

# BUREAU OF WATER

South Carolina Department of Health and Environmental Control

## Source Water Assessment

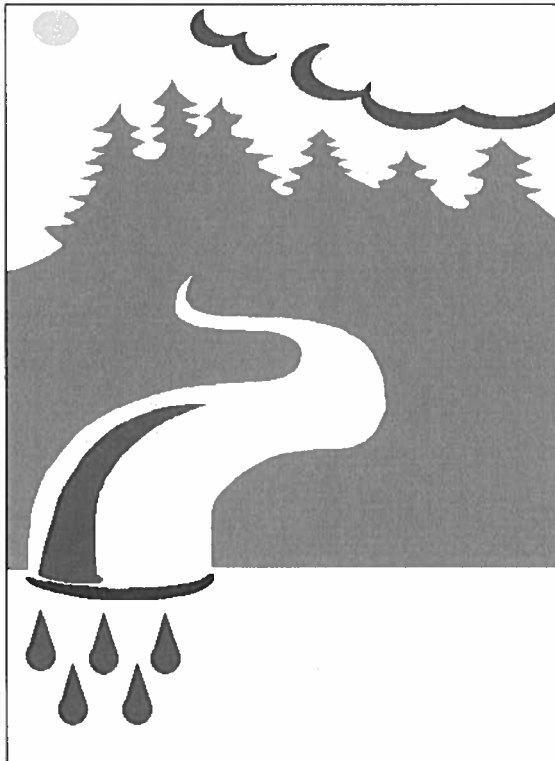
A Technical Report for Public Water Systems

Water System: **GILBERT SUMMIT RURAL WATER DISTRICT**

**3220001**

**Lexington County**

Water Source: **G32104, G32105, G32107, G32109, G32110, G32677, G32678, G32834**



June 7, 2006



South Carolina Department of Health  
and Environmental Control

[www.scdhec.net/water](http://www.scdhec.net/water)

## Table of Contents

Summary.....	1
Introduction.....	1
Water Intake Integrity And Vulnerability.....	1
Description of System and Source.....	2
Delineation Of Source Water Protection Areas.....	2
Potential Contaminants Of Interest And The Inventory Of Potential Contaminant Sources .....	2
Susceptibility Analysis .....	2
Local Protection Plans .....	3
Selected References .....	3

## Tables

Table 1. Parameters Used to Calculate Time-of-Travel Zones for Each Well and Delineate Source Water Protection Areas.....	4
Table 2. Groundwater Susceptibility Matrix.....	5

## Figures

Figure 1. Vulnerability Designations for the State.....	6
Figure 2. Source Water Protection Area and Locations of Potential Contaminant Sources .....	7

## Appendices

Appendix A. Inventory of Potential Contaminants of Interest.....	8
Appendix B. Potential Contaminant Source Susceptibility Analysis.....	9

## **SUMMARY**

This report contains the completed groundwater susceptibility assessment for the GILBERT SUMMIT RURAL WATER DISTRICT, System No. 3220001. The system includes public supply wells: G32104, G32105, G32107, G32109, G32110, G32677, G32678, G32834. The system is located in Lexington County, South Carolina and serves a primary population of approximately 4518. The system is located in Vulnerability Area 1 in the Piedmont physiographic province. The source aquifer is unconfined. Of the 13 potential contaminant sources (PCSs) in this initial inventory, 10 PCSs had more than one category of contaminants. The inventory includes 3 PCSs with volatile organic compounds (VOCs); 4 PCSs with petroleum products; 5 PCSs with metals; 7 PCSs with nitrates; 1 PCSs with pesticides/herbicides; 7 PCSs with pathogens; no PCSs with radionuclides; and no PCSs with undetermined contaminants. The susceptibility analysis determined 13 PCSs with a high susceptibility ranking; 0 PCSs with a moderate susceptibility ranking; and 0 PCSs with a low susceptibility ranking.

