



**FRANKLIN COUNTY, GA  
BOARD OF COMMISSIONERS**

**WATER SYSTEM PLANNING  
2023 ENGINEERING EVALUATION**

Engineer's Project No. 443-07A

**PRELIMINARY ENGINEERING REPORT  
(SRF PLANNING DOCUMENT)**

December 1, 2022

**FRANKLIN COUNTY**

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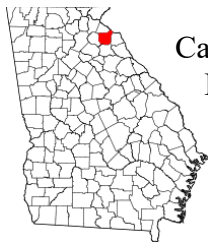
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  - Eavenson Well (EVW), Memorandum of Agreement, June 9, 2006
  - Ertzberger Well #1 (EW1), Memorandum of Agreement, April 18, 2008
  - Ertzberger Well #2 (EW2), Memorandum of Agreement, June 5, 2013
- G SALES AGREEMENT:
  - GRP Franklin, LLC Water Sales Agreement, August 6, 2018

## 1.0 GENERAL

This report presents the results of an engineering evaluation undertaken to determine needs, feasibility, environmental impacts, and preliminary opinion of probable costs for water system improvements in Franklin County, Georgia. Franklin County Board of Commissioners (BOC) wants to make needed improvements to keep their water system facilities in good working order and to meet regulatory requirements.



Franklin County is located in northeast Georgia along the state line of South Carolina (see inset map). Franklin County's southern border is formed by the Hudson River. The northeast tip borders South Carolina at the Savannah River which is impounded in this area to form Lake Hartwell. The surrounding Georgia counties are Banks, Hart, Madison, and Stephens. Cities within the county include Carnesville, Canon, Franklin Springs, Lavonia, and Royston. Carnesville is the county seat.

Franklin County was incorporated February 25, 1784, has a population of approximately 23,504 people per Census 2020, and a total land area of approximately 263 square miles. The Year-2020 median household income in Franklin County is approximately \$47,821.

The BOC operates a public water system with limited service area for the benefit of residential, commercial, and industrial customers. Portions of the water system are located in Stephens County including one storage tank.

The scope of the report consists of evaluating options for improvements to the Franklin County water system which provides transport, treatment, and delivery of potable water to water customers. This report was authorized by the Franklin County BOC; it includes identification of needed water system improvements, preliminary opinion of probable costs, and recommendations for implementation.

The costs presented herein are based on information readily available for this report. Detailed engineering and calculations were not performed, and no subsurface exploration data were available. Actual costs will vary depending on numerous factors including requirements of final design, permitting, environmental impacts, and actual site conditions.

This report, including the findings and conclusions expressed herein, are intended for the exclusive use of the Franklin County BOC relative to making needed improvements to their water system. No other use of this report is authorized without expressed written permission of Peoples & Quigley, Inc. No warranty, expressed or implied, extends to any unnamed third party for any use.

## 2.0 PROJECT PLANNING AREA

Franklin County is located in northeast Georgia on the State Line with South Carolina as shown by Figure No. 1 - Location Map. The surrounding counties and communities of Franklin County are shown in Figure No. 2 - Vicinity Map. The city limits of Carnesville, Canon, Franklin Springs, Lavonia, Royston, and the areas to be served by this project are shown by Figure No. 3 – Planning Area Map.



Like other counties in north Georgia, Franklin County is located at the foothills of the Appalachian Mountain range. There are many creeks, rivers, and ponds throughout the County. The Hudson River forms the southern county line; Middle and North Fork Broad River flow through the middle of the County and form the Broad River; Choestoea Creek forms the northeastern border of the County, which is a tributary of Lake Hartwell. Also, Interstate 85 goes through the midsection of the County, bisecting the County from northwest to southeast.

The topography in Franklin County is gently rolling with elevations ranging from 540 to 980-ft above mean sea level according to the published USGS maps. Because the County is located along the foothills, flooding is not a major issue in the populated areas. Development in the county is limited to where utilities (water, sewer, electricity, and gas services) are available.

The most recent population projections for Franklin County are provided by Governor’s Office of Planning and Budget, 2021. A summary of the historical and projected population of Franklin County are as follows:

**TABLE NO. 1 – POPULATION PROJECTIONS**

	<u>Year</u>	<u>Population</u>
<u>Historic:</u>	2020	23,504
<u>Projection:</u>	2025	24,745
	2030	25,974
	2035	27,216
	2040	28,481
	2045	29,752
	2050	31,026
	2055	32,294

These projections could change substantially depending on development around Lake Hartwell, industrial growth, and new commercial development, especially along Interstate 85.

