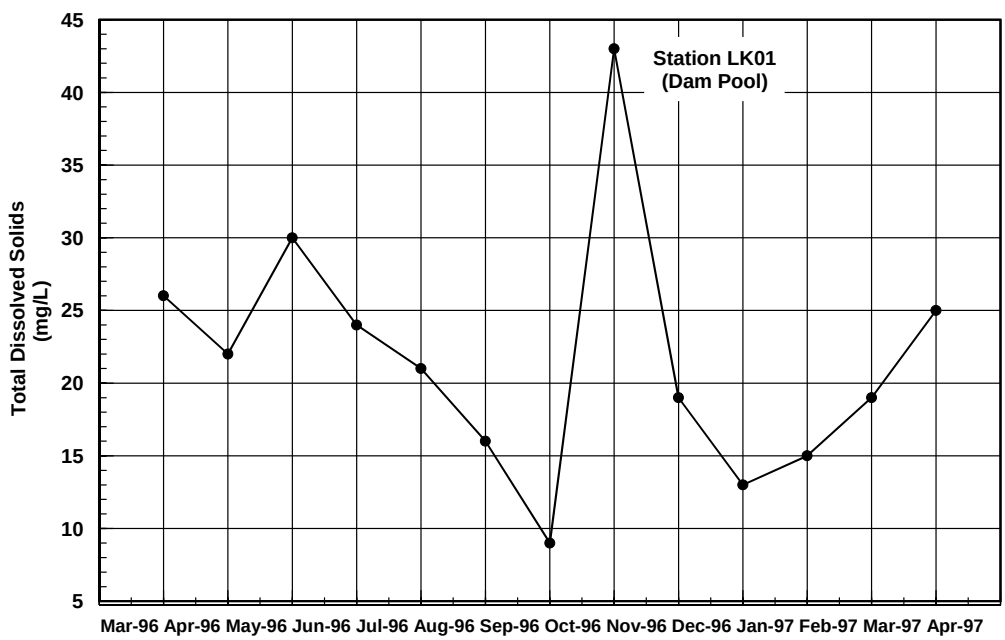


Figure 5. Lake Lanier TDS

Thermal Stratification

Variations in the thermal stratification of the water column at the diffuser discharge site span a wide range of time-scales, ranging from hour-to-hour, to seasonal changes. These temperature variations were monitored using a vertically distributed string of 15 temperature-measuring data loggers incorporated into a mooring positioned near the location of the proposed outfall (See Figure 4). The mooring was placed in deeper water

(~30+ meters) to permit measurements of the temperature of the lake water at depths in excess of the depth of the proposed discharge ports.

The mooring was designed so that the upper four data loggers were attached to a surface float, and hence remained at fixed depths below the surface of the lake, independent of the elevation of the surface of Lake Lanier. Thus their elevations above the discharge ports change in response to changes in the lake level. On the other hand, the lower 11 data loggers were positioned at fixed elevations above the lake bottom, and hence relative to the discharge ports—no matter what the lake level.

Data Collection

The temperature data were recorded at one-hour intervals and stored internally in the recording instruments in digital format. At monthly intervals, the instruments were retrieved, the data downloaded to a computer, the meters serviced, and the logging process started again.

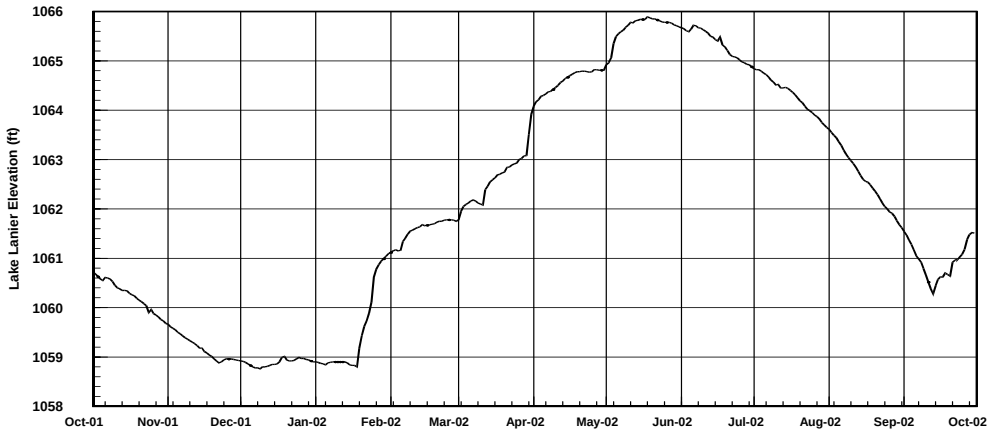
Minor Temperature Gradients

An examination of the time-series of raw (i.e. “as recorded”) temperatures during these periods indicated the presence of weak temperature inversions. It was determined that these inversions were not real, but artifacts of the weak gradients, the limits associated with the instrument resolutions, small deviations among data loggers in the calibration process, or simply instrument “noise”. Weak inversions were removed from each time-series by examining each profile for such an inversion, then applying a fourth-order smoothing procedure to remove it.

Pool Elevations

Lake Lanier pool elevations, reported daily by the Army Corps of Engineers, were the basis for the Lake surface elevation used in the simulation (See Figure 6). These daily measurements were interpolated to hourly intervals for our simulations. As with most of the environmental parameters, a seasonal pattern is evident. As the lake level changes, so does the depth of the water column above the diffuser ports (see Figure 1).

Figure 6. Lake Lanier Surface Elevations



Temperature and TDS Input Files

The input data structure for the UMERGE (and TSMERGE) initial dilution models allow only a single water depth (from the surface to the diffuser ports) to be used for a dilution simulation, or a single time-series of simulations. To include the changes in Lake Lanier water surface elevations, the time-series of effluent and receiving water parameters was sub-divided into groupings in which the difference between the maximum and minimum lake elevation within that period was less than one foot. Time-series initial dilution calculations were then run for each of these groupings of near-constant lake surface elevation. After carrying out these individual simulations, the results from each simulation were then reincorporated to form a continuous time-series for the entire period for which data was available.

The time-series of TDS were also combined with the corresponding time-series of water temperatures (at the depth of each data logger) during each of the time periods used in the simulations to obtain time-series of the density stratification of the water column The result was a time-series of the density at each of the data logger positions in the water column at hourly intervals for a period in which the lake level only underwent small changes.

Lake Currents

Previous water current measurements (LTI, 1998) in the general area of the diffuser indicated that they were relatively weak. A speed of 0.02 m/sec (0.07 ft/sec) was assumed for the model. The water current direction was estimated to be at 90 degrees to the port discharge direction. Variations in water current speed and direction are addressed in the sensitivity analyses.

SIMULATION MODEL RESULTS

Computational Procedure

Time-series of dilutions were generated for each of the “constant lake surface elevation” time-series using the TSMERGE model. The entire data period was then reconstructed into a single time-series by linking the individual time-series of constant lake surface elevation.

Three output files were generated by TSMERGE for each simulation period. The standard output file contained the initial dilution results with one row of output per observation. Each row contained the following values:

- Observation number
- Date as calendar day (including fractional day)
- Discharge rate
- Effluent temperature (added for this study)

The second file contained output relevant to the dilution at the specified distance of 3m from the discharge port. Each line of output contained the following values:

- Date as calendar day (including fractional day)
- Dilution at the 3m distance
- Depth to the centerline of the jet at the 3m distance

A third file was added for this study. This file contains a list of the observations when the density of the effluent was greater than the density of the receiving water at the depth of the discharge port.

In addition to these time-series simulations, a number of individual simulations were carried out with UMERGE3 to compare the results with those from TSMERGE, and to examine the sensitivity of the results to changes in assumptions about the speed and direction of the currents, or changes in the discharge rates, or diffuser design.

Results

The dilution achieved at a horizontal distance of 3m from the outfall is almost entirely driven by the momentum of the jet from the discharge port. Thus the 3m dilutions show little dependence on the density stratification of the water column. The outcome of the modeling is that for a horizontal discharge, the dilution achievable at the distance of three meters is within one percent of a value of 16.8 to 1.

Earlier it was noted that since the effluent temperature remains below 90 degrees F, this maximum temperature requirement at a distance of 3 meters from the discharge port will always be met, independent of the magnitude of the dilution at this point--provided that the ambient temperature does not exceed 90 degrees F. The average temperatures of the discharging jet 3m from the discharge port are illustrated in Figure 7.

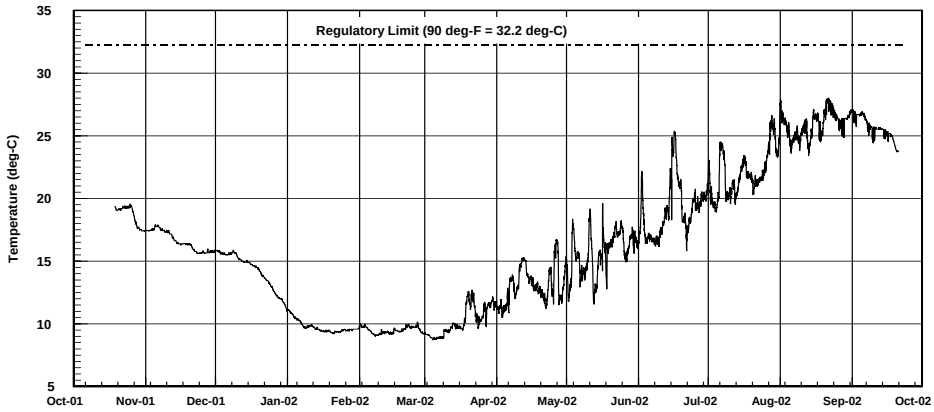


Figure 7. Discharge Jet Temperature at 3m Distance

The second regulatory requirement is that the ambient temperature of Lake Lanier not be increased by more than 5 degree-F. The constant dilution value of 16.8 to 1, combined with the ambient temperature at the depth of the discharge port and the temperature of the discharged effluent was used to simulate the anticipated temperature change. The results are illustrated in Figure 8. It is apparent that the changes in ambient water temperature are well within the regulatory limit of 5 degree-F (2.78 degree-C). The range of these increases is summarized by the probability distribution shown in Figure 9. The median change is about 0.325 degree-C; the maximum increase, 0.601 degree-C (0.59 and 1.08 degree F).

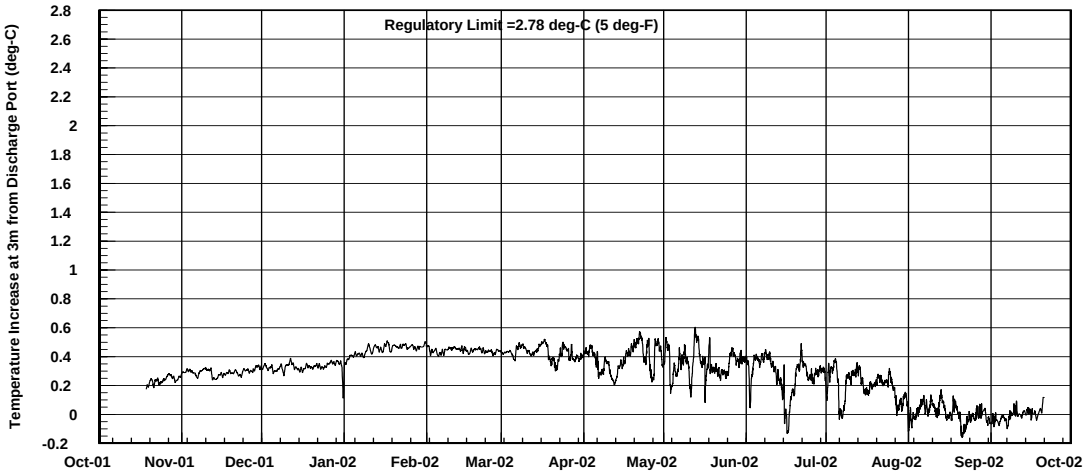


Figure 8. Temperature Increase at 3m Distance

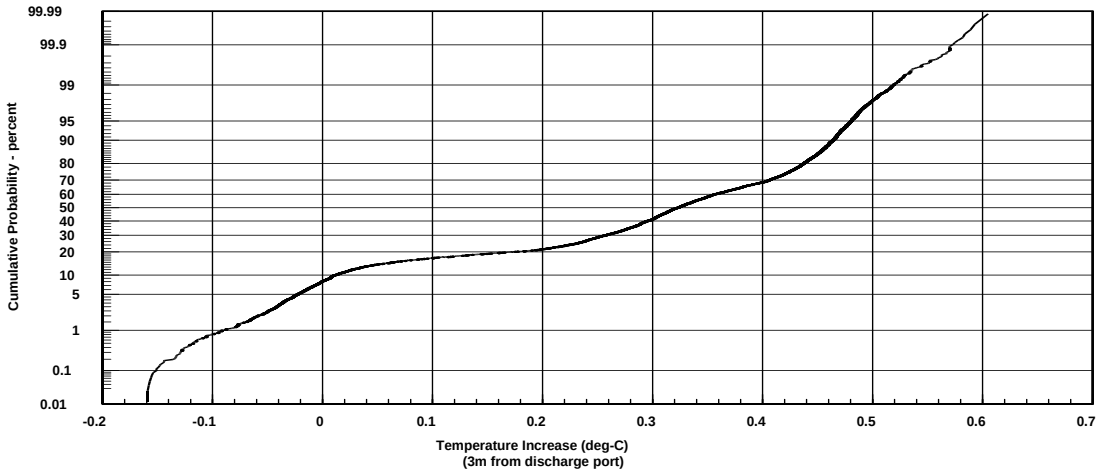


Figure 9. Probability Distribution - Temperature Increase at 3m from Diffuser Port

SENSITIVITY ANALYSIS

The UMERGE3 model (in the Visual Plumes package) was used to examine the sensitivity of the dilutions achieved at the three-meter distance as changes are made to the diffuser design, or occur in the receiving water environment. These comparisons were done for only a few cases from among the total set of observations, but the trends are representative of most of the cases in the entire data set (more on the exceptions below).

The results for the conditions existing at 16:00 (local time) on May 24, 2002 were used to perform the sensitivity analysis presented in this portion of memorandum. This was a typical day with a normal range of density difference between the effluent and the Lake water.

Discharge Rate

The time-series simulations were carried out for a discharge rate of 3.65 m^3/sec (83.3 MGD). However, in practice, the discharge rate will typically vary daily as well as over the design life. Therefore discharge rates were varied to determine how the dilution, achieved at the 3m reference point, will change. Table 1 summarizes the results:

Table 1
Effect of Discharge Rate on 3m Dilutions

Discharge Rate		Dilution at 3m Distance
(m^3/sec)	MGD	
1.0	22.8	26.3
1.5	34.2	19.6
2.0	45.6	18.4
2.5	57	17.9
3.0	68.4	17.6
3.5	80	17.6
4.0	91.2	17.6
4.5	103	17.6
5.0	114	17.2
6.0	137	17.2
7.0	160	17.2

Several trends in the 3m dilution are readily evident. One is that the dilution associated with a discharge of 3.65 m^3/sec, as used in the time-series simulations, has a dilution value of 17.6--versus the value of 16.8 predicted with the TSMERGE model. This difference is attributed to the refinements incorporated into the more recently developed three-dimensional UMERGE3 model. Thus the dilutions predicted for the time-series with the TSMERGE model can be expected to be conservative (i.e. they slightly under predict the magnitude of the dilution).

The second trend is that the dilutions at the 3m distance are almost independent of discharge rate for discharges between 2.5 and 7 m^3/sec (57 to 160 MGD). This indicates that the diffuser is optimized and will perform well for higher flow rates. As discharge rates decrease below 2.5 m^3/sec, the buoyancy effects take on greater importance, and the path of the plume begins to curve upward while on its way to the 3m distance. This increases the entrainment length, as well as adding additional energy (buoyancy) that augments the entrainment, and thus increases the dilution achieved at the 3m distance.

Effluent Temperature

The temperature of the diluted effluent in the jet will increase with increasing effluent temperature. One year of effluent temperature data was used in the temperature dilution simulations of this study. However, it is possible that higher temperatures may occur at some point in the future. Therefore, it was decided to evaluate whether the regulatory limits might be exceeded if future effluent temperatures were to increase--perhaps also accompanied by an increase in discharge rate.

As noted in the preceding discussion, the effect of an increased discharge rate has a minimal effect on the dilution achieved at the 3m distance. Assuming that the dilution ratio remains at 16.8, and that the Lake Lanier water temperature at the depth of the discharge port is 27 degrees C, the maximum temperature of the effluent could increase as much as 50% and the diluted effluent would be only 82.9 degrees F at the 3m distance.

Assuming an ambient receiving water temperature of 8 degrees C at the discharge port, and a dilution of 16.8 at the 3m distance, the maximum effluent temperature could rise as much as 50% and the ambient temperature would rise 4.2 degrees F at the 3m distance. The above rise of 4.2 degrees F was calculated assuming the Lake water surface is very low. Since there is a seasonal dependency on the temperature of the effluent and that of the Lake, the condition used is quite extreme. Thus all realistically feasible effluent temperatures in excess of the maximum effluent temperature measured during this study will also satisfy both regulatory requirements.

Ambient Current Speed

Lake currents at the site of the proposed diffuser were assumed to be 0.02 m/sec for the simulations as a “representative” speed based on the LTI study. UMERGE3 was used to examine the sensitivity of the dilutions to different strengths of the currents. The results are summarized in Table 2.

Table 2
Effect of Current Speed on Dilution

Speed (m/sec)	Dilution (at 3m distance)
0.0	17.2
0.01	17.2
0.02	17.2
0.03	17.6
0.04	17.6
0.05	17.9

Since the port velocities at the point of discharge (> 4 m/sec) are much larger than are the possible ambient current speeds, the latter have little effect on the dilutions achieved at the 3m distance. Dilutions for currents between 0.0 and 0.02 m/sec are virtually the same. As current speeds increase above 0.02, they add to the shear. Thus there is a slight increase in dilution with increasing ambient current speeds. Since the time-series simulations were carried out using a current speed of 0.02 m/sec, they can be regarded as being on the conservative side with regard to the range of current speeds likely to be present in Lake Lanier.

Ambient Current Direction

The direction of the ambient current, relative to the direction of the discharge from the diffuser port can also affect the magnitude of the dilution. If the discharge is into an oncoming ambient flow, the shear between the plume and the ambient water is increased, thus increasing the rate of entrainment of diluting water into the plume. The transit time for a parcel of water in the plume to reach the 3-meter distance is also increased, further increasing the dilution achieved. The direction of the ambient currents were varied by computing the 3m dilutions in increments of 45 degrees. The results are summarized in Table 3.

Table 3
Effect of Ambient Current Direction on Dilution

Angle (degrees)	Dilution (at 3m)	Angle (degrees)	Dilution (at 3m)
0	18.54		
45	18.27	225	18.13
90	17.56	270	17.51
135	18.27	315	18.13
180	18.54	360	18.54

The time-series simulations were carried out with an ambient current at an angle of 90-degrees (perpendicular to the diffuser). Hence as illustrated in Table 3, the dilution values in our time-series simulations can be considered as being conservative, relative to the actual distribution of current directions that may occur at the discharge site.

Port Spacing

The rate of entrainment of ambient receiving water into the plume depends not only on the shear between the two, but also on the area available for entrainment. The latter depends principally on the diameter of the plume, but it is also affected by whether two adjacent plumes (one from each port) have expanded sufficiently so that they merge together. When the latter occurs, the rate of dilution beyond that point is diminished. Hence dilutions at the 3m distance can be maximized by choosing the spacing between ports such that merging will not occur until after the plumes have passed the 3m distance. Increasing the port spacing beyond this critical value will not further increase the dilutions at the 3m distance.

Table 4 summarizes the merging distances from the discharge port for a port spacing of 1.22m (4 feet) at various rates of discharge. The merging distance is the distance from the port where the individual plumes from each port merge. This is shown schematically in Figure 1.

Table 4
Merging Distances (Port Spacing = 1.22m)

Discharge Rate		Merging Distance (meters)
(m^3/sec)	**MGD**	
1.0	22.8	2.96
2.0	45.6	3.07
3.0	68.4	3.01
4.0	91.2	2.99
5.0	114	2.94

At all discharge rates, the downstream distance to the point of merging of the plumes occurs very close to the 3m reference distance (average = 2.99m). Thus a spacing of 1.22m is the optimal value to maximize the 3m dilution while minimizing the length of the diffuser.

Port Diameter

The proposed design is for port diameters of 3” (0.0762m). The effect of port size on the 3m dilutions was examined by simulating a discharge with a 2” (0.0508m) diameter port. The 3” diameter ports resulted in an average merging distance of 2.99m and a 3m dilution of 16.8 to 1; the 2” ports yielded a merging distance of 2.97m and a 3m dilution of 25.6 to 1. Thus changes in port size have minimal effect on merging distance, but smaller ports lead to increased dilution. The penalty for going to smaller ports is, of course, the fact that the hydraulic head required to push the flow through the ports would be approximately five times higher, with the added possibility of erosion of the port due to the high port velocities.

From a dilution standpoint, we have determined that the 3-inch port is a good selection. Hydraulic considerations dictate that the port size vary around a median value of 3 inches. In fact to achieve as much as possible uniform discharge among the ports, it is necessary to size the ports to compensate for the varying internal pressure in the diffuser pipe. Consequently the ports closest to the beginning of the diffuser, where the internal pressure is higher, will have a diameter slightly smaller than 3 inches, and the ports toward the end of the diffuser will be slightly larger than 3 inches. Providing 4-inch stub outs will allow additional flexibility to utilize nozzles of varying diameter to balance flow over the length of the diffuser and at different flow rates (See Figure 2).

Port Axis

Dilution for various inclinations of the axis of the discharge port above the horizontal were also modeled. Increasing the axis inclination will also increase the dilution at a distance of 3m measured horizontally. Since a horizontal discharge produces 3m dilutions that amply meet the regulatory requirements, a horizontal discharge was selected for this evaluation.

Practical constraints may dictate a discharge that is somewhat above horizontal. It is envisioned that bedding stone will be placed up to the springline of the pipe. Within small angles above the horizontal, the increased dilution will be practically proportional to the length of the jet trajectory to the regulatory boundary. For a discharge angle of 10 degrees above horizontal, this will increase the dilution at the 3m horizontal boundary by 1.5 % and a 15 degree inclination will be 3.4 % more diluted. It was concluded that discharges 10 to 15 degrees above horizontal simplify fabrication of the diffuser.

Effluent Density Greater Than Ambient Water Density

Since TDS only plays a minor role in the densities of Lake Lanier water and the discharged effluent, a comparison of the effluent temperature at the point of discharge with the ambient temperature of the Lake Lanier water at the same depth gives a good indication of whether the effluent is lighter, or heavier, than the receiving water as it is discharged.

Figure 10 shows the temperature of the Lake Lanier water at the depth of the discharge port (along with the effluent temperature before dilution). Most of the time (~90-percent), the effluent is warmer, and hence less dense, than the Lake Lanier water—and the plume rises after being discharged. However, approximately 10-percent of the time the effluent is colder, and hence denser, than the ambient water. The first instance of this occurred in June, but most of the instances occur in August.

In these latter cases, the plume will want to settle, rather than rise in the water column. However, the presence of the lake bottom limits this settling motion, leading to a down slope flow developing along the bottom. This is a complex flow situation to model, and neither TSMERGE nor UMERGE3 can produce reliable estimates of the dilutions for this case. However, this situation only occurs when the discharged effluent is colder (i.e. denser) than the ambient water, so the regulatory requirement that the discharge not raise the temperature of Lake Lanier water by more that 5 degrees will be satisfied.

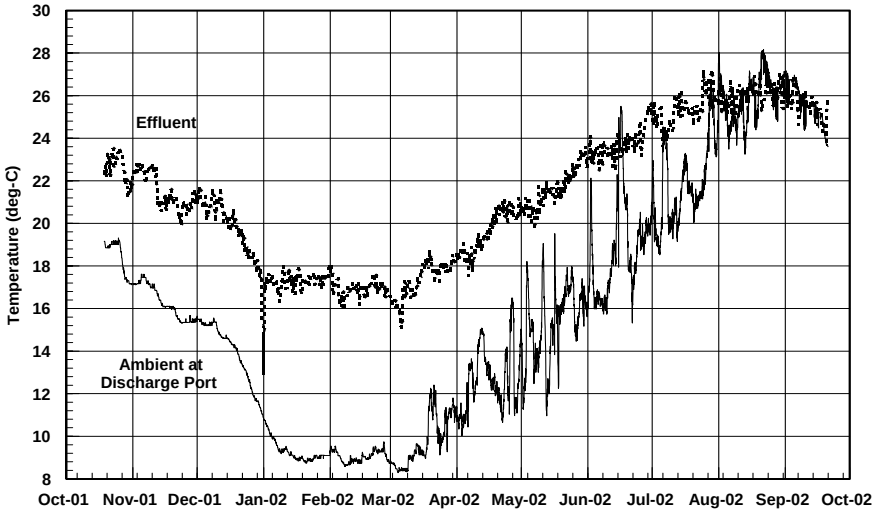


Figure 10. Comparison of Effluent Temperature With Ambient Water Temperature (at Discharge Depth)

CONCLUSIONS

- The proposed diffuser design yields a predicted dilution of 16.8:1 at a distance of 3 m away from the discharge port. This dilution, when combined with the temperature of the treated effluent in the diffuser, yields a maximum temperature of 82.5 degrees F which is well under the 90 degree F discharge criteria.

- The predicted dilution, when combined with the measured ambient temperatures of Lake Lanier water at that depth, yields plume temperatures at 3m that are also well within the 5-degree Fahrenheit maximum increase in the temperature of Lake Lanier Water requirement. The median temperature rise was 0.59 degree-F; the maximum (1 out of 8000+ simulations) was 1.08 degree-F.

- In both cases, the predicted temperatures at the 3m compliance point are well below the permitted criteria thus providing a very positive degree of protection for Lake Lanier.

REFERENCES

EPA, 2002. Dilution Models for Effluent Discharges, 4th Edition (W.E. Frick, et.al.). Ecosystems Research Division, NERL, ORD, USEPA, Athens, GA. March, 2002.

LTI, 1998. Development of Linked Watershed and Water Quality Models for Lake Lanier. Limno-Tech, Inc. in association with J.E. Edinger Associates and Brown and Caldwell. Ann Arbor, MI. February, 1999.

Rasmussen, T., 2002. Personal communication. Dept. of Forestry, Univ. of Georgia. March 16, 2002.

APPENDIX A
LANIER TEMPERATURE DISCHARGE SIMULATION PROCEDURE

1. The effluent temperature at FWHWRC was measured once per day, while the temperature was measured twice per day at Crooked Creek (AM and PM). The temperature change was computed between the FWHWRC and Crooked Creek for the period prior to June 5, 2002 (when measurements were available for both locations). The changes were computed separately for the AM and PM measurements at Crooked Creek.

2. Estimated the effluent temperature change in route to the Lanier discharge point by scaling the observed temperature change using the ratio of pipeline distances – 9 miles and 22 miles (9/22) as previously described.

3. Computed the average change in temperature between the treatment plant and the Lanier discharge for the morning (= 0.42 degrees C) and in the afternoon (= 0.15 degrees C).

4. Subtracted the average temperature change from the computed temperature changes (again, AM and PM) to get their deviations from the average temperature changes.

5. Plotted the probability distributions of these residual variations and determined that they were approximately Gaussian distributed with standard deviations of 0.38 and 0.48 degrees C for the AM and PM measurements, respectively.

6. Subtracted the average reductions (from step 3) from the effluent temperatures measured at the treatment plant for the observations subsequent to June 5 to compute corresponding "average" morning and afternoon temperatures at the point of discharge.

7. Add to these, Gaussian, randomly distributed deviations having, in the aggregate, the same standard deviations determined in step 5.

8. Interpolated these AM and PM temperatures to yield estimates of the temperatures at the discharge point at hourly intervals.

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Memorandum

DATE: July 21, 2005
PROJECT: **LANIC10**

TO: **Doug Baughman**
CH2M HILL

FROM: **Tad Slawecki**
CC:

SUBJECT: **Interim CE-QUAL-W2 results with increased 2030 withdrawals (revised 5/19/03; 12/17/03; 7/21/05)**

This memo summarizes results from the incorporation of increased 2030 water withdrawals in the CE-QUAL-W2 model of Lake Lanier. This model was originally developed by LTI for Upper Chattahoochee River Basin Group, and is used here to evaluate impacts of an additional 40 MGD treatment plant discharge to the lake.

Summary

The lake was modeled using CE-QUAL-W2 including extreme climatological conditions, the proposed additional discharge of 40 MGD into Lake Lanier, revised dam rules, and an increase of in-lake water withdrawals to match Georgia EPD forecasts for the year 2030. It is believed that calculated lake levels and releases are consistent with both USACE model predictions and management goals, but there has been no formal USACE review or approval to date.

Model results show that nitrogen and dissolved oxygen levels in Lake Sidney Lanier comply with Georgia standards even when lake levels are considerable lowered by drought conditions accompanied by 2030 increased withdrawal and other demands both above and below Buford Dam. Chlorophyll-a results also comply with Georgia's standard in four out of the five years simulated in this water quality impact assessment, and exceed the standard during the driest years. This exceedance corresponds to simulated lake levels (minimum lake surface elevation of 1047.9 feet MSL) that have not occurred in the available historical record; in fact, the lowest level seen in the 2000-2001 drought was 1055.6 feet MSL.

Since filling of the pool in 1957-1958, the lowest May-October lake levels of 1054.85 feet MSL (1986-87) and 1055.61 feet MSL (2000-2001) represent a recurrence interval of approximately 22 years. This suggests that the extreme climatological conditions associated with these levels may not cause exceedances more often than once every 22 years. This might be compared favorably to US EPA guidance on exceedances for toxics (once in three years) and 7Q10-based wasteload allocations that implicitly acknowledge the possibility of exceedances during decadal low flow events.

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Model Runs

The model was applied using the 1984 to 1988 five-year meteorological period and 1996 land use conditions. This meteorological period was previously selected as the critical environmental design period for the application of the Lake Lanier Management Tool (LTI, 1995). Additional analysis (LTI, 2003) confirmed that 1984-1988 was among the most, and perhaps the most, critical periods since 1929 in terms of water quality impacts of a proposed discharge.

For this analysis, the following scenarios were examined:

- **Baseline** – Current conditions for land use, 1984-1988 meteorology, current water withdrawal rates, and existing discharges only.

- **A** – Baseline scenario plus 40 MGD additional discharge at location L-4 (on the bottom of a submerged ridge at an approximate elevation of 961 feet MSL, mixing into the model layers from 961-967 feet MSL). The discharge temperature is assumed to be 26°C during summer months, and existing dam operation rules that ensure a minimum discharge of 600 cfs are used. In addition, the TP loading at Gainesville #2 was decreased to offset the added L-4 loading and maintain a constant total TP load to the lake.

- **B** – Increased withdrawal. This scenario is the same as Scenario A, except that drinking water withdrawals from Lake Lanier are increased. All withdrawals are increased to match Georgia EPD's forecast 2030 withdrawal for the Chattahoochee River from headwaters to Buford Dam. Note that the incorporation of increased water withdrawal is conservative in that the forecast withdrawals are all being taken from the lake, when in fact, some of these withdrawals occur above the lake in tributaries.

- **C** – Increased withdrawal and revised dam rules. This scenario is the same as Scenario B except that revised operating rules for Buford Dam were incorporated in the model. These rules generally call for increased discharges/releases from Buford dam to meet downstream water quality and withdrawal needs, especially in times of drought.

- **D** – "No-Action" with increased withdrawal and revised dam rules. This scenario is equivalent to the Baseline scenario, but with increased drinking water withdrawals from Lake Lanier as described in Scenario B and the revised dam operating rules described in Scenario C. This provides a representation of future conditions should no action be taken to change discharges to Lake Lanier.

- **E** – Minimum lake elevation. This scenario is the same as Scenario C, except that drinking water withdrawals from Lake Lanier are increased to bring simulated lake levels down to 1035 feet MSL. This provides a representation of critical

conditions corresponding to drought or other extremes that deplete the store of water in the reservoir.