## **INTRODUCTION**

The 1996 Amendments to the Safe Drinking Water Act required the States to develop Source Water Assessment and Protection Programs (U.S. Environmental Protection Agency, 1996). The program's goal is to provide added protection of both groundwater and surface water drinking water sources by conducting source water assessments and implementing protection measures. To meet this goal, SCDHEC is serving as the coordinating agency for the State's Source Water Assessment and Protection Program (SWAP) and has conducted assessments of the source water for all federally defined drinking water supply systems. A more detailed description of the program can be found in a Bureau of Water publication, *A Guide to Source Water Protection* (September 2002).

This report contains the completed assessment for the GILBERT SUMMIT RURAL WATER DISTRICT, System No. 3220001, that includes drinking water well(s): G32104, G32105, G32107, G32109, G32110, G32677, G32678, G32834. Site-specific information for each susceptibility assessment was obtained from SCDHEC files, site inspections, and published reports on hydrogeology (Colquhoun and others, 1983) and aquifer tests (Aucott and Newcome, 1986; Newcome, 1993). A copy of this assessment report can be obtained by contacting the Bureau of Water in Columbia, South Carolina at (803) 898-4300 or on the web at <http://www.scdhec.net/water>.

## **WATER INTAKE INTEGRITY AND VULNERABILITY**

Sanitary surveys of public water supply systems are conducted periodically by the Department. Part of that inspection includes the evaluation of the physical integrity of the intake structure and identification of any potential threats to the intake. To get more information about the latest sanitary survey for System No. 3220001, call the Drinking & Recreational Waters Compliance Section of the SCDHEC in Columbia, South Carolina at (803) 898-3543.

The SCDHEC evaluated the relative vulnerability of regional aquifers on the basis of geographic/physiographic location within the state. The State's hydrogeology is divided into three geographic areas of relative vulnerability (Figure 1.) Aquifers in Area 1 are generally unconfined and are considered vulnerable to activities at land surface. Aquifers in Area 2 generally are semi-confined and are considered less vulnerable relative to aquifers in Area 1. Aquifers in Area 3 generally are confined and are considered the least vulnerable, relative to Areas 1 and 2.

## **DESCRIPTION OF SYSTEM AND SOURCE**

The GILBERT SUMMIT RURAL WATER DISTRICT, System No. 3220001 is located in Lexington County, South Carolina. The system serves a primary population of approximately 4518. The drinking water sources for the system is/are 8 drinking water supply well(s): G32104, G32105, G32107, G32109, G32110, G32677, G32678, G32834 (Table 1).

System No. 3220001 is located in Vulnerability Area 1 in the Piedmont physiographic province. The source aquifer is unconfined.

## **DELINEATION OF SOURCE WATER PROTECTION AREAS**

Source Water Protection Areas (SWPAs) or Wellhead Protection Areas (WHPAs) were delineated for the 8 water supply well(s) in System No. 3220001. For wells in the Piedmont or rock wells, a volumetric equation incorporating pumping rate and recharge rate was used to calculate an area of contribution. The area of contribution is equal to the SWPA for the well. For wells in the Coastal Plain, RESSQC – a U. S. Environmental Protection Agency computer code - was used to estimate time of travel (TOT) in the source aquifer and to delineate TOT zones around each well. (U. S. Environmental Protection Agency, 1993). The outer edge of the 10-year TOT zone delineates the SWPA for each well. Site-specific well construction and aquifer hydraulic properties used to calculate the 1-, 5-, and 10-year time of travel zones surrounding each well area summarized in Table 1.

## **POTENTIAL CONTAMINANTS OF INTEREST AND THE INVENTORY OF POTENTIAL CONTAMINANT SOURCES**

Eight categories of potential contaminants of interest were considered by the SCDHEC for susceptibility analysis. These eight categories include: volatile organic compounds (VOCs), petroleum products, metals, nitrates, pesticides/herbicides, pathogens, radionuclides, and undetermined.

Potential contaminant sources (PCSs) are defined by land-use or site-specific activities that could potentially release contaminants of interest within the SWPA. Examples of PCSs include gas stations, dry cleaners, agricultural areas, automobile repair shops, landfills, septic systems, and manufacturers, businesses, and facilities where potential contaminants of interest are used or stored.

The SCDHEC identified an initial inventory of the potential contaminants of interest at 13 PCSs in the SWPAs for System No. 3220001 (Appendix A). The inventory and location of each PCS was obtained from the SCDHEC databases and site inspections. The inventory was added to a GIS database and plotted relative to the SWPA around each well (Figure 2.).

