CITY OF SOPCHOPPY

INITIAL CAPACITY ANALYSIS REPORT

PWS ID No. 1650612

Prepared for:

CITY COUNCIL

CITY OF SOPCHOPPY

WAKULLA COUNTY, FLORIDA

OCTOBER 2007

Prepared by:

BASKERVILLE-DONOVAN, INC.
325 JOHN KNOX ROAD, BUILDING 200
TALLAHASSEE, FLORIDA 32303
khatcher@baskervilledonovan.com

BDI PROJECT NO. 40918.01

EB #0000340

Sign, seal, and date

Ken R. Hatcher, P.E.

Table of Contents

List of Figures

List of Tables

1 DESCRIPTION OF PUBLIC WATER SYSTEM

1.1 OWNER

The City of Sopchoppy is a rural community in Southwestern Wakulla County, Florida close to the Gulf of Mexico, approximately 40 miles southwest of Tallahassee. It is bounded on the west by the Ochlockonee River and the Apalachicola National Forest on the north.

1.2 INTERCONNECTIONS

In Wakulla County, the county has a small water system north of Crawfordville towards Tallahassee in the River Sink area. This system has its own well and elevated tank and is not connected to the Sopchoppy system. There are no plans to connect these systems.

Talquin Water System also has a small system in the northeast section of Crawfordville. This system has its own well(s) and is not connected to the Sopchoppy system. There are no plans to connect these systems.

Panacea Water System is located to the southeast of the City of Sopchoppy. This system has its own well(s) and is not connected to the Sochoppy system. There are no plans to connect these systems.

1.3 SERVICE AREA

The original potable water system was constructed in 1968. The system has since then expanded to other areas beyond the City limits, namely the Medart area and the Crawfordville area. The City's overall water service area and surrounding water system service areas are illustrated in **Attachment A**. The City's system currently serves approximately 3,185 customers, including residential and commercial users. There are no industrial users in the service area.

Growth in the service area is more prevalent in the Crawfordville and Medart area to the northeast. The Apalachicola National Forest borders the west and northwest of the service area and very little growth will occur in this direction. Southern boundary of the service area follows the Wakulla and Franklin County boundary. It is not likely that the City of Sopchoppy will not expand across the county line.

The future land use map for the City of Sopchoppy indicates that most of the property is zoned for residential or agricultural use. A copy of the City of Sopchoppy Future Land Use Map is included in **Attachment B**. The service area that falls outside the city limits in Wakulla County is mostly zoned for Rural 1 and Rural 2 development with the Crawfordville area being zoned as Urban 1. A Future Land Use map for Wakulla County is included in **Attachment C**. These zoning restrictions provide guidance concerning growth in the City of Sopchoppy and Wakulla County and are useful for planning purposes.

According to the latest information compiled by the Census Bureau, Wakulla County's average person per household in 2000 was 2.57 persons. A copy of the QuickFact Sheet is included in **Attachment D**. Of the 3,185 existing connections as reported in February 2007, 240 were identified as being high flow customers and assumed to be commercial based. The remaining 2,945 connections are assumed to be residential. At 2.57 persons per connection, the City of Sopchoppy currently serves a population of 7,570.

1.4 FIRE PROTECTION

Most of the service area for the City of Sopchoppy water system is located outside the city limits in Wakulla County. Wakulla County addresses fire protection needs in Article X, Section 8-140 of their Code of Ordinances. The minimum fire flow standard set by the County is one thousand (1,000) gallons per minute of fire flow in addition to average daily flow demands with a minimum pipeline pressure of twenty (20) psi for non-residential or multi-family uses in urban or rural areas with a gross density equal to or greater than one (1) dwelling unit to two (2) acres; and five hundred (500) gallons per minute in addition to average daily flow demand in all other areas. This ordinance does not address the duration of this fire flow requirement. A sustained fir flow for two houts is typical for Fire flow needs between five hundred (500) and one thousand five hundred (1,500) gallons per minute. This is the standard that is used later in this report for determination of pumping and storage needs.