Scenarios A through E were run for water quality and lake level information. Water quality results for the baseline scenario are taken from earlier studies; discharge and level information for the baseline run are not currently included in this memorandum.

Water Quality Results

Table 1 shows phosphorus and chlorophyll-a results for the scenarios described above. Table 2 shows total nitrogen and dissolved oxygen results.

Table 1. Summary of Simulated TP and Chl-a Concentrations
Average
(Range)

Scenario	Segment 19/ (LN1) Photic Zone		Whole Lake Photic Zone	
	Chl_a (µg/L)	TP (µg/L)	Chl_a (µg/L)	TP (µg/L)
Baseline	**3.0** (2.4-3.5)	**6.5** (4.9-8.1)	**5.0** (4.5-5.6)	**14.4** (13.3-15.9)
A1	**2.9** (2.4 - 3.4)	**6.3** (4.8 - 8.0)	**4.8** (4.3 - 5.4)	**14.0** (12.8 - 15.6)
B	**3.0** (2.4 - 3.5)	**6.4** (4.9 - 8.0)	**4.9** (4.3 - 5.4)	**14.2** (12.9 - 15.7)
C	**3.0** (2.4 - 3.4)	**6.6** (4.9 - 8.1)	**5.0** (4.5 - 5.5)	**14.6** (13.7 - 15.8)
D	**3.2** (2.5-3.6)	**7.0** (5.2 - 8.3)	**5.3** (4.8-5.6)	**15.4** (14.5-16.5)
E	**3.1** (2.6 - 3.5)	**7.1** (5.6 - 8.1)	**5.2** (4.8 - 5.5)	**15.5** (14.5 - 16.4)

Table 2. Summary of Simulated TN and DO Concentrations				
	Segment 19/ (LN1)			Whole Lake
	Max photic zone TN (mg/L)	Mean photic zone TN (mg/L)	Minimum surficial DO (mg/L)	Mean photic zone TN (mg/L)
Baseline	**1.30**	**0.92**	**5.72**	**1.28**
A	**1.26**	**0.92**	**5.70**	**1.05**
B	**1.27**	**0.93**	**5.88**	**1.05**
C	**1.27**	**0.93**	**5.95**	**1.06**
D	**1.28**	**0.93**	**5.74**	**1.31**
E	**1.31**	**0.94**	**5.90**	**1.07**

The following table summarizes lake elevation results. The increased water withdrawal is predicted to lower mean lake elevation by about 1 foot for the simulated conditions (compare Scenario B to Scenario A). Minimum lake levels show a more pronounced effect, dropping by 3.5 feet from A to B. The revised dam rules included in Scenario C further lower predicted water levels. These lowered lake levels may contribute to elevated chlorophyll-a results by altering the water chemistry and reducing the water volume in the receiving segment. Scenario D shows yet lower lake levels because a smaller volume of water is discharged into the lake in the "no-action" case, and Scenario E's lake levels reflect an artificially imposed critical condition.

Scenario	Lake Elevation (feet MSL)
A	**1068.3** (1061.7-1073.4)
B	**1067.0** (1058.2-1073.3)
C	**1063.8** (1047.9 - 1074.9
D	**1063.2** (1045.8 - 1075.3
E	**1056.8** (1034.7 - 1074.9

References

LTI, 1995. Critical Environmental Conditions for Lake Lanier Modeling. Memorandum prepared for the Upper Chattahoochee Basin Group, Gainesville, GA.

LTI, 2003. Selection of Critical Period for Lake Lanier Modeling. Memorandum prepared for Gwinnett County, GA.

Technical Memorandum No. 10A

Diffuser Dilution Modeling Using Five Years Of Simulated Lake Temperature

Project: Gwinnett County DPU Project No. 5697
Reuse Pipe Line and Diffuser to Lake Lanier

Prepared by: Parsons

Date: August 12, 2005

SUMMARY

This memorandum provides documentation of the dilution simulation modeling that was recently conducted using a five-year time-series of ambient temperature data generated by CH2MHill/Limnotech as part of their CE-QUAL-W2 water quality modeling of Lake Lanier. Previous to this effort, Parsons had undertaken dilution modeling which successfully documented that the proposed submerged diffuser design would successfully meet the NPDES temperature permitting criteria at the 3 meter compliance point.

This recent modeling effort is similar in format to that conducted in May 2003 the results of which were presented in Technical Memorandum (TM) No. 10. Technical Memorandum No. 10 was originally undertaken to determine if the inter-annual variability of the ambient temperature at the diffuser discharge point would impact previous modeling results. The five-year temperature data provided were used to simulate dilutions and temperature increases by substituting this temperature data for the previous in-situ measurements performed by Parsons during the 2001-2002 period. The speed of the currents was also reduced from a previous value of 2 cm/sec to 1 cm/sec, used in Technical Memorandum 6, since the CE-QUAL-W2 simulations indicated that current speeds at the discharge depth might be more commonly in the range of 0 to 1 cm/sec. The remaining data on the characteristics of the effluent and receiving water are the same as used in the earlier analysis.

The changes in TM 10A are as follows:

- The depth of the diffuser of the reuse outfall was deepened from 1037.2 to a new depth of 965 ft. MSL.
- Lake Lanier pool elevation was evaluated for two conditions- normal pool at 1070 ft. MSL and low pool at 1035 ft. MSL.
- Terminal Initial Dilution (TID), the point where the plume reaches its point of stagnation was evaluated and quantified.

The following is a comparison of the dilution simulation results from all the previous modeling efforts:

Simulation Description	Dilution At Compliance Pt.	Maximum Temperature °F	Median Temperature Rise- °F	Maximum Temperature Rise- °F
Annual In-situ Data (TM No. 6)	16.8	82.5	0.59	1.08
Five Years Time Series (TM No. 10)	16.777 Average	85.3	0.46	1.35
Five Years Time Series (TM No. 10A) Pool Elevation 1070 ft. MSL	16.764 Average	79.3	1.37	1.96
Five Years Time Series (TM No. 10A) Pool Elevation 1035 ft. MSL	16.770 average	79.29	1.05	1.75

Results from all modeling efforts confirmed that the proposed diffuser design would meet the NPDES permit temperature criteria and that inter-annual temperature variability will not affect the ability of the diffuser to meet these regulatory requirements.

Terminal Initial Dilution (TID), the point where the plume reaches its point of stagnation and ceases to move, was quantified as follows:

- The 50 percentile of the TID is 58.7 to 1. The maximum dilution for all cases is 109.6 to 1 at the TID point.
- The range of distances to the TID is between 13.6 and 132.8 meters, with the 50 percentile of the distribution around 40 meters.
- The range of temperature increases in lake water at the TID is 0.04 to 0.40 °F, with a 50 percentile of 0.20 °F.

INTRODUCTION

Effluent from the Gwinnett County – F. Wayne Hill Water Resources Center (FWHWRC) is proposed to be discharged into Lake Lanier from a multi-port, submerged diffuser. In a previous evaluation, documented in Technical Memorandum No. 6 - “Diffuser Dilution Modeling” (Parsons, 2003), a simulation model was employed to quantify the dilution of the discharged effluent into Lake Lanier and to ensure that the diffuser design will meet the regulatory requirements of the State of Georgia Department of Natural Resources. Approximately one year of data on the characteristics of the receiving waters of Lake Lanier and the effluent were used in this original evaluation. The temperature data were measured in the Lake at several depths at a monitoring station in the vicinity of the proposed discharge. A description of the methodology, the simulation model, a discussion of the data used in the simulations, and the results and conclusions from the analysis are described in Technical Memorandum No. 6.

This memorandum documents the results of a duplicate analysis, that uses a longer record of Lake temperature. Five years of temperature data were simulated at several pool elevations throughout Lake Lanier. Employing a longer temperature record provides some insight into the inter-annual variability in the characteristics of Lake Lanier, and how that variability might affect compliance with the regulatory requirements.

BACKGROUND

The NPDES permit determines temperature requirements for the discharge from the FWHWRC into Lake Lanier; they are as follow: "At a sampling point 3 meters from the outfall diffuser, the temperature shall not exceed 90 degrees Fahrenheit nor increase the lake ambient temperature more than 5 degrees Fahrenheit." (State of Georgia DNR Permit No. GA0038130).

A multi-port, submerged diffuser will be used to meet these requirements. The initial dilution achieved by the diffuser is dependent on the characteristics of the effluent, the design of the outfall diffuser, and the properties of the receiving water environment. In the previous analysis, effluent and receiving water data were input into a model simulating the initial dilution process to determine if the NPDES temperature requirements would be met by the proposed design. The analysis was based on in-situ measurements of the thermal stratification of the water column at hourly intervals for the period spanning October 18, 2001 to September 26, 2002.

Technical Memorandum No. 6 indicated that a seasonal cycle dominated the thermal stratification of the water column. However, with only a year of observations, it was not possible to assess inter-annual variability in this seasonal cycle and any related effects on the dilution, and hence the ability of the proposed design to meet the regulatory requirements over time. CH2MHill/ Limnotech provided Parsons with five years (1984 through 1988) of simulated data in the year 2003 on the thermal characterization of the water column in the vicinity of the proposed outfall with the normal pool Lake elevation being 1070 ft. MSL. This data was produced as part of their CE-QUAL-W2 water quality modeling of Lake Lanier, which generated data throughout the Lake at daily intervals (CH2MHill/Limnotech- 2003). This data was used by Parsons to generate Technical Memorandum No. 10. In 2005, CE-QUAL-W2 was used to generate a similar five years of simulated data for the same time period with the pool elevation being at 1070 and 1035 ft. MSL and the discharge elevation deepened to 965 ft MSL.

The purpose of this memorandum is to document that the proposed design of the outfall diffuser system will meet the temperature requirements by evaluation of the following:

- The depth of the diffuser of the reuse outfall was deepened from 1037.2 to a new depth of 965 ft MSL.
- Lake Lanier pool elevation was evaluated for two conditions- normal pool at 1070 ft. MSL and low pool at 1035 ft. MSL
- Terminal Initial Dilution (TID), the point where the plume reaches its point of stagnation and ceases to move was evaluated and quantified.

This memorandum is organized as follows:

- Dilution Simulation Model
- Simulations
- Results and Discussion

- Conclusions
- References

DILUTION SIMULATION MODEL

In this evaluation, effluent dilutions were computed using a version of the EPA numerical simulation model UMERGE. The TSMERGE version -- an adaptation of the EPA's UMERGE model in which the computational core of the model is the same as in UMERGE, but the input and output file structures have been customized to permit simulations to be computed for time-series observations of various discharge and receiving water characteristics (e.g. discharge rate, effluent density, density of the water column, ambient currents, etc.). TSMERGE also allows generation of an output showing the characteristics of the jet or plume when some specified condition(s) are met. For example--in the present case--the 3m dilution, which is 3 meters from the discharge port. TSMERGE was used to evaluate all the time-series data used for this technical memorandum.

SIMULATIONS

The temperature data provided were used to simulate dilutions and temperature increases during each of these years by substituting this new temperature data for our previous in-situ measurements. Much like in TM 10, the speed of the currents was also reduced from our previous value of 2 cm/sec to 1 cm/sec since the CE-QUAL-W2 simulations indicated that current speeds at the discharge depth might be more commonly in the range of 0 to 1 cm/sec. However, this change is largely academic since the sensitivity analysis in the previous evaluation showed that dilutions were independent of current speeds for speeds of 2 cm/sec or less. The remaining data on the characteristics of the effluent and receiving water are the same as used in the earlier analysis.

Receiving Water Thermal Stratification

The regulatory requirements relating to dilution are based on the dilutions achieved at a distance of 3m from the diffuser discharge port. The simulations performed show that within this region the dilution is almost exclusively a consequence of the momentum of the jet from each diffuser port. Temporal variations in the thermal stratification of the water column, and the temperature of the effluent have a negligible effect on the dilutions achieved, and on the trajectory of the jet within this region. Hence the discharged effluent is almost exclusively mixed with the ambient water at the depth of the diffuser port.

Normal Pool elevation – 1070 ft. MSL: Figure 1 shows the seasonal variation of the ambient Lake temperature at the new discharge depth (965 ft. MSL) for each of the five years for which data was provided. The seasonal cycle typically spans a range of about 11.38 °C (20.48 °F), with minimum temperatures found in February, and maximum temperatures occurring in November-December.

Table 1 summarizes the maximum and minimum temperatures at the 965 ft. discharge depth for each of the five years of temperature data simulated, as well as from the direct measurements for the year 2001 to 2002. Among the simulated temperature values, the

difference between the highest and lowest maximum temperatures is 4.55 °C (8.05 °F). The difference between the highest and lowest minimum temperatures is 1.77 °C (3.19 °F).

It should be noted that the readings for 2001-2002 are based on the recordings at the deepest temperature sensors in that field study. Depending on the period, the deepest layer monitored was between 971 ft. and 976 ft. MSL, or 6 to 11 feet higher than the diffuser port depth of 965 ft. MSL.

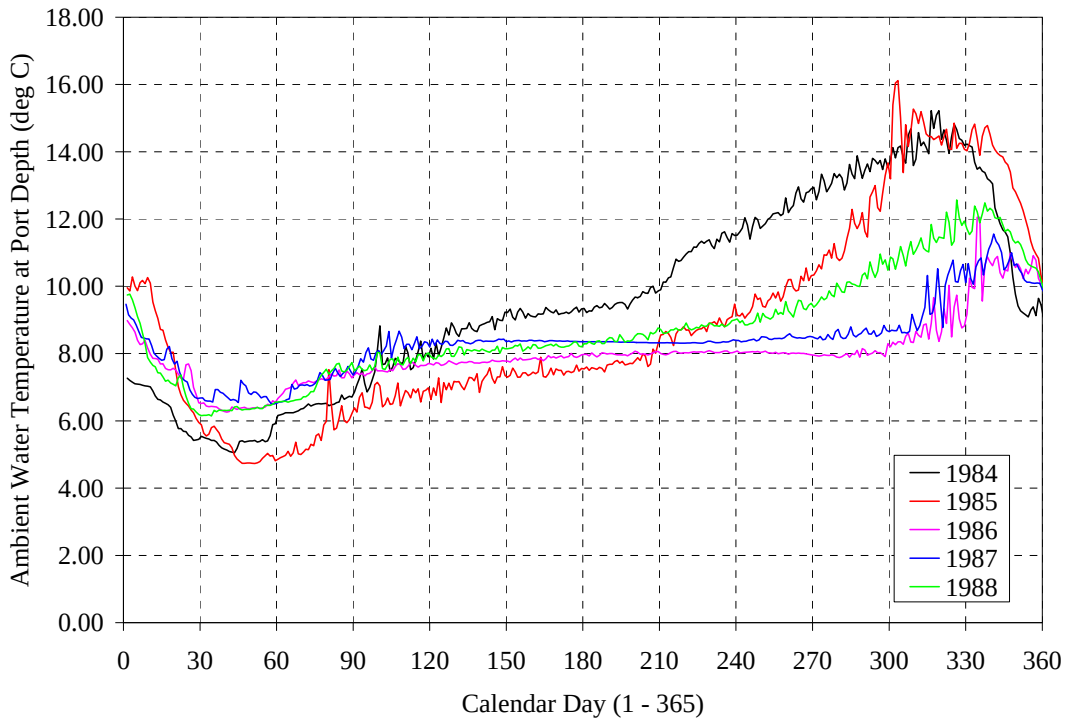

Figure 1. Lake Lanier Simulated Water Temperature
Pool Elevation 1070 ft. MSL

Table 1
Ambient Water Temperatures at the Discharge Depth of 965 ft. MSL

Year	Maximum (°C)	Minimum (°C)	Range (°C)
1984	15.22	5.05	10.17
1985	16.11	4.73	11.38
1986	12.05	6.26	5.79
1987	11.56	6.50	5.06
1988	12.57	6.14	6.43
84-88	16.11	4.73	11.38
2001-2002*	10.75	8.21	2.54

*Readings for 2001-2002 based on deepest recorded points between 971 and 976' MSL

The temperature recording campaign of 2001-2002 was focused on obtaining temperature information within the shallower depths of the 1037.2 ft. discharge being considered at that time. We consider the available data to be sufficient for modeling the temperature changes in the ambient water as a result of the 965 ft. discharge. This is because of the reduced rate of changes in temperature occurring at depth, and because at the regulatory distance of 3 meters from the outfall, the dilution is almost exclusively a consequence of the momentum of the jet from each diffuser port.

Low Pool Elevation – 1035 ft. MSL: Figure 2 shows the seasonal variation of the ambient Lake temperature at the 965 ft. discharge depth for each of the five years for which data was provided. The seasonal cycle typically spans an average range of 13.98 °C (25.17 °F), with minimum temperatures found in February, and maximum temperatures occurring in October.

Table 2 summarizes the maximum and minimum temperatures at the discharge depth for each of the five years of temperature data simulated, as well as from the direct measurements for the year 2001 to 2002. Among the simulated temperature values, the difference between the highest and lowest maximum temperatures is 4.42 °C (7.96 °F). The difference between the highest and lowest minimum temperatures is 1.73 °C (3.11 °F).

Also for the low pool elevation, the readings for 2001-2002 are based on the recordings at the deepest temperature sensors in that field study (6 to 11 feet higher than the diffuser port).

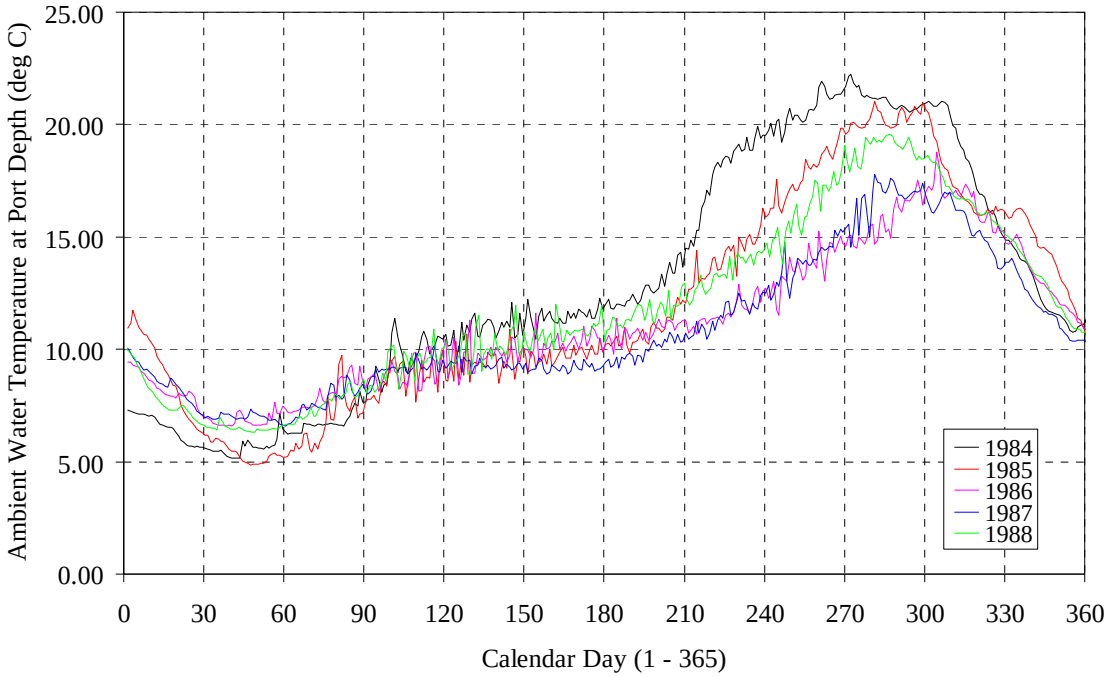

Figure 2. Lake Lanier Simulated Water Temperature
Pool Elevation 1035 ft. MSL

Table 2
Ambient Water Temperatures at the Discharge Depth of 965 ft. MSL with Low Lake Levels

Year	Minimum (°C)	Maximum (°C)	Range (°C)
1984	5.14	22.22	17.08
1985	4.87	21.06	16.19
1986	6.59	18.79	12.20
1987	6.60	17.80	11.20
1988	6.33	19.59	13.26
84-88	4.87	22.22	17.35
2001-2002*	7.25	13.82	6.57

*Readings for 2001-2002 based on interpolation of recorded points near a water depth of 70 ft. (21.34m)

Effluent Temperature

Normal Pool Elevation – 1070 ft. MSL: The upper line in Figure 3 shows the seasonal pattern in the temperature of the effluent before it is discharged from the diffuser port. The maximum temperature is 26.3 °C (79.3 °F) and the minimum is 14.7 °C (58.5 °F). Thus the range of temperature variation is about 11.6 °C (20.8 °F) or for 1987, the year shown in the lower plot roughly twice the variation in the temperature of the ambient water at the depth of the discharge port. As an example, the lower line in Figure 3 shows simulated Lake temperatures at the 965 ft. discharge depth for the year 1987.

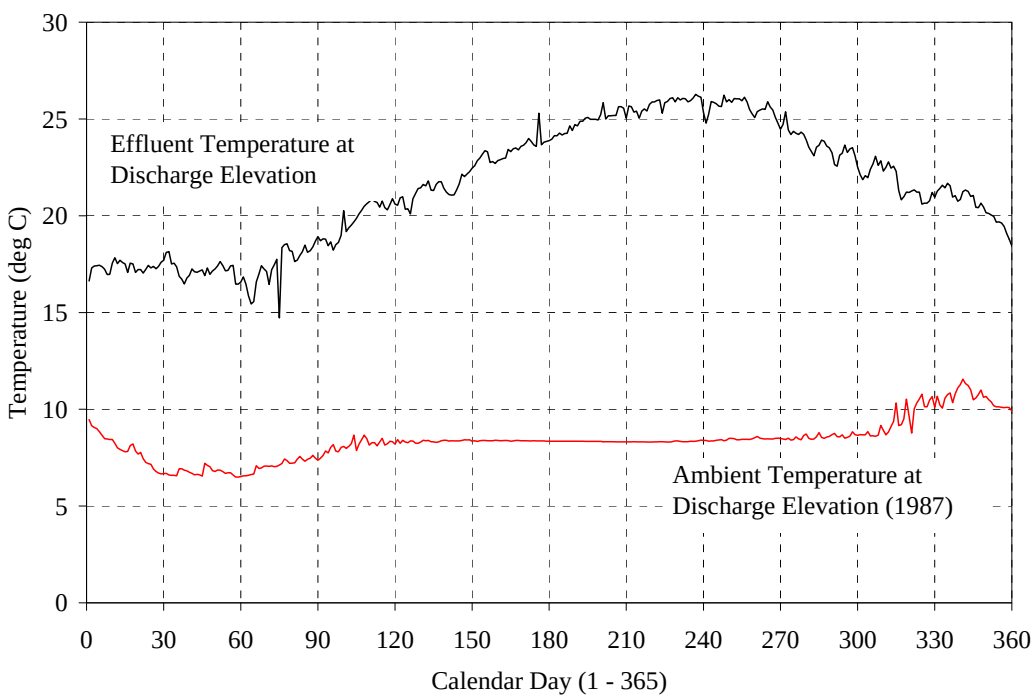

Figure 3. Effluent Temperature and Lake Lanier Temperature at Discharge Depth (Year 1987) Pool Elevation 1070 ft. MSL

The temperature increase, over background, of the water in the jet at a distance 3m from the discharge port is related to the temperature of the effluent as it emerges from the diffuser, the temperature of the ambient water at the discharge depth, and the dilution that has been achieved between the discharge port and the 3m reference distance. The relationship of these variables is shown in the following equation:

$$\Delta T = T_P - T_A = \frac{T_E + T_A \cdot (D-1)}{D} - T_A$$

where:

ΔT	= temperature increase above ambient at 3m from discharge port
T_P	= temperature of the jet at a distance of 3m from the discharge port
T_A	= temperature of the ambient water at the depth of the discharge port
T_E	= temperature of effluent at the time of discharge
D	= dilution (as generated by the TSMERGE model)

Figure 3 shows the temperature of the effluent is always higher than that of the ambient water at the discharge depth. Therefore, the effluent plume will rise in the water column, since warmer water is lighter.

Low Pool Elevation – 1035 ft. MSL: The upper line in Figure 4 shows the seasonal pattern in the temperature of the effluent before it is discharged from the diffuser port at a low pool elevation of 1035 ft. MSL. The maximum temperature is 26.3 °C (79.3 °F) and the minimum is 14.7 °C (58.5 °F). These values remain the same regardless of the level in the Lake. Thus the range of temperature variation is 11.6 °C (20.8 °F), or roughly the same as the variation in the temperature of the ambient water at the depth of the discharge port. The lower line in Figure 4 shows simulated Lake temperatures at the same discharge depth for the year 1987.

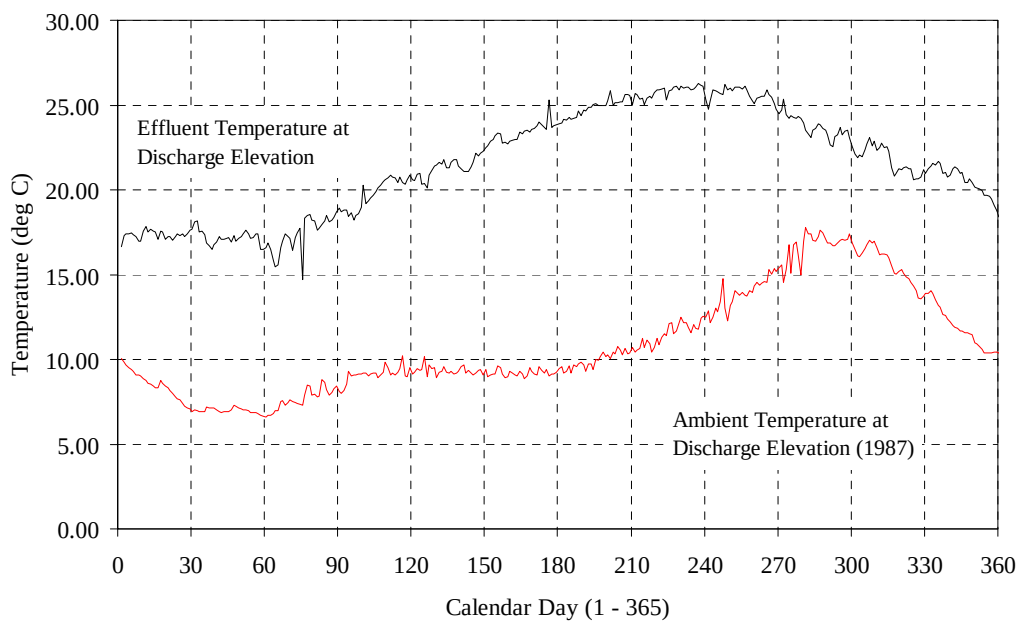

Figure 4. Effluent Temperature and Lake Lanier Temperature at Discharge Depth (Year 1987) Pool Elevation 1035 ft. MSL

Figure 4 shows that always the temperature of the effluent is higher than that of the ambient water at the discharge depth. Therefore, when the pool elevation is as low as 1035 ft., the effluent plume will ultimately rise in the water column, since warmer water is lighter.

RESULTS AND DISCUSSION

Dilution at 3m from the Discharge Port

Normal Pool Elevation – 1070 ft. MSL: Table 3 summarizes the dilutions achieved at a distance of 3m from the discharge port. There are only very minor deviations from an average dilution of 16.764. This confirms the previous conclusion that within this region close to the discharge port, the dilution is primarily driven by the initial momentum of the jet, and that the effect of the buoyancy of the effluent plays a negligible role in the magnitude of the dilution.

Table 3
Dilutions at 3m from Discharge Port

Year	Average Dilution	Minimum Dilution	Maximum Dilution
1984	16.766	16.749	16.783
1985	16.764	16.746	16.782
1986	16.764	16.746	16.783
1987	16.764	16.746	16.783
1988	16.764	16.747	16.783
1984-1988	16.764	16.746	16.783

Low Pool Elevation – 1035 ft. MSL: Table 4 summarizes the dilutions achieved at a distance of 3 m from the discharge port during low pool elevation of 1035 ft. MSL. In this case also there are only very minor deviations from an average dilution of 16.770.

The results of this modeling effort also indicate that with the deepened discharge, the changes in pool elevation have virtually no influence on the level of achievable dilution.

Table 4
Dilutions at 3m from Discharge Port

Year	Minimum Dilution	Maximum Dilution	Average Dilution
1984	16.754	16.792	16.773
1985	16.751	16.789	16.771
1986	16.751	16.784	16.768
1987	16.750	16.783	16.768
1988	16.753	16.784	16.770
1984-1988	16.750	16.792	16.770

Temperature Increase at 3m from Discharge Port.

Normal Pool Elevation – 1070 ft. MSL: Table 5 presents the statistical summary of the five years simulation for the temperature at the 3-m regulatory distance:

Table 5
Plume Temperature at 3m Regulatory Distance (°F)

Year	Minimum (°F)	Maximum (°F)	Median (°F)
1984	42.38	60.05	50.63
1985	41.84	61.65	49.29
1986	44.41	54.72	47.87
1987	44.77	53.84	48.50
1988	44.28	55.49	49.07
1984-1988	41.84	61.65	49.07

Low Pool Elevation – 1035 ft. MSL: Table 6 presents the statistical summary of the five years simulation for the temperature at the 3-m regulatory distance:

Table 6
Plume Temperature at 3m Regulatory Distance

Year	Minimum (°F)	Maximum (°F)	Average (°F)
1984	42.53	72.34	56.03
1985	42.07	70.16	54.49
1986	44.92	66.17	53.13
1987	44.95	64.66	52.66
1988	44.54	67.72	54.28
1984-1988	42.07	72.34	54.12

Normal Pool Elevation – 1070 ft. MSL: Table 7 summarizes the increase in the water temperature of the jet above that of the surrounding ambient water at a distance of 3m from the discharge port:

Table 7
Temperature Increase at 3m from Discharge Port

Year	Minimum (°F)	Maximum (°F)	Median (°F)
1984	0.62	1.74	1.27
1985	0.62	1.93	1.36
1986	0.81	1.96	1.45
1987	0.77	1.93	1.41
1988	0.74	1.87	1.37
1984-1988	0.62	1.96	1.37

Low Pool Elevation – 1035 ft. MSL: Table 8 summarizes the increase in the water temperature of the jet above that of the surrounding ambient water at a distance of 3 m from the discharge port:

Table 8
Temperature Increase at 3m from Discharge Port

Year	Minimum (°F)	Maximum (°F)	Average (°F)
1984	0.10	1.49	0.93
1985	0.17	1.67	1.03
1986	0.34	1.61	1.12
1987	0.61	1.75	1.15
1988	0.37	1.52	1.04
1984-1988	0.10	1.75	1.05

Normal Pool Elevation – 1070 ft. MSL: The time-series of the temperature changes at the 3m-reference distance with each simulation year for normal pool elevation of 1070 ft. are illustrated in Figures 5 through 9. The seasonal cycle is readily evident, as a way of an example, comparison of Figure 8 with Figure 3 (both year 1987) shows that the largest temperature increases coincide with the greatest differences between the temperature of the discharged effluent and the temperature of the ambient water at the discharge depth (e.g. August to September). This is, of course, what would be expected since the dilution achieved at the 3m-distance is essentially constant and independent of season.