## **SUSCEPTIBILITY ANALYSIS**

A susceptibility matrix is used to rank the susceptibility of source water to a potential contaminant source within a SWPA (Table 2.). The matrix assigns a ranking of high, moderate or low susceptibility to each PCS on the basis of location of the public supply system (Vulnerability Area 1, 2, or 3, Figure 1.) and the contaminant of interest.

System No. 3220001 had 3 PCSs with VOCs; 5 PCSs with metals; 1 PCSs with pesticides/herbicides; 7 PCSs with pathogens; no PCSs with radionuclides; no PCSs with undetermined; 4 PCSs with petroleum products; and 7 PCSs with nitrates (Appendix A). System No. 3220001 had 13 PCSs with a high susceptibility ranking; 0 PCSs with a moderate susceptibility ranking; and 0 PCSs with a low susceptibility ranking (Appendix B).

## **LOCAL PROTECTION PLANS**

The information provided in this report is intended to be the foundation of a local effort to provide better protection of our state's sources of drinking water. The initial inventory of PCSs and potential contaminants of interest presented in this report should be verified by the owners and managers of System No. 3220001 for accuracy and annually updated to reflect changes in land-use and site-specific activities within the SWPA.

## **SELECTED REFERENCES**

- Aucott, W.R., and Newcome, Roy, 1986, Selected aquifer-test information for the Coastal Plain aquifers of South Carolina: U.S. Geological Survey Water-Resources Investigations Report 86-4159.
- Colquhoun, D. J., Woollen, I. D., Van Nieuwenhuise, D. S., Padgett, G. G., Oldham, R. W., Boylan, D. C., Bishop, J. W., and Howell, P. D., 1983, Surface and Subsurface Stratigraphy, Structure and Aquifers of the South Carolina Coastal Plain.
- Newcome, R., Jr., 1993, Pumping Tests of the Coastal Plain Aquifers in South Carolina, With a Discussion of Aquifer and Well Characteristics: State of South Carolina Water Resources Commission Report 174.
- U. S. Environmental Protection Agency, 1993, RESSQC-WHPA Version 2.2.

**Table 1. Parameters Used to Calculate Time-of-Travel  
Zones for Each Well and Delineate the Source Water Protection Area.**

**TABLE 1: Parameters used to calculate time-of-travel zones for each well and delineate the source water protection area.**

**GILBERT SUMMIT RURAL WATER DISTRICT**

System 3220001

<i>Well Number</i>	<i>Well Depth (feet)</i>	<i>Aquifer</i>	<i>Screened Length (feet)</i>	<i>Pumping Rate (gpn)</i>	<i>Transmissivity (ft<sup>2</sup>/d)</i>	<i>Hydraulic Gradient</i>	<i>Regional Flow Direction</i>
G32104	400	ROCK	0	20	0	0	0
G32105	298	ROCK	0	23	0	0	0
G32107	298	ROCK	0	13	0	0	0
G32110	171	MIDDENDORF	82	83	2496	0.0008	315
G32677	171	MIDDENDORF	82	157	2496	0.0008	315
G32678	157	MIDDENDORF	82	180	2496	0.0008	315
G32834	184	MIDDENDORF	82	251	2496	0.0008	310

**Table 2. Groundwater Susceptibility Matrix**



**Table 2**  
**Groundwater Susceptibility Matrix**

<b>Type of Contaminant</b>	<b>Vulnerability Area 1</b>	<b>Vulnerability Area 2</b>	<b>Vulnerability Area 3</b>
Volatile Organic Compounds (VOCs)	HS	HS	MS
Petroleum Products	HS	MS	LS
Metals	HS	MS	LS
Nitrates	HS	MS	LS
Pesticides/Herbicides	HS	MS	LS
Pathogens	HS	LS	LS
Radionuclides	HS	MS	LS
Undetermined	HS	MS	MS