1.5 EXISTING FACILITIES

1.5.1 Supply

Raw water from the City's system is currently supplied by seven wells. The source of water for these wells is the upper limestone formation of the Floridan Aquifer. Details of the supply wells are presented in **Table 1.**

Table 1. Existing Water Supply Wells

Description	Well No. 1	Well No. 2	Well No. 3	Well No. 4	Well No. 5	Well No. 6	Well No. 7
Year Drilled	1968	1981	Unknown	1978	1972	1967	1977
Depth Drilled	260	200	200	200	190	175	180
Casing Diameter/Length	12"/121'	14"/85'	12"/100'	12"/59'	8"/160'	6"/105'	8"/155'
Casing Construction	BI	BI	BI	BI	BI	BI	BI
Depth of Static Water Level	12'	18'	22'	30'	35'	50'	25'
Normal Suction Lift	80'	70'	Unknown	Unknown	40'	Unknown	Unknown
Normal Yield, gpm	200	211	291	300	200	200	150
Pump Type	Vertical Turbine	Vertical Turbine	Submersed	Submersed	Submersed	Submersed	Submersed

This information was obtained from the Florida Department of Environmental Protection (FDEP) Sanitary Survey Report, dated April 3 and 4, 2006.

Based on conversations with utility personnel, Well No. 2 is not normally in service due to localized excessively high pressures being generated in the immediate vicinity of the plant. However, during high usage periods, Well No. 2 is needed to meet the peak demands.

In May 2000, pump tests were performed at each well. The results of these tests are summarized in **Table 2.** In June 2000, the pump at Well No. 6 was replaced to restore the well to its original permitted capacity of 200 gpm. In September 2000, the pump at Well No. 5 was replaced. Well No. 5 now has a pumping capacity equal to its original permitted capacity of 200 gpm. Standby power is provided at Well Nos. 1, 2, 3 and 4.

Table 2. Well Pump Test Data

Well No.	Permitted Capacity (gpm)	Pump Test Capacity (gpm)	Available Pumping Data (gpm)
1*	300	250	250
2*	200	240	200
3*	300	300	300
4*	450	315	315
5	200	200	200
6	100	200	100
7	150	170	150
TOTAL	1700	1675	1515

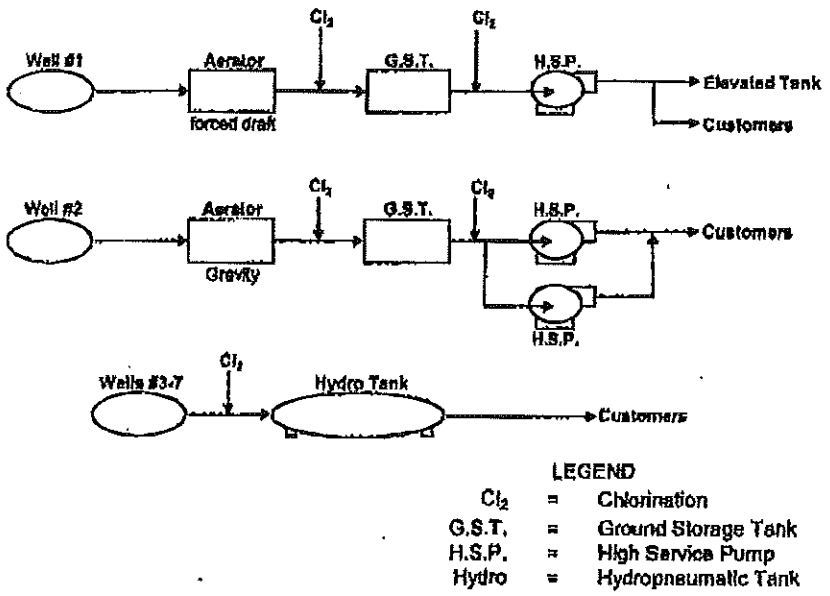
*Equipped with standby power.

1.5.2 Treatment

For the City of Sopchoppy, water treatment refers to the removal of hydrogen sulfide gas via forced draft aeration. Of the seven wells, only Well No. 1 and Well No. 2 have forced draft aerators. Note that these are the only wells located in the southern portion of the service area. Basic disinfection is provided for all seven wells using gaseous chlorination.

