PRELIMINARY ENGINEERING REPORT

ON

WATER SYSTEM IMPROVEMENTS

FOR THE

CITY OF HOGANSVILLE, GEORGIA

APRIL 2015
(REVISED JUNE 2015)
PROJECT No. 311776

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Prepared by:

G. BEN TURNIPSEED ENGINEERS
Environmental-Civil-Hydraulic
ATLANTA · AUGUSTA · ST. SIMONS ISLAND
770-333-0700 - 706-863-8800

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I. INTRODUCTION

This report was prepared at the request of the Mayor and City Council of Hogansville, Georgia. **G. BEN TURNIPSEED ENGINEERS, INC.** has been authorized to evaluate the existing water system and make recommendations for improvements.

City personnel have provided operating records and a list of operational issues related to the system. Numerous site visits were made in addition to a review of existing construction drawings and operating records. Our firm also field surveyed water system assets and compiled a GIS database and prepared a hydraulic model of the existing water system.

This report includes an assessment of the system, recommendations for improvements to be completed, an estimated cost of the improvements and a proposed schedule for implementation. The recommended improvements include rehabilitation of the water distribution system, construction of additional finished water storage and construction of a booster pump station.

Prior to developing this scope of work, the City conducted public hearings to discuss the failing water and sewerage systems in conjunction with Community Development Block Grant projects. Public input was received. Notice will be published in the local newspaper when application is made for USDA funding.

II. PROJECT PLANNING AREA

A. Location

Hogansville is located in northern Troup County is western Georgia. Hogansville is served by Georgia Highway 54 and U.S. Highway 29 and by Interstate Highway 85. The CSX Transportation, Inc. railroad runs from north to south through the City. Hogansville is approximately 55 miles southwest of Atlanta and 110 miles northeast of Montgomery, Alabama. The Location Map is shown on Exhibit One.

B. Topography

Elevations in Hogansville range from 680 feet above mean sea level to 860 feet above mean sea level. The City is divided into two main drainage basins by a ridge line on which Highway 54 is constructed. Generally, the area north of Highway 54 and Mobley Bridge Road drains north to Yellow Jacket Creek, and the area south of the ridge drains to Flat Creek.

A Topographic Map is shown on Exhibit Two.

C. Environmental Resources Present

An Environmental Report has been prepared in conjunction with this Preliminary Engineering Report. The review included an assessment within the project area of the flood plains, streams and wetlands, potential historically significant structures and critical wildlife habitats that may be impacted.

Since nearly all of the proposed improvements will involve rehabilitation of the existing water distribution system, no direct or indirect conversion of farmland is anticipated.

A Wetlands Map and a Flood Map are shown on Exhibit Three and Exhibit Four, respectively.

EXHIBIT ONE

CITY OF HOGANSVILLE, GEORGIA
WATER SYSTEM IMPROVEMENTS

LOCATION MAP

SCALE: N.T.S. DATE: APRIL 2015

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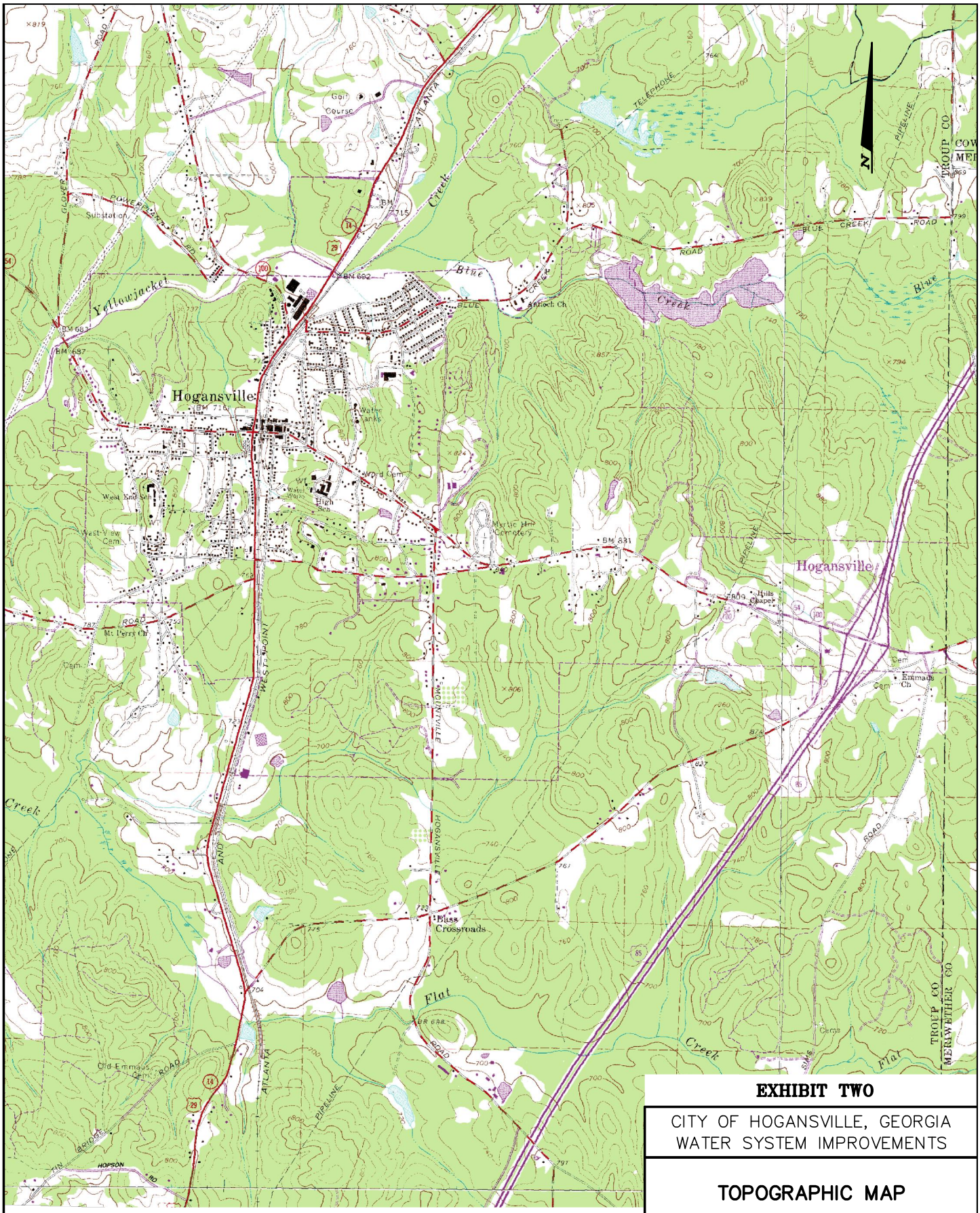