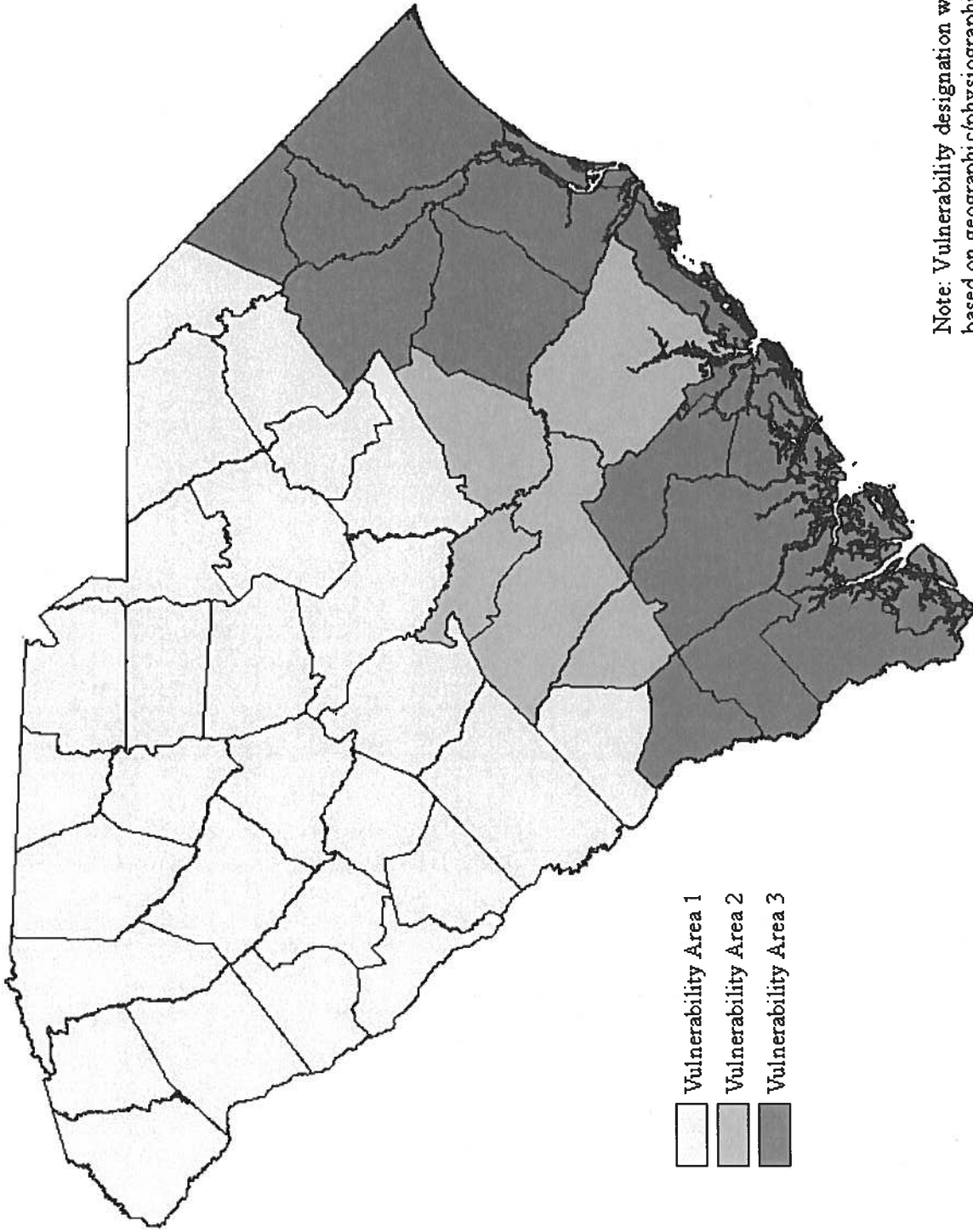
HS = High Susceptibility

MS = Moderate Susceptibility

LS = Low Susceptibility

**Figure 1. Vulnerability Designations for the State**

# Vulnerability Area Designations for the State



- Vulnerability Area 1
- Vulnerability Area 2
- Vulnerability Area 3

Note: Vulnerability designation wells based on geographic/physiographic location within the state.