### 3.0 EXISTING WATER SYSTEM

Franklin County BOC owns and operates a public water system with limited-service area for the benefit of its residents, businesses, and industries. The existing water system is shown in Figure No. 4A – Franklin County Water Service Area and in recent photographs (see Appendix) which shows the wells, storage tanks, and meters.

The County is permitted by the Georgia Department of Natural Resources Environmental Protection Division (GA DNR EPD) to operate their public water system under Permit No. CP1190051 (see Appendix).

Portions of the water distribution system date back to the early 1990’s. This consisted of a well, water mains, and storage tanks. Since that time numerous improvements have been made to expand the water system. The major milestones of the system are as follows:

**TABLE NO. 2 – WATER SYSTEM MILESTONES**

Early 1990’s	New well along JF Shirley Road.
Early 1990’s	New 0.1 MG elevated storage tank along JF Shirley Road.
Early 1990’s	New 0.1 MG elevated storage tank along State Route 59.
2004	New 1.5 MG ground storage tank (T1) along State Route 106 (Stephens County).
2004	New Eavenson Well (EVW) along State Route 106.
2010	New Ertzberger Well #1 (EW1) along Stone Bridge Road.
2011	New Andrews Well #1 (AW1) along Isbell Road.
2013-2014	Demolished 0.1 MG elevated storage tank along JF Shirley Road.
2013-2014	Abandoned well along JF Shirley Road.
2019	New 1.0 MG ground mixing and storage tank (T2) along Turkey Creek Road.
2019	New 0.3 MG elevated storage tank (T3) along Black Snake Road.
2020	Demolished 0.1 MG elevated storage tank along State Route 59.
2020	New Ertzberger Well #2 (EW2) along Stone Bridge Road.
2020	New Bold Springs Well (BSW) along Holbrook Road.
2020	New Andrews Well #2 (AW2) along Turkey Creek Road.

Franklin County BOC is currently in negotiation with the City of Carnesville to acquire the Carnesville water system. The Carnesville water system was constructed in 1970. One well and one spring provide water to the system and an eighty-foot standpipe is used for storage. The water system datum is at approximately elevation 880, which is lower than that of Franklin County. Existing water system conditions are shown in Figure No. 4B – Carnesville Water Service Area and in recent photographs (see Appendix).

Improvements are needed to the Carnesville water system to incorporate it into the Franklin County system. The scope of work for these improvements is included in this document.

## Water Supply and Withdrawal

Currently the County is permitted by GA DNR EPD to withdraw groundwater under the Permit No. 059-0003 (see Appendix). The permit allows an average monthly withdrawal of 1.545 mgd and an average yearly withdrawal of 1.545 mgd. Groundwater is withdrawn from six active wells.

Water is consistently purchased from the City of Toccoa and sometimes from Banks County. Franklin County can purchase up to 1.0 mgd and a peak demand of up to 1.4 mgd from the City of Toccoa; as needed from Banks County as shown in the Intergovernmental Agreements (see Appendix).

Franklin County withdraws groundwater from six well sites as follows:

**TABLE NO. 3 – GROUNDWATER WITHDRAWAL**

Well ID	Description	Safe Yield (gpm)	Installation Date	Location
AW1	Andrews Well #1	200	2011	Isbell Road
AW2	Andrews Well #2	100	2020	Turkey Creek Road
BSW	Bold Springs Well	65	2020	Holbrook Road
EVW	Eavenson Well	140	2004	State Route 106
EW1	Ertzberger Well #1	255	2010	Stone Bridge Road
EW2	Ertzberger Well #2	250	2020	Stone Bridge Road
Total		1,010		

All of the well sites are privately owned and Franklin County BOC has an agreement for purchasing water from each of them (see Appendix). Four of the wells (AW1, AW2, EW1, & EW2) feed Tank No. 2. Water is disinfected prior to entering the storage tank and then pumped into the distribution system. Water from the other wells (BSW & EVW) are disinfected at the well heads and directly supply the distribution system.

Water from AW1 is blended to reduce uranium concentrations below the maximum contaminant level using the ground mixing and storage Tank No. 2. EVW water is blended to reduce gross alpha, radium 266, and uranium below the maximum contaminant level. Flow is diluted with water from an offshoot of the distribution system at a ratio of approximately 1 to 1 before being distributed back into the system.

EW2 is currently offline due to a broken variable frequency drive.