EXHIBIT TWO

CITY OF HOGANSVILLE, GEORGIA
WATER SYSTEM IMPROVEMENTS

TOPOGRAPHIC MAP

SCALE: AS SHOWN DATE: APRIL 2015

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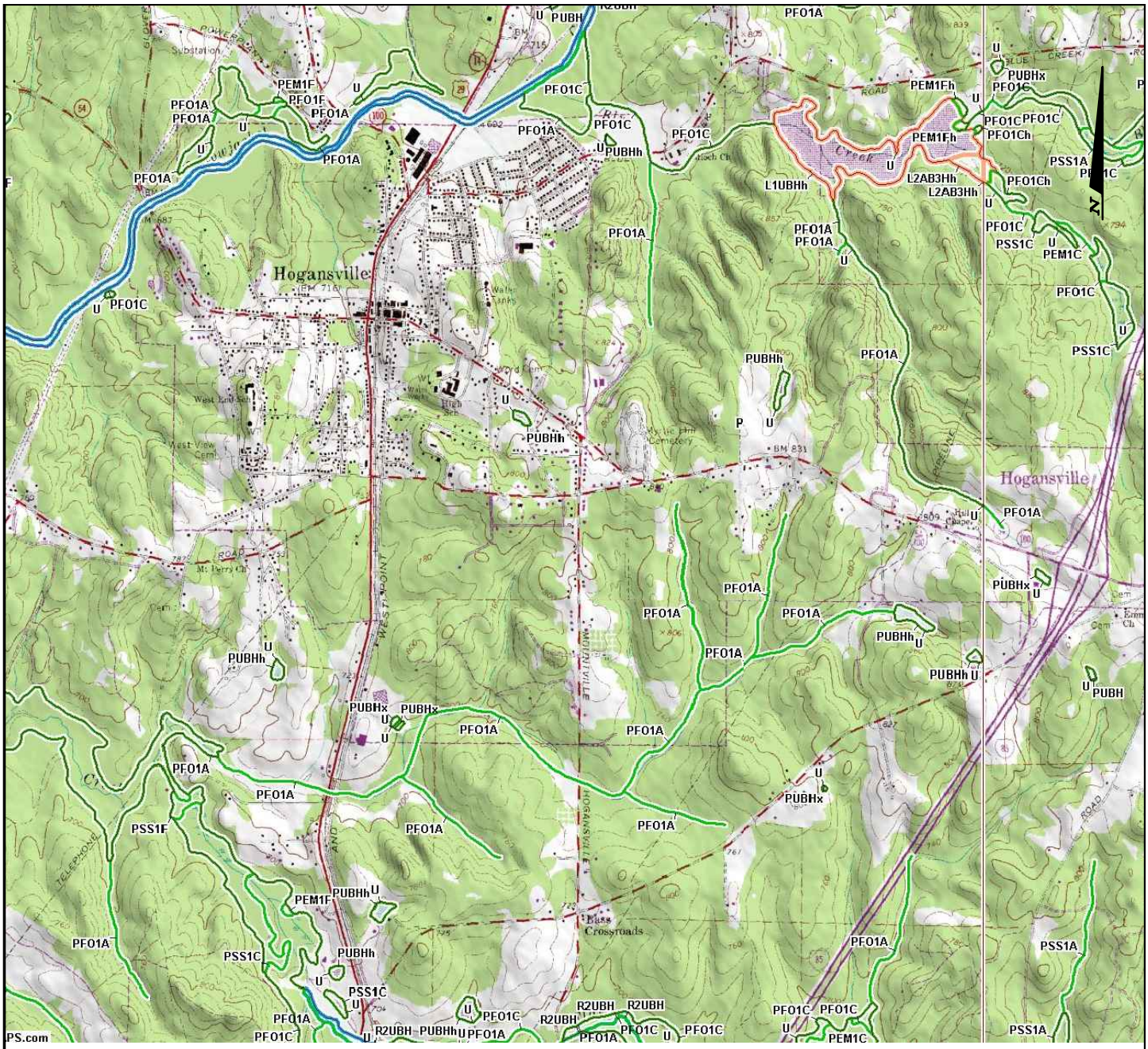

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GRAPHIC SCALE

[U] Upland - All areas not defined as wetland or deepwater habitats.

[P] Palustrine - The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5 ppt.

[R] Riverine - The Riverine System includes all wetlands and deepwater habitats contained in natural or artificial channels periodically or continuously containing flowing water or which forms a connecting link between the two bodies of standing water. Upland islands or Palustrine wetlands may occur in the channel, but they are not part of the Riverine System.

[L] Lacustrine - The Lacustrine System includes wetlands and deepwater habitats

EXHIBIT THREE

CITY OF HOGANSVILLE, GEORGIA
WATER SYSTEM IMPROVEMENTS

WETLANDS MAP

SCALE: AS SHOWN DATE: APRIL 2015

G. BEN TURNIPSEED ENGINEERS
Environmental - Civil - Hydraulic
ATLANTA - AUGUSTA - ST. SIMONS ISLAND, GEORGIA

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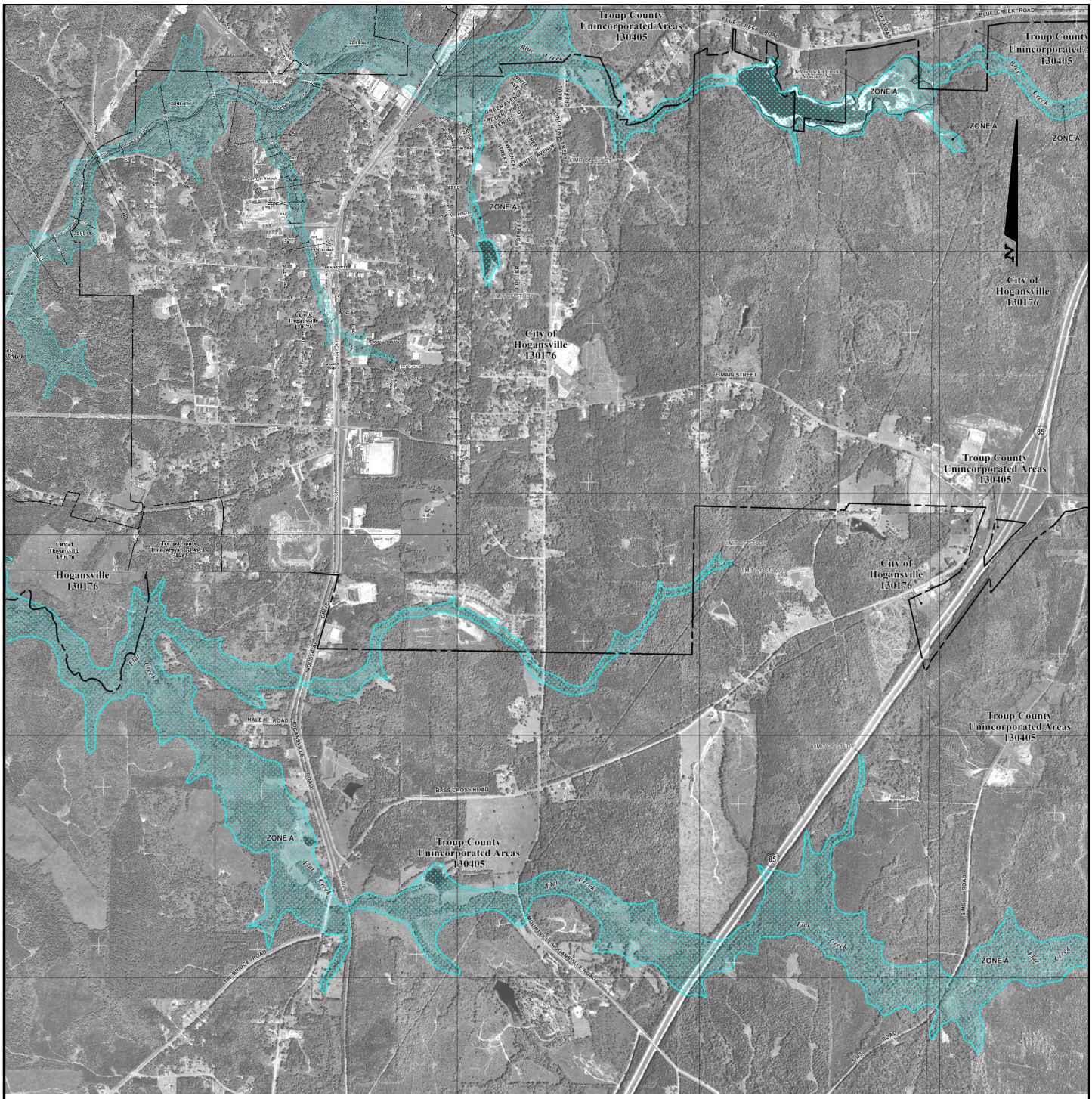