At Well No. 1 and Well No. 2, raw water is pumped from the wells into the top section of the forced draft aerator or tray aerator located on top of the ground storage tank. The aerated water drains into the ground storage tank. Chlorination occurs at the point of discharge from the aerator to the ground storage tank. Water stored in the ground storage tank is pumped into the distribution system by high service pumps. A schematic diagram of the existing treatment plants and wells is included as **Figure 1.**

Figure 1. Schematic Diagram of Existing Treatment Plants



1.5.3 Distribution System

The water distribution system consists of PVC pipe in sizes ranging from 1-inch to 8-inches in diameter. Size and approximate length of the water mains within the Sopchoppy Water System are summarized in **Table 3**. A map of the utility system is included as **Exhibit I**.

Table 3. Summary of Existing Water Mains

Description	Diameter (in.)	Length (ft.)
Polyvinyl Chloride (PVC)	1	1,720
	1-1/2	4,020
	2	144,820
	2-1/2	4,460
	3	21,580
	4	40,960
	6	166,900
	8	49,400

1.6 PERMITTED OPERATING CAPACITY

The Northwest Florida Water Management District permits the operating capacity of utilities through Consumptive Use Permits. The City of Sopchoppy operates under CUP No. 20030034 that expires May 1, 2008. The permit authorizes the City of Sopchoppy to make a combined average annual withdrawal of 950,000 gallons of water per day, a maximum combined withdrawal of 1,825,000 gallons during a single day, and a combined monthly withdrawal of 40,000,000 gallons. Withdrawals for the individual facilities are authorized as shown in **Table 4.**

Table 4. Individual Maximum Well Withdrawal

Withdrawal Point ID No.	**Location Sec, Twn, Rng**	**Gallons per Day Maximum**
CS#1 (AAA7837)	Sec. 12, T5S, R3W	432,000
CS#2 (AAA0244)	Sec 3, T5S, R3W	288,000
CS#3 (AAA7838)	Lot 86, T4S, R1W	432,000
CS#4 (AAA7839)	Lot 91, T4S, R1W	648,000
CS#5 (AAA7840)	Sec 36, T3S, R2W	288,000
CS#6 (AAA7847)	Lot 74, T3S, R1W	144,000
CS#7 (AAA7846)	Lot 76, T3S, R1W	216,000

The use of the permitted water withdrawal is restricted to the use classification of Public Supply. Any change in the use of said water shall require a modification of the Consumptive Use Permit. **Attachment E** is a map of the service area with the City wells identified. **Attachment F** is a copy of the current Consumptive Use Permit.

1.7 USEFUL FINISHED STORAGE

The distribution system is supplied by eight storage tanks, including elevated storage, ground storage and hydropneumatic. The tanks are associated with the well that supplies them, from which the numbering is derived. All tanks are located at the same site as the well that they are associated with, except the Crawfordville elevated tank. The elevated tank in Crawfordville, Tank No. 5B, is located near the corner of Wakulla-Arran Road and Oak Street and not at Well No. 5. The storage capacities of the tanks are summarized in **Table 5.** The operational characteristics of the elevated storage tanks are summarized in **Table 6.**

Table 5. Storage Capacity Summary

Tank No.	Location	Type of Storage	Volume (gallons)
1A	City Hall	Elevated	75,000
1B	City Hall	Ground	14,000
2	Otter Creek	Ground	239,000
3	Wildwood Drive	Hydropneumatic	5,000
4	Wakulla Manor	Hydropneumatic	2,500
5A	Courthouse Square	Hydropneumatic	3,000
5B	Wakulla-Arran/Oak St.	Elevated	150,000
7	Hudson Heights	Elevated	500,000
8	Rockhole Road	Elevated	400,000
TOTAL			**1,388,500**

Table 6. Elevated Tank Data

Tank Location	Ground Elevation (Ft.)	Low Water Level (Ft.)	High Water Level (Ft.)
City Hall	28.0	138.0	161.5
Wakulla-Aaron/Oak St.	25.0	107.5	163.5
Rockhole Road	33.5	132.83	163.5
Hudson Heights	30.0	131.5	163.5