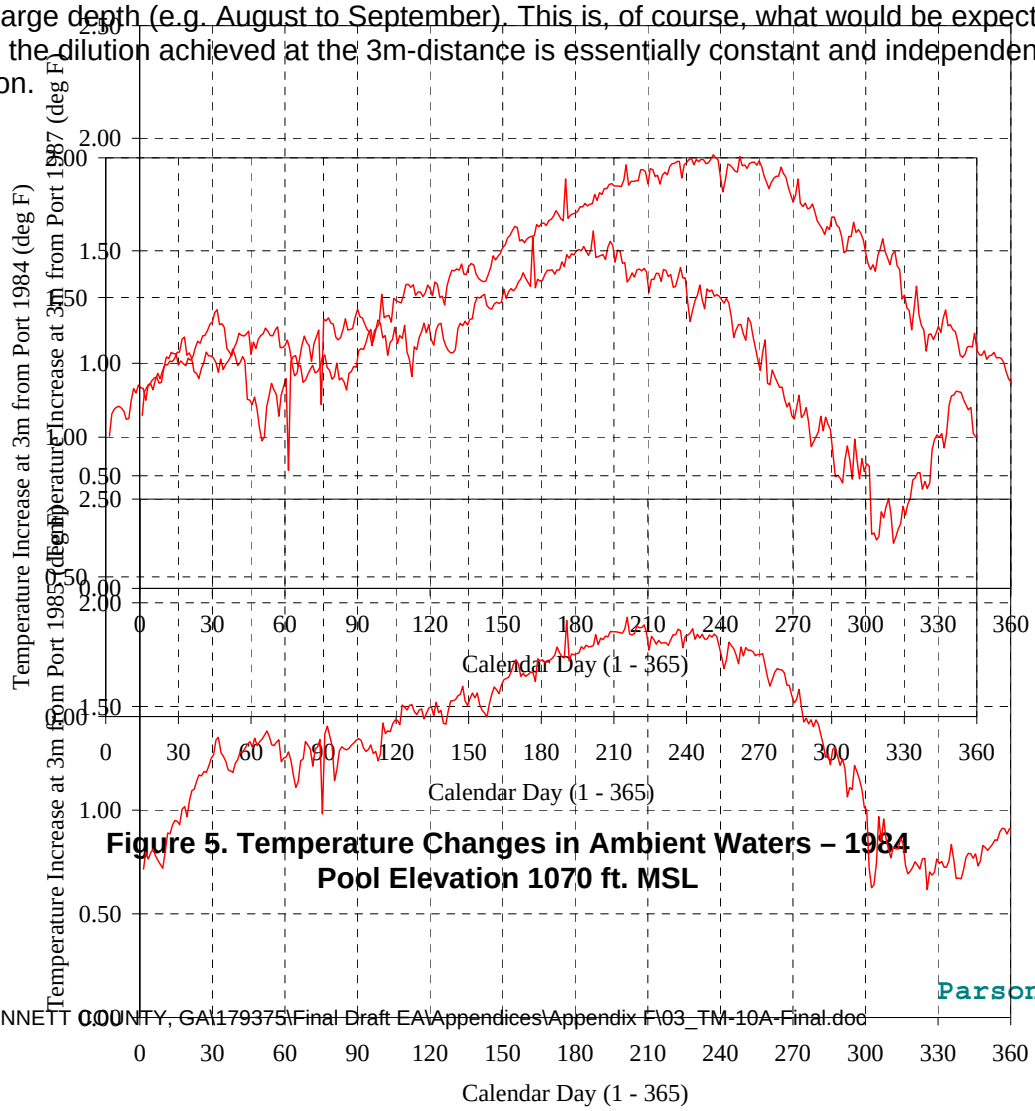

Figure 5. Temperature Changes in Ambient Waters – 1984
Pool Elevation 1070 ft. MSL

Figure 6. Temperature Changes in Ambient Waters – 1985
Pool Elevation 1070 ft. MSL

Figure 7. Temperature Changes in Ambient Waters – 1986
Pool Elevation 1070 ft. MSL

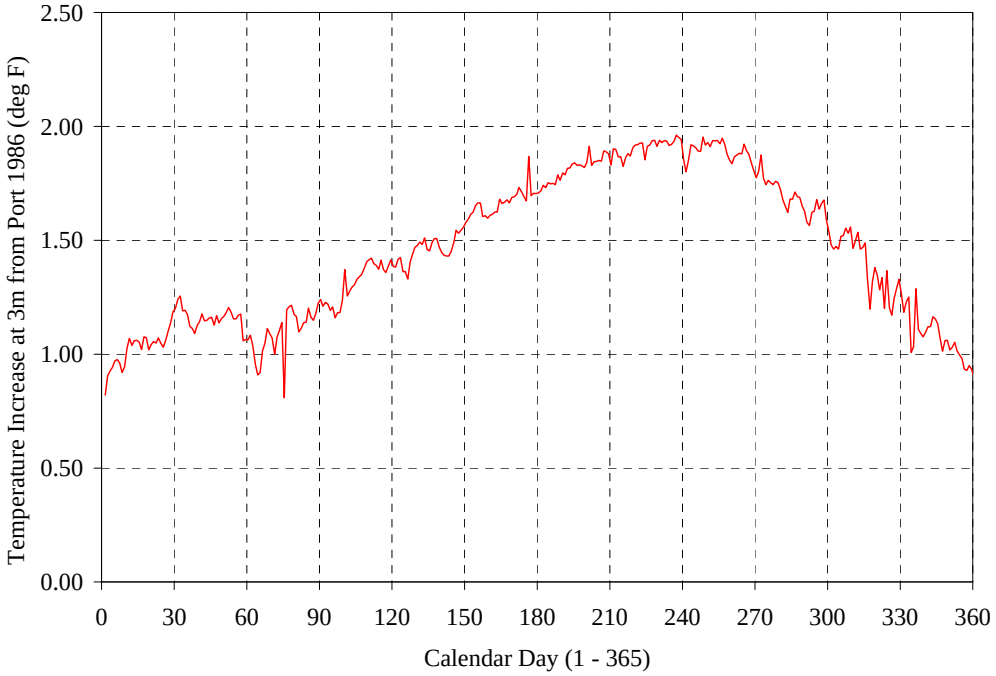

Figure 8. Temperature Changes in Ambient Waters – 1987
Pool Elevation 1070 ft. MSL

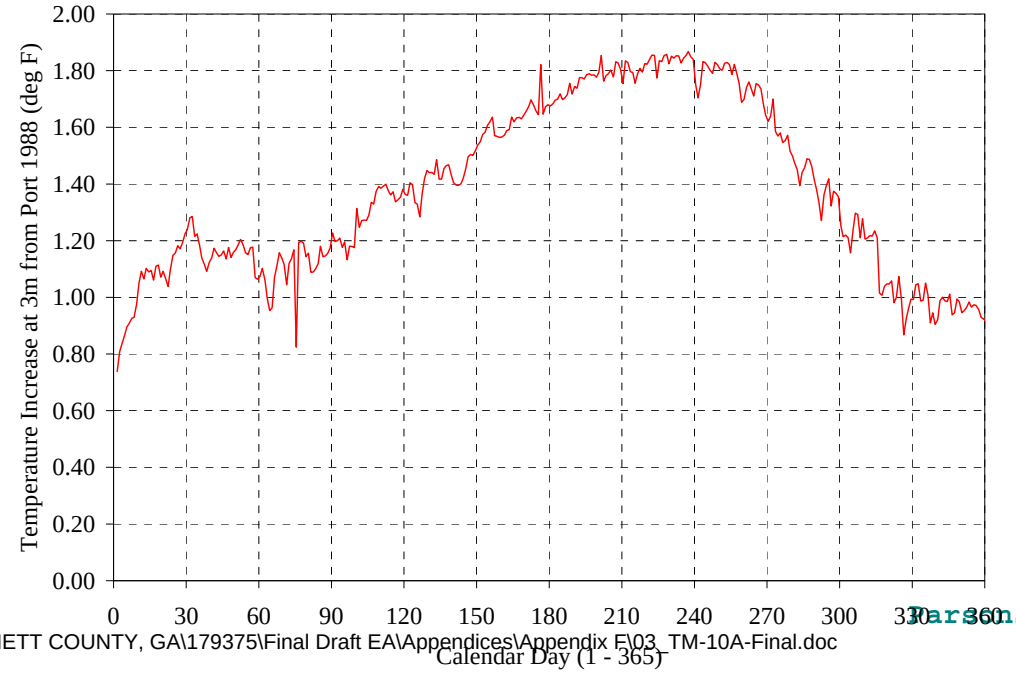

Figure 9. Temperature Changes in Ambient Waters – 1988
Pool Elevation 1070 ft. MSL

Low Pool Elevation – 1035 ft. MSL: The time-series of the temperature changes at the 3 m-reference distance with each simulation year for low pool elevation of 1035 ft. are illustrated in Figures 10 through 14. The seasonal cycle is readily evident, as a way of an example, comparison of Figure 13 with Figure 4 (both year 1987) shows that the largest temperature increases coincide with the greatest differences between the temperature of the discharged effluent and the temperature of the ambient water at the discharge depth (e.g. August to September). This is what would be expected since the dilution achieved at the 3 m-distance is essentially constant and independent of season.

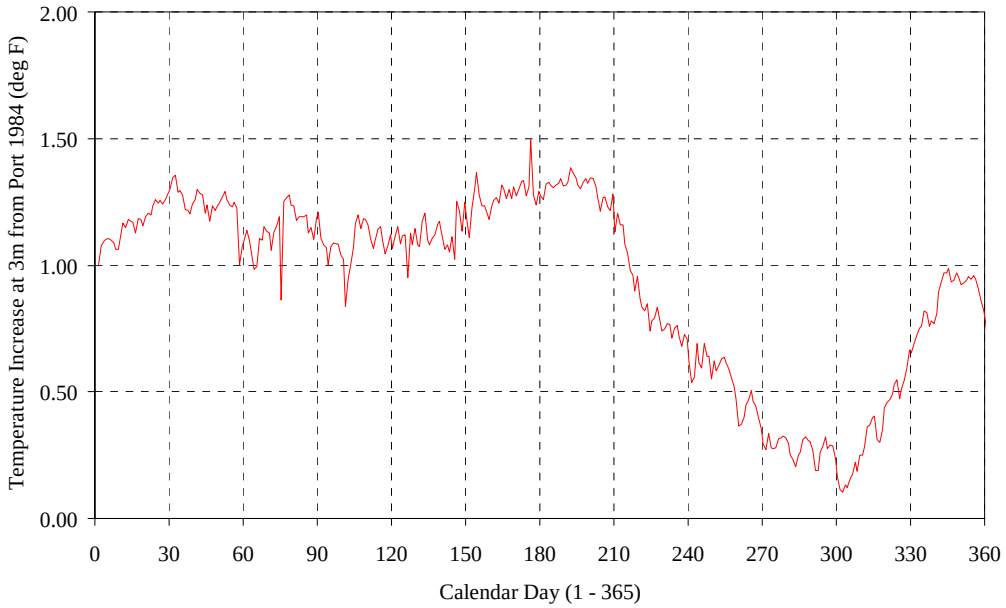

Figure 10. Temperature Changes in Ambient Waters – 1984
Pool Elevation 1035 ft. MSL

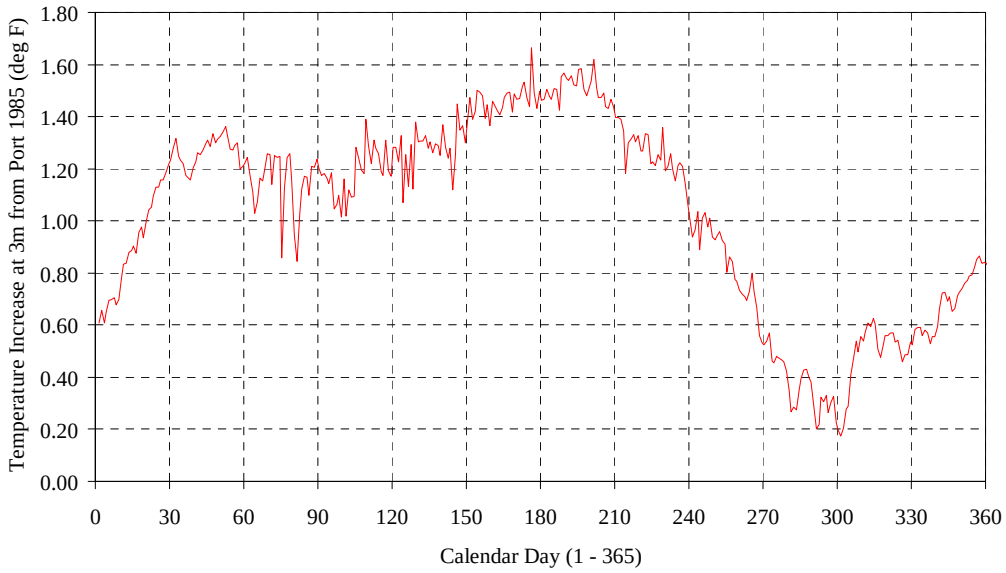

Figure 11. Temperature Changes in Ambient Waters – 1985
Pool Elevation 1035 ft. MSL

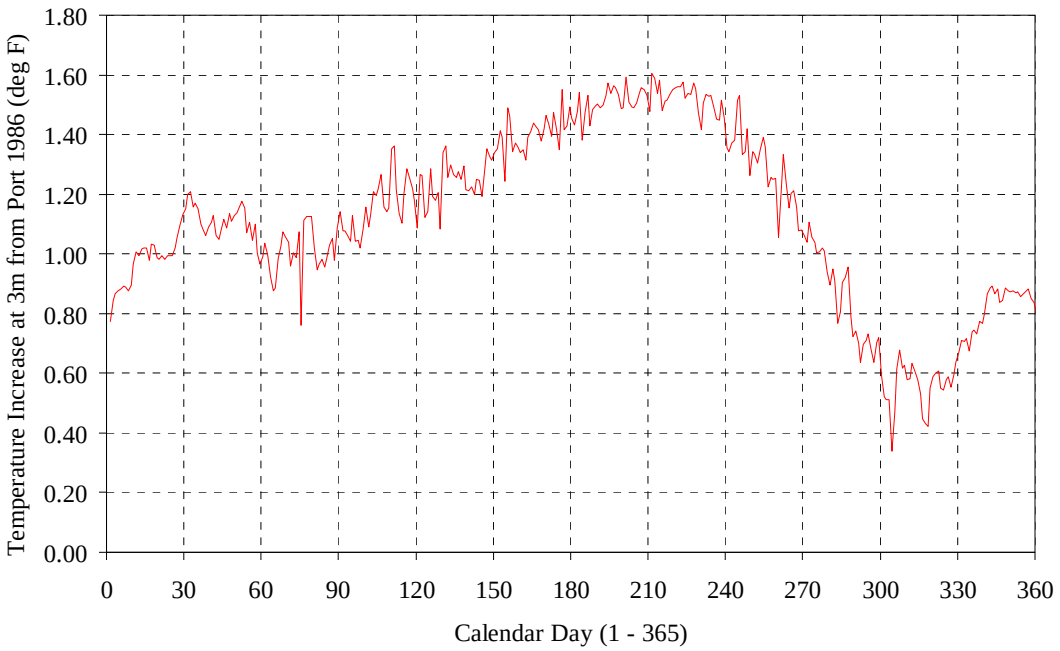

Figure 12. Temperature Changes in Ambient Waters – 1986
Pool Elevation 1035 ft. MSL

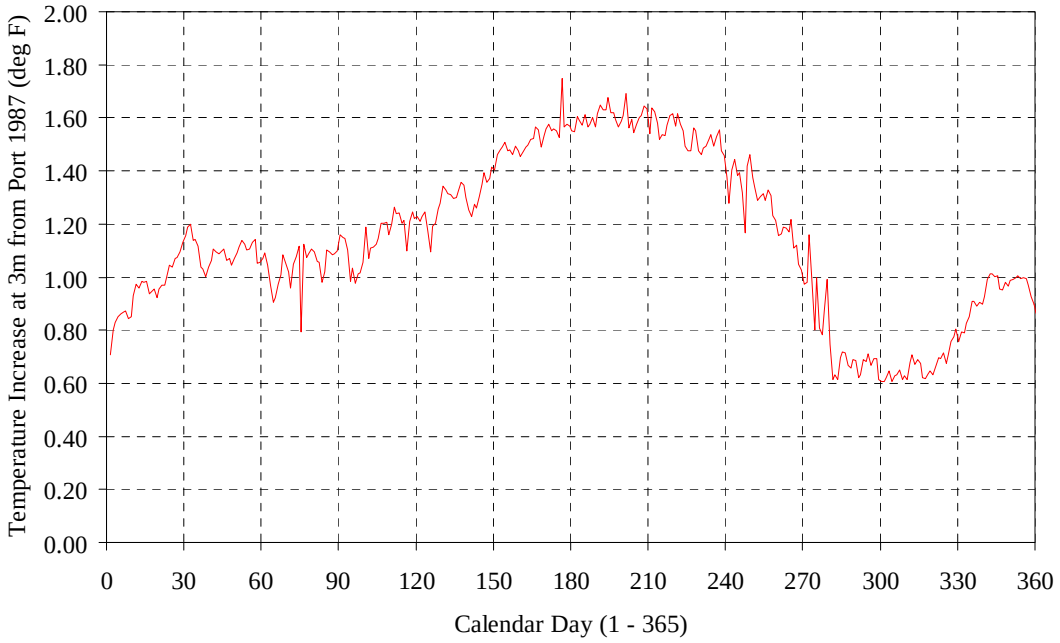

Figure 13. Temperature Changes in Ambient Waters – 1987

Pool Elevation 1035 ft. MSL

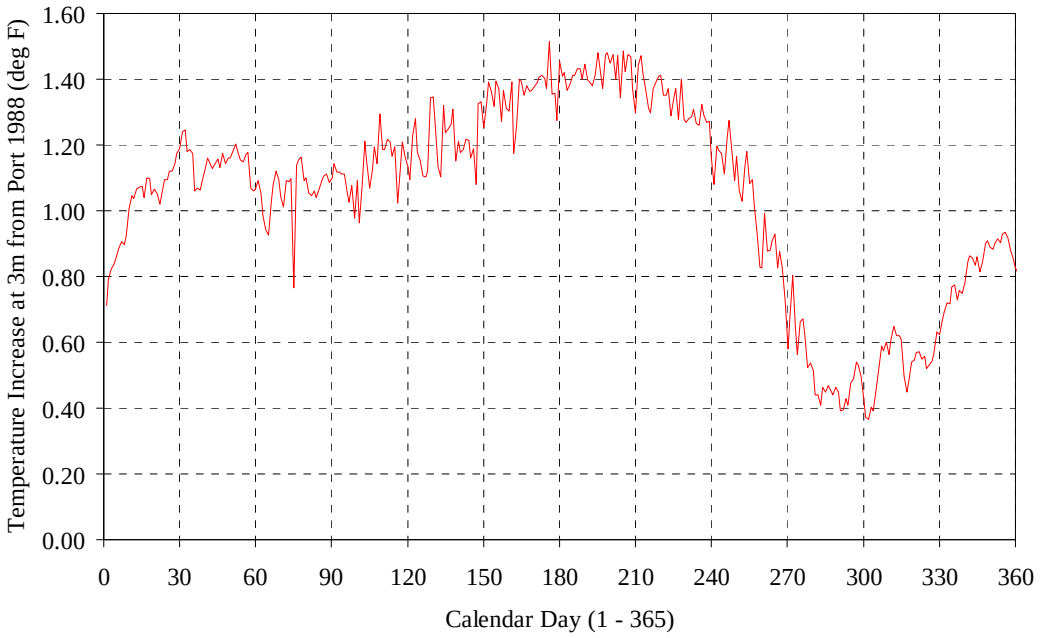

Figure 14. Temperature Changes in Ambient Waters – 1988
Pool Elevation 1035 ft. MSL

Terminal Initial Dilution (TID)

As required by the NPDES permit, the initial dilution is computed as it occurs at 3 meters from the discharge. The initial dilution process continues past the 3-meter point till the plume reaches its point of stagnation and ceases to move. The level of dilution reached at this point can be defined as Terminal Initial Dilution (TID) to distinguish it from the initial dilution attained at 3m from the diffuser.

In the following subsection, Parsons defines the dilution ratio occurring at the TID point, the increase in water temperature at this point, and its distance from the diffuser. Figure 15 shows the plot of the TID versus delta T, the increase in temperature of the Lake water due to the discharge. Based on the simulated Lake temperature data, the TID ranges from a minimum dilution of 31 to a maximum of 110 to 1. Both the minimum and maximum dilutions are associated with Lake temperatures occurring in year 1985. The resulting increase in lake temperatures associated with the discharge ranges between 0.02 and 0.21°C. The highest dilutions are associated with average increases in the temperature of the water in the Lake.

Figure 16 shows a plot of the Lake temperature increase versus the distance from the discharge point. This is the distance to the point where the plume ceases to move vertically entraining diluting water (where the TID process is completed). The range of distances is between 13 and 133 meters, although half of the cases have a distance of less than 40m. The largest distance is associated with median values of temperature increases in the Lake.

Figure 17 shows a plot of the TID versus distance from the diffuser. Generally, but not always, the highest dilutions are achieved furthest away from the diffuser.

Figure 18 shows the relationship between the depth of the plume and the attainable TID. Not surprisingly the highest dilutions are achieved when the plume reaches the surface. In these cases the path is the longest.

Figure 19 shows a plot of the depth versus distance of the center of the plume. This representation gives, perhaps, the best view of the plume(s) . Each dot in the plot is a location, in the vertical and horizontal, where the initial dilution process is complete under the specific conditions of the simulation.

Table 9 presents the statistical summary of the TID parameters:

Table 9
Characteristics of the Terminal Initial Dilution

	Dilution Ratio	Distance from Diffuser (m)	Delta T (°F)
Maximum	109.6 to 1	132.8	0.40
Minimum	30.8 to 1	13.6	0.04
Average	58.7 to 1	39.9	0.2
Median	53.8 to 1	34.9	0.2

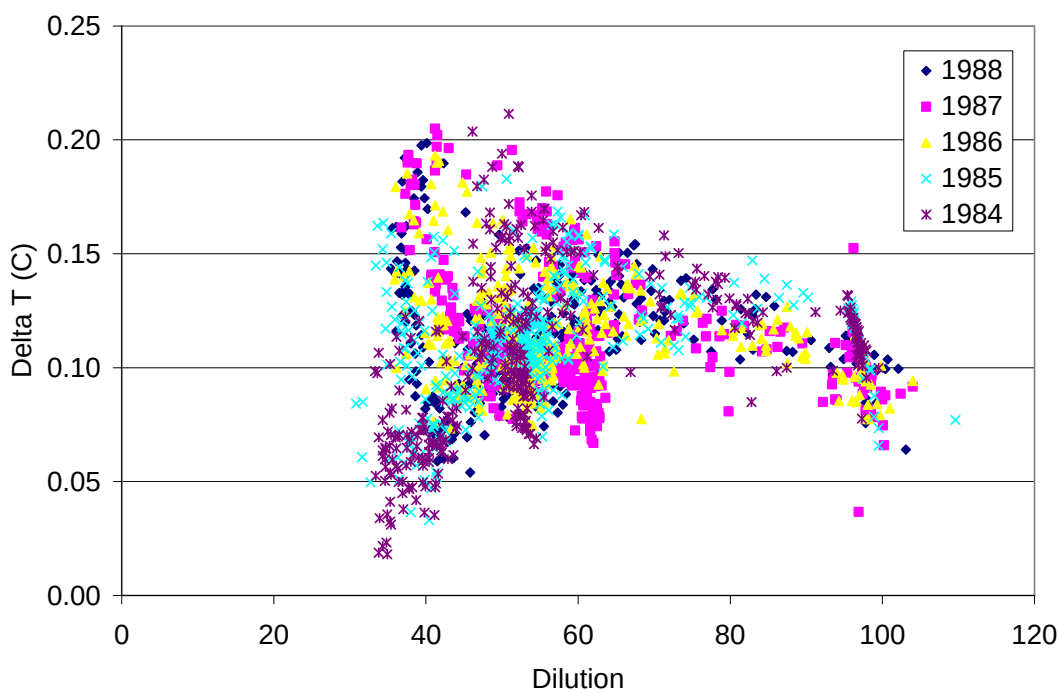

Figure 15. Terminal Initial Dilution versus Delta T

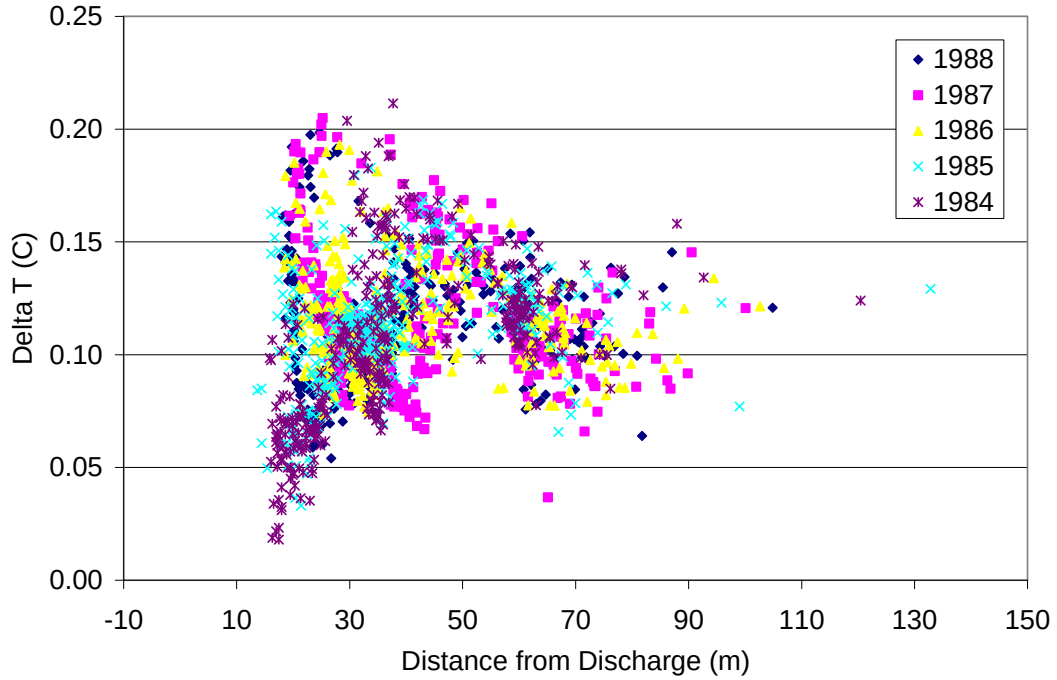

Figure 16. Distance from Discharge versus Delta T

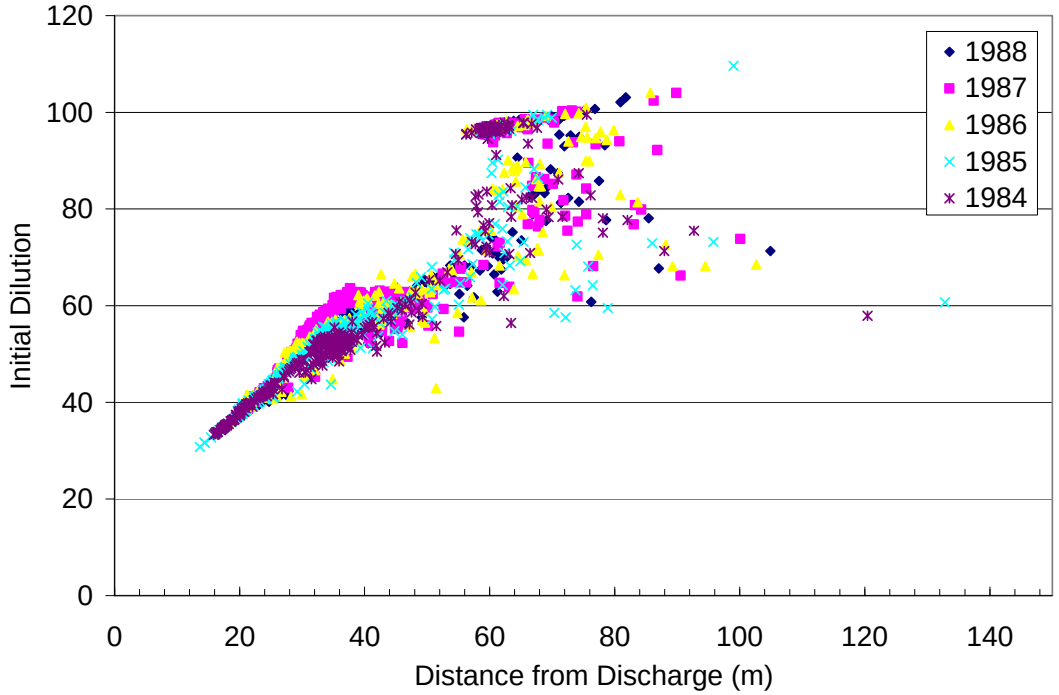

Figure 17. Terminal Initial Dilution versus Distance

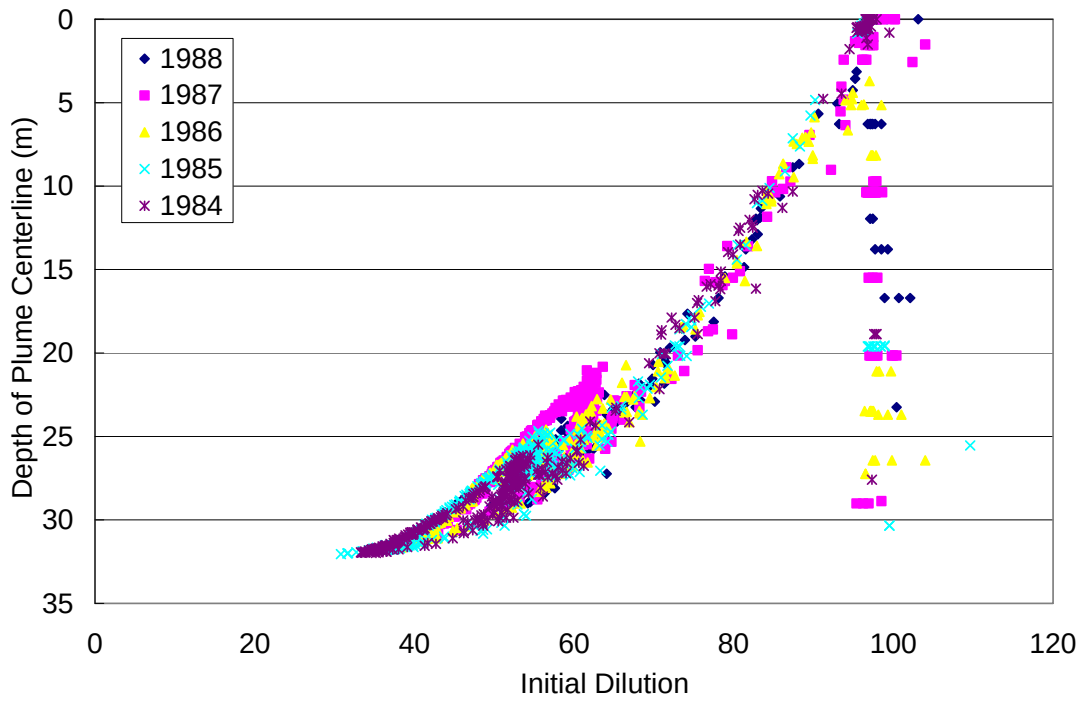

Figure 18. Terminal Initial Dilution versus Depth

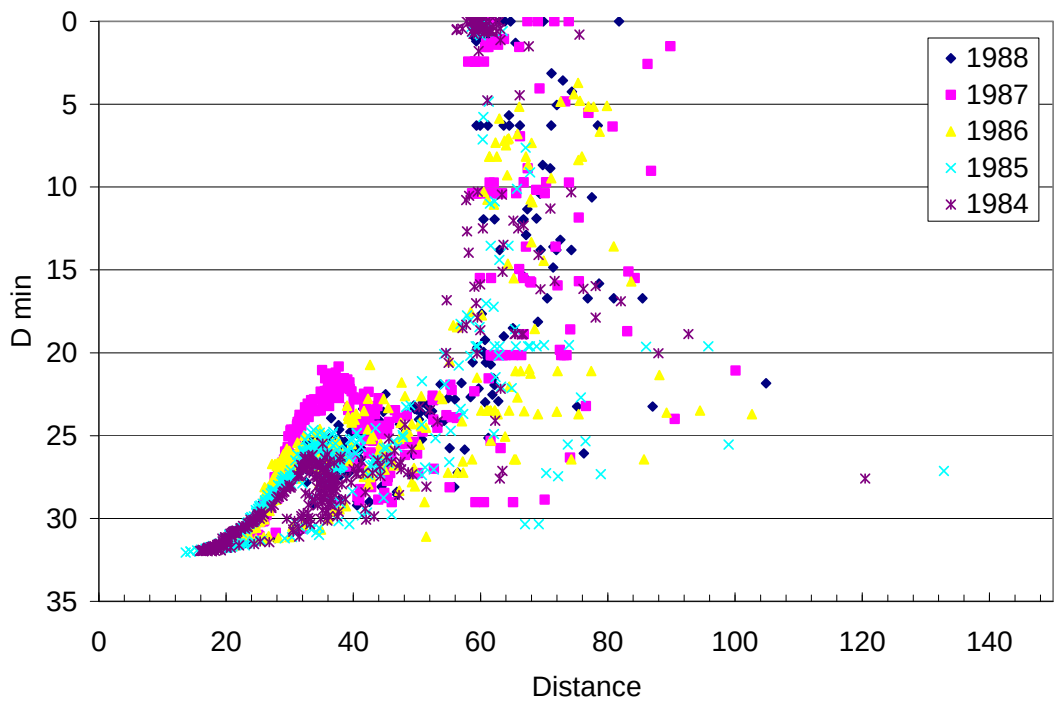

Figure 19. Depth versus Distance from Discharge

CONCLUSIONS

- The dilutions achieved at a distance of 3m from a discharge port for normal pool elevation (1070 ft. MSL) are virtually independent of variations in the thermal stratification of the water column, and average 16.764 to one.