**Figure 2. Source Water Protection Area and  
Locations of Potential Contaminant Sources for GILBERT SUMMIT  
RURAL WATER DISTRICT.**

# Source Water Protection Area(s) and Location of Potential Contaminant Source(s) for Gilbert Summit Rural Water District, System No. 3220001

Source Water Protection Area for the above system. This figure shows the PCSs for the system wells. PCSs are located in one of three time-of-travel (TOT) zones which define the Source Water Protection Area (SWPA). The area of the state where this SWPA is located is shown in the lower right-hand corner of the map. The level of susceptibility for PCSs is based on the area of the state where the system is located and the type of contaminants associated with the PCS.

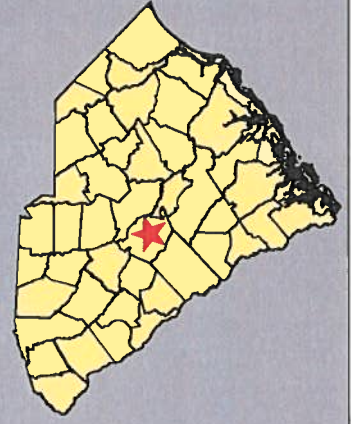
## LEGEND

### Potential Contaminant Sources (PCS) and Susceptibility

- High Susceptibility
- Moderate Susceptibility
- Low Susceptibility
- ∧ Roads

### Source Water Protection Area (SWPA)

- 1 Year TOT
- 5 Year TOT
- 10 Year TOT



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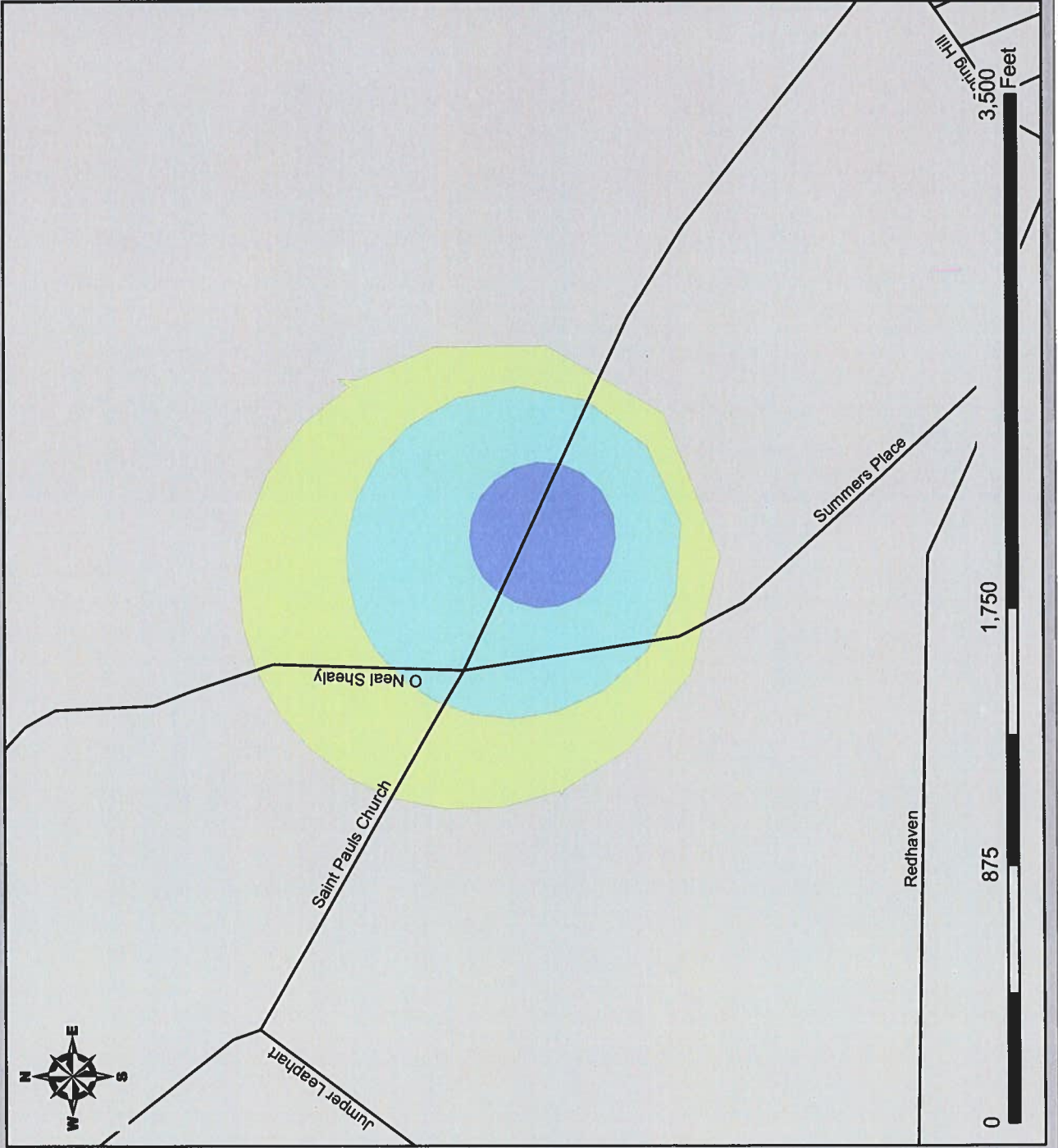
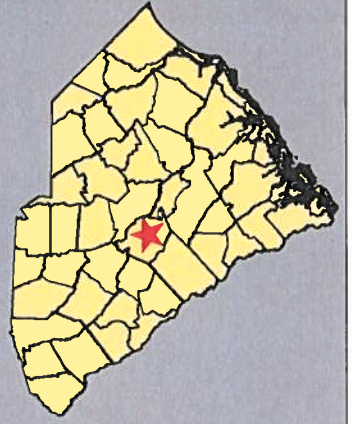
## LEGEND