With the exception of he Wakulla-Aaron/Oak St. tank, the exterior coating of the tanks show no signs of corrosion as viewed from the ground; the condition of the tank interiors is not known. Generally, these ground and elevated storage tanks appear to be in good condition. The Wakulla-Aaron/Oak St. tank is experiencing problems due to corrosion. This tank has been patched and repaired numerous times to stop leaking. The City has acquired land in the Medart area for the purpose of constructing a new elevated tank so the Wakulla-Aaron/Oak St. tank can be taken out of service.

2 PAST WATER PRODUCTION

Tables 7 – 13 list the annual average and maximum monthly daily usage for each of the seven City of Sopchoppy wells from 1997 through 2006. **Table 14** is a tabulation of the combined flow of all wells for the same period. **Table 15** is a tabulation of the combined total monthly, monthly average day, and monthly single maximum day usage from January 2006 through February 2007 and **Figure 2** represents this data graphically.

Table 7. Average Day and Maximum Daily Flow

Well 1

	ADF	MDF
1997	107,814	206,000
1998	130,672	397,000
1999	133,694	308,000
2000	113,573	435,000
2001	88,515	227,000
2002	74,509	240,000
2003	115,985	496,000
2004	73,326	296,000
2005	43,914	900,000
2006	52,457	192,000

Table 8. Average Day and Maximum Daily Flow

Well 2

	ADF	MDF
1997	0	0
1998	88,380	539,400
1999	183,429	457,400
2000	101,702	583,200
2001	5,308	302,100
2002	2,408	342,200
2003	5,143	321,000
2004	4,309	227,000
2005	1,019	83,000
2006	3,604	91,000

Table 9. Average Day and Maximum Daily Flow

Well 3

	ADF	MDF
1997	84,544	198,200
1998	118,319	461,000
1999	175,196	451,000
2000	256,390	650,000
2001	163,980	502,000
2002	121,935	451,000
2003	191,602	549,000
2004	185,824	505,000
2005	26,353	485,000
2006	60,430	545,000

Table 10. Average Day and Maximum Daily FloW

Well 4

	ADF	MDF
1997	192,445	941,600
1998	222,881	883,000
1999	131,914	596,300
2000	204,186	620,200
2001	240,952	545,600
2002	282,675	492,200
2003	251,007	474,000
2004	286,147	471,000
2005	388,955	486,000
2006	429,037	629,000

Table 11. Average Day and Maximum Daily Flow

Well 5
Average Day and Maximum Daily Flow

	ADF	MDF
1997	154,564	380,000
1998	126,203	752,000
1999	118,506	244,000
2000	60,570	219,000
2001	81,394	353,000
2002	87,189	320,000
2003	85,972	323,000
2004	44,060	268,000
2005	121,633	358,000
2006	148,947	350,000

Table 12. Average Day and Maximum Daily Flow

Well 6
Average Day and Maximum Daily Flow

	ADF	MDF
1997	67,598	734,000
1998	149,856	259,000
1999	26,001	109,600
2000	81,232	275,900
2001	137,333	332,900
2002	124,352	287,300
2003	41,894	429,200
2004	40,965	268,000
2005	84,837	180,600
2006	122,743	275,900

Table 13. Average Day and Maximum Daily Flow

Well 7
Average Day and Maximum Daily Flow

	ADF	MDF
1997	0	0
1998	33,702	242,100
1999	58,217	337,700
2000	104,879	349,300
2001	20,405	265,500
2002	76,812	317,100
2003	39,099	240,100
2004	50,046	269,800
2005	124,608	306,700
2006	203,479	330,000