- The predicted dilution when combined with the simulated time-series of temperature yields lake temperatures at 3m from the port for both pool elevations investigated well under the 90 °F discharge criteria.

- The maximum temperature increase in the effluent jet at a distance of 3m from the discharge is 1.96 °F, and the average increase is about 1.37 °F for the pool elevation of 1070 ft. These values are well within the regulatory limit of 5.0 °F.

- The maximum temperature increase in the effluent jet at a distance of 3m from the discharge is 1.75 °F, and the average increase is about 1.05 °F for the pool elevation of 1035 ft. These values are well within the regulatory limit of 5.0 °F.

- Terminal Initial Dilution (TID), the point where the plume reaches its point of stagnation and ceases to move, was quantified as follows:
    - The 50 percentile of the dilution is 58.7 to 1. The maximum dilution for all cases is 109.6 to 1 at the TID point.
    - The range of distances to the TID is between 13.6 and 132.8 meters, with the 50 percentile of the distribution around 40 meters.
    - The range of temperature increases in lake water at the TID is 0.04 to 0.40 °F, with a 50 percentile of 0.20 °F.

- The proposed discharge is expected to readily meet the temperature regulatory limits set by the State of Georgia Department of Natural Resources.

REFERENCES

CH2MHill/Limnotech, 2003. Result from the CE-QUAL-W2 water quality modeling of Lake Lanier (Normal Pool Elevation 1070 ft. MSL) prepared by CH2MHill/Limnotech in April, 2003.

CH2MHill/Limnotech, 2005. Result from the CE-QUAL-W2 water quality modeling of Lake Lanier (Low Pool Elevation 1035 ft. MSL) prepared by CH2MHill/Limnotech in June, 2005.

Parsons, 2003. Technical Memorandum No. 6 – Diffuser Dilution Modeling. Project: Gwinnett County DPU Project No. 5697 - Reuse Pipe Line and Diffuser to Lake Lanier. Prepared by Parsons, Jan. 8, 2003.

Parsons, 2003. Technical Memorandum No. 10 – Near Field Diffuser Dilution Modeling. Using Five Years of Simulated lake Temperature. Project: Gwinnett County DPU Project No. 5697 - Reuse Pipe Line and Diffuser to Lake Lanier. Prepared by Parsons, May 16, 2003.

Evaluation of Temperature Impacts below Buford Dam from the F. Wayne Hill Water Resources Center

Prepared for:

Gwinnett County, Georgia

June 7, 2006

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Introduction

This document describes the results of an updated water quality model application to Lake Lanier to evaluate impacts of Gwinnett County's proposed 40 MGD discharge on water temperature below Buford Dam.

As documented in Attachment A, the Lake Lanier CE-QUAL-W2 model was updated with finer spatial resolution in order to more clearly define potential temperature impacts associated with the proposed discharge. Application of the re-segmented model to a five-year period encompassing a range of climatological conditions (both wet and dry years) showed that the proposed discharge will be in compliance with the State standard for maximum increase in daily average temperature of the Buford Dam outflow. As shown in Attachment B, predicted temperature increases in the Dam outflow attributable to the proposed discharge are less than 0.7^{o} F, well below the regulatory criterion of 2° F.

After presentation of these findings, Georgia Environmental Protection Division (EPD) and Wildlife Resources Division (WRD) specified several information needs to be addressed prior to acceptance of the modeling results:

1. Model Calibration – comparison of actual monitored temperatures below Buford Dam to simulated dam discharge temperatures (EPD and WRD)
2. Critical Conditions – Consideration of worst-case scenarios considering drought periods and reduced outflows (EPD and WRD)
3. Sensitivity Analysis – Consideration of sensitivity of the system to higher than expected wastewater temperatures (EPD and WRD)
4. Stratification – Comparison of duration and extent of lake stratification with and without discharges (WRD).

An additional need suggested by WRD was consideration of increased wastewater discharge flows. The NPDES permit application to Georgia EPD is for 40 MGD, so the increase of wastewater flows to 80 MGD or 120 MGD are not considered herein. Any future discharge requests would have to be addressed at that time and a separate or revised permit.

The remainder of this memorandum describes the analyses conducted and results of the additional modeling. It is divided into sections of:

- Summary of Findings
- Calibration
- Critical Conditions
- Sensitivity to Proposed Discharge Temperature
- Stratification

Summary of Findings

The additional analyses and simulations described below demonstrate that:

- The Lake Lanier CE-QUAL-W2 application, in addition to being calibrated to observed data within the lake pool, predicts discharge temperatures below Buford Dam that are statistically comparable to observed temperatures.
- Simulated daily temperatures just upstream of the dam in Lake Lanier increased by at most 0.76 ^{o}F (0.42 ^{o}C) during a simulated drought period with reduced dam discharges when the heat load of the proposed 40 MGD discharge was included.
- A sensitivity analysis with an increase of 9 ^{o}F (5 ^{o}C) in the temperature of the proposed 40 MGD discharge showed an increase of at most 0.94 ^{o}F (0.52 ^{o}C) in simulated daily temperatures in the lake directly upstream of the dam under the same simulated drought conditions.
- Review of model-simulated temperature profiles in Lake Lanier showed little or no difference in thermal structure with or without the heat load of the proposed 40 MGD discharge

Calibration

This section describes the results of an analysis to define the ability of the Lake Lanier model to predict observed temperatures below Buford Dam. It is divided into sub-sections of:

- Historical calibration efforts for Lake Lanier
- Data used for below-Dam comparisons
- Results of below-Dam comparisons

The comparison of predicted and observed temperatures show that the model error below Buford Dam is similar in magnitude to the error obtained in the original Lake water quality model (CE-QUAL-W2) calibration, and is smaller in magnitude than the errors in the observed data themselves. This leads to the conclusion that the model is acceptable to predict temperature impacts below the Dam.

In this section of the document, temperatures are presented only in degrees Celsius for consistency with measurements and model simulation results and for simplicity.

Historical Calibration Efforts

The CE-QUAL-W2 model of Lake Lanier was originally calibrated to in-lake data collected during the period 1996-1997. Monthly to bi-monthly profiling was conducted at 18 lake stations to support model calibration, resulting in a total of 7823 temperature measurements being collected. These 7823 measurements were then compared to model predictions for the corresponding location and time in order to quantitatively define model error.

Two sets of error statistics were calculated: mean error (ME), and absolute mean error (AME). Mean error is the arithmetic average of the predicted minus the observed concentrations. The sign of the ME (+ or -) indicates whether predictions are higher or

lower than observed. The absolute mean error (AME) is an average of the absolute value of the difference between predicted and observed data. The AME represents the amount of error in predictions regardless of whether they are higher or lower than observed.

The resulting error statistics are shown in Table 1.

Table 1. Error Statistics for Temperature Calibration of Lake Lanier Model

Number of measurements	Mean Error (^oC)	Absolute Mean Error (^oC)
7823	0.27	1.03

Data used for below-Dam comparisons

The ability of the Lake Lanier model to predict temperatures below Buford Dam was evaluated as part of this study by comparing model predicted temperature below Buford Dam to observed temperature. This comparison was somewhat confounded by the fact that there were multiple temperature recorders below Buford Dam, covering different time periods and representing differing levels of accuracy. The sources of data available in the mid- to late-1990s for comparison to model output consisted of:

- US Army Corps of Engineers (COE) tailrace – 1994-2005
- EPD tailrace – 5/95 - 10/95
- US Geological Survey (USGS) tailrace – 5/95 - 10/95

The COE tailrace data were the only data that were collected coincident with the CE-QUAL-W2 calibration period of 1996-1997. However, the representativeness of the COE data has been questioned due to sample being collected from a dark pipe subject to solar heating. Figure 1 shows a comparison of the three data sources from the period (October 1995) nearest the 1996-1997 calibration period where contemporaneous measurements were available from all three sources. The COE data are consistently higher than the other two sources, and also show a diurnal variation not present in the other data sources.

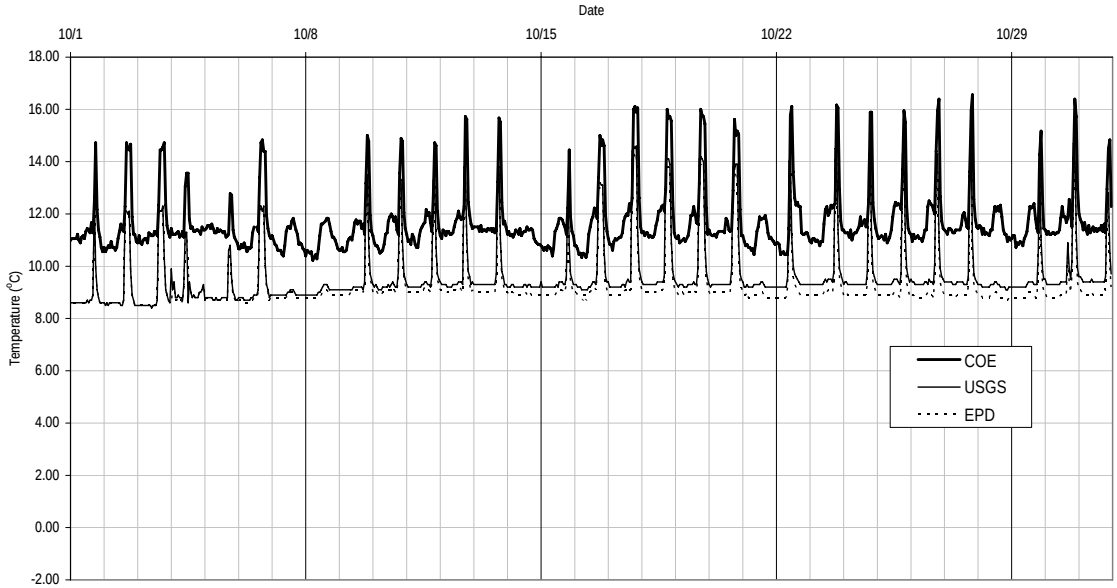


Figure 1
Comparison of 1995 temperature measurements from Buford Dam tailrace

Correction factors were developed to adjust the COE data to provide a best estimate of actual Dam temperatures during the calibration period. A monthly adjustment was used to convert the COE measurements to what would have been expected of EPD and USGS measurements for 1996-1997 if they had been available, for purposes of comparing model to data. Development of the correction factors is discussed below.

The period of overlapping tailrace hourly temperature data between COE, EPD and USGS was May 1 to October 31, 1995. The EPD and USGS data were averaged for each hour to represent the “true” temperature; if one data source was missing then the other was used by itself. Monthly average temperatures for May through October were calculated for COE and for EPD/USGS and then used to specify correction factors for each month. The correction factor was set equal to the observed difference in temperature for months where data existed, and interpolated for the other months. The results of the correction factor analysis are shown in Table 2.

Table 2
Average Monthly Temperatures for Each Data Source and Correction Factor

Month	**COE** (^oC)	**EPD/USGS** (^oC)	**Correction Factor** (^oC)
January	-	-	0.84
February	-	-	0.84
March	-	-	0.84
April	-	-	0.84
May	9.27	8.43	0.84
June	9.21	8.55	0.66
July	9.73	8.69	1.04
August	11.28	9.00	2.27
September	11.70	9.45	2.25
October	11.73	9.49	2.24
November	-	-	2.24
December	-	-	1.54

The correction factors shown in Table 2 were subsequently subtracted from the observed COE data to generate the best estimate of actual Dam temperatures during the calibration period.

Results of below-Dam comparisons

Daily average model output for the calibration period were compared to the daily average of the corrected COE temperature data. Daily averages were used because insufficient data were available to describe hourly variations in model forcing functions during the calibration period. Results of the analysis are shown in Table 3.

Table 3
Error Statistics for Temperature Comparison to Buford Dam Data

Number of measurements	Mean Error (^oC)	Absolute Mean Error (^oC)
293	0.54	1.21

Error statistics were also calculated on a monthly average basis, and were found to be similar to the daily average statistics reported above. The mean error for the month averages was 0.51 ^oC, with an average mean error of 1.14 ^oC.

The degree of error is deemed acceptable for the following reasons:

- The model error at the dam is comparable to the error observed in the original Lake calibration, with an absolute mean error of 1.21 ^oC vs. 1.03 ^oC.

- The error in the model vs. "corrected" data comparison is smaller than the error observed among the three data sources. The unadjusted COE data was, on average, 1.51 ^{o}C higher than the USGS data. The average spread (equivalent to the Absolute Mean Error) among the three data sources was 1.65 ^{o}C.

Since the error in the comparison of model results is smaller than the spread among the available data observations and is comparable to the accepted calibration results in the lake above the dam, the model simulation results are an acceptable predictor for the temperature of the dam discharge. Figure 2 compares daily averages of adjusted COE data to simulated temperature of the dam discharge, and also shows that the spread between simulated model and COE data for 1996 (blue line) is less than the spread among the three data sources for 1995 (red line). The observed and simulated temperatures used in this analysis are included in electronic format on the CD-ROM attached to this original report.

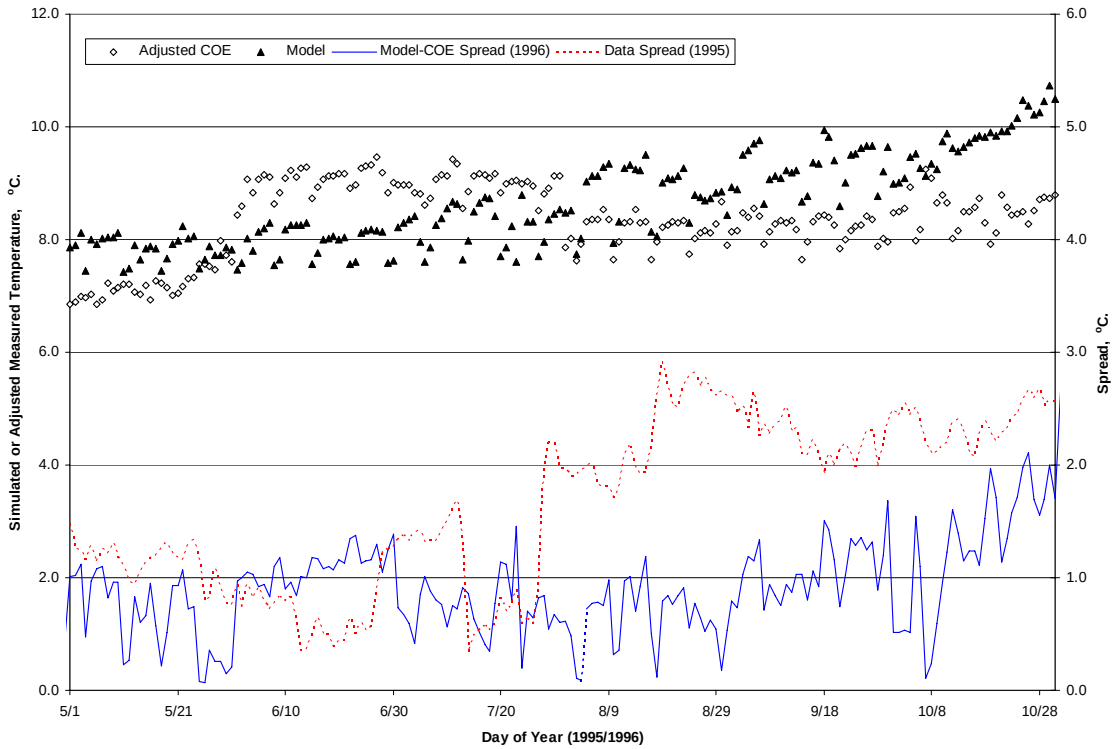


Figure 2.
Comparison of adjusted COE data to simulated temperature, with 1996 model-corrected COE data spread and 1995 data spread

Critical Conditions

Both WRD and EPD requested that due consideration be given to the potential impacts of the proposed discharge during extreme environmental conditions, such as low lake levels and dam discharge flows typical of an extreme drought situation. Two additional scenarios were developed to exercise the model:

- Baseline with proposed 40 MGD discharge using new, refined segmentation; dam rules adjusted to deliver constant 500 cfs flow during a synthesized "drought" period caused by simulated reduction of inflows by 640 cfs.
- Same as above except with discharge temperature set close to ambient conditions to provide a hydraulically equivalent baseline for comparison

These scenarios were run using 1984-1988 climatological conditions, and included a two-month drought period (corresponding to August-September 1986) during which Buford Dam discharges were held constant at 500 cfs and the water surface elevation dropped from 1043.0 feet to 1035.7 feet (Figure 3). Because of the dynamic nature of the system, this simulation of drawdown and recovery was used instead of a static "design condition" that might violate underlying model assumptions related to continuity and forcing functions.

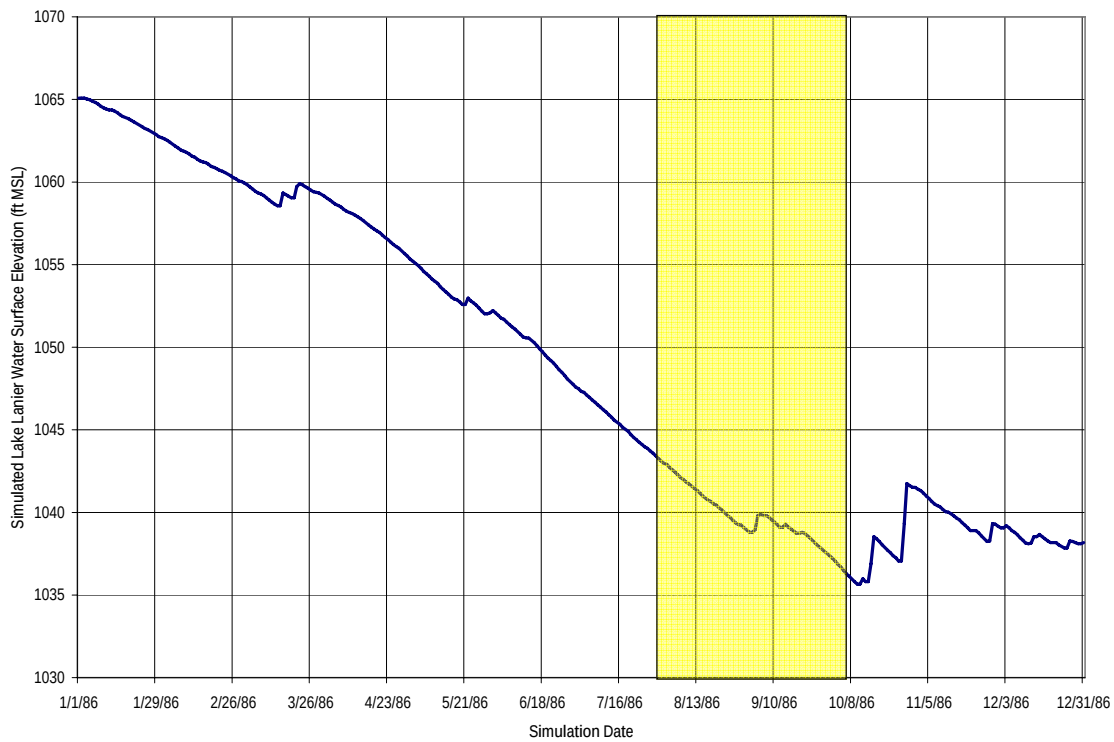


Figure 3.
Simulated Lake Lanier water surface elevation for critical conditions scenarios. Buford Dam flows are held to a constant 500 cfs during highlighted period.

Model-simulated temperatures in the layers of Segment 21 (the portion of Lake Lanier directly adjacent to the dam) were compared for the two scenarios, and the largest change was found to be 0.76 ^{o}F (0.42 ^{o}C) . This indicates that the impact of the proposed 40 MGD discharge on the Buford Dam discharge temperature will be less than the 2° F regulatory criterion – even during periods of extreme drawdown and restricted outflow. As shown in Table 4, this temperature change under critical conditions is actually slightly lower than the maximum impact of 0.83 ^{o}F (0.46 ^{o}C) simulated for less extreme

drawdowns (described in Appendix B). This may be attributable to shorter lake residence times under critical conditions that result in reduced solar heating.

Table 4.
Maximum simulated temperature differences (^{o}F) in CE-QUALW2 segment adjacent to Buford Dam for selected scenarios

Layer	New Discharge - HEB		New - HEB (critical)		New + 9°F- HEB (critical)	
	Max	Average	Max	Average	Max	Average
1	0.13	0.003	0.11	0.011	0.23	0.042
2	0.18	0.010	0.20	0.012	0.40	0.060
3	0.31	0.013	0.27	0.011	0.68	0.062
4	0.14	0.012	0.23	0.011	0.92	0.071
5	0.36	0.008	0.20	0.009	0.59	0.083
6	0.52	0.008	0.20	0.011	0.52	0.063
7	0.41	0.009	0.59	0.012	0.67	0.053
8	0.29	0.008	0.56	0.011	0.63	0.052
9	0.41	0.009	0.76	0.013	0.88	0.052
10	0.54	0.011	0.61	0.014	0.94	0.052
11	0.83	0.013	0.56	0.015	0.74	0.050
12	0.59	0.013	0.47	0.014	0.52	0.047
13	0.25	0.012	0.38	0.013	0.36	0.044
14	0.20	0.013	0.38	0.012	0.41	0.040
15	0.18	0.013	0.38	0.012	0.45	0.038
16	0.14	0.013	0.32	0.010	0.31	0.036
17	0.13	0.014	0.23	0.012	0.29	0.036
18	0.16	0.014	0.16	0.013	0.43	0.033
19	0.11	0.014	0.14	0.014	0.38	0.031
20	0.18	0.014	0.13	0.014	0.38	0.029
21	0.29	0.013	0.13	0.015	0.36	0.026
22	0.16	0.014	0.11	0.015	0.22	0.026

Scenario descriptions:

New Discharge - 40 MGD discharge with typical WWTP effluent temperatures, normal dam rules

HEB - Hydraulically Equivalent Baseline scenario with 40 MGD discharge at ambient temperature

New (critical) - 40 MGD discharge with typical temperatures, dam discharge fixed at 500 cfs for critical period, 630 cfs removed from lake to simulate drought-driven reduction of inflows

HEB (critical) - Same as New (critical) with 40 MGD discharge at ambient temperatures

New + 9 ^{o}F - Same as New (critical) with effluent temperatures raised 9 ^{o}F (5 ^{o}C) above typical WWTP effluents

Sensitivity to Proposed Discharge Temperature

An additional scenario was created to examine the sensitivity of the system to increased discharge temperatures:

- Same as scenarios above except with proposed 40 MGD discharge temperatures increased by 9 ^{o}F (5 ^{o}C).

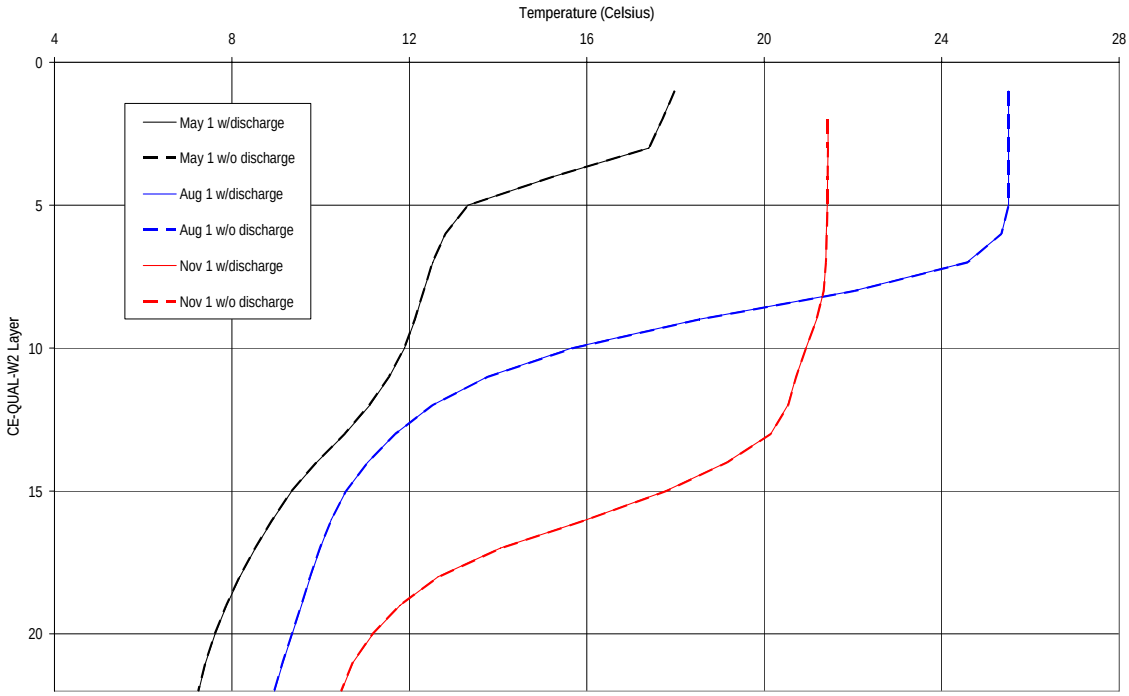
As also shown in Table 4, The maximum change in simulated temperatures attributable to temperature impacts of the proposed 40 MGD discharge **with discharge temperatures elevated by 9 ^{o}F (5 ^{o}C)** was found to be 0.94 ^{o}F (0.52 ^{o}C**)** in Segment 21.

Stratification

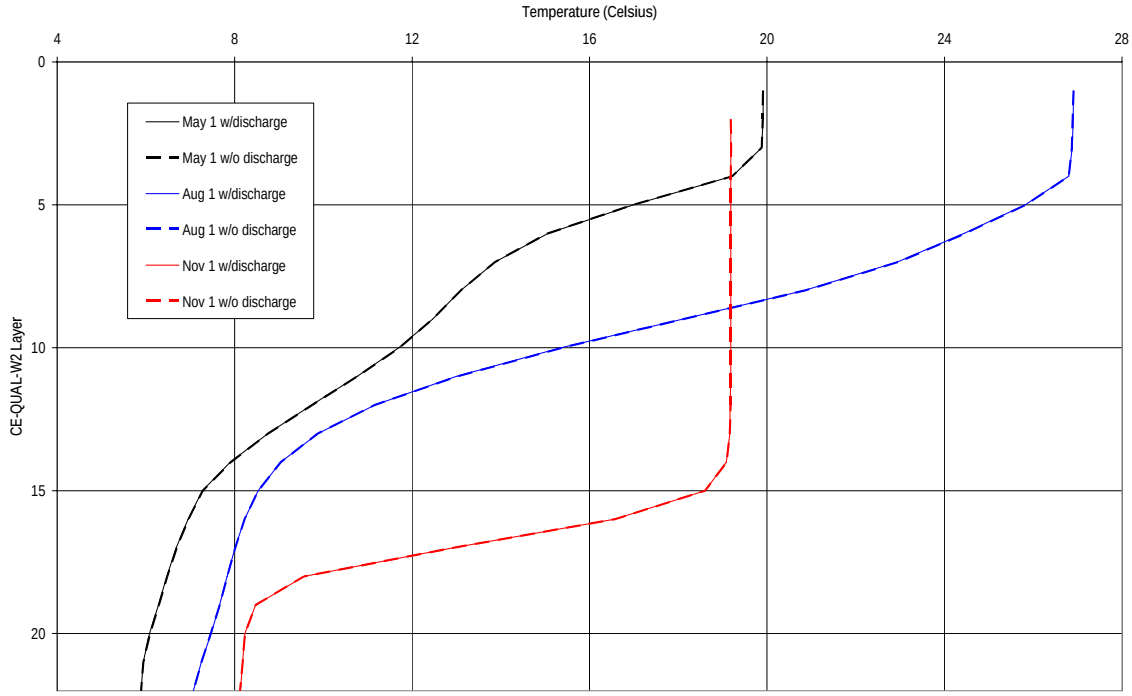
In order to assess potential impacts of the proposed 40 MGD discharge on stratification processes in Lake Lanier, the simulated daily temperature profiles were examined from previously developed scenarios:

- Baseline (normal dam operation), with proposed 40 MGD discharge using new, refined segmentation. (New Discharge)
- Baseline including a 40 MGD discharge with discharge temperatures approximately equal to ambient receiving water, using new, refined segmentation. (HEB)

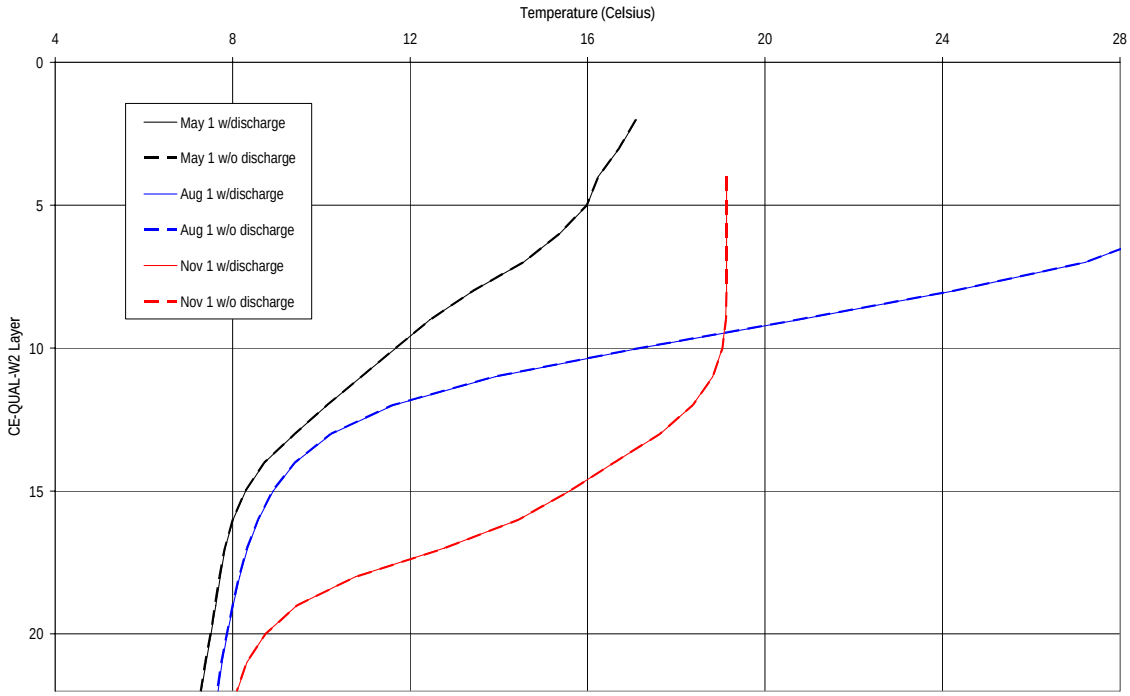
As described in Appendix B, these scenarios are equivalent from a hydraulic balance standpoint and offer an appropriate basis for direct comparison to evaluate temperature impacts. The charts below show that for May 1, August 1, and November 1 in each of the simulated years, there is little or no difference in Lake Lanier's thermal structure in the segment adjacent to Buford Dam when comparing these two scenarios. This indicates that stratification processes are essentially unaffected by the discharge.