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GRAPHIC SCALE

EXHIBIT FOUR

CITY OF HOGANSVILLE, GEORGIA
WATER SYSTEM IMPROVEMENTS

FLOOD MAP

SCALE: AS SHOWN DATE: APRIL 2015

G. BEN TURNIPSEED ENGINEERS
Environmental - Civil - Hydraulic
ATLANTA - AUGUSTA - ST. SIMONS ISLAND, GEORGIA

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III. POPULATION PROJECTIONS

According to the Census in 2010, the population of Hogansville was 3,060 which represented 10.3% growth since the 2000 census. Population is projected to increase at double that rate over the next decade. *(Source: Governor's Office of Planning and Budget projection for Troup County).*

Table III-1 – U.S. Census Population Data

Year	*City of Hogansville*	*Troup County*
1980	3,362	50,003
1990	2,976	55,532
2000	2,774	58,779
2010	3,060	67,044

Table III-2 shows population projections for Troup County taken from the County's 2007 Comprehensive Plan Community Data Assessment. Hogansville's population is shown as a direct proportion of the County's. Table III-2 also shows a revised projection of the City of Hogansville's population based on increased Troup County population.

Prior to the Census results being released, the Governor's Office of Planning and Budget published population projections through year 2030 for Troup County. Those projections are shown in Table III-2.

Table III-2 – Population Projections

Year	*City of Hogansville*	*Troup County**
2010	2,912	66,608
2015	3,213	73,505
2020	3,543	81,046
2025	3,910	89,442
2030	4,249	97,191

* *Based on the State of Georgia: Population Projections 2010 to 2030 prepared by the Governor's Office of Planning and Budget (March 2010)*

Population growth is likely linked to the impact of the KIA automotive plant and related suppliers locating in Troup County, Meriwether County and the Hogansville area.

Table III-3 shows updated projections for the City of Hogansville population and Troup County population using the revised baseline of the 2010 Census, the growth rates projected by the Governor's Office of Planning and Budget and a linear extrapolation of population growth through 2040. Population growth within the City is expected to increase to over 4,500.

Table III-3 – Updated Population Projections

Year	*City of Hogansville*	*Troup County*
2010	3,060*	67,044*
2015	3,292	73,986
2020	3,540	81,577
2025	3,809	90,027
2030	4,051	97,827
2035	4,309	106,338
2040	4,584	115,589

* *Based on the US Census 2010*

The planning period for this project is 20 years. Therefore, since the permitting and construction process may not be complete until 2017, the planning period extends through the year 2040. The population of Hogansville may be further impacted by annexation, the growth of metropolitan Atlanta down Interstate 85, and the growth of the KIA plant in Troup County.

In September 2011, automotive supplier Mando America announced plans to construct a facility in the Meriwether County Industrial Park, employing 200 when it opens and a total of 450 by 2016. Announcement of additional suppliers locating in the industrial park and served indirectly by the City of Hogansville water system are pending.

IV. DESCRIPTION OF EXISTING WATER SYSTEM

The City of Hogansville purchases wholesale water from both the City of LaGrange and the Coweta County water system. Hogansville also sells wholesale water to Meriwether County. The City's water treatment plant is no longer in operation. The plant was closed by order of the Georgia Environmental Protection Division and no longer has a valid withdrawal permit or permit to operate the plant. In 2014 the City purchased a total of 204,215,000 gallons, or an average of 17,017,917 gallons per month.

Meters at LaGrange Connection

Meter at Coweta County Connection

Historical annual water demand since 2011 is shown below in Table IV-1.

Table IV-1 – City of Hogansville Annual Average Day Water Demand

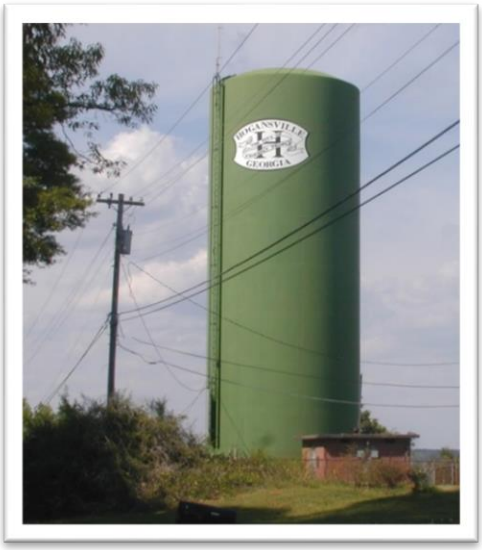
	Daily Purchase Average (gallons per day)		
Year	***City of LaGrange***	***Coweta County***	***Total Water Purchased***
2011	213,467	173,673	387,140
2012	175,611	353,238	528,849
2013	175,699	400,867	576,566
2014	161,315	398,178	559,493

As indicated, average daily purchase has increased 45% over the last 3 years.

The City's contract with LaGrange specifies a minimum daily purchase amount of 200,000 gallons and a maximum of 350,000 gallons. The contract with Coweta

County also includes a minimum daily purchase amount of 150,000 gallons and a maximum of 1,000,000 gallons.

The existing water system consists of 12-inch, 10-inch, 8-inch, 6-inch and smaller water lines, one (1) 175,000 gallon stand pipe, one (1) 200,000 gallon elevated storage tank and one (1) 100,000 gallon stand pipe tank. Two (2) tanks are not in service. A fifth tank was taken out of service and dismantled. Altitude valves are installed at each tank.



Granite Street Standpipe (175,000 gallons)

Pine Street Standpipe (100,000 gallons)

Interstate Tank (200,000 gallons)

The effective water storage capacity is 282,500 gallons as indicated in Table IV-2.

Table IV-2 – Water Storage Capacity

	Tank	*Type*	*Capacity (gal.)*	*Effective Capacity (gal.)*
1.	Interstate Tank	Elevated	200,000	200,000
2.	Granite Street	Standpipe	175,000	52,500
3.	Pine Street	Standpipe	100,000	30,000
Total			***475,000***	***282,500***

Based on average daily demand, effective storage capacity is approximately 0.5 times demand or 12 hours.

No booster pump is used at either wholesale connection; however, flow from LaGrange is limited by available pressure. Due to the long line length from LaGrange, chlorine levels are boosted near the point of connection.

A booster pump is installed at the intersection of Montville Road and East Boyd Road and pumps to the Interstate Tank. The station is equipped with two (2) centrifugal pumps, each rated at 250 gallons per minute. In addition to filling the Interstate Tank, this pump station also pumps water to serve Meriwether County.

Booster Pump Station at Montville Road and Boyd Road

Pump Station Converted to Pressure Control Valve

Pump Station Converted to Pressure Control Valve

The distribution system was constructed beginning in approximately 1913 and extended thereafter as needed. Parts of the system were upgraded in 1990. An inventory of the existing pipe sizes is included below:

Table IV-3 –Water Line Inventory

Line Size	*Linear Feet*
12-inch	5,900
10-inch	3,850
8-inch	23,900
6-inch	112,400
4-inch	8,050
2-inch	11,560
1-inch	10,000

Water lines consist of PVC pipe, cast iron and galvanized steel pipe, asbestos cement pipe and small sections of ductile iron pipe. Many older lines create hydraulic limits within the system. Due to the age of many lines, especially in the downtown district and mill villages north and west of downtown, water leaks are common. The City has an aggressive effort to repair leaks when discovered to limit unaccounted for water.