Table 14. Average Day and Maximum Daily Flow

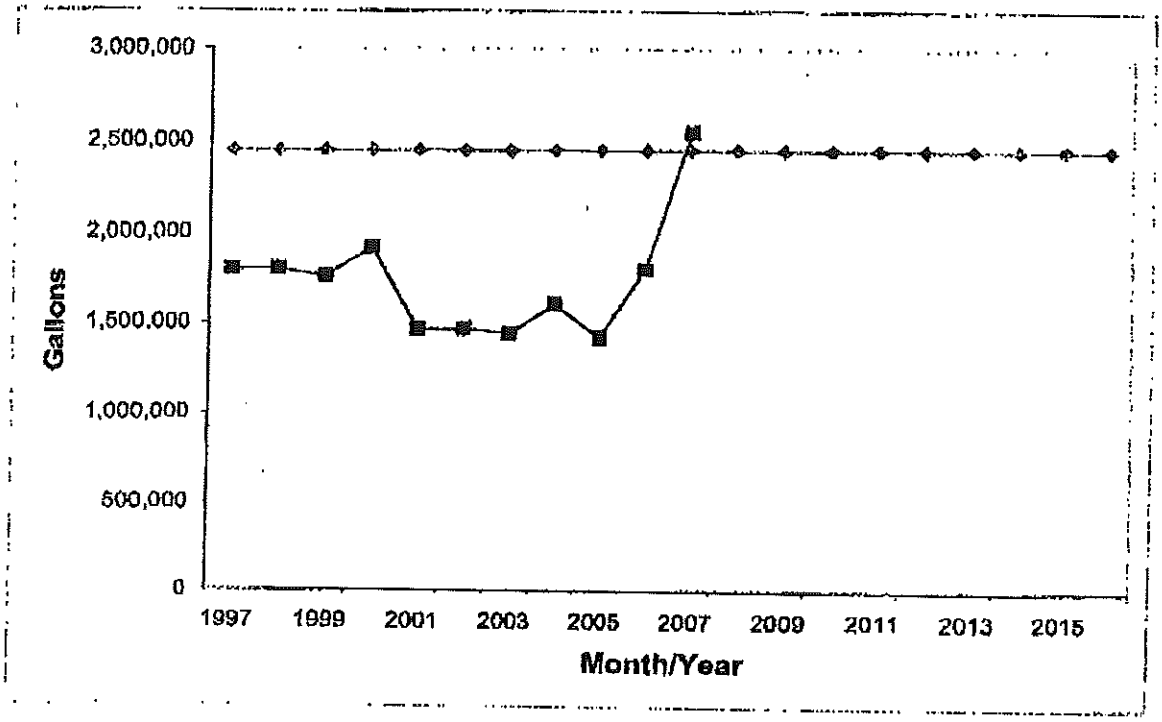
Combined Total
Average Day and Maximum Daily Flow

	ADF	MDF
1997	606,965	1,796,000
1998	870,014	1,796,800
1999	826,955	1,755,400
2000	922,533	1,915,100
2001	737,887	1,459,300
2002	769,879	1,462,300
2003	730,702	1,437,200
2004	684,679	1,598,200
2005	791,318	1,413,100
2006	1,020,698	1,794,300

Table 15. Current Flow Data

Month/Year	Total Month (gallons)	Monthly Daily Average (gallons)	Single Maximum Day (gallons)
January 2006	23,204,900	751,126	895,000
February 2006	18,922,300	675,976	837,700
March 2006	26,292,300	848,139	1,061,900
April 2006	33,446,400	1,078,916	1,314,500
May 2006	34,326,000	1,107,290	1,566,700
June 2006	35,735,600	1,152,761	1,739,800
July 2006	28,975,400	934,690	1,128,200
August 2006	30,383,500	980,113	1,315,700
September 2006	27,737,000	894,742	1,158,300
October 2006	29,845,200	962,748	1,794,300
November 2006	24,837,900	801,223	1,594,200
December 2006	23,148,500	746,726	1,514,800
January 2007	21,492,700	693,313	1,520,700
February 2007	20,279,700	654,184	1,527,900
Total	378,627,400	12,281,947	18,969,700
Average	27,044,814	877,281	1,354,978
Maximum	35,735,600	1,152,761	1,794,300