## Water Storage and Distribution

The water system has 2.8 MG of storage provided by three storage tanks. The water system has a single pressure zone with a datum at El. 1,020.0 ft. A summary of the storage tanks is as follows:

**TABLE NO. 4 – STORAGE TANKS**

Tank ID	Type	Size (gal)	Overflow Elevation (ft)	Installation Date	Location
T1	Ground Concrete	1,500,000	1,020	2004	State Route 106 (Stephens County)
T2	Ground/Mixing Concrete	1,000,000	740	2019	Turkey Creek Road
T3	Elevated Steel	300,000	1,020	2019	Black Snake Road
Total		2,800,000			

Storage Tank No. 1 and Tank No. 3 maintain system pressures during normal demands ranging from 25 to 200 psi. These tanks are used to meet instantaneous demands and provide limited fire protection. Elevated-storage Tank No. 3 was recently added to the distribution system for additional storage capacity and is currently offline due to a broken altitude valve.

Franklin County has ten interconnections with adjacent municipalities including Banks County, Bowersville, Canon, Carnesville, Franklin Springs, Lavonia, Madison County, Martin, Royston, and Toccoa. Intergovernmental agreements with six of the ten municipalities (Banks County, Bowersville, Lavonia, Madison County, Martin, and Toccoa) are included in the Appendix. The remaining four municipalities (Canon, Carnesville, Franklin Springs, and Royston) have verbal agreements with Franklin County BOC to buy water as needed.



## Water Production

Franklin County produces water from six wells and purchases water from the City of Toccoa. A summary of the permitted average and peak production is as follows:

**TABLE NO. 5 – WATER PRODUCTION**

Source	Average Production (gpd)	Peak Production (gpd)
Wells	1,545,000	1,545,000
City of Toccoa	1,000,000	1,400,000
Total	2,545,000	2,945,000

The maximum supply from the wells is 1.545 mgd. This amount of water is produced by all wells operating continuously at the maximum pump capacity. The continuous operation of these wells leads to over pumping which causes poor water quality and a reduction of safe yield.

City of Toccoa can provide a maximum day demand of up to 1.400 mgd. This gives a total maximum supply of 2.945 mgd. Also, Lavonia and Banks County are able to provide emergency water as needed.

## Water Consumption

Franklin County's water customers are billed monthly for their water consumption. Each month meters are read and bills are distributed to the customers. Customers include residential, commercial, industrial, and municipal. One of the largest industrial customers is GRP Franklin, LLC. The water sales agreement states that GRP Franklin, LLC agrees to purchase between 500,000 and 1,250,000 gallons of water per day as shown in the Sales Agreement (see Appendix).

The total quantity of water sold varies from 42.1 to 71.4 million gallons per month which corresponds to a monthly average ranging from 1.4 to 2.4 mgd. The estimated daily peak usage is estimated to be 4.5 mgd which assumes a 2.5 peaking factor and 17 percent unaccounted water.

The estimated daily peak usage exceeds the maximum supply of the system. It is recommended that the water supply be increased so that the safe yield exceeds the estimated daily peak for all times of the year. This equates to adding wells with 1,100 gpm of total capacity. Also, a new purchase agreement with Royston, as well as modifications to the existing purchase agreement with Toccoa, should be pursued to provide additional water supply and emergency redundancy.

Water consumption will increase with development around Lake Hartwell, industrial growth, and new commercial development, especially along Interstate 85. Additional water supply is important for future growth and should be considered in all purchase agreements.

## System Analysis

Losses: Unaccounted-for-water (UAW) for the system is about 17% which indicates the system is in good condition. UAW is the difference between the amount of water produced and the amount of water sold. Franklin County's UAW from October 2021 to September 2022 was 136 MG, which is an average of 373,000 gpd or about 17% of the water produced. Replacing old leaking water mains and replacing old meters is commonly needed to address this issue.

Franklin County BOC does not have specific procedures in place for recording leak events, fire flow testing, or emergency water usage. The water used for these events is included in the UAW calculation. Procedures should be implemented to have more accurate data and better understand the water system.

Withdrawal: Water quality in wells reduces over time. Issues with water quality need to be addressed and adequate treatment equipment installed.

Storage: Additional storage of over 800,000 gallons is needed within the water system. Average water demand is 1.8 mgd and there should be storage two times that or 3.6 MG. Franklin County's total storage from the tanks is 2.8 MG. Franklin County should consider adding a 1.5 MG concrete ground storage tank to provide enough storage for existing needs with room for expansion.