The City's lost and unaccounted for water is calculated by subtracting the water sold to its customers from the water purchased from its sources. Adjustments are made to

account for known leaks, hydrant flushing and fire events. Table IV-4 shows the lost and unaccounted for water over 2013 – 2014.

Table IV-4 – Unaccounted For Water

Month	*Water Purchased*	*Water Billed*	*Lost & Unaccounted*	*% Lost & Unaccounted*
Jan-13	19,248,500	6,466,998	12,781,502	66.4%
Feb-13	19,054,500	5,708,119	13,346,381	70.04%
Mar-13	16,538,000	7,252,939	9,285,061	56.14%
Apr-13	15,594,500	5,986,464	9,608,036	61.61%
May-13	19,972,000	6,637,542	13,334,458	66.77%
Jun-13	16,793,500	6,987,470	9,806,030	58.39%
Jul-13	16,945,000	6,730,402	10,214,598	60.28%
Aug-13	17,330,500	6,971,919	10,358,581	59.77%
Sep-13	17,215,000	9,643,811	7,571,189	43.98%
Oct-13	16,186,000	8,302,591	7,883,409	48.71%
Nov-13	17,218,000	6,976,546	10,241,454	59.48%
Dec-13	18,351,000	5,752,196	12,598,804	68.65%
Jan-14	16,334,000	8,384,679	7,949,321	48.67%
Feb-14	20,607,000	8,283,904	12,323,096	59.80%
Mar-14	17,319,000	6,277,241	11,042,259	63.76%
Apr-14	17,248,000	8,510,468	8,738,032	50.66%
May-14	16,514,000	7,649,597	8,864,403	53.68%
Jun-14	17,505,000	8,072,018	9,433,482	53.89%
Jul-14	18,253,000	8,819,545	9,433,455	51.68%
Aug-14	19,748,000	8,908,053	10,840,447	54.89%
Sep-14	16,028,000	8,569,871	7,458,629	46.53%
Oct-14	16,378,000	8,027,306	8,351,194	50.99%
Nov-14	14,012,000	8,369,854	5,642,146	40.27%
Dec-14	14,266,000	7,366,602	6,899,398	48.36%
Average	***17,277,438***	***7,527,339***	***9,750,224***	***55.98%***

The City has a regular hydrant flushing and maintenance program. There are 186 full sized hydrants installed throughout the system. A copy of the 2012 field test reports are enclosed in the Appendix and show available flow and residual pressures, as well as those hydrants that needed repair or replacement.

A copy of the Existing Water System Map is on the following page on Exhibit Five.

WATER LEGEND

EXISTING

- WATER TANK
- WELL
- BOOSTER PUMP STATION
- CONTROL VALVE
- METER PIT
- WATER LINE
  - LESS THAN 4"
  - 4"
  - 6"
  - 8"
  - 10"
  - 12"

HOGANSVILLE WPCP

PINE ST. STAND PIPE (100,000 GAL.)

GRANITE ST. STAND PIPE (175,000 GAL.)

INTERSTATE TANK (200,000 GAL.)

HOGANSVILLE

CITY LIMITS

GEORGIA POWER COMPANY

YELLOWJACKET CREEK

BLUE CREEK

CSX R/R

SPRAYFIELD

STORAGE POND

HOLDING POND

FLAT CREEK

TO ATLANTA

TO LUTHERSVILLE

TO MONTGOMERY

TO LAGRANGE

GRAPHIC SCALE 1000 0 2000

N

EXHIBIT FIVE

CITY OF HOGANSVILLE, GEORGIA
WATER SYSTEM IMPROVEMENTS

EXISTING WATER SYSTEM MAP

SCALE: AS SHOWN DATE: APRIL 2015

G. BEN TURNIPSEED ENGINEERS
Environmental - Civil - Hydraulic
ATLANTA - AUGUSTA - ST. SIMONS ISLAND, GEORGIA

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V. DESCRIPTION OF EXISTING SEWERAGE SYSTEM

The existing sewerage system consists of a water pollution control plant, a land application system for disposal of treated effluent, approximately 50.4 miles of 16-inch, 15-inch, 12-inch and 8-inch sewer lines and two (2) raw sewage pump stations. The Georgia Environmental Protection Division (EPD) issued a final consent order to the City June 14, 2010, regarding past permit violations and deficiencies in the sewerage system, and the City is currently constructing a third phase of improvements to the sewerage system to address the consent order. Design has also been completed for construction of a new water pollution control plant using USDA Rural Development funds.

A. Water Pollution Control Plant:

The water pollution control plant was first constructed in 1964. The plant was upgraded in 1990 and the stream discharge was converted to a slow rate land application system. Also in 1990 the raw sewage pump station on Yellow Jacket Creek and Highway 54 was abandoned. A gravity sewer constructed of 15-inch PVC and 16-inch ductile iron pipe was installed to connect the Yellow Jacket Creek interceptor to the plant. Since 1991 sewer lines have also been constructed along Blue Creek to serve the commercial customers near the Interstate 85 interchange.

Bids for constructing improvements to expand treatment capacity to 1.5 mgd will be taken in summer 2015.

B. Pump Stations:

The City currently operates only two (2) raw sewage pump stations. Each was constructed privately and added to the City's system. Both pump stations serve neighborhoods within the Flat Creek drainage basin. The pump stations are duplex, submersible pump type located within the respective developments. Neither station is equipped with a stand-by generator. The

pump stations are operating well below capacity given that neither development is completely built out.

C. Collection System:

The existing collection system was constructed largely in 1964 and prior. The older parts of the system are predominantly constructed of vitreous clay sewer pipe that is prone to infiltration of groundwater and to inflow of surface water. The effects of the infiltration and inflow are evidenced by high flows to the water pollution control plant during and after storm events. Three (3) phases of sewer rehabilitation projects have decreased inflow and infiltration considerably.

The land application system is approximately 2 miles southwest of the treatment plant. The effluent force main is 10,600 feet of 8-inch HDPE pipe. The system consists of a 12.6 million gallon storage pond, an irrigation pump station with three (3) vertical turbine pumps and 170 wetted acres divided into 14 separate spray field areas.

VI. EVALUATION OF EXISTING WATER SYSTEM NEEDS

The existing water system needs to be upgraded significantly to address several major issues that impact City of Hogansville residents. The issues are:

- ✧ Lost and unaccounted for water is excessively high.
- ✧ Residents in two (2) main areas have chronically low water pressure.
- ✧ The connection with LaGrange is received at inadequate pressure to deliver minimum daily purchase commitments.
- ✧ The distribution system has inadequate storage tank capacity.
- ✧ Several long, 1-inch and 2-inch water lines serve residential areas and do not meet *The Minimum Standards for Public Water Systems*.
- ✧ Significant amounts of 100 year old cast iron pipe are still in service throughout the system (contributing to lost and unaccounted for water, as well as low water pressure).

The system has recently been mapped and a GIS environment has been developed by **G. BEN TURNIPSEED ENGINEERS** and the City. Extensive water models using H_2O Net have also been developed. Both tools have been used to properly evaluate the system.