Figure 2. Current Flow Data



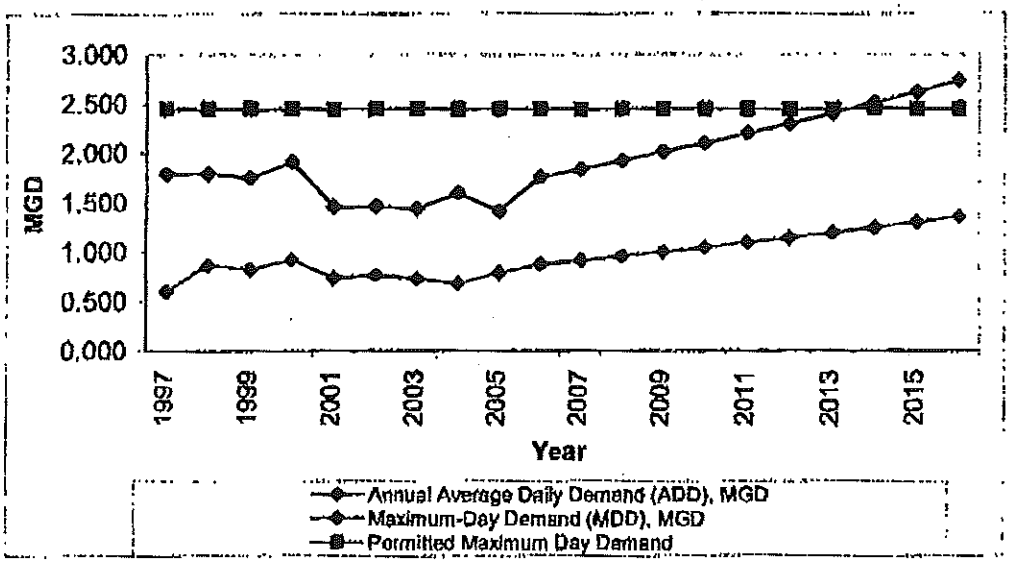
The highest maximum daily pumpage recorded for a single day occurred in March 2007. On that day the utility pumped 2.544 million gallons which exceeded the maximum capacity of 2.448 million gallons. This high pumping was most likely the result of high rates of irrigation to off-set the effects of the on-going drought being experienced in the area at the time. This pumping rate triggered the requirement to complete a Capacity Analysis Report for the City of Sopchoppy Utility System.

3 PROJECTED WATER DEMAND AND FINISHED WATER STORAGE NEED

3.1 PROJECTED WATER DEMAND NEEDS

In order to project future water demands, an annual growth must be determined. Evaluating the average daily flow over the last nine years indicates that water usage has increased at a rate of 7.5% annually. The Bureau of Census published population for Wakulla County in 2000 was 22,863. Each year the census data is updated with projected populations. For 2006, the Census Bureau projected the population of Wakulla County to be 29,542. This represents an annual average increase of 4.5% in the county. This projection is much more realistic for the planning area and is what is used to develop projected annual and maximum day demands for the next ten years. The average daily demand for the period of January 2006 through February 2007 was 877,281 gallons. Projecting this out through the year 2016 at an annual growth rate of 4.5% indicates that the utility will need the capability of producing 1.362 MGD. With an ADD to MDD peaking factor of 2.01, the maximum daily demand in 2016 is projected to be 2.738 MGD. These projections are illustrated in the table in **Attachment G. Figure 3** shows this data graphically.