Distribution: The distribution system is comprised of ductile iron and PVC mains with sizes varying from 4 to 20-inches.

Replace old mains that are made of antiquated materials and may leak. Replacing these mains should be addressed as soon as practical.

Loop water mains to eliminate dead-end lines. This will improve water quality and fire protection.

Replace old service lines from the main to the meter with new HDPE pipe. These lines leak and are way past their useful life.

Replace old hydrants which do not work or are obsolete. Replace old valves that do not work or are way past their useful life.

Supply: Additional water supply is needed to meet daily peak demands and provide for future growth in the County. New water purchase agreements should be pursued, especially with Royston. Also, existing intergovernmental agreements should be revised to provide mutual aid between Franklin County and municipalities.

Pressures and Limited Fire Protection: Modeling results shown in Table No. 7 indicate that the water system maintains good pressures throughout for minimum and peak usages. However, the water system has low pressures near the highest elevations and is not able to provide fire flow at multiple locations.

**TABLE NO. 6 – MODEL RESULTS SUMMARY**

Location	Minimum Usage (psi)	Peak Usage (psi)	Fire Flow (psi)
Bond Bridge Rd (Low Point El. 556)	194	180	177
Careytown Rd @ Jim Grizzle Rd	174	156	140
SR 106	172	155	164
Jackson Bridge Rd @ Casey Rd	123	112	113
SR 59 @ Bold Springs Church Rd	105	83	90
SR 198 @ New Bethel Rd	97	55	80
SR 106 @ Toms Creek Rd @ Brown Rd	55	47	52
New Franklin Church Rd @ New Hope Ext	38	25	13
Jones St @ Pleasant Hill Cir	34	25	-11
SR 320 @ Barrett Dr (High Point El. 940)	26	26	26

Tanks assumed to be half full, wells were on, six interconnections (Banks, Bowersville, Canon, Carnesville, Franklin Springs, & Madison) open, remaining interconnections closed, and flow conditions as follows:

1. Minimum usage is 10% of the annual average (124 gpm).
2. Average usage is annual average (1,236 gpm).
3. Peak usage is 3 times the annual average (3,708 gpm).
4. Fire flow is 500 gpm during average usage (AWWA Manual M31).

The EPANET computer software program was used to model the distribution system hydraulically and estimate water pressures. The basis for model input came from available data including water system maps and water production data. Note that the Carnesville water system was not included in this model.

Replacing substandard water mains and creating loops where feasible, will provide more reliable service, increased fire protection, and greatly reduce water losses in the system.

County growth has caused single water main extensions to be made without being looped into the distribution system, creating dead ends. Looping improves conditions with respect to both flow and pressure. Also, looping provides an alternate means of delivering water when a main segment is temporarily out of service. This is particularly important with respect to providing sufficient water for firefighting.

Water main extensions will be made to provide public water to currently unserved areas.

## 4.0 PROPOSED WATER SYSTEM IMPROVEMENTS

Water system improvements are needed to keep the system in good working order. The overall scope includes improvements associated with water supply and withdrawal and water storage and distribution. Carnesville improvements are included in the scope. Improvements should be implemented in phases to minimize capital outlays. The proposed improvements are shown by Figure No. 5A – Franklin County Water System Improvements and Figure No. 5B – Carnesville Water System Improvements, and described below:

### 1. Water Supply and Withdrawal

#### A. Wells:

1. Repair wells (as needed). Install treatment equipment.
2. Develop additional wells. Install well house, pumps, and all related appurtenances. County to own, operate, and maintain additional wells.
3. Renovate Carnesville spring and well house.

#### B. Interconnections:

1. Replace Lavonia booster pump station.
2. Obtain an agreement with Royston for water supply.
3. Revise Toccoa agreement for increasing supply.

### 2. Water Storage and Distribution

#### A. Storage Tanks:

1. Repair storage tanks (as needed). Install treatment equipment.
2. Add 1.5 MG ground storage tank at Stephens County site.
3. Remove Carnesville standpipe.

#### B. Water Mains:

1. Install water mains to provide public water to unserved areas.
2. Install water mains to create loops.
3. Replace old meters.
4. Install sampling stations (sites to be determined).
5. Enhance SCADA system.
6. Replace old mains.
7. Replace valves (as needed).
8. Replace hydrants (as needed).
9. Replace old service lines.
10. Install remote terminal units and pressure gauges in all Carnesville master meters.
11. Map the Carnesville water distribution system.