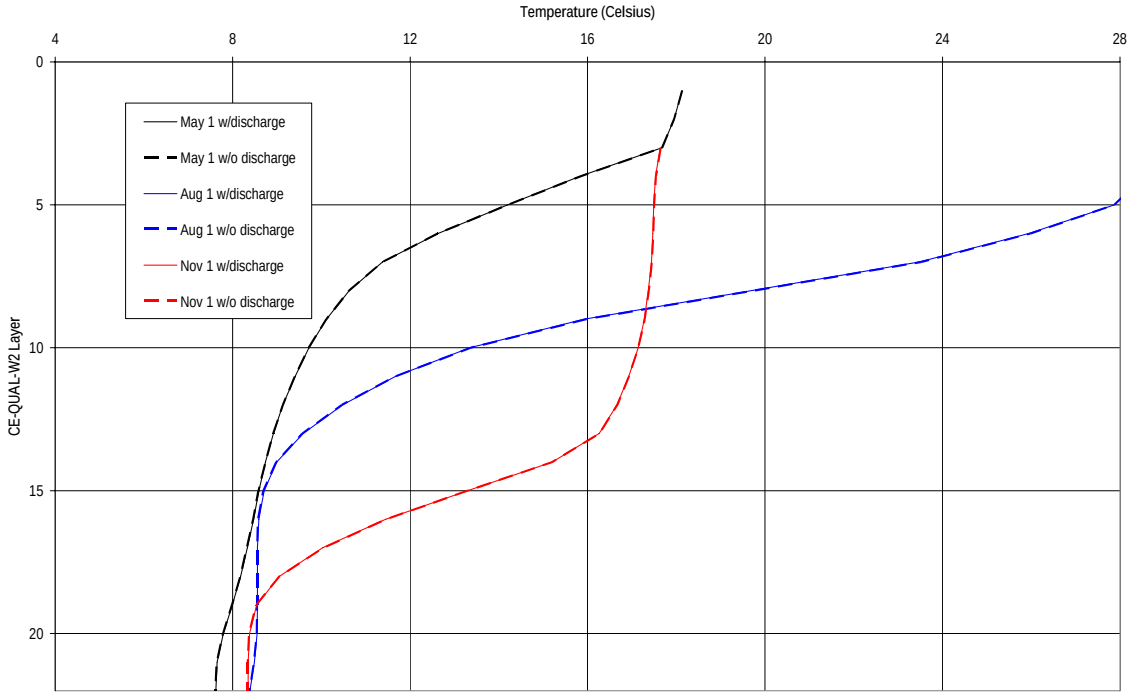
Simulated 1984 Temperature Profiles in CE-QUAL-W2 Segment 21 (adjacent to dam)



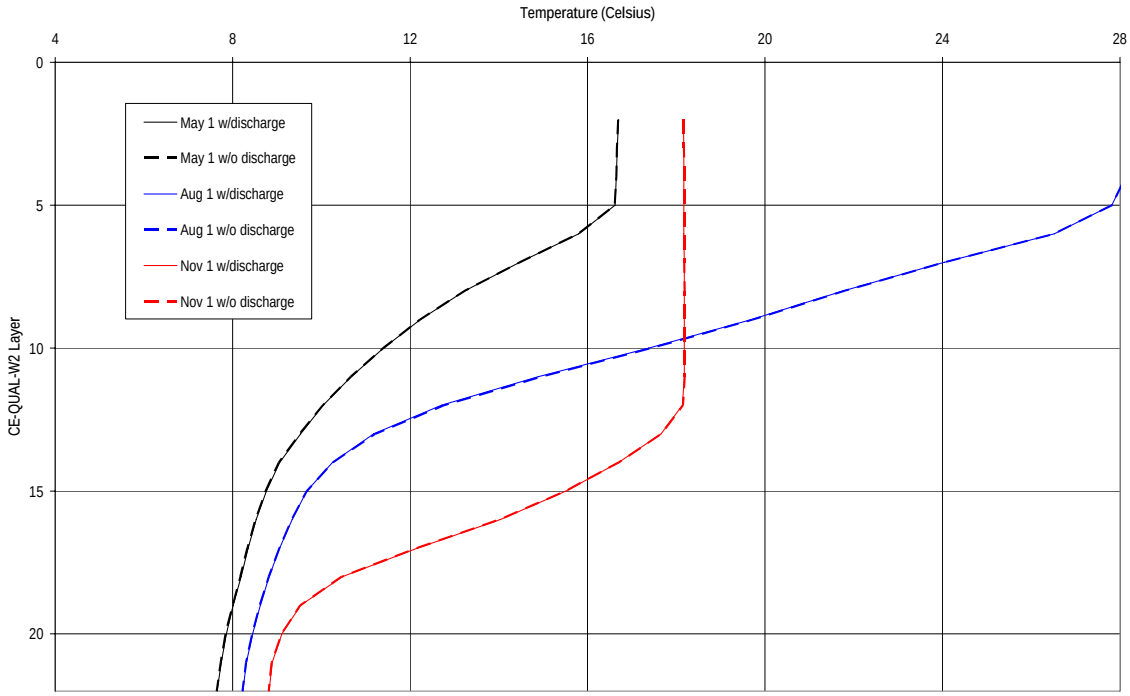
Simulated 1985 Temperature Profiles in CE-QUAL-W2 Segment 21 (adjacent to dam)



Simulated 1986 Temperature Profiles in CE-QUAL-W2 Segment 21 (adjacent to dam)



Simulated 1987 Temperature Profiles in CE-QUAL-W2 Segment 21 (adjacent to dam)



Simulated 1988 Temperature Profiles in CE-QUAL-W2 Segment 21 (adjacent to dam)

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Appendix A

Provisional CE-QUAL-W2 resegmentation

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Memorandum

TO: Receiver

FROM: Sender

SUBJECT: Subject

DATE: June 8, 2006

PROJECT: Project

COPIES:

This memorandum presents a provisional resegmentation of the CE-QUAL-W2 model application for Lake Sidney Lanier to improve resolution of temperature impacts from a proposed discharge located near Buford Dam. The existing model segmentation may understate the impacts because the segment receiving the discharge (Segment 19) may provide an overly large dilution effect.

EFDC Analysis of Average Mass Flux

A two-dimensional EFDC application was used to characterize mass flux from the proposed discharge in the area of Segment 19. A point source was placed in the grid cell matching the proposed discharge location, and mass flux (g/cm^2) of a conservative substance injected into the 40 MGD discharge was tracked throughout the EFDC grid over the course of a two-year simulation. As seen in Figure A-1, the discharge mixes with roughly the lower two-thirds to three-quarters of Segment 19 in the existing CE-QUAL-W2 application.

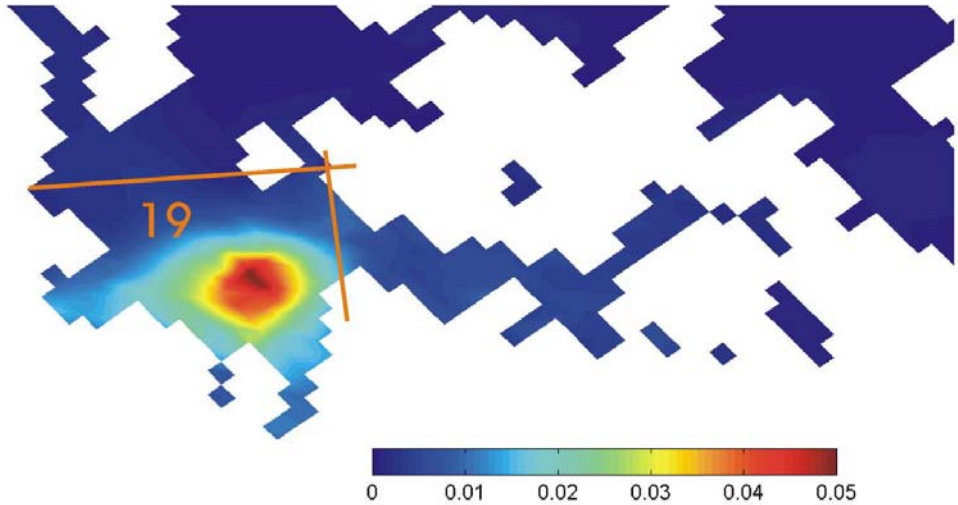

Figure A-1. Average mass flux during 2-year EFDC 2-D simulation. Approximate extent of CE-QUAL-W2 Segment 19 is shown for reference.

Proposed Resegmentation

Figure A-2 depicts LTI's proposed resegmentation based on the results of the EFDC 2-D analysis and the model geometry constraints imposed by CE-QUAL-W2. This resegmentation removes the volume from Segments 19a and 19c from the initial dilution calculation.

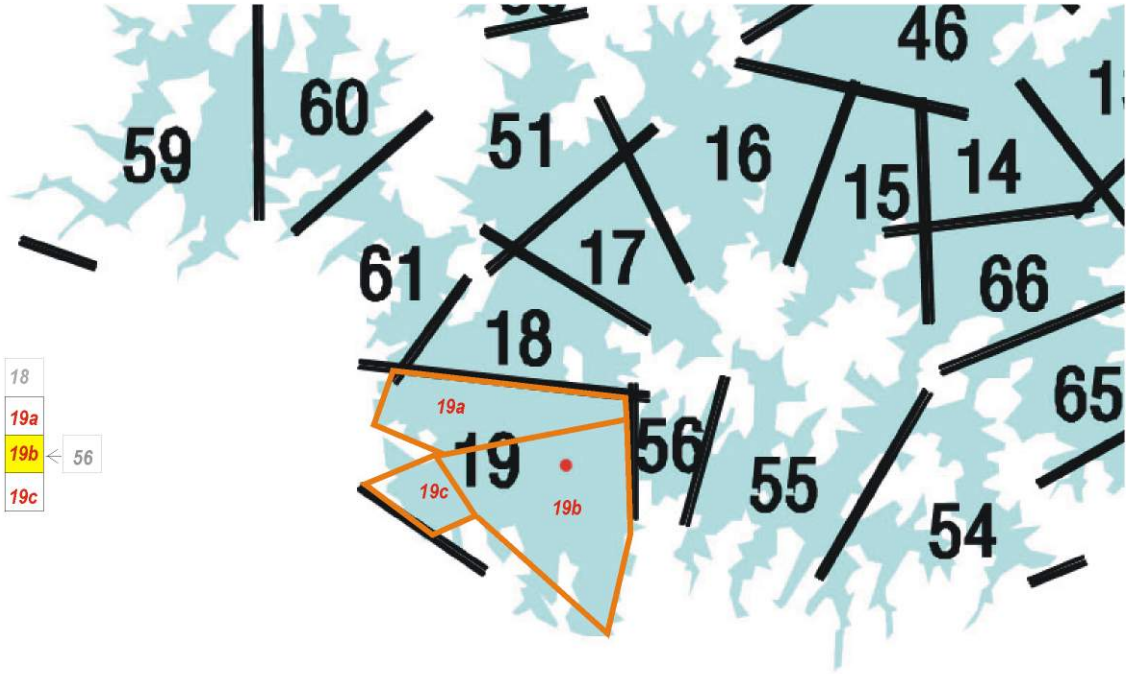

Figure A-2. Proposed resegmentation.

Appendix B

Refined CE-QUAL-W2 Assessment of Temperature Impacts of F. Wayne Hill Water Resources Center Discharge

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Limno-Tech, Inc.
Excellence in Environmental Solutions Since 1975

Memorandum

DATE: April 27, 2006
PROJECT: **LANIC11**

TO: **Paul Lamarre**
GA EPD

FROM: **Tad Slawecki**
Dave Dilks
CC: Doug Baughman

SUBJECT: **Refined CE-QUAL-W2 Assessment of Temperature Impacts of F. Wayne Hill Water Resources Center Discharge**

Summary

This memorandum presents the results of an application of an updated CE-QUAL-W2 model of Lake Lanier to evaluate impacts of Gwinnett County's proposed 40 MGD discharge on water temperature below Buford Dam. The updated CE_QUAL-W2 model has finer spatial resolution than the original Lake Lanier CE-QUAL-W2 model in order to more clearly define potential temperature impacts.

Application of the re-segmented model to a five-year period encompassing a range of climatological conditions shows that the proposed discharge will be in compliance with the State standard for maximum increase in daily average temperature of the Buford Dam outflow. Predicted temperature increases in the Dam outflow attributable to the proposed discharge are less than 0.7^{o} F, well below the regulatory criterion of 2° F.

The memorandum is divided into sections discussing:

- Background
- Model re-segmentation
- Evaluation of temperature impacts

Background

The Gwinnett County Department of Public Utilities (DPU) has applied for an NPDES permit to expand the 20 million gallons per day (mgd) F. Wayne Hill Water Resources Center to a capacity of 60 mgd. Treatment processes at this facility produce a high quality effluent suitable for indirect reuse. The current release location for the facility is the Chattahoochee River, where the effluent is combined with effluent from the Crooked Creek Water Reclamation Facility (WRF). The proposed outfall location for the 40 mgd expansion is a return to Lake Lanier.

The original Lake Lanier model was run previously to define temperature impacts (LTI, 2005). Model results showed potential exceedance of the State temperature criterion below Buford Dam, but it could not be ascertained whether these exceedances were caused by excess temperature from the proposed discharge or numerical artifacts of the model.

In response to comments from EPD, efforts were made to apply a full three-dimensional hydrodynamically-based circulation and temperature model to Lake Lanier. The variable-depth vertical grid version of the EFDC model initially agreed on proved to be poorly suited because of difficulties in accurately representing lateral water exchanges in areas of steeply-sloped bathymetry. At EPD's request, LTI reviewed the literature to identify other 3-D models, but found no generally available and supported public domain alternative to EFDC (LTI, 2006a).

Model re-segmentation

Following further discussions, EPD and LTI agreed that the best way to evaluate temperature impacts with the available modeling tools was to re-segment the existing CE-QUAL-W2 application. This re-segmentation divided segment 19 (adjacent to Buford dam) into three smaller segments (LTI, 2006b). The new segmentation reflects CE_QUAL-W2 geometry constraints and two-dimensional EFDC analysis of probable mixing zone extents, and better represents the dilution volume adjacent to the proposed outfall location by effectively halving the volume of the model layer receiving the discharge.

In order to assess the effects of the re-segmentation, LTI conducted a CE-QUAL-W2 simulation with the re-segmented model and compared the temperature of the dam discharge to the temperature from the original segmentation. The modeled dam temperatures were consistently higher for the re-segmented model, which is consistent with a reduced mixing volume.

Evaluation of temperature impacts

Several additional scenarios were run with the refined CE-QUAL-W2 segmentation to define the temperature impact of the proposed outfall at Buford Dam. The scenarios are described below and followed by a discussion of results:

1. Baseline without discharge using new, refined segmentation.
2. Baseline with proposed 40 MGD discharge using new, refined segmentation.
3. Baseline including proposed 40 MGD discharge with unspecified 40 MGD withdrawal from main pool for water balance, using new, refined segmentation.
4. Baseline including a 40 MGD discharge with discharge temperatures approximately equal to ambient receiving water, using new, refined segmentation.

Initial Comparison without Hydraulic Balance

The initial evaluation of the temperature effect of the proposed discharge consisted of a comparison of CE-QUAL-W2 results "with" and "without" the discharge. The arithmetic average of the hourly modeled dam temperatures was calculated for both simulations, and the increase from baseline was found to be 0.061^{o}C. However, inspection of differences in the simulated temperature differences hour-by-hour showed many times where the temperature differences exceeded the target of 1.1 ^{o}C (2 ^{o}F). Similar excursions were observed with the older model and were attributed to differences in timing of dam

operations as simulated by the model caused by differences in lake level due to the alteration in the water balance from the added flow from the Gwinnett County discharge. This potential artifact was addressed by conducting additional simulations that contained more comparable water balances in the lake in order to factor out the effect of dam operation on predicted temperature differences.

Comparison with Coarse Hydraulic Balance

Alternative scenarios were developed to provide a hydraulic equivalent to the baseline "no discharge" simulation, by imposing a 40 MGD withdrawal of water from Lake Lanier. Results of these simulations were highly dependent to the assumed location of the withdrawal, with withdrawal location having a greater influence on Dam temperatures than the discharge itself. These results suggest that the hypothetical water withdrawal from the main pool may have changed temperature dynamics. For this reason, a more direct hydraulic balance was developed.

Comparison with Direct Hydraulic Balance

The final scenario (Scenario 4) was developed to be directly hydraulically equivalent to the baseline discharge scenario (Scenario 2). A 40 MGD discharge was added to the baseline scenario at the same location as the proposed Gwinnett discharge, but with a discharge temperature regime based on the monthly average of simulated ambient receiving water temperatures (effectively making the discharge temperature the same as the receiving water temperature). The five-year average of simulated Dam outfall temperature with the discharge at expected WWTP effluent temperature was 0.003 ^{o}C higher than with the discharge at ambient Lake temperature.

However, inspection hour-by-hour of differences in simulated temperatures still showed exceedances of the 1.1 ^{o}C target. Figure 1 demonstrates that the differences in temperature are directly related to differences in timing of water releases from the dam. The figure shows model results at Buford Dam for discharge rate, water surface elevation at Buford Dam, and temperature of the discharge. Extremely small differences in modeled water surface elevation arise between the two scenarios because of the differences in discharge temperature, which affect temperature profiles and evaporation rates. These differences result in different (simulated) dam operations – typically a slight lag in start and end times. This results in different dam discharge flows between the scenarios, which in turn results in different discharge temperatures because of the difference in entrainment. For example, Buford Dam starts discharging at 9500 cfs at about 8:00 AM on Saturday 5/23/87 for Scenario 2, but doesn't start this flow until about 12:00 noon in Scenario 4. Since the higher flow entrains warmer water from higher layers, Scenario 2 predicts warmer temperatures than Scenario 4 from 8:00 AM to 12:00 noon.

Analysis of in-lake temperatures provided further evidence that the occasionally large differences in Buford Dam temperatures between scenarios were solely attributed to Dam operation. Predicted temperatures for the model segment immediately above Buford Dam were compared between Scenarios 2 and 4. The maximum temperature difference between scenarios, at any layer and at any point in time over the five year simulation, was

0.52 ^{o}C. Given that the absolute maximum in-lake temperature difference was less than 0.52 ^{o}C, it is not possible that water being released from the Dam could be raised by more than this amount due to the discharge. Any short-term differences between scenarios greater than the 1.1 ^{o}C target are therefore attributed to the timing of Dam operation.

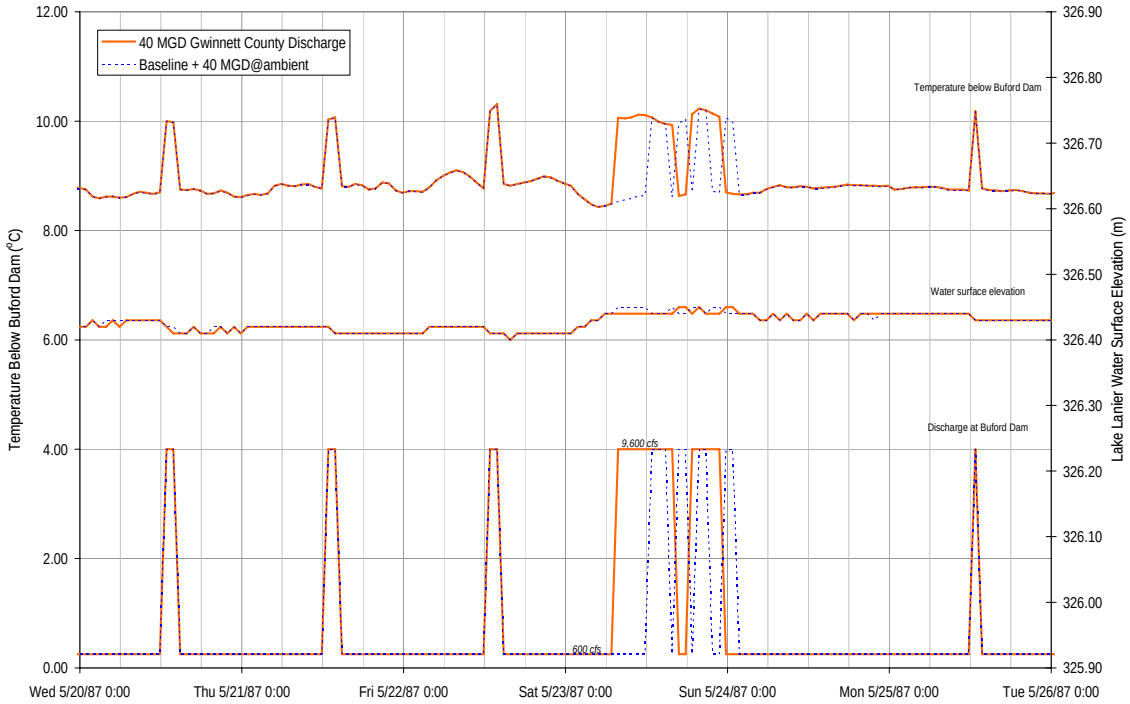

Figure 1. Hourly model results for discharge at expected temperature vs. discharge at ambient temperature

One approach to better account for the differences between scenarios and to factor out small timing differences in Dam operation is to compare daily average (instead of hourly) model temperatures. LTI compared daily (arithmetic) average temperature for the two scenarios, and found that the largest increase, – on 5/23/87 – to be 0.377 ^{o}C, or about 0.68 ^{o}F. Figure 2 shows the average daily temperatures for Scenarios 2 and 4 and the difference between the scenarios.

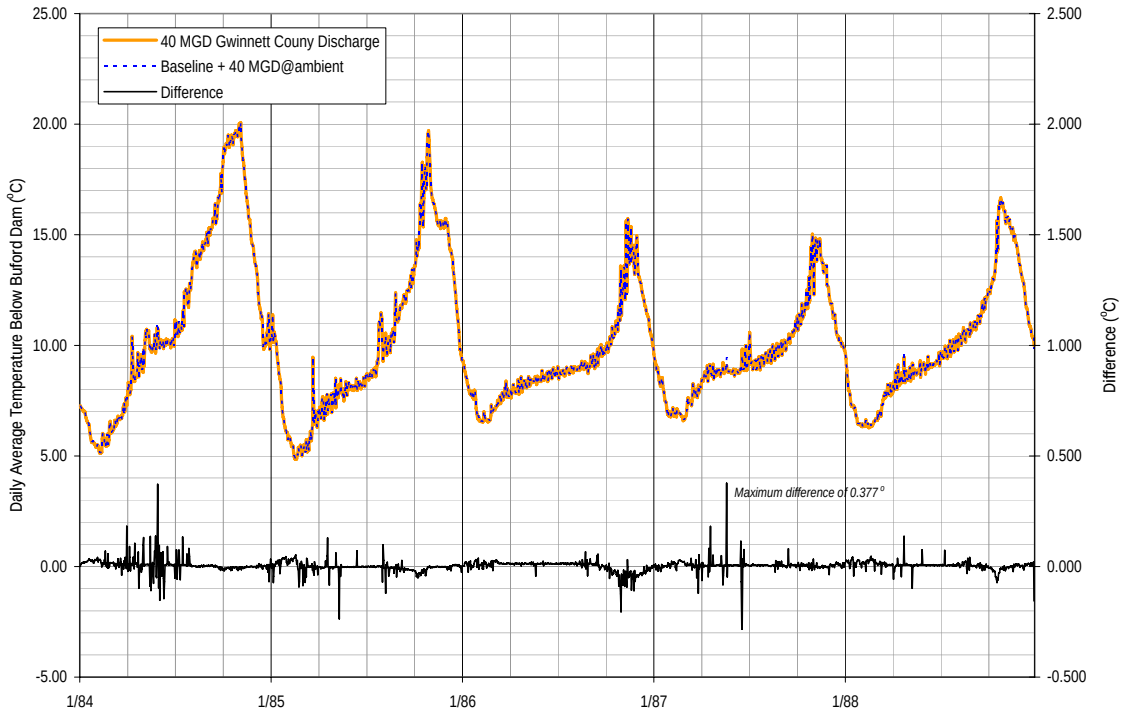

Figure 2. Daily average of simulated temperatures and temperature differences

The maximum increase of 0.377 ^{o}C (0.68 ^{o}F) in daily average temperature is less than the regulatory maximum of 2 ^{o}F.

References

LTI, 2005. Water Quality Modeling Assessment of F. Wayne Hill Water Resources Center Discharge on Lake Lanier. Presentation to Georgia Department of Natural Resources, Atlanta, Georgia.

LTI, 2006a. Overview of 3-D Hydrodynamic Models. Technical Memorandum dated 3/17/2006.

LTI, 2006b. Provisional CE-QUAL-W2 resegmentation. Technical Memorandum dated 3/7/2006.

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Appendix G

United States Army Corps of Engineers

Savannah District

Standard Operating Procedures for

Stream and Wetland Mitigation

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DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
P.O. BOX 889
SAVANNAH, GEORGIA 31402-0889

REPLY TO ATTENTION OF:

July 11, 2003

Regulatory Branch

PUBLIC NOTICE
Savannah District

SUBJECT: Draft Standard Operation Procedure for Calculating Compensatory Mitigation Requirements for Adverse Impacts to Wetlands, Open Waters and/or Streams.

The US Army Corps of Engineers, Savannah District, Regulatory Branch (USACE) is soliciting comments on the attached draft document titled "Wetlands, Open Waters and Streams, Standard Operation Procedure, Compensatory Mitigation (SOP)." This document is the result of a joint effort between the USACE, the US Environmental Protection Agency, the US Fish and Wildlife Service, the National Marine Fisheries Service and the Georgia Department of Natural Resources. The SOP will be applicable to regulatory actions requiring compensatory mitigation for adverse impact to 10 acres or less of wetland or other open waters, and/or 5000 linear feet or less of intermittent and/or perennial stream. It is intended to provide a basic written framework, which will provide predictability and consistency of the development, review, and approval of compensatory mitigation plans.

All comments should be submitted to the above address by August 1, 2003. The comments received will be considered in development of the Final SOP, which will be published on September 1, 2003. As of publication of the Final SOP all previous versions of the SOP will become obsolete. The Draft SOP is available on the Savannah District Internet Home Page at http://www.sas.usace.army.mil/permits.htm.

- ORIGINAL SIGNED -

David Crosby
Acting Chief, Regulatory Branch

Enclosure

Department of the Army
Savannah District, Corps of Engineers
PO Box 889
Savannah, Georgia 31402-0889

Standard Operating Procedure
Compensatory Mitigation
WETLANDS, OPENWATER & STREAMS

Table of Contents

1. Applicability
2. Purpose
3. Other Guidance
4. Mitigation Plan
5. General Guidelines
6. Monitoring and Contingency
7. Performance Standards
8. Drawings
9. Mitigation Banking
10. Point of Contact
11. Authorizing Signature

1. Applicability. This Standard Operating Procedure (SOP) is applicable to regulatory actions requiring compensatory mitigation for adverse impacts to 10 acres or less of wetland or other open waters, and/or 5000 linear feet or less of intermittent and/or perennial stream (Definitions, 65 FR Vol. 47, Page 12898). This SOP may be used as a guide in determining compensatory mitigation requirements for projects with impacts greater than the above wetland and stream limits, or for enforcement actions, however, higher than calculated credit requirements would likely be applicable to larger impacts. In instances where it is unclear whether the jurisdictional area proposed to be impacted is a wetland, a stream, or other waters, the US Army Corps of Engineers (USACE) will make the final determination. This SOP does not address mitigation for categories of effects other than ecological (e.g., historic, cultural, aesthetic). Types of mitigation other than compensation (e.g., avoidance, minimization, reduction) are not addressed by this SOP. As an alternative to proposing a site specific mitigation plan, you may consider purchasing the required mitigation credits from a wetland or stream mitigation bank. For impacts in areas not serviced by approved wetland or stream banks, wetland or stream in-lieu-fee banking, as appropriate, may be proposed.

When this SOP is used in the establishment of a Mitigation Bank, the USACE will consult with the Mitigation Bank Review Team (MBRT), with the goal of achieving a consensus of the MBRT regarding the factors, elements, and design of the Mitigation Bank Plan. Once a mitigation bank receives final approval using a dated version of this SOP, that version would remain valid for that bank unless the bank is amended or substantially modified. In other words, an approved bank cannot use a later version of this SOP to possibly generate more credit.

Also, note that this document is subject to periodic review and modification, and consultation with the local USACE office is necessary to ensure utilization of the latest approved version. However, once a project is permitted using a dated version of this SOP, that version would remain applicable to the project, unless the project is substantially modified. With regard to approved mitigation banks, the version of the SOP used to calculate credits generated by the bank would remain applicable to that bank for the purpose of re-calculating credits associated with proposed minor modifications to the bank. If a substantial modification is proposed for an approved mitigation bank, the last approved version may be required for use in re-calculating credits. Regardless of which version of the SOP might have been used to calculate credits for an approved mitigation bank, permit applicants intending to purchase mitigation bank credits are required to use the latest approved version of the SOP when calculating credit requirements. All decisions on which version of this SOP are applicable to any given situation will be made by the USACE, and are final.

2. Purpose. The intent of this SOP is to provide a basic written framework, which will provide predictability and consistency for the development, review, and approval of compensatory mitigation plans. A key element of this SOP is the establishment of a method for calculating mitigation credits. While this method is not intended for use as project design criteria, appropriate application of the method should minimize uncertainty in the development and approval of mitigation plans and allow expeditious review of applications. However, nothing in this SOP should be interpreted as a promise or guarantee that a project which satisfies the criteria or guidelines given herein will be assured of a permit. The District Engineer (DE) has a responsibility to consider each project on a case by case basis and may determine in any specific situation that authorization should be denied, modified, suspended, or revoked. This SOP does not obviate or modify any requirements given in the 404(b)(1) Guidelines or other applicable documents regarding avoidance, sequencing, minimization, etc. Such requirements shall be evaluated during consideration of permit applications.

3. Other Guidance.

3.1. *Mitigation Thresholds.* Projects impacting less than 0.1 acre of wetland or open water and/or less than 100 linear feet of stream will be required to provide mitigation on a case-by-case basis. Projects impacting greater than 0.1 acre of wetlands or open water and/or more than 100 linear feet of stream will usually have to at least satisfy the requirements of this SOP.

3.2 *Minimal Impacts.* Permit applicants with projects impacting more than 0.1 and less than 1.0 acres of wetland and/or more than 100 and less than 300 linear feet of stream may choose to use the following abbreviated methodology for calculating mitigation credit requirements:

- Multiply the acres of impact by 8 to arrive at the required number of wetland mitigation credits (eg, 0.5 acres of wetland impact x 8 = 4 wetland credits).
- Multiply the linear feet of stream impact by 8 to arrive at the required number of stream mitigation credits (eg, 100 linear feet of stream x 8 = 800 stream credits).

3.3 *Regulatory Guidance Letter 02-02.* On December 24, 2002, the USACE issued Regulatory Guidance Letter 02-02 (RGL 02-02). Guidance provided in RGL 02-02 is applicable to all compensatory mitigation proposals associated with permit applications submitted for approval after it's date of issuance. If a discrepancy is discovered between this SOP and RGL 02-02, or any other relevant guidance, the applicant should notify the USACE of the discrepancy and request clarification before incorporating any such guidance into a proposed mitigation plan.

4. Mitigation Plans. The following information will typically be required for consideration of a mitigation proposal. Proposals will be reviewed and the applicant will be advised if additional information will be required to make the proposal adequate for consideration.

- Plans and detailed information regarding the work for which the mitigation is required.
- Drawings in accordance with the requirements given in this SOP.
- A narrative discussion of the key elements of the proposed mitigation plan.
- A narrative description of any proposed funtctional assessment methogology (HGM, WRAP, etc.).
- A proposed monitoring plan and a plan for documenting baseline conditions of the mitigation site.
- Names, addresses, and phone numbers for all parties responsible for mitigation and monitoring.
- A description of the existing conditions of all areas to be affected by the proposed mitigation.
- A description of the existing vegetative communities to be affected by the proposed mitigation.
- Native vegetation proposed for planting and/or allowances for natural regeneration.
- Plans for control of exotic invasive vegetation.