### Potential Contaminant Sources (PCS) and Susceptibility

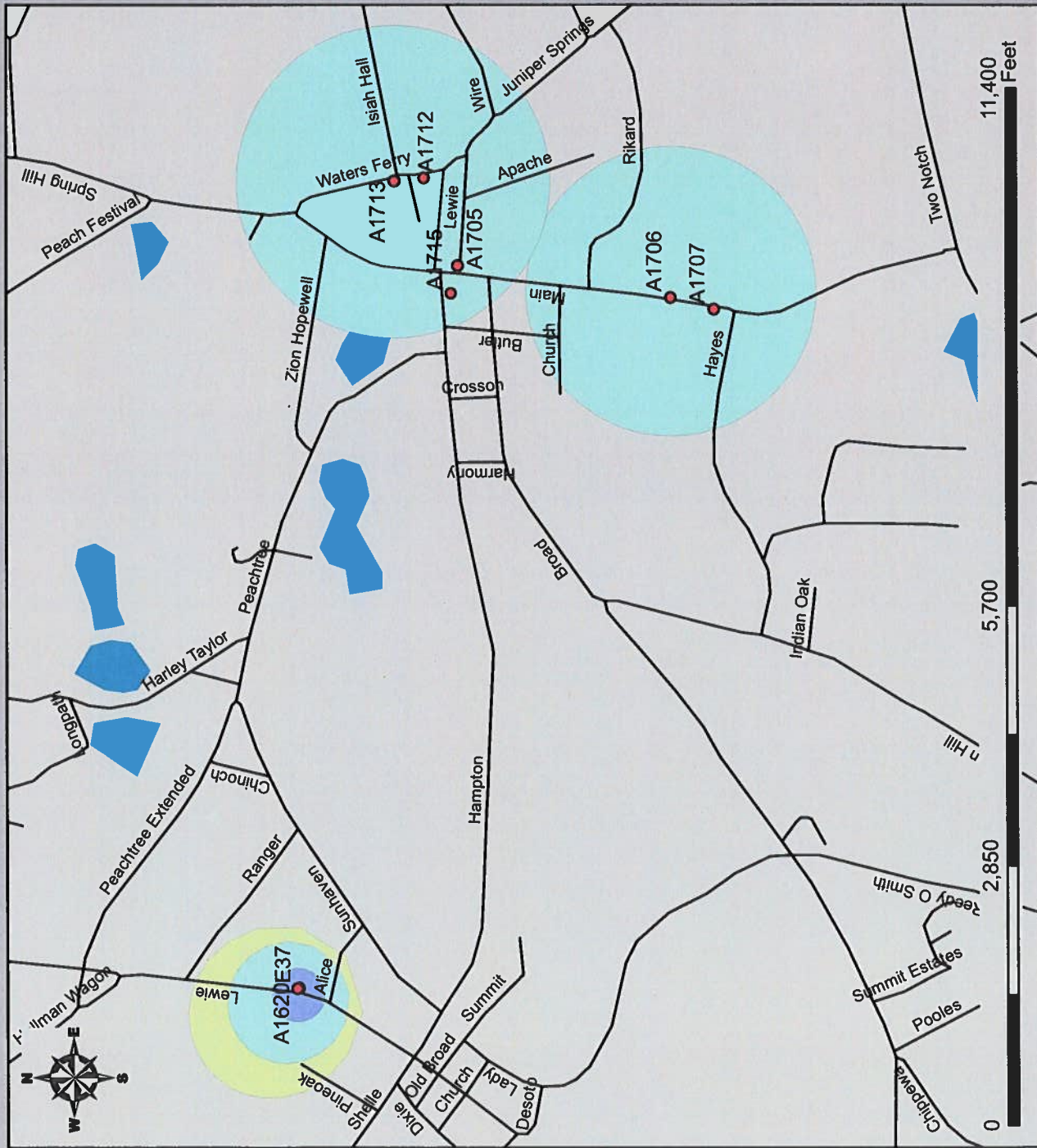
- High Susceptibility
- Moderate Susceptibility
- Low Susceptibility
- Λ Roads