The numerous proposed improvements identified herein can be categorized in terms of need and thereby prioritized into phases of manageable project scopes. Phase 1 consists of the highest priority improvements of those described above and are summarized in the next section. Phase I should be implemented as soon as practical. All other improvements would be similarly grouped into later phases depending on need and priority.

## 5.0 PRELIMINARY OPINION OF PROBABLE COSTS

Phase 1 improvements include water supply and withdrawal renovations (replacing the Lavonia BPS, obtaining water from Royston, repairing wells, and developing additional wells) and water storage and distribution renovations (installing water mains and repairing tanks). The estimated project cost for the proposed Phase 1 improvements is \$2,500,000 and is broken down as follows:

**TABLE NO. 7 – PRELIMINARY OPINION OF PROBABLE COSTS  
PHASE 1 WATER SYSTEM IMPROVEMENTS**

1.	Water Supply and Withdrawal	\$ 1,450,000
	Replace Lavonia BPS	
	Obtain water from Royston	
	Repair wells	
	Develop additional wells	
2.	Water Storage and Distribution	500,000
	Install water mains	
	Repair storage tanks	
3.	Contingency	<u>200,000</u>
4.	Construction Subtotal	\$ 2,150,000
5.	Engineering Design	135,000
6.	Permitting & Easements	40,000
7.	Bidding & Construction Administration	135,000
8.	Funding Administration	40,000
Project Total		\$ 2,500,000

The costs presented herein are based on information readily available for this study. Detailed engineering and calculations were not performed, and no subsurface exploration data were available. Actual costs will vary depending on numerous factors, including requirements of final design, permitting, environmental impacts, and actual site conditions. Actual costs will vary greatly depending on market forces shaped by product, material and labor availability. A large portion of the data used in this study was furnished by others and was not verified.

## 6.0 PROJECT FINANCING

Funding for projects such as described in this report can be obtained from many sources. In some cases, Federal and State grant assistance is available which will minimize the amount of funds that have to be borrowed. Also, additional rate increases will be required to repay loans. Possible sources of funds include:

Agency	Type	Duration/Limit
1. Georgia Environmental Facilities Authority (GEFA)		
- Water Improvements (2.9%)	Loan	5-20 Year
- Water Improvements (SRF @ 0%)	Loan/Grant	5-20 Years
2. Rural Economic & Community Development Services (RECD) (Farmers Home Administration)		
- Intermediate (3.5%), Poverty (2.5%)	Loan	40 Year/Unlimited
(Poverty rate for health hazard projects)	Grant	55-75% Total Costs
3. Northeast Georgia RDC (Must meet location requirements)		
	Grant	Unknown
4. Georgia Department of Community Affairs (DCA)		
- Community Development Block Grant (Requires Low to Mod Income Cust.)	Grant	\$500,000
- Employment Incentive Program (Requires new or expanding Industry)	Grant	\$250,000
5. Economical Development Administration		
	Grant	\$500,000
6. Publicly Issued Revenue Bonds		
	Bonds	
7. Local Option Sales Tax		
	Tax	

Each source listed has different criteria in determining project eligibility. Applications should be submitted if agency criteria can be met. Franklin County BOC should request that Georgia Mountain RDC assist in obtaining the maximum grant funds available.

## 7.0 SUMMARY & IMPLEMENTATION

This report presents the results of an engineering evaluation undertaken to determine needs, feasibility, environmental impacts, and preliminary opinion of probable costs for public water system improvements for Franklin County BOC.

Proposed improvements can be categorized in terms of need and thereby prioritized into phases of manageable project scopes. Phase 1 consists of the highest priority improvements including water supply and withdrawal renovations (replacing the Lavonia BPS, obtaining water from Royston, repairing wells, and developing additional wells) and water storage and distribution renovations (installing water mains and repairing tanks), as shown by Figure No. 5A – Franklin County Water System Improvements and Figure No. 5B – Carnesville Water System Improvements. The Preliminary Opinion of Probable Cost for Phase 1 improvements is \$2,500,000.

The following steps are recommended to implement the project:

- |   |               |
|---|---------------|
| 1. Submit Engineering Report & EID to EPD for concurrence | 12/22         |
| 2. Submit GEFA funding application                        | 03/23         |
| 3. Prepare Construction Documents (CD's)                  | 05/23 – 01/24 |
| 4. Submit CD's to EPD for concurrence                     | 01/24         |
| 5. Obtain contractor bids and construct improvements      | 02/24 – 02/25 |



## APPENDIX