- Elevation(s) and slope(s) of the proposed mitigation area to ensure they conform with required elevation and hydrologic requirements, if practicable, for target plant species.
- Source of water supply and connections to existing waters and proximity to uplands.
- Stream or other open water geomorphology and features such as riffles and pools, bends, etc.
- An erosion and sedimentation control plan.
- A schedule showing earliest start and latest completion dates for all significant activities.
- A listing of measurable success factors with quantifiable criteria for determining success.
- Definitions for all success factors and other significant terms used in the plan.
- Description of the equipment, materials, and methods required for execution of the plan.
- A management plan, if necessary, for any maintenance of the mitigation.
- A contingency plan, in the event that the mitigation fails to meet success factors.

5. General Guidelines. Mitigation must be designed in accordance with the following guidelines.

5.1. *Adverse Effects Area.* The area of adverse effects as used in this document includes aquatic areas impacted by filling, excavating, flooding, draining, clearing, or other adverse ecological effects. Impacts to wetlands and other open waters will be calculated in acres and impacts to streams will be calculated in linear feet as measured along the centerline of the channel. Other categories of effects such as aesthetic, cultural, historic, health, etc., are not addressed by this document. As explained in Attachments A and C, direct effects are caused by the action and occur at the same time and place; and indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

5.2. *Mitigation Area.* In general, the adverse impacts and compensatory mitigation are geographically distinct areas. The aquatic area in which the adverse effects occur will generally not be given credits as part of the compensatory mitigation area. For example, if a pond is excavated in wetlands with a resulting wetland fringe, the wetland fringe is generally not considered compensation for the excavation impacts. Similarly, an impoundment of a riverine system with a resulting increase in open surface water area or wetland fringe is not considered compensatory mitigation for the adverse impacts to the impounded riverine system. Certain exceptions may be allowed on a case-by-case basis. For example, a temporary construction impact (e.g., cofferdams, access roads, staging areas) might be mitigated by restoration or preservation of the area, depending on the nature, severity, and duration of the impacts.

A compensatory mitigation area may not be given credits under more than one mitigation category nor credited more than once under any category. However, it is acceptable to subdivide a given area into sub-areas and calculate credits for each sub-area separately. For example, a restored aquatic area donated to a conservancy organization may be credited as either restoration or preservation, but not both. An aquatic area that contains some restoration (e.g., plugging canals in a drained wetland) and some enhancement (e.g., plugging shallow ditches in an impaired wetland) could either be subdivided into a restoration area component and an enhancement area component, or the entire area could be lumped together and given one net enhancement/restoration credit calculation. Whether or not an area is subdivided or lumped for the purpose of credit calculations is a case-by-case decision based on what is reasonable and appropriate for the given mitigation proposal. All decisions on whether a proposed mitigation action would be considered restoration, enhancement or a combination of both, will be made by the USACE, and these decisions are final.

5.3 *Restrictive Covenants*. In most cases, mitigation sites must be perpetually protected by a Declaration of Covenants and Restrictions, whereby the owner of the property places permanent conservation restrictions on identified mitigation property. The restrictive covenant restricts development and requires that the land be managed for its conservation values. The draft model and instructions for use with the

Declaration of Covenants and Restrictions is located on the USACE, Savannah District, web site located at www.sas.usace.army.mil. The web site should be viewed in order to assure that the latest version is used. Select the yellow box titled, "Permitting Info." Under the bold paragraph titled, "Savannah District Regulatory Publications," scroll down to find the Declaration of Covenants and Restrictions draft and instructions. The restrictive covenant is prepared by an attorney for the property owner in consultation with the environmental consultant. Property owners should make allowances for any foreseeable circumstances (e.g., utility lines, power lines, road crossings, ditch maintenance, etc.) that may conflict with recording a restrictive covenant on mitigation property. Once a property is protected by restrictive covenant, further impacts to that property are strongly discouraged by the USACE. The procedure for modifying a restrictive covenant is also located on the above web site.

5.4. *Conservation Easement*. In addition to the restrictive covenant requirement, additional credit may be obtained by the granting of a conservation easement by the owner of the property, to a qualified third party grantee. The grantee must be a holder as defined by the Georgia Uniform Conservation Easement Act, O.C.G.A. § 44-10-1 et seq. In addition, the conservation easement is required to have certain language and meet the standards set out in the guidance. The guidance on conservation easements accepted for credit is located on the Savannah District web site under the file titled, "Conservation Easements." The conservation easement is prepared by the attorney for the owner of the property in consultation with the grantee and reviewed by the USACE.

5.5 Buffers. In most circumstances, wetland, open water and stream mitigation areas must include the establishment and maintenance of buffers to ensure that the overall mitigation project performs as expected. Buffers are upland or riparian areas that separate aquatic resources from developed areas and agricultural lands. Buffers typically consist of native plant communities (i.e., indigenous species) that reflect the local landscape and ecology. Buffers enhance or provide a variety of aquatic habitat functions including habitat for wildlife and other organisms, runoff filtration, moderation of water temperature changes, and detritus for aquatic food webs.

5.5.1 *Upland Buffer*. Upland buffers serve to enhance aquatic functions and increases the overall ecological functioning of wetland and open water mitigation areas. Upland buffers are necessary for wetlands or open water mitigation areas that perform important physical, chemical, or biological functions, the protection and maintenance of which is important to the region where those aquatic resources are located; and are under demonstrable threat of loss or substantial degradation from human activities that might not otherwise be avoided. Therefore, unless it can be demonstrated that an upland buffer is not necessary or practicable, wetland and openwater mitigation plans must include a minimum 25' wide upland buffer on at least 95% of the jurisdictional boundary of the mitigation area (i.e., verified wetland/upland boundary on the mitigation area). Mitigation areas will generally not be considered acceptable if they do not include a minimum 25' upland buffer. This required 25' minimum width upland buffer receives no mitigation credit. Only the area of a proposed upland buffer in excess of the minimum 25', which meets the width required at *Attachment B*, "Minimum Upland Buffer Widths for Mitigation Credit," will receive consideration for mitigation credit. Portions of buffers may be excluded from calculation of credits if they have been compromised or are of questionable protection value due to shape, condition, location, excessive width, excessive proportion of the total mitigation area, or other factors. Wetlands or other aquatic areas cannot be used as buffers on wetlands or open waters. Wetland buffer credit can be calculated using the Upland Buffer Worksheet.

5.5.2 *Riparian Buffer*. Riparian Buffers serve to enhance aquatic functions and increases the overall ecological functioning of stream mitigation. Riparian Buffers are necessary for streams that: 1) perform important physical, chemical, or biological functions, the protection and maintenance of which is important to the region where those aquatic resources are located; and 2) are under demonstrable threat of loss or substantial degradation from human activities that might not otherwise be avoided. Therefore, in most cases stream restoration plans must include a vegetated buffer. Riparian buffers that do not meet the appropriate minimum width requirements cannot be included in calculating credits (*Attachment D*, Riparian Enhancement and Preservation). Wetlands or other aquatic areas used to generate wetland mitigation credits cannot be used to generate stream buffer credits (i.e., multiple mitigation cannot be generated from one area).

5.6. *No Net Loss.* To assist in meeting the national policies of "no net loss" of wetlands and/or aquatic function, at least 50% of the wetland mitigation credits required for an authorized project must be generated from mitigation activities that result in a net gain in acres and/or aquatic function (i.e., wetland restoration, enhancement or creation), and at least 50% of the stream mitigation credits required for an authorized project must be from stream and/or riparian restoration. Wetland and stream bank credits are considered functional replacement. Conversely, no more than 50% of the wetland mitigation credits required for an authorized project can be generated from wetland preservation and/or upland buffering, and no more that 50% of the stream mitigation credits required for an authorized project can be generated from riparian buffer and/or stream preservation. In-lieu-fee bank credits are considered preservation. On a case-by-case basis, 100% of the wetland and/or stream mitigation credits required for an authorized project may be in the form of in-lieu-fee banking, but only if no commercial mitigation bank services the project area and site specific mitigation would be impractical.

5.7. *Goals and Objectives.* Compensatory mitigation plans should discuss environmental goals and objectives, the aquatic resource type(s), e.g., hydrogeomorphic (HGM) regional wetland subclass, Rosgen stream type, Cowardin classification, and functions that will be impacted by the authorized work, and the aquatic resource type(s) and functions proposed at the compensatory mitigation site(s). For example, for impacts to tidal fringe wetlands the mitigation goal may be to replace lost finfish and shellfish habitat, lost estuarine habitat, or lost water quality functions associated with tidal backwater flooding. The objective statement should describe the amount, i.e., acres, linear feet, or functional changes, of aquatic habitat that the authorized work will impact and the amount of compensatory mitigation needed to offset those impacts, by aquatic resource type.

5.8. *Site Selection.* Compensatory mitigation plans should describe the factors considered during the site selection process and plan formulation including, but not limited to:

5.8.1 *Location.* Mitigation is required to be, when practicable, in areas adjacent or contiguous to the discharge site (on-site compensatory mitigation). On-site mitigation generally compensates for locally important functions, e.g., local flood control functions or unusual wildlife habitat. However, off-site mitigation may be used when there is no practicable opportunity for on-site mitigation, or when off-site mitigation provides more watershed benefit than on-site mitigation, e.g., is of greater ecological importance to the region of impact. Off-site mitigation will be in the same geographic area, i.e., in close proximity to the authorized impacts and, to the extent practicable, in the same watershed. The following factors that should be considered when choosing between on-site or off-site compensatory mitigation: likelihood for success; ecological sustainability; practicability of long-term monitoring and maintenance or operation and maintenance; and relative costs of mitigation alternatives.

5.8.2. *Watershed Considerations.* Mitigation plans should describe how the site chosen for a mitigation project contributes to the specific aquatic resource needs of the impacted watershed. A compensatory

mitigation project generally should be located in the same "State of Georgia Hydrologic Map Cataloging Unit (i.e., 8-Digit Unit)" as the impact site. The further removed geographically that the mitigation is, the greater is the need to demonstrate that the proposed mitigation will reasonably offset authorized impacts. For guidance on service areas for mitigation banks, see *Attachment E* "Mitigation Bank Service Areas."

5.8.3. *Practicability.* The mitigation plan should describe site selection in terms of cost, existing technology, and logistics.

5.8.4. *Air Traffic.* Compensatory mitigation projects that have the potential to attract waterfowl and other bird species that might pose a threat to aircraft will be sited consistent with the Federal Aviation Administration Advisory Circular on Hazardous Wildlife Attractants on or near Airports (AC No: 150/5200-33, *5/1/97).*

5.9. *Scheduling.* In most cases, mitigation should be completed concurrent with authorized impacts to the extent practicable. Advance or concurrent mitigation can reduce temporal losses of aquatic functions and facilitate compliance. However, it is recognized that because of equipment utilization it may be necessary to perform the mitigation concurrent with the overall project. This is usually acceptable provided the time lag between the impacts and mitigation is minimized and the mitigation is completed within one growing season following commencement of the adverse impacts. In general, when impacts to aquatic resources are authorized to proceed before an approved mitigation plan can be initiated, the permittee will be required to secure the mitigation site and record a restrictive covenant.

5.10. *Maintenance.* Mitigation plans which require perpetual or long-term human intervention will usually not be acceptable. Mitigation areas should be designed to be naturally sustaining following the completion of the mitigation. Hydrology must be adequately considered since plans requiring an energy subsidy (pumping, intensive management, etc.) will normally not be acceptable. The goal is to achieve a natural state that does not depend upon maintenance. Plans with maintenance will be discouraged.

5.11. *Pre-project Consultation.* To minimize delays and objections during the permit review process, applicants are encouraged to seek the advice of resource and regulatory agencies during the planning and design of mitigation plans. For complex mitigation projects, such consultation may improve the likelihood of mitigation success and reduce permit processing time. Furthermore, developers should typically seek advice from consultants on complicated mitigation projects.

5.12. *Lakes, Ponds, and Impoundments.* Mitigation using lakes, ponds, and impoundments may be allowed as compensation for impacts to similar waterbodies. Mitigation using lakes, ponds, or impoundments will generally not be acceptable as compensatory mitigation for adverse impacts to wetlands. Additionally mitigation using wetlands, lakes, ponds, or impoundments will generally not be acceptable as compensatory mitigation for adverse impacts to riverine systems. It is understood that open surface waterbodies provide some valuable public interest factors such as storm water storage, fisheries habitat, or ground water recharge. Therefore, in recognition of this fact, the adverse effect factors for flooding and impounding have been adjusted relative to other factors.

6. Monitoring and Contingency Plans. The applicant will normally be required to monitor the mitigation area for success and to provide written reports describing the findings of the monitoring efforts. Such reports will normally involve photographic documentation, information on survival rates of planted vegetation, and information on the monitored hydrology. Because of the many variables involved, no specific standards are set forth as a part of this policy. Instead, a monitoring plan should be submitted as a part of the mitigation proposal for review. Monitoring efforts should usually include periodic reviews in the first year and annually thereafter. For major mitigation projects, the plan should

include contingency measures specifying remediation procedures which will be followed should the success criteria or scheduled performance criteria not be fully satisfied. Monitoring and contingency plans typically address the following items, as applicable:

- A narrative discussion of the key elements of the proposed monitoring and contingencies plan.
- Names of party(s) responsible for the monitoring and contingencies plan.
- A description of the baseline conditions (e.g., soils, hydrology, vegetation, and wildlife).
- A schedule for monitoring activities and reporting.
- A listing of measurable success factors with quantifiable criteria for determining success.
- Definitions for success factors and other terms used in the plan.
- Descriptions of equipment, materials, and methods to be used.
- Proposed protective measures (e.g., restrictive covenants or conservation easements).
- Vegetation monitoring and contingency plan.
- Hydrological monitoring and contingency plan.
- Designation of reference site.
- For stream mitigation, monitoring of physical parameters.

7. Performance Standards. Compensatory mitigation plans will contain written performance standards for assessing whether mitigation is achieving planned goals. Performance standards will become part of individual permits as special conditions and be used for performance monitoring. Project performance evaluations will be performed by the USACE, as specified in the permits or special conditions, based upon monitoring reports. Adaptive management activities may be required to adjust to unforeseen or changing circumstances, and responsible parties may be required to adjust mitigation projects or rectify deficiencies. The project performance evaluations will be used to determine whether the environmental benefits or "credit(s)" for the entire project equal or exceed the environmental impact(s) or "debit(s)" of authorized activities. Performance standards for compensatory mitigation sites will be based on quantitative or qualitative characteristics that can be practicably measured. The performance standards will be indicators that demonstrate that the mitigation is developing or has developed into the desired habitat. Performance standards will vary by geographic region and aquatic habitat type, and may be developed through interagency coordination at the regional level. Performance standards for wetlands can be derived from the criteria in the 1987 Corps of Engineers Wetlands Delineation Manual, such as the duration of soil saturation required to meet the wetland hydrology criterion, or variables and associated functional capacity indices in hydrogeomorphic assessment method regional guidebooks. Performance standards may also be based on reference sites.

8. Drawings. Mitigation plans should include drawings in conformance with the following.

a. Drawings must be provided on 8.5 x 11” paper. For larger mitigation projects, 11 x 17” or larger drawings should be submitted, in addition to 8.5 x 11” drawings. Generally, all drawings should have a scale no smaller than 1”=200’. Drawings must be clear, readable, and reproducible on standard, non-color office copiers. Each drawing sheet should include the following:

- An unused margin of no less than ½”.
- An appropriate graphic scale (when reasonable).
- All significant dimensions clearly indicated and annotated.
- Title block with applicant's name, project title, site location, drawing date, and sheet number.
- A directional arrow indicating north.
- A clear, legible plan view indicating area sizes (e.g., square feet, acres) for all mitigation sites.

b. Location maps for the proposed activity must be included. Two maps are desired. A County road map and a US Geological Quadrangle map are preferred as sources. The location maps must show roads leading to the site and must include the name or number of these roads. The project latitude and longitude should be annotated on the maps. Each map should include a title block.

c. Plan views of the proposed mitigation must be included. These drawings must show the general and specific site location and character of all proposed activities, including the relationship of all proposed work to Waters of the United States in the vicinity of the project.

d. For ground-disturbing mitigation work, cross section views must be submitted depicting the existing ground contours and the proposed finished contours.

e. **All** aquatic areas within the project boundaries (avoided, impacted, or mitigated) must be shown.

f. Each restoration, enhancement, preservation, creation and upland buffer area must be shown.

g. A legend must be shown identifying cross-hatching, shading, or other marking techniques used.

h. A summary table with the quantity of each category of impact and mitigation must be provided.

i. Show the ordinary high water line of affected and adjacent non-tidal open surface waterbodies.

j. Show the mean high tide line and spring high tide line of affected and adjacent tidal waterbodies.

k. For mitigation plans with more than ten acres of wetland restoration, enhancement, creation and upland buffer, or a combination thereof, certified topographic drawings showing the contours and elevations of the completed mitigation area may be required. The drawings should show types of plantings, locations of plantings, and all structures and work that are a significant part of the mitigation.

9. Mitigation Banking. Proposals to establish mitigation banks will be processed in accordance with "Guidelines on the Establishment and Operation of Wetland Mitigation Banks in Georgia." Proposals which include use of credits from a mitigation bank must normally comply with the requirements given in this SOP as well as any conditions or restrictions applicable to the bank. Guidance on the appropriate use of mitigation bank credits is contained in the document titled "Addendum 1 - Guidelines on the Establishment and Operation of Wetland Mitigation Banks in Georgia," dated January 16, 1996. This document is available on the Savannah District web site.

10. Point of Contact. Copies of this document are available at Savannah District's Regulatory Office. Questions regarding use of this policy for specific projects must be addressed to the Project Manager handling the action. Other inquiries or comments regarding this document should be addressed to:

Southern Section: US Army Corps of Engineers, Savannah District
Regulatory Branch
Post Office Box 889
Savannah, Georgia 31402-0889
Phone: Richard Morgan: 912-652-5139 or 800-448-2402
E-mail: Richard.w.morgan@sas02.usace.army.mil

Northern Section: US Army Corps of Engineers, Savannah District
1590 Adamson Parkway, Suite 200
Morrow, Georgia 30260
Phone: Alan Miller: 678-422-2729
E-mail: Alan.miller@sas02.usace.army.mil

11. Authorizing Signature. By the signature given below, this draft SOP is authorized for use.

David Crosby
Acting Chief, Regulatory Branch

ATTACHMENTS:

A. Wetland Mitigation Definition of Factors
B. Wetland/Openwater Mitigation Worksheets
C. Stream Mitigation Definition of Factors
D. Stream Mitigation Worksheets
E. Draft Wetland and Stream Mitigation Bank Service Areas

WETLANDS AND OPEN WATERS
Compensatory Mitigation
Definitions of Factors

Adverse effects as used in this section of the SOP means any adverse ecological effect on wetlands or areas of open water. Those effects, or impacts, include filling, excavating, flooding, draining, clearing, or similar changes affecting wetlands or open water areas. Other categories of effects such as aesthetic, cultural, historic, health, etc., are not addressed by this SOP.

Aquatic site means wetlands and other open water areas (streams not included in this section).

Control means the entity responsible for enforcing preservation requirements. Related terms are:
- Public Ownership. (0.5 credit factor)
- Restrictive Covenant (RC) and Conservation Easement (CE). (0.4 credit factor)
- Property Owners Association (POA) with Restrictive Covenant. (0.3 credit factor)
- Private with Restrictive Covenant. (0.2 credit factor)
- No Restrictive Covenant. (0.0)

Credit Schedule means the timing of mitigation in relation to adverse impacts to aquatic sites. Mitigation schedules are reviewed and approved on a case-by-case basis. Related terms include:
FOR NON-BANKS:
- Schedule 1. Mitigation is done prior to the adverse impacts. (0.4 credit factor)
- Schedule 2. The majority of the mitigation is done prior to the impacts and the remainder is done concurrent with, or after the impacts. (0.3 credit factor)
- Schedule 3. The mitigation is constructed concurrent with the impacts. (0.2 credit factor)
- Schedule 4. The majority of the mitigation is done concurrent with the impacts, and the remainder is done after the impacts. (0.1 credit factor)
- Schedule 5. The mitigation is done after the impacts. (0 credit factor)

FOR MITIGATION BANKS:
- Schedule 1. No credits may be withdrawn prior to final determination of success.
- Schedule 2. No more than 5% of the total credits are released upon recording a restrictive covenant over the bank site and at least 25% of the total credits are held until final determination of success.
- Schedule 3. No more than 10% of the total credits are released upon recording a restrictive covenant over the bank site and at least 20% of the total credits are held until final determination of success.
- Schedule 4. No more than 15% of the total credits are released upon recording a restrictive covenant over the bank site and at least 20% of the total credits are held until final determination of success.

Degree of Threat is an assessment of the level of imminent risk of loss or damage to a system. None (0 credit factor); Low (0.1 credit factor); Moderate (0.3 credit factor); High (0.5 credit factor).

Dominant Effect categories are defined as follows:
- Shading means to shelter or screen by intercepting radiated light or heat. (0.5 impact factor)
- Clear means to mechanically remove vegetation (mechanized landclearing). (1.0 impact factor)
- Flood means to periodically and temporarily cover an aquatic area with water. (1.2 impact factor)
- Draining means ditching, channelization, or excavation that results in the removal of water from an aquatic area causing the area, or a portion of the aquatic area, to change over time to a non-aquatic area or to a different type of aquatic area. (1.4 impact factor)

- Impound means to create a permanent lake or pond by obstructing the flow of a riverine system. (1.6 impact factor)
- Dredge means to dig, gather, pull out, or excavate from US waters. (1.8 impact factor)
- Fill material means any material used for the primary purpose of replacing an aquatic area with dry land or of changing the bottom elevation of a waterbody. (2.0 impact factor)

Duration means the length of time the adverse impacts are expected to last. Impact factors range from 0.1 (< 1 year) to 2.0 (7+ years).

Effect is defined by Webster to mean something that inevitably follows an antecedent (as a cause or agent). The Council on Environmental Quality (CEQ) has defined at 40 CFR Part 1508.8 that the words impacts and effects are synonymous, and that effects includes ecological, aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Mitigation for other categories of effects (e.g., historic, cultural, aesthetic) is not addressed in this SOP. The CEQ stated that effects include: direct effects which are caused by the action and occur at the same time and place; and indirect effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

Existing Conditions categories are defined as follows. This SOP is limited to evaluation of compensatory mitigation plans for adverse ecological effects.

- Class 1 means fully functional. For example: Mixed species hardwood forest with 40-year old or older dominant canopy trees, and no evidence of hydrologic alteration (2.0 impact factor).
- Class 2 means adverse impacts to aquatic function are minor and would fully recover without assistance. For example: Mixed species hardwood forest with 20 to 40-year old dominant canopy trees, and no evidence of hydrologic alteration (1.5 impact factor).
- Class 3 means adverse impacts to aquatic functions are minor and would not fully recover without some minor enhancement activity. For example: Mixed species 10 to 20-year old hardwoods with evidence of minor hydrologic alteration (i.e., few shallow ditches) (1.0 impact factor).
- Class 4 means major adverse impacts to aquatic function and substantial enhancement would be necessary to regain lost aquatic functions. For example: Clear-cut/cutover 0 to 10-year old stand dominated by early successional tree species (i.e., gums, maples, willows, etc.), and lacking many indigenous mast producing hardwood species. In addition, these areas may have extensive hydrologic alteration (i.e., network of drainage ditches and canals) (0.5 impact factor).
- Class 5 means most aquatic function has been lost. For example: Intensively managed pine plantations or farmed wetlands. (0.1 impact factor).

Hydrology, as used in this SOP, means the properties, distribution, and circulation of water on the surface of the land, in the soil, and underlying rocks. Related terms include:

- Mechanical hydrology means the employment of mechanical methods (e.g., pumps) to supply water to an area thereby causing an ecologically significant change in the hydrology of the area. (0 credit factor)
- Created hydrology means the permanent manipulation of the topography resulting in an ecologically significant change in the hydrology of the area. (0.1 credit factor)
- Natural hydrology means the area's hydrology, as it existed prior to the actions of modern man. Hydrology which has been restored to its natural state qualifies as natural hydrology. Examples of

such restoration include effectively filling ditches that drain the area or removing berms that prevent inundation. (0.3 credit factor)

Kind is a factor used to compare the relative functions and values of the mitigation site to the impacted site. For Mitigation Banks the Kind Category will almost always be Category 1 (In Kind), because banks are encouraged to target restoration or enhancement of forested riverine systems, and these are the types of wetlands that receive the most impact. For Non-Banks, kind is as follows:

- Category 1 is In-kind. In-kind Mitigation means the replacement of the impacted aquatic site with one of the same hydrologic regime and plant community type (same species composition). (0.6 credit factor)
- Category 2 is Out-of-kind. Out-of-kind Mitigation means the replacement of an impacted aquatic site with one of a different hydrologic regime and plant community type (different species composition). For example, if a wooded swamp habitat is filled or altered and the mitigation consists of grading an area and planting it in freshwater emergent marsh species. (0.2 credit factor)

Lost Kind categories are based on functional values. Habitat types that are not categorized below will be evaluated and assigned a category ranking by the Project Manager on a case-by-case basis.

- Kind A - Riverine forested wetlands; intertidal wetlands. (2.0 impact factor)
- Kind B - Non-riverine forested wetlands; freshwater areas adjacent to tidal areas. (1.5 impact factor)
- Kind C - Pine flatwood wetlands. (1.0 impact factor)
- Kind D - Lakes and impoundments. (0.5 impact factor)
- Kind E - Naturalized borrow pits. (0.1 impact factor)

Maintenance means any long term or perpetual manipulation or action after completion of the monitoring period that is necessary to achieve the mitigation goal. Remedial or planned work during the monitoring period is not considered maintenance, but is rather just a part of the mitigation work.

- None -- The mitigation area is expected to continue developing into the preferred habitat without any human intervention after the monitoring period is complete. (0.3 credit factor).
- Low -- Minimal level maintenance including removal of unwanted species. (0.2 credit factor).
- Moderate -- Maintenance including some replanting of the desired vegetation. (0.1 credit factor).
- High -- Maintenance includes significant replanting, addition of soils, hydrology manipulation, or other similar actions. (0 credit factor)

Monitoring and Contingencies (M and C Plans) means the actions which will be undertaken during the mitigation project to measure the level of success of the mitigation work and to correct problems or failures observed. Mitigation Banks are required to develop an Excellent M and C Plan. Contingencies means the actions that will be employed to correct deficiencies or failures found during the monitoring period and to achieve the specified success criteria. Monitoring means the collection of field data to measure the success of a mitigation effort. It usually includes analysis of the data, and submittal of a comprehensive report containing the data, analyses, and a narrative discussion of the findings and conclusions.

- Minimum Level Monitoring and Contingencies Plans: (0.1 credit factor)
  - At least 5 years of monitoring (unless approved otherwise)
  - Vegetation survival monitoring (including a commitment to replant if success is not achieved)
- Moderate Level Monitoring and Contingencies Plans: (0.2 credit factor)
  - At least 5 years of monitoring

- Vegetation survival monitoring (including a commitment to replant if success is not achieved)
- Basic hydrological monitoring
- Collection of suitable baseline data

- Substantial Level Monitoring and Contingencies Plans: (0.3 credit factor)
  - At least 5 years of monitoring
  - Vegetation survival monitoring (including a commitment to replant if success is not achieved)
  - Extensive hydrological monitoring
  - Collection of suitable baseline data
  - Reference site comparison monitoring
- Excellent Level Monitoring and Contingencies Plans: (0.4 credit factor)
  - At least 7 years of monitoring
  - Vegetation survival monitoring (including a commitment to replant if success is not achieved)
  - Extensive hydrological monitoring
  - Collection of suitable baseline data
  - Reference site comparison monitoring
  - For mitigation banks, submission of an annual status report until all credits are sold

Net Improvement is the level of enhancement and/or restoration of the functions of an aquatic site being used for mitigation. There are two Net Improvement credit factors. Vegetative Net Improvment can range from 0.1 to 1.4 and Hydrologic Net Improvement can range from 0.1 to 1.4. For larger mitigation sites and for mitigation banks, a functional assement (i.e., HGM, RAP, etc.) will normally be required to provide justification in support of the selected Vegetative and Hydrologic Net Improvments factors. The USACE will make final decisions with requard to appropriate net improvements factors.

Preventability is an evaluation of the degree to which the adverse effects could be prevented. This factor is intended primarily for Nationwide Permit mitigation. Individual Permits must also satisfy the 404(b)(1) guidelines regarding avoidance, minimization, etc. Preventability levels are as follows:

- High means there may be practicable, less damaging alternatives that satisfy the purpose of the project. In the case of existing violations the presumption will be that there was high preventability unless demonstrated otherwise. (2.0 impact factor)
- Moderate means there may be alternatives but it is unclear if they satisfy the project purpose or if they are practicable. (1.0 impact factor)
- Low means there are no known alternatives which satisfy the purpose, are practicable, and are less damaging. (0.5 impact factor)

Rarity Ranking categories are determined based on information furnished by the US Fish and Wildlife Service and/or the Georgia Department of Natural Resources or other available data. The USACE will assign a rarity ranking on a case-by-case basis with consideration of any comments provided by resource agencies. Categories are defined as follows.

- Rare means that the designated category is seldom occurring and is marked by some special quality. (2.0 impact factor)
- Uncommon means that the designated category is not ordinarily encountered or is of exceptional quality. (0.5 impact factor)
- Common means that the designated category is frequently occurring or widespread in distribution. (0.1 impact factor)

Upland Buffer Credit is based on the acreage of the upland buffer and the percentage of the total jurisdictional boundary on the mitigation area that is protected by the buffer. Only the area (acres) of upland buffer in excess of the minimum 25' can be used to calculate upland buffer credit. Categories are as follows:

- More than 95% of the total jurisdictional boundary of the aquatic site is protected by a suitable upland buffer. (1.0 credit factor)
- From 68% to 95% of the total jurisdictional boundary of the aquatic site is protected by a suitable upland buffer. (0.8 credit factor)
- From 50% to 67% of the total jurisdictional boundary of the aquatic site is protected by a suitable upland buffer. (0.6 credit factor)
- From 33% to 49% of the total jurisdictional boundary of the aquatic site is protected by a suitable upland buffer. (0.3 credit factor)
- Less than 33% of the total jurisdictional boundary of the aquatic site is protected by a suitable upland buffer. (0.1)

Upland Buffer Enhancement Credit is based on the acreage of the buffered aquatic site and the percentage of the total jurisdictional boundary protected by the buffer. Categories are as follows:

- More than 95% of the total jurisdictional boundary of the aquatic site is protected by a suitable upland buffer. (0.15 credit factor)
- From 50% to 95% of the total jurisdictional boundary of the aquatic site is protected by a suitable upland buffer. (0.1 credit factor)
- Less than 50% of the total jurisdictional boundary of the aquatic site is protected by a suitable upland buffer. (0.05 credit factor)

Vegetation means the plant material within a defined area. Related terms used in this SOP include:

- N.A.-- Not Applicable and vegetation adjustment is not part of the mitigation plan. (0 credit factor).
- Natural revegetation involves no planting. (0.1 credit factor).
- Planted means using transplanted, or nursery stock vegetation. (0.4 credit factor).

Wetland Enhancement is the manipulation of the physical, chemical, or biological characteristics of a wetland (undisturbed or degraded) site to heighten, intensify, or improve specific function(s) or to change the growth stage or composition of the vegetation present. Enhancement is undertaken for specified purposes such as water quality improvement, flood water retention, or wildlife habitat. Enhancement results in a change in wetland function(s) and can lead to a decline in other wetland functions, but does not result in a gain in wetland acres. This term includes activities commonly associated with enhancement, management, manipulation, and directed alteration. Proposed enhancement mitigation plans must include an explanation of what values or functions are being enhanced and to what degree, and a narrative description of how the enhancement will be accomplished. The plan must also include a narrative description of how a functional assessment methodology (i.e., reference site, HGM, WRAP, etc.) would be used to document that identified values and/or functions are enhanced to the degree proposed.