### Source Water Protection Area (SWPA)

- 1 Year TOT
- 5 Year TOT
- 10 Year TOT



# Source Water Protection Area(s) and Location of Potential Contaminant Source(s) for Gilbert Summit Rural Water District, System No. 3220001



Source Water Protection Area for the above system. This figure shows the PCSs for the system wells. PCSs are located in one of three time-of-travel (TOT) zones which define the Source Water Protection Area (SWPA). The area of the state where this SWPA is located is shown in the lower right-hand corner of the map. The level of susceptibility for PCSs is based on the area of the state where the system is located and the type of contaminants associated with the PCS.

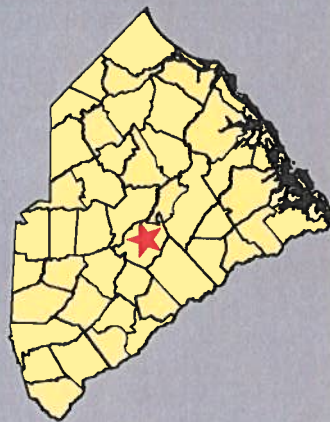
## LEGEND

### Potential Contaminant Sources (PCS) and Susceptibility

- High Susceptibility
- Moderate Susceptibility
- Low Susceptibility
- ∧ Roads

### Source Water Protection Area (SWPA)

- 1 Year TOT
- 5 Year TOT
- 10 Year TOT



# Source Water Protection Area(s) and Location of Potential Contaminant Source(s) for Gilbert Summit Rural Water District, System No. 3220001



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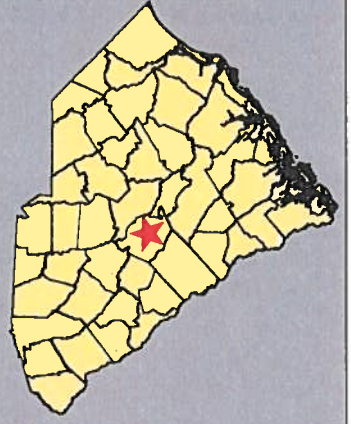
## LEGEND

### Potential Contaminant Sources (PCS) and Susceptibility

- High Susceptibility
- Moderate Susceptibility
- Low Susceptibility
- ⚡ Roads

### Source Water Protection Area (SWPA)

- 1 Year TOT
- 5 Year TOT
- 10 Year TOT





**APPENDIX A**  
**Inventory of Potential Contaminants of Interest for each**  
**Potential Contaminant Source for GILBERT SUMMIT RURAL WATER**  
**DISTRICT.**