Figure 3. Projected Water Demands Through 2016

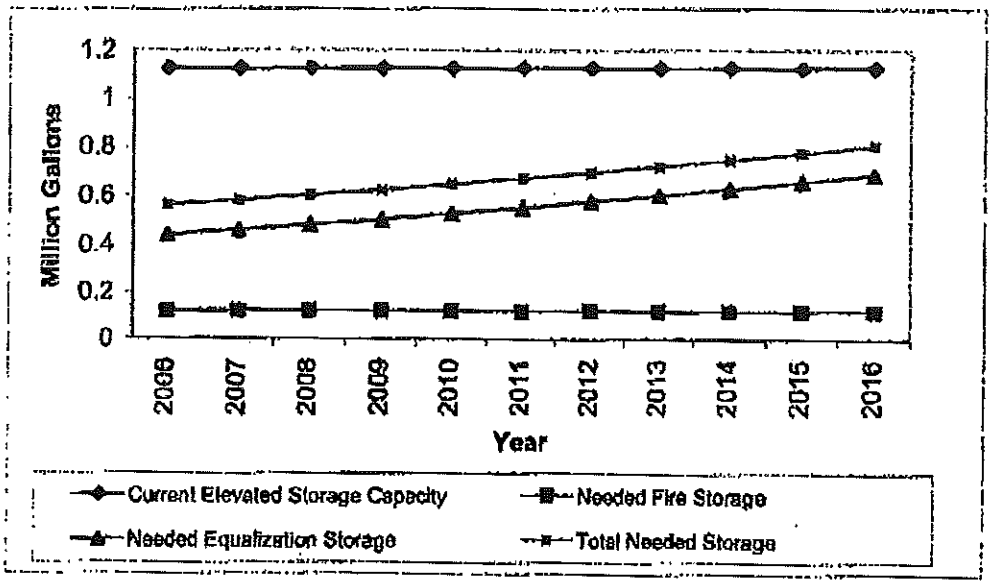


3.2 FINISHED STORAGE NEEDS

Finished storage must be equivalent to needed fire flows plus 25% of the maximum daily demand. Using the fire flow demand of 1,000 gpm for two (2) hour duration, the required storage for fire flow is 120,000 gallons. With a projected maximum day demand of 2.738 MGD in 2016, the equalization storage required is 0.685 million gallons. The total

storage required is 0.805 million gallons. These projections are illustrated in the table in **Attachment F. Figure 4** shows this data graphically.

Figure 4. Storage Needs Through 2016



4 RECOMMENDATION FOR NEW OR EXPANDED FACILITIES

4.1 PROJECTED WATER DEMAND RECOMMENDATION

Maximum daily demand is a varying number based on geographical and weather conditions in the area. The maximum daily demand of 1.763 MGD that was recorded between January 2006 and February 2007 is significantly less than the 2.544 MGD that was recorded in March 2007. As previously stated, this maximum day was probably related to drought conditions in the area. Since then, the customer usage appears to be decreasing. Based on the ADD/MDD peaking factor of 2.01, the maximum daily demand is not going to be exceeded until 2013. Exceptions to this would be continued or prolonged drought periods. With a well capacity of 2.488 and storage in excess of 1.152 million gallons, single day maximum demands that exceed the well capacity can be met. It is our recommendation that the City of Sopchoppy acquire property for a new well and begin construction as soon as possible. **Table 16** provides a schedule for property location and acquisition, design and construction.

Table 16. Capital Improvement Schedule

Activity	Month/Year Completed
Property Location and Acquisition	January 2008
Well and Pipeline Design	June 2008
Permitting	September 2008
Contract Documents and Bidding	November 2008
Construction	August 2009

4.2 FINISHED STORAGE RECOMMENDATION

Requirements for storage are the sum of equalized volumes equivalent to twenty-five (25) percent of maximum daily flow plus fire flow requirements. Elevated storage within the service area is 1.125 million gallons. There is a 239,000 gallon ground storage tank with high service booster pumps. However, the capacity of this tank is accounted for in the evaluation of pumping capacity by taking into consideration the capacity of the well. The smaller hydropneumatic tanks also are not being considered as available storage. Based upon the projected maximum day demands, the utility will need equalization storage in the amount of 0.685 million gallons. Adding fire flow demands of 0.120 million gallons, the total required storage is 0.805 million gallons. With a storage capacity of 1.125 million gallons, the utility has ample storage to meet the projections beyond 2016. No improvements are being recommended at this time.

CERTIFICATION STATEMENT

I am duly authorized to sign this statement on behalf of the City of Sopchoppy. I certify that the City of Sopchoppy is meeting, and intends to meet, the schedule for design, permitting, and construction of new or expanded facilities as recommended in the Capacity Analysis Report dated October 2007 and prepared by Ken R. Hatcher, P.E. of Baskerville-Donovan, Inc.

City of Sopchoppy

_____
Signature of Authorized Representative

_____
Printed Name and Title