Wetland Establishment (Creation) is the manipulation of the physical, chemical, or biological characteristics present to develop a wetland on an upland or deepwater site, where a wetland did not previously exist. Establishment results in a gain in wetland acres. In designing creation mitigation, the selection of high quality upland habitat for conversion will generally not be acceptable. For example, a cutover area or former agricultural field would be ecologically preferable to a mature forested area as a

candidate for alteration. Mature forested areas will generally not be approved as suitable creation areas. Proposals for establishment mitigation must include an explanation of what values or functions are to be established and to what degree, and a narrative description of how the establishment will be accomplished. The plan must also include a narrative description of how a functional assessment methodology (i.e., reference site, HGM, WRAP, etc.) would be used to document that identified values and/or functions are established to the degree proposed.

Wetland Preservation is the permanent perpetual protection of existing wetlands, or other open water aquatic resources may be an acceptable form of mitigation when these areas are preserved in conjunction with establishment (creation), restoration, and enhancement activities. Preserved resources should augment the functions of newly established, restored, or enhanced aquatic resources. In **exceptional circumstances**, the preservation of existing wetlands or other aquatic resources may be authorized as the sole basis for generating credits as mitigation projects. Natural wetlands provide numerous ecological benefits that restored wetlands cannot provide immediately and may provide more practicable long-term ecological benefits. If preservation alone is proposed as mitigation, it must be demonstrated that the wetlands or other aquatic resources perform important physical, chemical or biological functions, the protection and maintenance of which is important to the region where those aquatic resources are located; and are under demonstrable threat of loss or substantial degradation from human activities that might not otherwise be avoided. The existence of a demonstrable threat will be based on clear evidence of destructive land use changes that are consistent with local and regional (i.e., watershed) land use trends, and that are not the consequence of actions under the control of the party proposing the preservation.

Wetland Restoration is the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural or historic functions to a former or degraded wetland. There are two categories of restoration as follows: (a) Re-establishment, which results in rebuilding a former wetland and results in a gain in wetland acres and (b) Rehabilitation, which results in a gain in wetland function but does <u>not</u> result in a gain in wetland acres. Proposals for restoration mitigation must include an explanation of what values or functions are being restored and to what degree, and a narrative description of how the restoration will be accomplished. The plan must also include a narrative description of how a functional assessment methodology (i.e., reference site, HGM, WRAP, etc.) would be used to document that identified values and/or functions are restored to the degree proposed.

WETLANDS AND OPEN WATERS
MITIGATION WORKSHEETS

ADVERSE IMPACT FACTORS

Factor	Options						
Dominant Effect	Fill 2.0	Dredge 1.8	Impound 1.6	Drain 1.4	Flood 1.2	Clear 1.0	Shade 0.5
Duration of Effects	7+ years 2.0	5-7 years 1.5	3-5 years 1.0	1-3 years 0.5	< 1 year 0.1		
Existing Condition	Class 1 2.0	Class 2 1.5	Class 3 1.0	Class 4 0.5	Class 5 0.1		
Lost Kind	Kind A 2.0	Kind B 1.5	Kind C 1.0	Kind D 0.5	Kind E 0.1		
Preventability	High 2.0	Moderate 1.0	Low 0.5	None 0			
Rarity Ranking	Rare 2.0	Uncommon 0.5	Common 0.1				

† These factors are determined on a case-by-case basis.

REQUIRED MITIGATION CREDITS WORKSHEET

Factor	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6
Dominant Effect						
Duration of Effect						
Existing Condition						
Lost Kind						
Preventability						
Rarity Ranking						
Sum of r Factors	R_1 =	R_2 =	R_3 =	R_4 =	R_5 =	R_6 =
Impacted Area	AA_1 =	AA_2 =	AA_3 =	AA_4 =	AA_5 =	AA_6 =
R × AA =						

Total Required Credits = $\sum$ (R × AA) = _____

WETLANDS AND OPEN WATERS
MITIGATION WORKSHEETS

CREATION MITIGATION FACTORS

Factor	Options				
Credit Schedule	Schedule 5 0	Schedule 4 0.1	Schedule 3 0.2	Schedule 2 0.3	Schedule 1 0.4
Hydrology	N. A. 0	Mechanical 0	Created 0.1	Natural 0.4	
Kind	Category 2 0.2	Category 1 0.6			
Maintenance	High 0	Moderate 0.1	Low 0.2	None 0.3	
Monitoring and Contingencies Plan	N/A 0	Minimum 0.1	Moderate 0.2	Substantial 0.3	Excellent 0.4
Control	N/A 0	Private RC 0.1	RC w POA 0.2	RC + CE 0.4	Public Ownership 0.5
Vegetation	N/A 0	Natural 0.1	Planted 0.4		

PROPOSED CREATION MITIGATION WORKSHEET

Factor	Area 1	Area 2	Area 3	Area 4	Area 5
Credit Schedule					
Hydrology					
Kind					
Maintenance					
M and C Plan					
Soils					
Vegetation					
Sum of m Factors	M_1 =	M_2 =	M_3 =	M_4 =	M_5 =
Mitigation Area	A_1 =	A_2 =	A_3 =	A_4 =	A_5 =
M x A =					

Total Creation Credits = $\sum (M \times A)$ = _____

WETLANDS AND OPEN WATERS
MITIGATION WORKSHEETS

RESTORATION/ENHANCEMENT MITIGATION FACTORS

Factor	Options				
Net Improvement Vegetation	Minimal Enhancement 0.1 ---------- to ---------- Complete Restoration 1.4				
Net Improvement Hydrology	Minimal Enhancement 0.1 ---------- to ---------- Complete Restoration 1.4				
Credit Schedule	Schedule 5 0	Schedule 4 0.1	Schedule 3 0.2	Schedule 2 0.3	Schedule 1 0.4
Kind	Category 2 0.2	Category 1 0.6			
Maintenance	High 0	Moderate 0.1	Low 0.2	None 0.3	
Monitoring and Contingencies Plan	N/A 0	Minimum 0.1	Moderate 0.2	Substantial 0.3	Excellent 0.4
Control	N/A 0	Private RC 0.1	RC w POA 0.2	RC + CE 0.4	Public Ownership 0.5

PROPOSED RESTORATION/ENHANCEMENT MITIGATION WORKSHEET

Factor	Area 1	Area 2	Area 3	Area 4	Area 5
Net Improvement Vegetation					
Net Improvement Hydrology					
Credit Schedule					
Kind					
Maintenance					
M and C Plan					
Control					
Sum of m Factors	M_1 =	M_2 =	M_3 =	M_4 =	M_5 =
Mitigation Area	A_1 =	A_2 =	A_3 =	A_4 =	A_5 =
M × A =					

Total Restoration/Enhancement Credits = $\sum$ (M × A) = _____

WETLANDS AND OPEN WATERS
MITIGATION WORKSHEETS

PRESERVATION MITIGATION FACTORS

Factor	**Options**				
Degree of Threat	None 0	Low 0.1	Moderate 0.3	High 0.5	
Kind	Category 2 0.2	Category 1 0.6			
Control	N/A 0	Private w RC 0.1	POA w RC 0.2	RC + CE 0.4	Public Ownership 0.5

PROPOSED PRESERVATION MITIGATION WORKSHEET

Factor	**Area 1**	**Area 2**	**Area 3**	**Area 4**	**Area 5**
Threat					
Kind					
Control					
Sum of m Factors	M_1=	M_2=	M_3=	M_4=	M_5=
Mitigation Area	A_1=	A_2=	A_3=	A_4=	A_5=
M x A =					

Total Preservation Credits = $\sum$ (M x A) = _____

WETLANDS AND OPEN WATERS
MITIGATION WORKSHEETS

MINIMUM UPLAND BUFFER WIDTHS FOR MITIGATION CREDIT †

Adjacent Land Use Category	Minimum Width
Single Family Residential	50 feet
Multi-Family	75 feet
Commercial	75 feet
Industrial	100 feet
Landfill	100 feet
Other Categories	case-by-case

† widths are based on linear, constant elevation measurement

BUFFER MITIGATION FACTORS

Factors	Options				
Upland Buffer	>95% 1.0	68% to 95% 0.8	50% to 67% 0.6	33% to 49% 0.3	<33% 0.1
Buffer Enhancement	>95% 0.15	50% to 95% 0.1	<50% 0.05		

UPLAND BUFFER CREDIT WORKSHEET

	Area 1	Area 2	Area 3	Area 4	Area 5
Total Jurisdictional Boundary (B1)*					
Buffered Jurisdictional Boundary (B2)*					
(B2 ÷ B1) x 100 = % Buffered					
Upland Buffer Factor (U1)					
Acres of Upland Buffer (A1)					
A1 x U1 = C1					
Buffer Enhancement Factor (U2)					
Aquatic Mitigation Area Acres (A2)					
A2 x U2 = C2					
C1 + C2 = D	D_1=	D_2=	D_3=	D_4=	D_5=

Total Buffer Credit = $\sum D_{1\text{-}5}$= _____

* B1 = Total linear feet of jurisdictional boundary of each proposed restoration, enhancement, preservation and/or creation area.
* B2 = Total linear feet of jurisdictional boundary proposed to be buffered for each restoration, enhancement, preservation and/or creation area.

WETLANDS AND OPEN WATERS
MITIGATION WORKSHEETS

Mitigation Summary Worksheet For Permit Application #_____

I.	**Required Mitigation**
A.	Total Required Mitigation Credits =

II.	**Mitigation Credit Summary**	**Credits**	**Acres**
B.	Mitigation Bank		
C.	Restoration and/or Enhancement		
D.	Creation		
E.	Functional Replacement Mitigation = B + C + D		
F.	Upland Buffer		
G.	Preservation		
H.	Total Proposed Non-Bank Mitigation = E + F + G		

The following criteria must be satisfied for the mitigation proposal to meet minimum SOP requirements:

1. Total Proposed Mitigation (Row H) must be greater than or equal to Total Required Mitigation Credits (Row A).

2. Functional Replacement Mitigation (Row E) must be at least 50% of Row A.

3. Preservation Mitigation (Row G) can be up to, but not more than 50% of Row A, if no Upland Buffer Credits are proposed. If Upland Buffer Credits are proposed, then Preservation Mitigation may be reduced to 30% of the Total Required Mitigation Credits.

4. Upland Buffer (Row F) cannot exceed 20% of the Total Required Mitigation (Row A). The following table provides examples of how Preservation and Upland Buffer Mitigation can be used in combination:

Total Required Mitigation Credits	**Functional Replacement Credits**	**Preservation Credits**	**Upland Buffer Credits**
100	50	50	0
100	50	40	10
100	50	30	20

Net benefit is an evaluation of the proposed mitigation action relative to the restoration and maintenance of the chemical, biological, and physical integrity of the Nation's waters. Six stream restoration methods are covered under this SOP – stream channel restoration/relocation, removal of culverts/dams or other instream structures that block flow or fish movement, streambank stabilization, riparian restoration, riparian habitat improvement, and riparian preservation. The USACE will determine, on a case-by-case basis, if net benefit for actions that do not involve direct manipulation of a length of stream and/or its riparian buffers, such as retrofitting stormwater detention facilities, construction of off-channel stormwater detention facilities in areas where runoff is accelerating streambank erosion, measures to reduce septic tank leakage, paving of dirt roads, contaminant reduction, stormwater surcharge reduction and other watershed protection practices will be considered. (Note: Off-channel stormwater detention facilities should not be placed in jurisdictional wetlands, forested floodplains, or riparian buffer zones.) Stream mitigation within 100' of a culvert, dam, or other man-made impact to waters of the United States generally will generate only minimal restoration or preservation credit due to impacts associated with these structures.

Stream Channel Restoration and Relocation: **Stream Channel Restoration** refers to actions to convert an unstable, altered, or degraded stream channel to a natural stable condition, considering recent and future watershed conditions. **Stream Relocation** means to move an unstable, altered or degraded stream channel and reconstruct it, in a natural stable condition, in a new location to allow an authorized project to be constructed in the stream's former location. Design of a restored or relocated channel shall be based on a reference reach and include restoration of appropriate pattern, profile, and dimension, as well as transport of water and sediment produced by the stream's upstream watershed. Stream channel restoration or relocation is appropriate only on entrenched, unstable streams (Simon Channel Evolution Stages III, IV, and V) -- restoration or relocation of a stream that is considered Fully Functional will not be considered for mitigation credit.

- **Priority 1 Restoration/Relocation** involves excavation or relocation of a stable Rosgen Class C or E stream channel, on previous floodplain, to replace an entrenched Rosgen Class G or F stream channel.
- **Priority 2 Restoration/Relocation** involves establishment of a stable Rosgen Class C or E stream channel and floodplain, at the current channel elevation, to replace an entrenched Rosgen Class G or F stream channel.
- **Priority 3 Restoration/Relocation** involves establishment of a stable Rosgen Class B channel and floodprone area, at the current channel elevation, to replace an entrenched Rosgen Class G or F stream channel.
- **Priority 4 Restoration** involves stabilization of an entrenched Rosgen Class G or F stream channel in place using instream structures and bioengineering. Typical instream structures for bank stability include crossvanes, J-hook vanes, other rock vanes, single and double wing deflectors, and root wads that divert the thalwag from the streambank and/or absorb water energy. Bioengineering techniques include fascines, branch packing, brush mattresses, live cribwalls, tree revetments, or coir fiber logs, supplemented with use of erosion control matting and live staking for long term stability. Priority 4 Restoration is not an acceptable mitigative measure for relocated streams.

All proposed stream channel restoration/relocation mitigation plans shall include:

(1) geomorphic data describing the existing stream, the reference reach upon which design criteria are based, and the proposed stream design (Table 2) and

(2) a minimum 25-foot riparian buffer on both banks along the length of the project. Additional mitigation credit may be generated if buffers on one or both banks meet or exceed minimum buffer width, as defined in this SOP.

Note: Fill of the original channel for a stream relocation is considered an impact and shall be included in calculations for required mitigation credit (Worksheet 1).

Streambank stabilization is the stabilization of localized lateral streambank erosion using bioengineering techniques such as fascines, branch packing, brush mattresses, live cribwalls, tree revetments, or coir fiber logs, supplemented with use of erosion control matting and live staking for long term stability. Streambank stabilization alone does not constitute Priority 4 Stream Channel Restoration. Credit for installation of streambank stabilization measures to stabilize localized lateral erosion will be based on 3X the length of the appropriate size structure (e.g., 600' for a 200' tree revetment).

Structure Removal refers to removal of existing pipes, culverts, dams, wiers, and other manmade structures that alter a stream's geomorphology or flows. A series of crossvanes or other appropriate grade control structures may be needed to reconstruct the channel profile and avoid a headcut if channel elevation above the location where the structure is to be removed is greater than channel elevation below the structure. Where dams are proposed to be removed, it generally is best to remove the dam to the level of sediment behind the dam and then to construct a series of crossvanes to develop a stable slope. To prevent disruption of fish movements, elevation drop from one crossvane to the next shall be no more than 0.5' (i.e., at least 4 crossvanes will be needed to develop a stable slope when channel elevation above and below a culvert to be removed drops 1.5'). Credit for removal of manmade structures will be based on total length of stream impacted directly or indirectly by the structure (i.e., dam fill plus length of impounded stream; culvert fill plus upstream and downstream areas where aggradation/degradation can be attributed to the culvert).

Riparian Restoration, Preservation, and Habitat Improvement:

- **Riparian restoration** is the reestablishment of well-established stands of deep-rooted native vegetation (trees, shrubs, and herbaceous species) in areas adjacent to riverine systems. Riparian restoration, alone, will not be allowed on streams that are at Simon Channel Evolution Stages III, IV, or V.
- **Riparian preservation** is the conservation of already well-vegetated buffers adjacent to riverine systems. Riparian buffer preservation may account for no more than 50% of the credits generated by a mitigation bank or required to mitigate for a single and complete project. If the mitigation plan for a single and complete project combines riparian buffer preservation with purchase of bank credits, non-bank buffer preservation may account for no more than 50% of the required credits. Mitigation credit for preservation or enhancement of riparian buffers is acceptable only if the stream being buffered is considered Fully Functional.
- **Riparian habitat improvement** is implementation of activities to improve the biological function of an existing buffer. Riparian habitat improvement may include planting of understory species, planting of desirable canopy trees, and/or timber stand improvement. Riparian habitat improvement is applicable only in buffers that already support well-established stands of deep-rooted native vegetation; activities proposed for riparian habitat improvement must be approved

by the USACE. Mitigation credit for enhancement of riparian buffers is acceptable only if the stream being buffered is considered Fully Functional.

Table 1. Riparian Buffer Restoration and Preservation

		71-100% of the Proposed Buffer will be Planted (Extensive Restoration)	41-70% of the Proposed Buffer will be Planted (Substantial Restoration)	10-40% of the Proposed Buffer will be Planted (Moderate Restoration)	Riparian Habitat Improvement	The buffer does not Require Planting (Preservation)
Minimum Buffer Width on One Side of Stream) (MBW = 50' + 2'/% slope)	4X MBW	2.0	1.6	0.8	0.4	0.3
	3X MBW	1.5	1.2	0.6	0.3	0.2
	2X MBW	1.0	0.8	0.4	0.2	0.1
	1X MBW	0.3	0.2	0.1	0	0

Control means the entity empowered or responsible for enforcing the mitigation requirements.

Restrictive Covenant means a legal document whereby a landowner imposes perpetual limitations or affirmative obligations on real property agency (see Page 3 of the Standard Operating Procedure).

- **POA** – a property owners association or other similar, formally chartered, non-profit organization
- **Private** – a private individual or business enterprise
- **Subdivided** - more than one owner has separate ownership of a portion of the mitigation site.

Conservation easement means an interest in real property granted by the owner to a qualified, experienced, non-profit conservation organization or government agency (Page 3 of the Standard Operating Procedure).

Dominant Impact:

- **Fill** means permanent fill of a stream channel due to construction of dams or wiers, relocation of a stream channel (even if a new stream channel is constructed), or other fill activities.
- **Pipe** means to route a stream for 100' or more through pipes, box culverts, or other enclosed structures.
- **Morphologic change** means to channelize, dredge, construct an armored ford, or otherwise alter the established or natural dimensions, depths, or limits of a stream corridor.
- **Impound** means to convert a stream to a lentic state with a dam or other retention/control structure that is not designed to pass normal flows below bankfull stage. Impact to the stream channel where the structure is located is considered fill, as defined above.
- **Stream Crossing** means to route a stream through pipes, culverts, or other structures where less than 100' of stream will be impacted per crossing.
- **Detention** means to temporarily slow flows ($\leq$ 72 hours) in a channel when bankfull is reached. Areas that are temporarily flooded due to detention structures must be designed to pass flows below bankfull stage.
- **Bank armor** means to riprap, bulkhead, or use other rigid methods to contain stream channels.

- **Utility crossing** means pipeline/utility line installation methods that require disturbance of the streambed.
- **Shading and clearing** means activities, such as bridging or streambank vegetation clearing, that reduce or eliminate the quality and functions of vegetation within riparian habitat without disturbing the existing topography or soil. Although these impacts may not be directly regulated, mitigation for these impacts may be required if the impact occurs as a result of, or in association with, an activity requiring a permit.

Duration: Duration is the amount of time the adverse impacts to a stream reach are expected to last.

- **Temporary** means impacts will occur within a period of less than 1 year and recovery of system integrity will follow cessation of the permitted activity.
- **Recurrent** means repeated impacts of short duration (such as with on-channel 24-hour stormwater detention).
- **Permanent** means project impacts will occur for more than one year. This will also be used in cases where the impact will occur during spawning or growth periods for Federal and State protected species.

Existing Condition: The functional state of a stream reach before any project impacts or mitigation actions occur.

- **Fully functional** means that the physical geomorphology of the reach is stable and the biological community is diverse. For the purposes of this SOP, a stream is considered fully functional if it meets one or more of the following five criteria:
  1. the stream reach has a stable pattern, profile, and dimension,
  2. the stream reach, on site or within 1000' upstream or downstream, supports aquatic species listed as endangered, threatened, or rare by the U.S. Fish and Wildlife Service (USFWS) or Georgia Department of Natural Resources (GADNR) (refer to USFWS Georgia Field Office or GADNR web page),
  3. the stream is a State designated primary trout stream (refer to GADNR web site),
  4. the stream reach, on site or within 1000' upstream or downstream, supports a diverse biological community (IBI Category classification of Good or Excellent; see attached form).
  5. the stream is a GADNR Stream Team reference reach (refer to list on Savannah District web site).

  Other indicators that the Corps may use, at its discretion, to identify a fully functional stream include a lack of culverts, pipes, impoundments, or other instream manmade structures on site or in reaches 1000' upstream or downstream of the site; little evidence of human-induced sedimentation; and presence of at least a 25-foot riparian buffer of deep-rooted vegetation on both sides of the stream.
- **Somewhat Impaired** means that stability and resilience of the stream or river reach has been compromised, to a limited degree, but the system has a moderate probability of recovering naturally. For purposes of this SOP, a stream is considered somewhat impaired if none of the five criteria listed above for a fully functional stream are met but the stream meets one of the following four criteria:
  2. the stream reach is moderately entrenched (entrenchment ratio of 1.4-2.2, excluding Rosgen Class B streams, which are naturally moderately entrenched)
  3. for streams in north Georgia, the channel is dominated by sand, gravel, cobble, boulders, or bedrock, rather than silt and clay
  4. bank erosion, excluding undercut banks often found in stable streams at bends, is localized

5. the stream reach, on site or within 1000' upstream or downstream, supports a moderately diverse biological community (IBI Category classification of Fair).

- **Fully Impaired** means that there is a high loss of system stability and resilience. Recovery is unlikely to occur naturally without further bank erosion and/or aggradation, unless restoration is undertaken. For purposes of this SOP, a stream is considered fully impaired if none of the nine criteria listed above for fully functional or somewhat impaired streams is met. Common indicators of a fully impaired reach include a high entrenchment ratio (<1.4, excluding Rosgen Class A streams, which are naturally entrenched); low sinuosity (<1.2, excluding Rosgen Class A streams, which are naturally relatively straight); low biodiversity (IBI or IWB Category classification of Poor or Very Poor); extensive human-induced sedimentation; extensive bank erosion on both sides of riffle reaches; significant erosion of point bars within the reach; and/or extensive culverting, piping, or impoundment within the reach.

Geomorphic Definitions:

- **Bankfull Discharge** is the flow that is most effective at moving sediment, forming or removing bars, forming or changing bends and meanders, and doing work that results in the average morphologic characteristics of channels (Dunne and Leopold 1978). The bankfull stage is the point at which water begins to overflow onto a floodplain (may not coincide with the top of the visible bank in entrenched streams). On average, bankfull discharge occurs approximately every 1.5 years
- **Dimension** refers to the stream's width, depth, and cross-sectional area at bankfull.
- **Entrenchment Ratio** is an index value that describes the degree of vertical containment of a river channel. It is calculated as the width of the flood-prone area divided by bankfull width.
- **Reference Reach/Condition** – A stable stream reach generally located in the same physiographic ecoregion, climatic region, and valley type as the project that serves as the blueprint for the dimension, pattern, and profile of the channel to be restored.
- **Pattern**: Stream pattern describes the shape of a stream as seen from above, and includes factors such as sinuosity, meander length, radius of curvature, and beltwidth.
- **Stable Stream**: A naturally stable stream channel is one that maintains its dimension, pattern, and profile over time such that the stream does not degrade or aggrade. Naturally stable streams must be able to transport water and the sediment load supplied by the watershed.
- **Profile**: The profile of a stream refers to its longitudinal slope, including factors such as water surface slope, pool-to-pool spacing, and pool and riffle slopes.

Minimum Buffer Width: The **minimum buffer width** (MBW) for which mitigation credit will be earned is 50 feet on one side of the stream, measured from the top of the stream bank (i.e., the bankfull stage), perpendicular to the channel. If topography within a proposed stream buffer has more than a 2% slope, 2 additional feet of buffer are required for every additional percent of slope (e.g., minimum buffer width with a +10% slope is 70'). Buffer slope will be determined in 50'-increments beginning at the stream bank. No additional buffer width will be required for negative slopes. For the reach being buffered, degree of slope will be determined at 100' intervals and averaged to obtain a mean degree of slope for calculating minimum buffer width. This mean degree of slope will be used to calculate the minimum buffer width for the entire segment of stream being buffered.

Mitigation Timing: No credits are generated for this factor if the proposed mitigation in a reach is primarily riparian buffer preservation or Riparian Habitat Improvement.

- **Non-Banks**: ***Schedule 1***: All mitigation is completed before the impacts occur.
  Schedule 2: The mitigation is completed concurrent with the impacts.
  Schedule 3: The mitigation will be completed after the impacts occur.

- **Banks:** Use Schedule 2 (Note: release of credits will be based on a release schedule).

Monitoring and Contingencies: Monitoring and contingency plans are actions that will be undertaken during the mitigation project to measure the level of success of the mitigation work and to correct problems or failures. All projects shall include contingency actions that will achieve specified success criteria if deficiencies or failures are found during the monitoring period. Monitoring is a required component of all mitigation plans. Mitigation Banks are required to develop an *Excellent M and C Plan*.

- **Minimum Level Restoration M&C**:
  -- **Riparian preservation/Riparian Habitat Improvement**: Collection of basic information on vegetation in the buffer and stability of the banks being buffered. Information shall be collected on the following two factors at 0-, 3-, and 5-years after the mitigation is approved:
  a. an evaluation of bank stability throughout the reach .
  b. species composition, average species height and average species diameter at breast height (dbh) of vegetation within the buffer.
  -- **Riparian restoration**: Collection of basic information on vegetation in the buffer and stability of the banks being buffered. Information shall be collected on the following three factors before planting and annually for 5 years after planting (remediation and continued monitoring will be required if success criteria are not met after 5 years).
  a. an evaluation of bank stability throughout the reach.
  b. species composition, average species height and average species dbh of vegetation within the buffer.
  c. survival and growth (height and dbh or other biomass measure) of planted vegetation.
  -- **Stream channel restoration, streambank stabilization and stream relocation**: Collection of baseline data on stream stability and water quality in streams before and after mitigation is implemented. Information shall be collected on the following three factors before mitigation activities are implemented and at 1-, 2-, and 5-years after mitigation activities are implemented (remediation and continued monitoring will be required if success criteria are not met after 5 years):
  a. an evaluation of bank stability throughout the reach.
  b. longitudinal and cross-sectional profiles of the restored, relocated, or stabilized reach.
  c. mean depth, width, entrenchment ratio, maximum depth at bankfull, bank height ratio, substrate characteristics, and other geomorphic data, as indicated on Table 2.
- **Moderate Level Restoration M&C Plans:**
  -- **Riparian preservation/Riparian Habitat Improvement:** Conducting all features under Minimum M&C, plus surveying bird, mammal, reptile, amphibian, and insect life in the buffer at 0-, 3-, and 5-years after the mitigation is approved.
  -- **Riparian restoration**: Conducting all features under Minimum M&C, plus surveying bird, mammal, reptile, amphibian, and insect life in the buffer before planting and at 1-, 3-, and 5 years after planting.
  -- **Stream channel restoration/streambank stabilization and stream relocation**: Conducting all features under Minimum M&C, plus surveying fish, freshwater mussels and snails, crawfish, and other macroinvertebrates, as appropriate, in the restored channel before mitigation activities are implemented and at 1-, 2-, and 5-years after mitigation activities are implemented.
- **Substantial Level Restoration M&C**: Conducting all features listed under Moderate M&C, plus simultaneous collection of these data in a suitable reference site. Substantial M&C Credit cannot be generated for Riparian Buffer Preservation or Habitat Improvement.

- **Excellent Level Restoration M&C**: Conducting all features listed under Substantial M&C at Year 7 and Year 10. For all banks, excellent level of M&C is required and an annual status report must be submitted until all credits are sold. Substantial M&C Credit cannot be generated for Riparian Buffer Preservation or Habitat Improvement.

Priority Area:

- **Primary Priority**: Reaches with species listed as endangered, threatened, or candidate by FWS or GaDNR
  Primary trout streams
  Streams identified by the GADNR Stream Team as having high aquatic biodiversity
  Waters adjacent to other Corps' approved mitigation sites/banks or other protected lands
  National Estuarine Research Reserves
  Reaches in approved greenway corridors
  Wild and Scenic Rivers
  Outstanding Resource Waters
  Essential Fish Habitat
- **Secondary Priority**: Waters with species listed as rare or uncommon by GADNR
  Secondary trout streams
  Waters on the 303(d) list
  State Heritage Trust Preserves
  Anadromous fish spawning habitat
  Designated shellfish grounds
  Reaches within 0.5 mile upstream or downstream of primary priority reaches
- **Tertiary Priority**: All other areas

Scaling Factor: The Scaling Factor is based on the cumulative length of stream, in feet, that will be affected by a given dominant impact.

Simon's Channel Evolution Stages:

Stage I	Stable stream connected to floodplain
Stage II	Disturbance
Stage III	Degradation; stream begins to entrench
Stage IV	Continued degradation and widening; significant bank erosion on both banks
Stage V	Stream continues to widen and form a floodplain; aggradation of sediment to form point bars
Stage VI	Quasi-stable stream with new, but lower, floodplain

System Credit: Bonus mitigation credit may be generated if proposed riparian mitigation activities include minimum width buffers on both sides of a stream reach and legal protection of a fully buffered stream channel. Condition 1 must be met to receive System Protection Credit for Condition 2.

Table 2. Geormorphic measurements for stream restoration and relocation projects.