As indicated in the previous section of this report, lost and unaccounted for water is a continuing problem. The percentage of lost and unaccounted for water purchased from Coweta County and the City of LaGrange was 51.9% in 2014. Monetized at a purchase rate blended proportionally based on actual purchase volume, lost and unaccounted for water cost the City $323,041 in 2014. Leaking lines, old meters and unmetered connections each contribute to this issue.

Residential areas along Pine Street, East Boyd Road by the booster pump station and along Lincoln Street are all hampered by low static water pressure, even when the two (2) standpipe tanks are full. Low pressure problems worsen when the booster

pump station is running. A map of the water system showing available pressure isobars as generated by the water model is shown on Exhibit Six.

The metered connection for water from the City of LaGrange is located south of Hogansville on Industrial Drive, approximately 12 miles from LaGrange. Static pressure at the connection is adequate for low volume, steady flow, but Hogansville cannot take the minimum volume of water for which they have contracted. The problem is in part due to the long line and pressure losses at peak flow from LaGrange, and partly from the pressure of the Coweta County system connection. This situation works against the City in two ways: the water from Coweta County costs more than LaGrange water, and the City pays LaGrange for water not consumed (i.e., they do not draw the minimum daily volume). Both conditions serve to increase the costs of operation for the system.

Storage capacity is limited to two (2) standpipes serving the 885-foot pressure zone and one (1) elevated tank serving the 992-foot pressure zone. Since the standpipes are ground tanks constructed in residential areas, the portion of the storage that is effective is limited to the top 30%. That volume is only 82,500 gallons. The 200,000 gallon elevated tank is located near Interstate 85 and serves the commercial and residential customers east of Hogansville. The tank also serves as suction pressure for Meriwether County's booster pump station. The Deer Creek subdivision tank was decommissioned when the Coweta County water connection was established. A 200,000 gallon elevated tank at the industrial park was decommissioned and then taken down because the overflow elevation was 20+ feet lower than the standpipes. The storage available in the 992-foot system is adequate; however, the storage in the 885-foot system should be increased to at least 750,000 gallons, providing approximately 2 days of annual average day demand (not including water sold to Meriwether County, which has its own elevated storage).

The Minimum Standards for Public Water Systems require 2-inch lines not to exceed 1,000 linear feet and not serve more than 20 customers. There are no provisions for 1-inch water mains. The Hogansville system includes over 2 miles of 2-inch and

nearly 2 miles of 1-inch water line, much of which should be replaced with larger lines and fire hydrants to provide better pressure and fire protection.

The distribution system west of U.S. Highway 29 is mainly 4-inch and 6-inch cast iron pipe constructed in 1913, 102 years ago. The pipes have exceeded the useful life and are a significant source of lost water, water line leaks and resources spent repairing broken lines. Because of the fragile condition of the lines, water pressure in the system cannot be increased without causing additional leaks. The corroded 2-inch and 1-inch galvanized water lines also impact water pressure and cause discolored water issues where they are still in service.

WATER LEGEND

EXISTING

- WATER TANK
- WELL
- BOOSTER PUMP STATION
- CONTROL VALVE
- METER PIT
- WATER LINE
  - LESS THAN 4"
  - 4"
  - 6"
  - 8"
  - 10"
  - 12"

Output @ 00:00 hrs
Pressure (psi)

1. Value = 20
2. Value = 35
3. Value = 50
4. Value = 75
5. Value = 100
6. Value = 120

HOGANSVILLE

CITY LIMITS

HOGANSVILLE WPCP

HOLDING POND

STORAGE POND

SPRAYFIELD

FLAT CREEK

TO ATLANTA

TO LUTHERSVILLE

TO MONTGOMERY

TO LAGRANGE

GRAPHIC SCALE 1000 0 2000

EXHIBIT SIX

CITY OF HOGANSVILLE, GEORGIA
WATER SYSTEM IMPROVEMENTS

EXISTING WATER PRESSURE MAP

SCALE: AS SHOWN DATE: APRIL 2015

G. BEN TURNIPSEED ENGINEERS
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ATLANTA - AUGUSTA - ST. SIMONS ISLAND, GEORGIA

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VII. ALTERNATIVES CONSIDERED

In developing the recommended improvements described in the following section, we evaluated a list of alternatives for each need identified. The alternatives considered are outlined in the table below. When two (2) alternatives were deemed feasible, a more in depth financial comparison of each was completed. The results are summarized in Table VII-2.

Table VII-1 – Summary of Alternatives Considered

Alternative	*Description*	*Pros and Cons*
1.	**Inadequate Storage Tank Capacity**	
a.	Construct a 500,000 gallon elevated storage tank on Granite Street	▪ More effective storage than standpipes ▪ Lower cost per gallon than smaller tanks
b.	Construct two (2) 250,000 gallon elevated storage tanks, one each at the existing standpipe tank sites	▪ More effective storage than standpipes ▪ Storage on either side of railroad and U.S. highway
c.	Construct pumped storage at the LaGrange meter location	▪ Lowest cost per gallon ▪ Facilitate additional flow from LaGrange connections
2.	**Chronic Low Water Pressure**	
a.	Construct new storage tank with higher overflow elevation	▪ Sufficient pressure from Coweta County for higher tanks ▪ Could increase volume of leaking water in old distribution system
b.	Pump water to Interstate Tank from LaGrange connection along Bass Cross Road instead of through residential area	▪ Facilitate additional flow from LaGrange connection ▪ Reduce friction losses (increase pressure) in residential area by booster pump station ▪ Improve system hydraulics by looping dead end lines
c.	Install larger line sizes in areas near standpipe tanks	▪ Improve pressure at peak flow ▪ No change of available static pressure

Table VII-1 – Summary of Alternatives Considered (continued)

Alternative	*Description*	*Pros and Cons*
3.	**High Lost and Unaccounted for Water**	
a.	Replace old water meters	
	Traditional, manually read	▪ increased labor cost ▪ potential for misreadings ▪ match existing meters ▪ acceptable cost payback period
	Touch read type meters	▪ reduced labor cost ▪ more accurate reading than manual reading ▪ no continuous leak detection ▪ additional software and billing system integration required ▪ acceptable cost payback period
	Radio read type meters	▪ nominal labor costs ▪ most accurate readings ▪ continuous leak detection capabilities ▪ additional software and billing system integration required ▪ acceptable cost payback period
b.	Replace 100-year old water lines	
	Install new water pipe	▪ over 40 year useful life ▪ high pressure capabilities ▪ better performance in rocky soil ▪ lower installation costs ▪ better performance in aggressive soil
	Leave distribution system “as is”	▪ lowest capital costs ▪ highest operation and maintenance costs ▪ deep water lines potentially dangerous to repair or maintain ▪ fittings, valves, hydrants, etc. difficult to match to old pipe sizes

Table VII-1 – Summary of Alternatives Considered (continued)

Alternative	*Description*	*Pros and Cons*
	Rehabilitate water mains by lining in place	▪ not feasible for small diameter mains ▪ tuberculation in existing cast iron and galvanized steel will prevent installation of liner material
4.	**Insufficient flow from LaGrange connection**	
a.	Construct pump station to increase flow through meter	▪ low pressure issue will develop on suction side from LaGrange ▪ inadequate storage for steady flow
b.	Construct ground storage tank and pump to Interstate Tank	▪ allow for near steady flow from LaGrange ▪ bypass residential area with high flows ▪ serve additional customers along Bass Cross Road
c.	Increase line size from LaGrange to Hogansville	▪ less friction loss results in higher available pressure ▪ high capital cost for 10 miles of new water line
5.	**Water lines that do not meet EPD Minimum Standards**	
a.	Replace with 6-inch pipe	▪ meets *Minimum Standards* ▪ possible to add fire hydrants ▪ improved water quality
b.	Replace with 2-inch pipe	▪ meets *Minimum Standards* for under 20 services and less than 1,000 feet ▪ no fire protection
c.	No Action	▪ high O&M costs ▪ poor water quality

Options evaluated for replacing 100-year old cast iron pipe are included within the options for reducing high lost and unaccounted for water volumes.