**APPENDIX A**

GILBERT SUMMIT RURAL  
System No. 3220001

Site ID	Potential Contaminant Source	Address	Volatile Organic Compounds	Petroleum Products	Metals	Nitrates	Pesticides/Herbicides	Pathogens	Radionuclides	Undetermined
D1612	SEPTIC TANKS IN WHPZ SEPTIC TANK	VARIOUS GILBERT	No	No	No	Yes	No	Yes	No	No
D1613	SEPTIC TANKS IN WHPZ SEPTIC TANK	VARIOUS GILBERT	No	No	No	Yes	No	Yes	No	No
A1705	CITGO GAS STATION	MAIN STREET GILBERT	No	Yes	No	No	No	No	No	No
A1706	GILBERT SUMMIT W/D SEPTIC TANK	MAIN STREET GILBERT	No	Yes	No	Yes	No	Yes	No	No
A1707	TEXACO FOODMART UST	MAIN STREET GILBERT	No	Yes	No	No	No	No	No	No
A1712	SANCRETE CONCRETE PLANT	WATERS FERRY ROAD GILBERT	Yes	No	Yes	No	No	No	No	No
A1713	GILBERT SUMMIT W/D SEPTIC TANK	119 WATERS FERRY ROAD GILBERT	No	No	Yes	Yes	No	Yes	No	No
A1715	SMALLWOOD GAS AND GROCERY UST	HAMPTON STREET GILBERT	No	Yes	No	No	No	No	No	No

Site ID	Potential Contaminant Source	Address	Volatile Organic Compounds	Petroleum Products	Metals	Nitrates	Pesticides/ Herbicides	Pathogens	Radionuclides	Undetermined
E26	IMPERIAL AUTOMOTIVE REFINISHING AUTO/TRUCK/BUS BODY SHOP	2614 POND BRANCH RD LEESVILLE	Yes	No	Yes	No	No	No	No	No
E27	TRIPLE R ENT. AUTO/TRUCK/BUS BODY SHOP	POND BRANCH RD LEESVILLE	Yes	No	Yes	No	No	No	No	No
E37	SEPTIC TANKS SEPTIC TANK	VARIOUS GILBERT	No	No	No	Yes	No	Yes	No	No
A1620	GILBERT SUMMIT WHPA SEPTIC TANK	2345 LEWIE ROAD SUMMIT	No	No	Yes	Yes	Yes	Yes	No	No
A2798	GILBERT SUMMIT W/D - WELLHEAD PROTECTION SEPTIC TANK	136 BRIDGE COURT ROAD GILBERT	No	No	No	Yes	No	Yes	No	No

**APPENDIX B**  
**Potential Contaminant Source Susceptibility Analysis**  
**for GILBERT SUMMIT RURAL WATER DISTRICT.**

**APPENDIX B**

**GILBERT SUMMIT RURAL WATER DIST**

System No. 3220001

<b>*SUSCEPTIBILITY</b>	<b>SITE ID</b>	<b>SITE NAME</b>	<b>FACILITY DESCRIPTION</b>
HS			
	A1620	Gilbert Summit WHPA	Wellhead Protection Area
	A1705	Citgo	Gas station and convenience store
	A1706	Gilbert Summit W/D	Wellhead protection area
	A1707	Texaco Foodmart	Gas station and convenience store
	A1712	Sancrete	Concrete plant
	A1713	Gilbert Summit W/D	Wellhead protection area
	A1715	Smallwood Gas and Grocery	Former gas station
	A2798	Gilbert Summit W/D - Wellhead Protection Area	Wellhead protection area
	D1612	SEPTIC TANKS IN WHPZ	SEPTIC TANKS IN WHPZ
	D1613	SEPTIC TANKS IN WHPZ	SEPTIC TANKS IN WHPZ
	E26	IMPERIAL AUTOMOTIVE REFINISHING	AUTO BODY SHOP
	E27	TRIPLE R ENT.	AUTO INTERIOR SHOP
	E37	SEPTIC TANKS	HOUSES ON SEPTIC TANKS IN WHPZ

**Total Number of Sites with HS 13**

**Total Number of Sites for System 3220001 is 13**

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\* HS = High Susceptibility  
MS = Moderate Susceptibility  
LS = Low Susceptibility