Parameter	Current Condition	Reference Reach	Designed Stream	Year 0 (as built)	Year 1	Year 2	Year 5
Drainage Area (square miles)							
Stream Type (Rosgen)							
W_{bkf} (Bankfull width in feet)							
D_{bkf} (Bankfull mean depth in feet)							
W_{fpa} (Width of floodprone area)							
A_{bkf} (Xsect. Area) = W_{bkf} X D_{bkf}							
W_{bkf} /D_{bkf} ratio							
W_{fpa}/W_{bkf} (Entrenchment ratio)							
D_{max} (Max. depth at bankfull)							
D_{maxtob} (Max depth at top of bank)							
D_{max}/$_{Dbkf}$ (Max depth ratio)							
D_{maxtob}/D_{max} (Bank ht ratio)							
Lm (Meander length in feet)							
Rc (Radius of Curvature in feet)							
W_{blt} (Belt width in feet)							
K (Sinuosity)							
Lm/W_{bkf} (Meander length ratio)							
Rc/W_{bkf} (Radius of Curve ratio)							
W_{blt}/W_{bkf} (Meander width ratio)							
S_{val} (Valley slope)							
S_{chan} (Channel slope)							
S_{rif} (Riffle slope)							
S_{pool} (Pool slope)							
S_{run} (Run slope)							
S_{glide} (Glide slope)							
S_{rif}/S_{chan} (Riffle slope ratio)							
S_{pool}/S_{chan} (Pool slope ratio)							
S_{run}/S_{chan} (Run slope ratio)							
S_{glide}/S_{chan} (Glide slope ratio)							
$D_{maxpool}$ (Max Pool depth in feet)							
W_{pool} (Width of pool in feet)							
L_{pool} (Length of pool in feet)							
Lps (Pool-pool spacing in feet)							
A_{pool} (Pool area) = W_{pool} X L_{poo}							
$D_{maxpool}$/D_{bkf} (Max pool depth ratio)							
A_{pool}/A_{bkf} (Pool area ratio)							
W_{pool}/W_{bkf} (Pool width ratio)							
L_{pool}/L_{bkf} (Pool length ratio)							
Lps/W_{bkf} (Pool-pool spacing ratio)							
D16 (mm)							
D35 (mm)							
D50 (mm)							
D84 (mm)							
D95 (mm)							

WORKSHEET 1: ADVERSE IMPACT FACTORS FOR RIVERINE SYSTEMS WORKSHEET

Stream Type Impacted	Intermittent 0.1			Perennial Stream > 15' in width 0.4			Perennial Stream ≤ 15' in width 0.8		
Priority Area	Tertiary 0.5			Secondary 0.8			Primary 1.5		
Existing Condition	Fully Impaired 0.25			Somewhat Impaired 0.5			Fully Functional 1.0		
Duration	Temporary 0.05			Recurrent 0.1			Permanent 0.2		
Dominant Impact	Shade/ Clear 0.05	Utility X-ing 0.4	Bank Armor 0.7	Deten-tion 1.5	Stream Crossing (≤ 100') 1.7	Impound 2.7	Morpho-logic Change 2.7	Pipe >100' 3.0	Fill 3.0
Scaling Factor (Based on # linear feet impacted)	< 100' impact 0	100-200' impact 0.05	201-500' impact 0.1	501-1000' impact 0.2	> 1000' impact 0.4 for each 1000' feet of impact (round impacts to the nearest 1000') (example: 2,200' of impact – scaling factor = 0.8; 2,800' of impact – scaling factor – 1.2)				

Factor	Impact 1	Impact 2	Impact 3	Impact 4	Impact 5	Impact 6	Impact 7
Stream Type Impacted							
Priority Area							
Existing Condition							
Duration							
Dominant Impact							
Scaling Factor							
Sum of Factors	M =						
# Feet of Stream Impacted	LF=						
M X LF							

Total Mitigation Credits Required = (M X LF) = _____

WORKSHEET 2: STREAM CHANNEL RESTORATION, STREAM RELOCATION, AND STREAMBANK RESTORATION WORKSHEET

Net Benefit	All proposals must include at least a 25' riparian buffer on both banks Buffers ≥50' +2'/%slope also may generate riparian credit (see buffer worksheet)					
	Streambank Stabilization	Structure Removal	Stream Channel Restoration and Stream Relocation			
	2.0	4.0	Priority 4 1.0	Priority 3 4.0	Priority 1 or 2 8.0	
Monitoring/ Contingency	Minimal (Required) 0	Moderate 0.3	Substantial 0.4	Excellent 1.0		
Priority Area	Tertiary 0.05	Secondary 0.2	Primary 1.0			
Control	RC on restored channel+25' buffer (Required)			CE on Restored Channel+25' Buffer 0.5		
	Subdivided 0	Private 0.05	POA 0.1			
Mitigation Timing	Schedule 3 0	Schedule 2 (Use for all banks) 0.1	Schedule 1 0.5			

Reach Information	Reach 1	Reach 2	Reach 3	Reach 4
Simon Channel Evolution Stage				
Cause of Instability				
Bankfull Width				
Bankfull Depth				
Upstream Land Use				
Constraints (utility lines, roads, etc.)				
Factors	**Reach 1**	**Reach 2**	**Reach 3**	**Reach 4**
Net Benefit				
Monitoring/Contingency (at least minimal M&C required)				
Priority Area				
Control (at least a RC required)				
Mitigation Timing				
Sum of Factors M =				
Feet Stream in Reach (do not count each bank separately) LF =				
M X LF =				

Total Channel Restoration/Relocation Credits Generated = (M X LF) = _____

WORKSHEET 3: RIPARIAN RESTORATION AND PRESERVATION WORKSHEET

Net Benefit - select value for each stream side	Riparian Restoration/ Preservation Factors – MBW = Minimum Buffer Width = 50'+2'/% slope Select Values from Table 1			
System Credit Condition 1	Condition 1: MWB restored or protected on both streambanks To Calculate Value: Average of the Net Benefit values for Stream Side A and Stream Side B			
System Credit Condition 2	RC Placed on Channel 0.05		RC and CE Placed on Channel 0.1	
M&C - select value for each stream side	Mimimal (Required) 0	Moderate 0.15	Substantial 0.2	Excellent 0.25
Priority Area	Tertiary 0.05	Secondary 0.2	Primary 0.7	
Control	RC on riparian buffer (Required)		CE on Riparian Buffer 0.3	
	Subdivided 0	Private 0.05	POA 0.1	
Mitigation Timing - select value for each stream side	Schedule 3 0	Schedule 2 (Use for all banks) 0.05	Schedule 1 0.15	

Reach Information	Reach 1	Reach 2	Reach 3	Reach 4
Simon Channel Evolution Stage				
Percentage of Proposed Buffer Already in Deep-rooted Vegetation				
Bankfull Width				
Bankfull Depth				
Upstream Land Use				
Constraints (utility lines, roads, etc.)				

Factors		Reach 1	Reach 2	Reach 3	Reach 4
Net Benefit	Stream Side A				
	Stream Side B				
System Credit: Condition 1 Met					
System Credit: Condition 2 met (applicable only if Condition 1 met)					
M&C (at least minimal M&C required)	Stream Side A				
	Stream Side B				
Priority Area					
*Control (at least a RC required)					
*Mitigation Timing (none for riparian preservation)	Stream Side A				
	Stream Side B				
Sum of Factors	M =				
Linear Feet of Stream Buffered (do not count each bank separately)	LF =				
M X LF =					

Total Riparian Restoration Credits Generated = (M X LF) = _____

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Appendix H

Gwinnett County Easement Request

To

United States Army Corps of Engineers

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GWINNETT COUNTY
DEPARTMENT OF WATER RESOURCES
Engineering & Construction Division
(678) 376-6700 • FAX (678) 376-6717

February 13, 2007

Mr. Lex Lawrence
Real Estate Division
U.S. Army Engineer District, Mobile
Attn: CESAM-RE-M
P.O. Box 2288
Mobile, AL 36628-0001

Re: Long-Term Easement for Reuse Pipeline and Diffuser to Lake Lanier

Dear Mr. Lawrence:

On November 3, 2006, the Georgia Environmental Protection Division issued the permit authorizing Gwinnett County to discharge up to 40 million gallons per day of treated wastewater from the Department of Water Resources' F. Wayne Hill Water Resources Center into Lake Lanier.

As such, the following is a request to modify the existing Department of the Army Easement No. DACW01-2-00-0059 to the Gwinnett County Water and Sewerage Authority for use of Government owned property at Lake Sidney Lanier to include the installation, maintenance and operation of a reuse pipeline and associated appurtenances.

This modification easement will allow a new 72-inch diameter reuse pipeline to be installed in the same 130-foot wide corridor previously disturbed for the Shoal Creek Raw Water Intake project.

684 WINDER HIGHWAY · LAWRENCEVILLE, GEORGIA 30045-5012

Please find enclosed the following:

- Drawing No. 1 Reuse Pipeline Easement

  Parcel 1 This drawing depicts the proposed easement for the reuse pipeline as it leaves the 130-foot wide easement and enters Lake Lanier.
  Parcel 2 This drawing also depicts the existing 130-foot wide easement and the proposed 80' easement for the reuse pipeline overlaid on top and contained within the 130-wide easement.
  Corresponding legal description for Parcel 1 and Parcel 2 along with the onshore centerline description are shown on this drawing and in separate attachments.

- Drawing No. 2 Reuse Outfall Easement

  This drawing depicts the proposed 200-foot wide offshore easement.
  Corresponding legal description for the offshore centerline description is shown on this drawing and in a separate attachment.
  This drawing also references miscellaneous pipeline crown elevations for the outfall pipeline.

- Legal Descriptions

  Parcel 1 This Legal Description is identical to that shown on Drawing No. 1, and is attached for clarity.

  Parcel 2 This Legal Description is also identical to that shown on Drawing No.1 and is attached for clarity.

  Onshore Centerline of Reuse Line This Legal Description is identical to that shown on Drawing No. 1, and is attached for clarity.

  Offshore Centerline Reuse Pipeline This Legal Description is identical to that shown on Drawing No. 2, and is attached for clarity.

It is Gwinnett County's request to modify the language of easement DACW01-2-00-0059 to include the reuse pipeline and to request an additional easement for the area needed for the reuse pipeline to overlay the existing 130-foot wide easement and to exit the 130-wide easement and enter the lake as shown in Drawing No. 2 and detailed in the legal description.

The permit issued by the State of Georgia contains specific details for the discharge point and metering parameters. The discharge point shown on the drawings is that required in the permit. A copy of the permit is enclosed for your review.

Gwinnett County has prepared the "Environmental Assessment for the U.S. Army Corps of Engineers Easement and Section 10/404 Permit Decisions for Placement of Water Reclamation Facility Discharge Pipeline and Diffuser in Lake Sidney Lanier, Gwinnett County, Georgia for the Mobile District" and is coordinating this work with the USACE, Savannah District.

We respectfully request that the Mobile District process this request as expeditiously as possible and would appreciate being kept informed of the status of this request. If you or any of the District Staff have any questions, please contact me at (678) 376-7114.

Sincerely,
GWINNETT COUNTY DEPARTMENT OF WATER RESOURCES

Lynn A. Smarr
Assistant Director

ATTACHMENTS: Drawing Package
NPDES Permit No. GA0038130

C: Chairman Bannister, BOC
Frank Stephens, DWR
Mr. Jonathan Davis / COE
Mr. John Watson / COE

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LEGAL DESCRIPTION
PARCEL 1

All that tract or parcel of land lying and being in Land Lot 362 of the 7th District of Gwinnett County, Georgia and being more particularly described as follows:

Beginning at an iron marker in the center of Buford Dam Road stamped "362-J," which is Northwest of the Southeast line and 600 feet, more or less, Southwest of the Northeast line of said Land Lot 362, at a corner of a Tract of Land owned by the United States of America at Lake Sidney Lanier and at State Plane Coordinate position North 1,509,260.63 Feet and East 536,390.14 Feet base on the Transverse Mercator Projection, Georgia West Zone, NAD '27, also being the Southeast corner of an existing 130 foot wide pump station easement; Thence South 66 Degrees 00 Minutes 24 Seconds West along the centerline of said road which is along the boundary of said United States tract and the southery line of said an existing 130 foot easement a distance of 130.45 Feet to the southwest corner of said existing 130 foot easement; Thence leaving said road centerline and along the westerly line of said existing 130 foot easement North 28 Degrees 43 Minutes 58 Seconds West 477.54 feet along the westerly line of said existing 130 foot easement to a point therein, said point being the TRUE POINT OF BEGINNING of the Parcel described herein;

Thence North 70 Degrees 07 Minutes 10 Seconds West 615.22 Feet to a point on the shoreline of Lake Sidney Lanier at contour elevation 1071.0 feet above mean sea level;

Thence along said 1071.0 contour in an easterly and northerly direction for a distance of +/- 507 feet to a point;

Thence leaving said 1071.0 contour South 70 Degrees 07 Minutes 10 Seconds East for a distance of 186.30 feet to a Point on the aforementioned westerly side of an existing 130 foot easement;

Thence along said existing easement South 28 degrees 43 minutes 58 seconds East 302.51 feet to THE POINT OF BEGINNING;

Together with and subject to covenants, easements, and restrictions of record.

Said property contains 1.417 Acres more or less, according to an easement plat for Gwinnett County Reuse Pipeline and Diffuser to Lake Lanier Project # 5697, 200-ft Wide Reuse Pipeline at Gwinnett County Park prepared by Moreland Altobelli Associates, dated 8-26-02, revised 12-4-06, said survey is incorporated herein by specific reference for a more complete and accurate description.

LEGAL DESCRIPTION
PARCEL 2

All that tract or parcel of land lying and being in Land Lot 362 of the 7th District of Gwinnett County, Georgia and being more particularly described as follows:

Beginning at an iron marker in the center of Buford Dam Road stamped "362-J," which is Northwest of the Southeast line and 600 feet, more or less, Southwest of the Northeast line of said Land Lot 362, at a corner of a Tract of Land owned by the United States of America at Lake Sidney Lanier and at State Plane Coordinate position North 1,509,260.63 Feet and East 536,390.14 Feet base on the Transverse Mercator Projection, Georgia West Zone, NAD '27, also being the Southeast corner of an existing 130 foot wide pump station easement; Thence South 66 Degrees 00 Minutes 24 Seconds West along the centerline of said road which is along the boundary of said United States tract and the southery line of said an existing 130 foot easement a distance of 50.17 Feet to a point therein, said point being the TRUE POINT OF BEGINNING of the Parcel described herein;

Thence continuing South 66 Degrees 00 Minutes 24 Seconds West along said road centerline and boundary of said United States tract to the southwest corner of said existing 130 foot easement a distance of 80.28 Feet to a point therein;

Thence leaving said road centerline and along the westerly line of said existing 130 foot easement North 28 Degrees 43 Minutes 58 Seconds West 780.05 feet along the westerly line of said existing 130 foot easement to a point therein;

Thence North 61 Degrees 16 Minutes 02 Seconds East 80.00 feet to a point;

Thence South 28 Degrees 43 Minutes 58 Seconds East 786.68 Feet to THE POINT OF BEGINNING;

Together with and subject to covenants, easements, and restrictions of record.

Said property contains 1.439 Acres more or less, according to an easement plat for Gwinnett County Reuse Pipeline and Diffuser to Lake Lanier Project # 5697, 200-ft Wide Reuse Pipeline at Gwinnett County Park prepared by Moreland Altobelli Associates, dated 8-26-02, revised 12-4-06, said survey is incorporated herein by specific reference for a more complete and accurate description.

LEGAL DESCRIPTION ONSHORE
CENTERLINE OF REUSE LINE

The Centerline of a proposed 72-inch reuse pipeline lying and being in Land Lot 362 of the 7th District of Gwinnett County Georgia and being more particularly described as follows:

Beginning at an iron marker in the center of Buford Dam Road stamped "362-J," which is Northwest of the Southeast line and 600 feet, more or less, Southwest of the Northeast line of said Land Lot 362, at a corner of a Tract of Land owned by the United States of America at Lake Sidney Lanier and at State Plane Coordinate position North 1,509,260.63 Feet and East 536,390.14 Feet base on the Transverse Mercator Projection, Georgia West Zone, NAD '27, also being the Southeast corner of an existing 130 foot wide pump station easement; Thence South 66 Degrees 00 Minutes 24 Seconds West along the centerline of said road which is along the boundary of said United States tract and the southery line of said an existing 130 foot easement a distance of 90.31 Feet to a point therein, said point being the TRUE POINT OF BEGINNING of the Proposed Centerline described herein;

Thence leaving said road centerline North 28 Degrees 43 Minutes 58 Seconds West 667.35 Feet to a point;

Thence North 80 Degrees 58 Minutes 53 Seconds West 234.80 Feet to a point on the shoreline of Lake Sidney Lanier at Contour elevation 1071.0 Feet above mean sea level.

Said centerline shown on an easement plat for Gwinnett County Reuse Pipeline and Diffuser to Lake Lanier Project # 5697, 200-FT Wide Reuse Pipeline at Gwinnett County Park Prepared by Moreland Altobelli Associates, dated 8-26-02, revised 12-4-06. Said survey is incorporated herein by specific refernece for a more complete and accurate description.

LEGAL DESCRIPTION
OFFSHORE CENTERLINE
REUSE PIPELINE

The Centerline of a proposed 72-inch reuse pipeline lying and being in Land Lot 362, 372 and 383 of the 7th District of Gwinnett County Georgia and being more particularly described as follows:

Beginning at an iron marker in the center of Buford Dam Road stamped "362-J," which is Northwest of the Southeast line and 600 feet, more or less, Southwest of the Northeast line of said Land Lot 362, at a corner of a Tract of Land owned by the United States of America at Lake Sidney Lanier and at State Plane Coordinate position North 1,509,260.63 Feet and East 536,390.14 Feet base on the Transverse Mercator Projection, Georgia West Zone, NAD '27, also being the Southeast corner of an existing 130 foot wide pump station easement; Thence South 66 Degrees 00 Minutes 24 Seconds West along the centerline of said road which is along the boundary of said United States tract and the southery line of said an existing 130 foot easement a distance of 90.31 Feet to a point therein; Thence leaving said road centerline North 28 Degrees 43 Minutes 58 Seconds West 667.35 Feet to a point; Thence North 80 Degrees 58 Minutes 53 Seconds West 234.80 Feet to a point on the shoreline of Lake Sidney Lanier at Contour elevation 1071.0 Feet above mean sea level, said point being the TRUE POINT OF BEGINNING of the Proposed Centerline described herein;

Thence continuing North 80 Degrees 58 Minutes 53 Seconds West 45.87 Feet to a point;

Thence North 70 Degrees 23 Minutes 38 Seconds West 425.61 Feet to a point;

Thence South 87 Degrees 57 Minutes 09 Seconds West 302.19 Feet to a point;

Thence North 65 Degrees 21 Minutes 46 Seconds West 752.81 Feet to a point;

Thence North 00 Degrees 48 Minutes 23 Seconds West 1613.72 Feet to a point;

Thence North 22 Degrees 29 Minutes 19 Seconds West 1595.36 Feet to a point;

Thence North 12 Degrees 23 Minutes 26 Seconds West 1038.84 Feet to a point;

Thence North 58 Degrees 02 Minutes 53 Seconds West 110.00 Feet to a point;

Thence North 00 Degrees 21 Minutes 14 Seconds East 610.03 Feet to a point, and the end of proposed reuse pipeline centerline;

Said centerline is the centerline of a 200 foot wide easement extending 100 feet on each side and beyond, according to an easement plat for Gwinnett County Reuse Pipeline and Diffuser to Lake Lanier Project # 5697, Figure 3A Reuse Outfall Easement at Gwinnett County Park prepared by Parsons, dated 12-16-03, last revised 2-2-07, said survey is incorporated herein by specific reference for a more complete and accurate description.

NOTES:

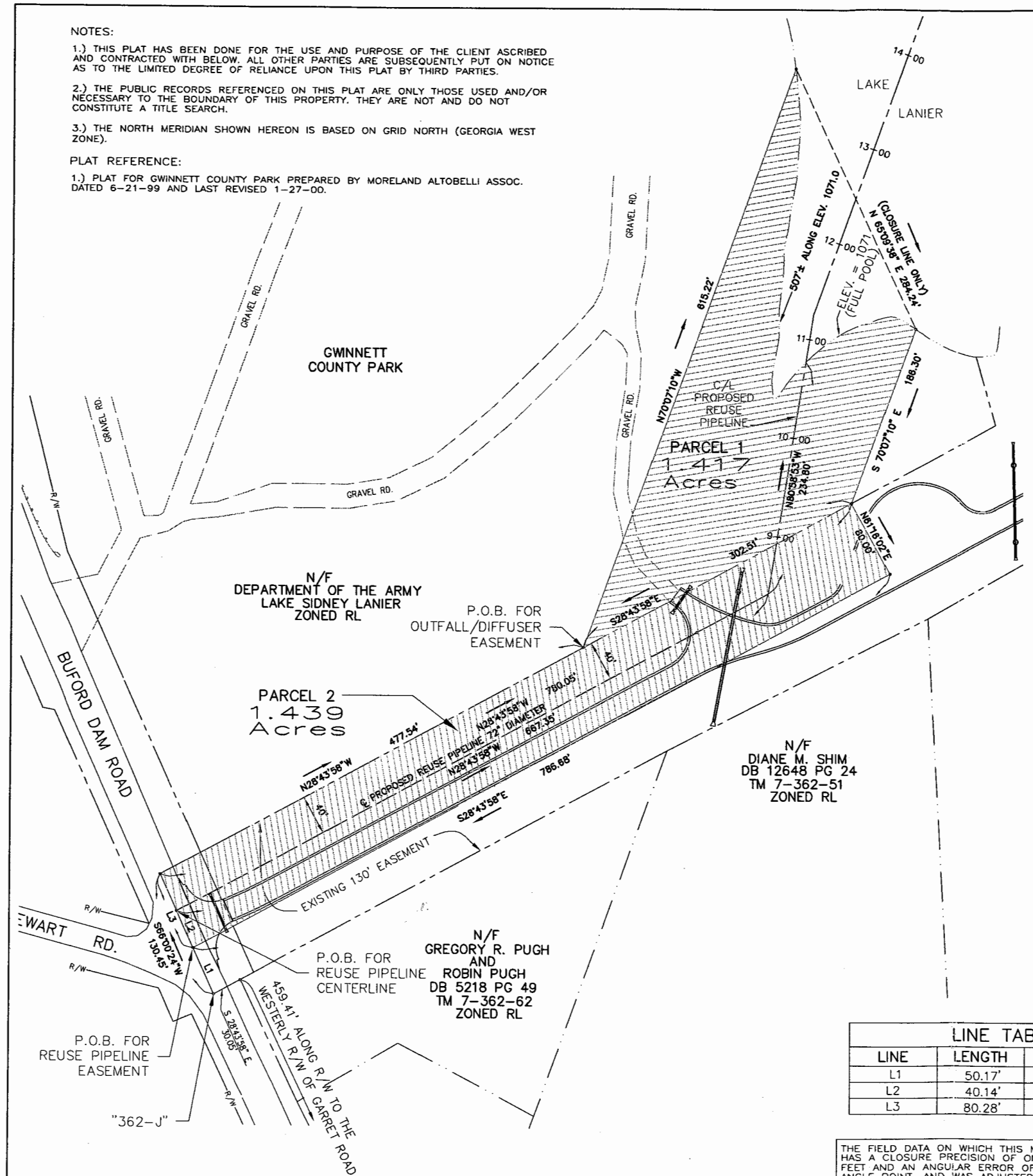
1.) THIS PLAT HAS BEEN DONE FOR THE USE AND PURPOSE OF THE CLIENT ASCRIBED AND CONTRACTED WITH BELOW. ALL OTHER PARTIES ARE SUBSEQUENTLY PUT ON NOTICE AS TO THE LIMITED DEGREE OF RELIANCE UPON THIS PLAT BY THIRD PARTIES.

2.) THE PUBLIC RECORDS REFERENCED ON THIS PLAT ARE ONLY THOSE USED AND/OR NECESSARY TO THE BOUNDARY OF THIS PROPERTY. THEY ARE NOT AND DO NOT CONSTITUTE A TITLE SEARCH.

3.) THE NORTH MERIDIAN SHOWN HEREON IS BASED ON GRID NORTH (GEORGIA WEST ZONE).

PLAT REFERENCE:

1.) PLAT FOR GWINNETT COUNTY PARK PREPARED BY MORELAND ALTOBELLI ASSOC. DATED 6-21-99 AND LAST REVISED 1-27-00.



revised: 12-4-06

LEGAL DESCRIPTION PARCEL 1

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Together with and subject to covenants, easements, and restrictions of record.

Said property contains 1.417 Acres more or less, according to an easement plat for Gwinnett County Reuse Pipeline and Diffuser to Lake Lanier Project # 5697, 200-ft Wide Reuse Pipeline at Gwinnett County Park prepared by Moreland Altobelli Associates, dated 8-26-02, revised 12-4-06, said survey is incorporated herein by specific reference for a more complete and accurate description.

LEGAL DESCRIPTION PARCEL 2

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TOTAL ACREAGE FOR PARCELS 1 AND 2 IS 2.856 ACRES.

LEGAL DESCRIPTION ONSHORE CENTERLINE OF REUSE LINE

The Centerline of a proposed 72-inch reuse pipeline lying and being in Land Lot 362 of the 7th District of Gwinnett County Georgia and being more particularly described as follows:

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LINE TABLE		
LINE	LENGTH	BEARING
L1	50.17'	S66°00'24"W
L2	40.14'	S66°00'24"W
L3	80.28'	S66°00'24"W

THE FIELD DATA ON WHICH THIS MAP OR PLAT IS BASED HAS A CLOSURE PRECISION OF ONE FOOT IN N/A FEET AND AN ANGULAR ERROR OF N/A SECONDS PER ANGLE POINT, AND WAS ADJUSTED USING THE N/A METHOD. THIS MAP OR PLAT HAS BEEN CALCULATED FOR CLOSURE AND IS FOUND TO BE ACCURATE WITHIN ONE FOOT IN 140,855 FEET.

THIS PLAT WAS PREPARED IN CONFORMITY WITH THE MINIMUM STANDARDS AND REQUIREMENTS OF LAW. GEORGIA LAWS 1978, AND IS SUITABLE FOR RECORDING.

TYPE OF EQUIPMENT: N/A

SHEET 1 of 1 SHEETS

VERTICAL SCALE: N/A
HORIZONTAL SCALE: 1" = 60'
DATE: 8-26-02
DRAWN BY: PDC/MC
CHECKED BY: DRJ
JOB NO.: 01105

PART OF LAND LOT 362 OF THE 7th DISTRICT
GWINNETT COUNTY, GEORGIA

GRID NORTH

60 0 60 120
SCALE IN FEET

Moreland Altobelli Associates, Inc.
Engineering * Planning * Landscape Architecture * Land Acquisition * Surveying
380 Downey Boulevard NE
Gainesville, Georgia 30501
PHONE:(770)532-4021 FAX:(770)532-4023

Rev	Date	Description	By
C	9/07/06	ADDED LEGAL DESCRIPTIONS	CMM
B	12/04/06	ESM T & ADJUSTMENTS	CMM
A	08/26/02	ORIGINAL SURVEY	JTS

Job No. 740415.03
Designed
Drawn CMM
Checked
Reviewed CMM
Approved CMM
Reg. No. -
Date 08/26/02

Issue Certification

GWINNETT COUNTY
DEPARTMENT OF WATER RESOURCES
GWINNETT COUNTY, GEORGIA

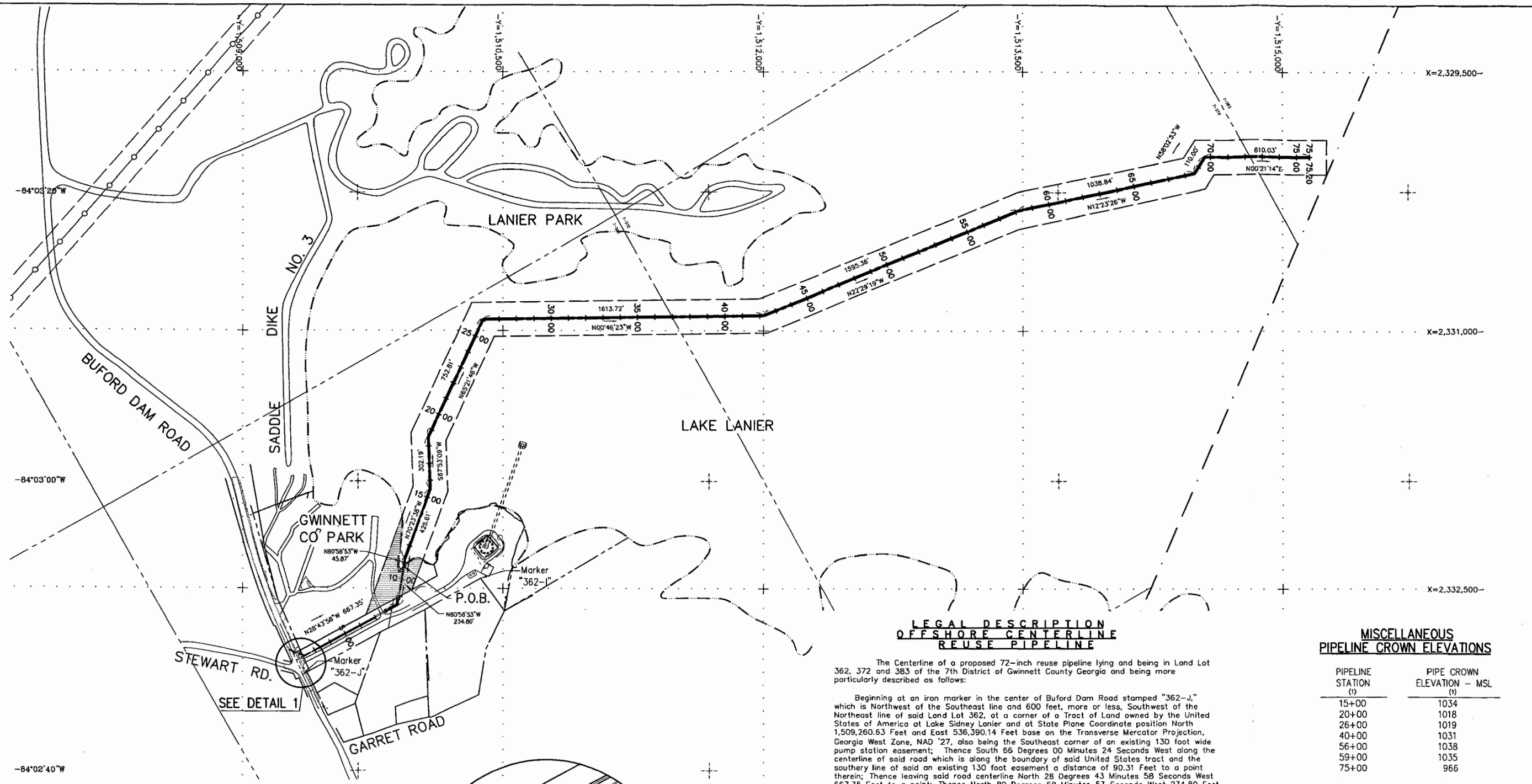
PARSONS, INC.
5390 Triangle Parkway, Suite 100, Norcross, GA 30092, (770) 446-4900

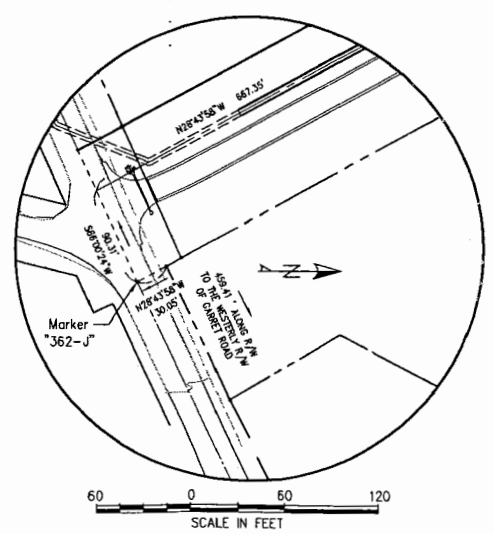
REUSE PIPELINE AND DIFFUSER TO LAKE LANIER
PROJECT # 5697

200-FT WIDE
REUSE PIPELINE EASEMENT
GWINNETT COUNTY PARK

DRAWING NO. 1
REV. C

I:\740415 GCDPU Diffuser\Permitting\EasementPlat\CORPS-LAKE-modified 11-29-06 b) t.g Rev 2.dwg, 2/6/2007 8:05:37 AM, PDF995





DETAIL 1

LEGAL DESCRIPTION
OFFSHORE CENTERLINE
REUSE PIPELINE

The Centerline of a proposed 72-inch reuse pipeline lying and being in Land Lot 362, 372 and 383 of the 7th District of Gwinnett County Georgia and being more particularly described as follows:

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Said centerline is the centerline of a 200 foot wide easement extending 100 feet on each side and beyond, according to an easement plat for Gwinnett County Reuse Pipeline and Diffuser to Lake Lanier Project # 5697, Figure 3A Reuse Outfall Easement at Gwinnett County Park prepared by Parsons, dated 12-16-03, last revised 2-2-07, said survey is incorporated herein by specific reference for a more complete and accurate description.

MISCELLANEOUS
PIPELINE CROWN ELEVATIONS

PIPELINE STATION (1)	PIPE CROWN ELEVATION – MSL (1)
15+00	1034
20+00	1018
26+00	1019
40+00	1031
56+00	1038
59+00	1035
75+00	966

(1) Shoreline to Station 14+30±, pipeline is buried below lake bottom.

LEGEND

APPROXIMATE SHORELINE

GRID NORTH

300 0 300 600
SCALE IN FEET

Rev	Date	Description	By
F	2/2/07	ADDED LEGAL DESCRIPTION	CMM
E	1/26/07	ADJUST ESMT.	CMM
D	4/04/06	MARCH REV D	CMM
C	9/07/05	EA SUBMITTAL	JTS
B	8/10/04	95% SUBMITTAL	JTS
A	12/15/03	LDP PERMIT SUBMITTAL	JTS

Issue Certification

Job No. 740415
Designed ___
Drawn ___
Checked CMM
Reviewed CMM
Approved CMM
Reg. No. –
Date 12/16/03

GWINNETT COUNTY
DEPARTMENT OF WATER RESOURCES
GWINNETT COUNTY, GEORGIA

PARSONS
5390 Triangle Parkway, Suite 100, Norcross, GA 30092, (770) 446-4900

REUSE PIPELINE AND DIFFUSER TO LAKE LANIER
PROJECT # 5697

FIGURE 3A
REUSE OUTFALL EASEMENT
GWINNETT COUNTY PARK

DRAWING NO. 1
REV. F

J:\740415\March 06 Revisions D\Current G-03 and G-04\415-LAKE EASEMENT 2-2-07 Rev F (bound).dwg, 2/6/2007 8:08:11 AM, PDF995