Present worth value of each alternative is based on initial capital costs, operation and maintenance costs and cost savings, replacement and renewal of short lived assets, salvage value after 20 years and interest charged during construction. Detailed worksheets for each alternative listed below are included in Appendix Three. As

indicated, the real discount rate for federal projects evaluated in the year 2015 is 1.2% for 20-year evaluation.

Table VII-2 – Summary of Annual Present Worth by Alternative – Life Cycle Cost Analysis

	Alternative	*Total Project Cost*	*O&M Present Worth*	*Salvage Value Present Worth*	*Total Present Worth*
A1	Construct 500,000 gallon tank, pump station and tank on Bass Cross Road, install new radio read meters and rehabilitate the distribution system (address identified deficiencies)	$4,123,000	$12,507,608	($394,270)	$16,353,388
A2	Construct 500,000 gallon tank, pump station and tank on Bass Cross Road (scale back project to save capital cost)	$2,551,505	$17,601,550	($303,285)	$19,886,047)
B1	Construct ground storage tank and booster pump station at Bass Cross Road	$1,209,610	$17,424,677	($44,114)	$18,623,248
B2	Construct booster pump station with no storage tank, construct additional water line to LaGrange to increase volume	$2,332,610	$17,424,677	($28,359)	$19,772,110

**Based on real discount rate of 1.2% for 20 year evaluation.*

The conclusion of the first set of present worth cost analyses shows that the distribution system rehabilitation is needed and will significantly decrease the water purchase cost and lower annual costs; select Alternative A1 over A2.

The conclusion of the second set of analyses shows that it is more cost effective to construct a pumped storage tank for suction volume for the proposed pump station, rather than increase the capacity of the pipe line from the City of LaGrange; select Alternative B1 over B2.

Construction problems are possible with each of the recommended alternatives. To mitigate potential issues, the City will:

- Conduct a subsurface investigation at the proposed tank site to design footings appropriately
- Leave current booster pump station operational as a redundant supply
- Services will be migrated from old, small lines only after the new lines have been pressure tested and disinfected. Old lines will be capped and abandoned.
- Proposed water lines will be field adjusted in the event of conflict with existing utilities. A contingency amount is included in the project budget for this purpose.

VIII. RECOMMENDED IMPROVEMENTS

The City of Hogansville should proceed with the planning and funding applications necessary to construct the recommended water system improvements outlined below. These improvements address the identified deficiencies in the water distribution system and wholesale connections. The proposed improvements are shown on Exhibit Seven, the Report Map.

A. Water Supply and Storage

To increase water volume purchased from the City of LaGrange, the City should construct a 50,000 gallon ground storage tank and booster pump station near the intersection of Industrial Drive and Bass Cross Road. The pumps will supply the Interstate Tank without negatively affecting the pressure in the vicinity of the existing pump station. Water lines should be extended as shown on the Report Map to serve the 992' pressure zone and eliminate several dead end lines.

To increase storage capacity in the 885' pressure zone, the City should construct a 500,000 gallon elevated storage tank next to the existing Granite Street standpipe.

The control valve / pressure reducing valve on the Coweta County supply line needs to be replaced with an electronic valve on which flow rate can be set and monitored remotely. The existing control valve is a repurposed booster pump station with water flowing in the opposite direction than intended.

B. Water Meters and Data Collection

The average age of the residential meters is 25 to 30 years old. All meters serving residential customers should be replaced, and the service lines retrofit with back-flow prevention devices to prevent cross contamination. The new meter system should include radio-read enabled devices, complete with collection equipment and software integration to the existing billing system.

C. Distribution System

The City should replace the cast iron and galvanized steel water mains as shown (highlighted) on the Report Map with new water lines. Proposed water lines will replace old, small lines which will be plugged and abandoned. Existing water services will be moved to the new lines. Isolation valves will be located to allow proper maintenance and repair or water lines. Where located under heavy traffic routes and state highways, the lines will be installed in steel casing by the jack and bore method. If asbestos cement lines are discovered, they will be abandoned and filled with flowable grout to Georgia Department of Transportation procedures.

WATER LEGEND

	EXISTING	PROPOSED
WATER TANK		
WELL		
BOOSTER PUMP STATION		
CONTROL VALVE		
METER PIT		
WATER LINE		
REPLACE WITH 6" PVC		
LESS THAN 4"		
4"		
6"		
8"		
10"		
12"		

O.E. 928.00
O.E. 885.00

REPLACE PRV

O.E. 885.00
O.E. 992.00

GRANITE ST. STAND PIPE
(175,000 GAL.)

PROPOSED 500,000 GALLON
ELEVATED TANK (O.E. 885.00)

HOGANSVILLE

PINE ST. STAND PIPE
(100,000 GAL.)

HOGANSVILLE
WPCP

INTERSTATE TANK
(200,000 GAL.)

O.E. 992.00
O.E. 885.00

8" PVC

10" PVC

12" PVC

PROPOSED 50,000 GALLON
GROUND STORAGE TANK
& BOOSTER PUMP STATION

GRAPHIC SCALE
1000 0 2000

N

TO ATLANTA

TO LUTHERSVILLE

TO MONTGOMERY

TO LAGRANGE

EXHIBIT SEVEN

CITY OF HOGANSVILLE, GEORGIA
WATER SYSTEM IMPROVEMENTS

REPORT MAP

SCALE: AS SHOWN DATE: APRIL 2015

G. BEN TURNIPSEED ENGINEERS
Environmental - Civil - Hydraulic
ATLANTA - AUGUSTA - ST. SIMONS ISLAND, GEORGIA

P:\Hogansville\311776 Water System Map and Model\Reports\Preliminary Engineering Report\Drawings\Exist System, Pressure & Report Maps.dwg

IX. PROJECT COST ESTIMATE

The total estimated project cost of the recommended improvements is $4,123,000 as shown below.

Table IX-1 – Project Cost Estimate

Item	*Description*	*Amount*
A.	Water Line Replacement	$725,600
B.	Bass Cross Road Water Line	$665,500
C.	Booster Pump Station	$175,000
D.	Ground Storage Tank (50,000 gallons)	$100,000
E.	Elevated Storage Tank (500,000 gallons)	$1,100,000
F.	SCADA Additions	$10,000
G.	Replace Existing PRV / Control Valve	$5,000
H.	Meter Replacement	$570,000
Total Estimated Construction Cost		***$3,351,100***
	Contingencies	$334,900
	Engineering	$226,600
	Inspection	$100,400
	D.O.T. Permits, Right-of-Way Certification	$10,000
	Preliminary Engineering Report	$12,500
	Environmental Report	$7,500
	Legal/Administrative	$80,000
Total Estimated Project Cost		***$4,123,000***

A detailed cost estimate of the proposed work is included in the Appendix. Construction cost estimates are based on similar projects recently bid and / or completed. Copies of certified bid tabulations from these projects are also included in the Appendix.

X. POSSIBLE FUNDING ALTERNATIVES

Low interest loan and grant assistance is available to assist the City in funding the recommended improvements. The following is a list of possible funding sources the City should consider.

		Type	***Amount***
1.	USDA Rural Development	Loan Grant	Unlimited $3,500,000
2.	Economic Development Administration	Grant	$300,000
3.	Community Development Block Grant	Grant	$500,000
4.	Georgia Environmental Facilities Authority	Loan	$15,000,000
5.	State Revolving Loan Fund	Loan and Principal Forgiveness	unlimited

The City can combine two or more of the funding sources to construct the proposed improvements. The City should evaluate the requirements to qualify for the above and then submit the necessary applications.

The City should submit an application for loan and grant assistance from USDA Rural Development. After the application and all required documents are reviewed by Rural Development, the City will be notified if funding is available.

XI. ANNUAL COSTS

According to the 2014 / 2015 budget, the annual operation, maintenance and depreciation costs for the water and sewerage systems are $1,781,204, as shown below in Table XI-1.

Table XI-1 – Annual Water And Sewerage Operation And Maintenance Budget

Water System Expense	***Amount***
Administrative and Personnel	$177,926
Water Purchases	$600,000
Utilities	$11,775
Miscellaneous (supplies, etc.)	$134,350
Vehicles	$15,200
Depreciation	$149,500
Total Water System Operation and Maintenance Costs	***$1,088,751***

Sewerage System Expense	***Amount***
Administrative and Personnel	$183,941
Utilities	$44,500
Vehicles	$243,551
Miscellaneous (supplies, etc.)	$15,750
Depreciation	$204,711
Total Sewerage System Operation and Maintenance Costs	***$692,453***

Total Water and Sewerage System Operation and Maintenance Costs	***$1,781,204***

In addition, the City has existing indebtedness through a Combined Public Utility System Refunding Revenue Bond issued in 1993. The bond proceeds have been used to fund water, sewer, gas and electric utility improvements. The outstanding balance as of June 30, 2009, was $5,830,000. The total debt service requirements for future repayment is shown in Table XI-2

Table XI-2 – Combined Public Utility Revenue Bond Repayment

Year	*Principal*	*Interest*	*Total*
2010	$250,000	$339,330	$589,330
2011	$265,000	$324,266	$589,266
2012	$285,000	$308,179	$593,179
2013	$300,000	$291,068	$591,068
2014	$315,000	$273,079	$588,079
2015 – 2019	$1,885,000	$1,053,600	$2,938,600
2020 – 2024	$2,530,000	$396,900	$2,926,900
Total	$5,830,000	$2,986,422	$8,816,422

The City also has an outstanding loan with the Georgia Environmental Finance Authority for past work on their water and sewerage systems. The loan is paid in monthly installments of $1,827 ($21,924 annually) through January 2021, 25% of which are allocated as water expenses.

The total amount required annually for debt service on the water system for the next five years (allocating 15% of the bond debt to water) is shown below.

Years	*GEFA (25%)*	*Revenue Bonds (15%)*	*Total*
2015 – 2020	$5,481	$88,158	$93,639

The annual operation and maintenance costs are expected to vary through 2020 as shown on Table XI-3. The values shown in the table do not include depreciation. The individual budget line items are increased annually by a blended inflation rate of approximately 1.28% across all expense lines. A detailed projection of the budget is included in Appendix Seven.

Also included is an estimated list of short lived assets for which replacement costs must be reserved annually. They are as follows:

1.	Fire Hydrant Parts	$1,000/year	$1,000
2.	Chemical feed equipment repairs	$500/year	$500
3.	Miscellaneous parts, etc.	$5,000/year	$5,000
4.	Pump impeller replacement	$2,000 every 10 years	$200
	Total Short Lived Asset Reserve		***$6,700***

Table XI-3 – Annual Operation and Maintenance Costs

Year	*Water O&M (less Depreciation)*	*Short Lived Assets Reserve*	*Total*
2014	$856,293	0	$856,293
2015	$939,251	0	$939,251
2016	$951,246	0	$951,246
2017	$963,478	$6,700	$970,178
2018	$975,952	$6,700	$982,652
2019	$988,676	$6,700	$995,376
2020	$1,001,654	$6,700	$1,008,354

The cost for lost and unaccounted for water is approximately $333,900, based on the current cost per thousand gallons paid by the City to each supplier. As indicated earlier, the amount of water not accounted for in 2013 and 2014 was nearly 56% of the total volume purchased. Since typical water system lost and unaccounted for volume is in the range of 10% to 20%, Hogansville's water system rehabilitation needs to address leaking lines and old meters to drastically reduce how much water is lost. On an annual basis, limiting lost and unaccounted for water from 56% to 20% will conservatively reduce the volume of water purchased by 93,454,600 gallons. At the current average purchase price, the reduction results in a cost savings of $268,000 annually. Accordingly, the water purchase cost will be reduced by that amount in the annual operation and maintenance budgets beginning in 2017 (partial year) and 2018 (full year). The budget projections have been adjusted to reflect this savings.

The total annual costs for the past year, current year and as projected over the next five years are shown below:

Table XI-4 – Annual Water System Expenses

Year	*O&M*	*Debt*	*Water Purchase Savings*	*Total*
2014	$856,293	$93,639	0	$949,932
2015	$939,251	$93,639	0	$1,032,890
2016	$951,246	$93,639	0	$1,044,885
2017	$970,178	$93,639	($134,000)	$995,817
2018	$982,652	$93,639	($268,000)	$808,291
2019	$995,376	$93,639	($268,000)	$821,015
2020	$1,008,354	$93,639	($268,000)	$883,993

XII. WATER USER RATES AND REVENUE PROJECTIONS

The City charges user rates to all water and sewerage customers based upon monthly meter readings. Revenues from the users, plus any tap fees, connections and other miscellaneous income provide the funds to pay the annual costs of operating the water and sewerage systems.

Current water and sewer user rates effective March 2014 are shown below in Tables XII-1 and XII-2.

Table XII-1 - Water Rates

Water	***Inside City***	***Outside City***
Base Charge – Residential	$6.50	$9.75
1 to 5,000 gallons	$4.46 per 1,000 gal	$6.33per 1,000 gal
5,001 to 15,000 gallons	$6.22 per 1,000 gal	$8.97 per 1,000 gal
15,001 to 30,000 gallons	$7.47 per 1,000 gal	$10.85 per 1,000 gal
over 30,000 gallons	$8.72 per 1,000 gal	
Senior Discount (residential)	$7.50 per month	$7.50 per month
Base Charge – Commercial	$6.50	$12.81
Volume Charge	$4.46 per 1,000 gal	$6.33 per 1,000 gal
Base Charge – 1-inch Meter	$8.54	$12.81
1 to 5,000 gallons	$4.46 per 1,000 gal	$6.33 per 1,000 gal
5,001 to 15,000 gallons	$4.46 per 1,000 gal	$6.33 per 1,000 gal
15,001 to 30,000 gallons	$4.46 per 1,000 gal	$6.33 per 1,000 gal
over 30,000 gallons	$4.46 per 1,000 gal	$6.33 per 1,000 gal
Base Charge – 2-inch Meter	$20.54	$20.54
Volume Charge	$4.46 per 1,000 gal	$6.33 per 1,000 gal
Base Charge – 3-inch Meter	$30.14	$30.14
Volume Charge	$4.46 per 1,000 gal	$6.33 per 1,000 gal

Table XII-2 - Sewer Rates

Classification	*Inside City*	*Outside City*
Base Charge – Residential	$5.70	$8.55
1 to 5,000 gallons	$6.06 per 1,000 gal	$8.73 per 1,000 gal
5,001 to 15,000 gallons	$6.22 per 1,000 gal	$8.97 per 1,000 gal
15,001 to 30,000 gallons	$7.47 per 1,000 gal	$10.85 per 1,000 gal
over 30,000 gallons	$8.72 per 1,000 gal	$12.72 per 1,000 gal
Senior Discount	$7.50 per month	$7.50 per month
Base Charge – Commercial	$5.70	--
Volume Charge	$6.06 per 1,000 gal	--
Base Charge – 1-inch Meter	$5.70	$8.55
Volume Charge	$6.06 per 1,000 gal	$8.01 per 1,000 gal
Base Charge – 2-inch Meter	$5.70	--
Volume Charge	$6.06 per 1,000 gal	--
Base Charge – 3-inch Meter	$5.70	--
Volume Charge	$6.06 per 1,000 gal	--

Based on FY2013/14 monthly usage and billing records, monthly revenue and usage by water customer classification are as shown in Table XII-3.

Actual revenue in FY2013/14 was $483,905. In FY2014, water rates were adjusted, and water system revenue increased to $659,953 and is budgeted to increase to $709,759 in the FY2015 budget.

Table XII-3 –Average Monthly Revenue And Usage

Rate Classification	*No. Customers*	*Per Customer Avg. Gallons per Month*	*Per Customer Revenue per Month*
Residential – Inside	1,105	3,624	$22.66
Residential – Outside	98	3,922	$34.57
Residential – Inside (Senior)	173	2,674	$10.92
Residential – Outside (Senior)	3	5,235	$35.39
Residential – 1" Inside	19	4,585	$28.99
Residential – 1" Outside	4	2,317	$27.48
Commercial – ¾"	73	8,503	$44.42
Commercial – 1"	11	16,605	$82.60
Large Meter – 2" Inside	15	12,444	$76.04
Large Meter – 3" Inside	2	36,639	$193.55
Flat Fee / Special*	6	57,503	$178.38
Meriwether County	1	782,727	$5,276.77
Total No. of Customers	***1,510***		

**Denotes City Meter – No revenue collected*

Based on average water use of 3,624 gallons per month from residential customers inside the city limits, the number of equivalent dwelling units (EDU's) currently served by the water system is 2,006. The average residential water bill is $22.66 per month, or 1.09 % of estimated median household income. The wholesale connection to Meriwether County accounts for 782,727 gallons per month or approximately 216 EDU.

The FY2014/15 water system budget shows projected expenses (including debt repayment but excluding depreciation) of $1,032,890. For the same period, projected water system revenue is $709,759, resulting in a shortfall of $323,131. Expenses should decrease by approximately $268,000 per year beginning in 2018 when lost and unaccounted for water is reduced from over 50% to 20%.

The City may be required to adjust user rates to qualify for additional low interest loan and grant funds. Revenue requirements are based on median household income and the number of equivalent dwelling units. Table XII-4 includes a summary of the Equivalent Dwelling Unit (EDU) calculations for the City's water customers. The number of EDU is used to calculate the City's ability to repay debt from water revenues. The projected annual revenue based on average residential water bills equaling 1.0% of median household income is shown as a benchmark only.

Table XII-4 – Projected Monthly Revenue

Rate Classification	*No. Customers*	*No. EDU*	*Projected Annual Revenue per Month @ 1.0% MHH1*
Residential – Inside	1,105	1,105	$276,626
Residential – Outside	98	98	$24,533
Residential – Inside (Senior)	173	173	$43,309
Residential – Outside (Senior)	3	3	$751
Residential – 1" Inside	19	19	$4,756
Residential – 1" Outside	4	4	$1,001
Commercial – ¾"	73	171	$42,808
Commercial – 1"	11	50	$12,517
Large Meter – 2" Inside	15	52	$13,018
Large Meter – 3" Inside	2	20	$5,007
Flat Fee / Special	6	95	$23,782
Meriwether County	1	216	$54,073
Total No. of Customers	***1,510***	***2,006***	***$502,181***

In addition to water sales revenue, the City also collects a 4.00% franchise fee on water sales. As shown, franchise fees plus the water sales revenue will total $522,268 annually. To cover projected annual costs water rates will need to increase. If the rate increases are proportional across all customer classifications, rates for residential users will be approximately 1.61% of median household income and will meet the projected annual expenses of $808,291 in 2018.

Using total projected annual water system expenses for the first full year of operation for the upgraded system, the estimated amount of proposed annual costs can be calculated as follows:

O & M Expenses (2018)	$982,652
Debt Repayment – Existing	$93,639
Less Water Purchase Savings	($268,000)
Net Annual Expenses	*$808,291*
Potential Annual Debt Service (100% loan)	$171,234
Debt Service Coverage (10%)	$17,123
Total Estimated Annual Costs	***$996,648***

If the City paid for the project using USDA Rural Development loan funds only, the annual costs would require revenue per EDU of $496.83 each year or 1.98% of median household income. Based on these calculations, the City may qualify for grant assistance from USDA Rural Development to offset project costs.

XIII. SUMMARY AND IMPLEMENTATION

The City of Hogansville water system is in need of rehabilitation and improvement. The distribution system is deteriorating, the storage capacity is inadequate, and there are hydraulic problems with the pressure zones that affect many customers. The customer metering system and the old, leaking water lines both contribute to lost and unaccounted for water volume of 56% over the past two years.

Funding construction of the proposed improvements will require loan and grant assistance, and possibly restructuring the existing debt at a lower interest rate. The City should proceed with the recommended water system improvements according to the implementation schedule below:

1.	Submit application for USDA Rural Development loan and grant funds	April 2015
2.	Receive funding commitments from USDA	June 2015
3.	Authorize completion of plans and specifications for recommended improvements	June 2015
4.	Start survey and design of plans and specifications for water system improvements	July 2015
5.	Complete design and submit to Georgia EPD for approval	October 2015
6.	Obtain Georgia EPD approval of plans and specifications	November 2015
7.	Advertise for construction bids	February 2016
8.	Award construction contracts and issue notice to proceed	May 2016
9.	Complete construction	April 2017

APPENDIX

Appendix One	Detailed Cost Estimate
Appendix Two	Present Worth Cost Analysis
Appendix Three	Certified Bid Tabulations from Similar Projects
Appendix Four	Summary of Wholesale Water Contract Terms
Appendix Five	Water Purchase and Sales Annual Summaries
Appendix Six	Population and Demographic Information
Appendix Seven	Water and Sewer Department Budget
Appendix Eight	2012 Field Test Reports

DETAILED COST ESTIMATE

PRESENT WORTH COST ANALYSIS

CERTIFIED BID TABULATIONS FROM SIMILAR PROJECTS

SUMMARY OF WHOLESALE WATER CONTRACT TERMS

APPENDIX FOUR

Summary of Wholesale Water Contract Terms

Purchase

CITY OF LAGRANGE

Minimum Daily Average:	200,000 gallons
Maximum Daily Average:	350,000 gallons
Cost per 1,000 gallons:	$2.50 (under min.) $2.10 (over min.)
Minimum Billing per Month:	*$12,099.20*

COWETA COUNTY

Minimum Daily Average:	150,000 gallons
Maximum Daily Average:	1,000,000 gallons
Cost per 1,000 gallons:	$2.60

Sell

MERIWETHER COUNTY

Minimum Daily Average:	25,000 gallons
Maximum Daily Average:	250,000 gallons
Rate per 1,000 gallons:	$3.50

WATER PURCHASE AND SALES ANNUAL SUMMARIES

POPULATION AND DEMOGRAPHIC INFORMATION

WATER AND SEWER DEPARTMENT
BUDGET

2012 FIELD TEST REPORTS