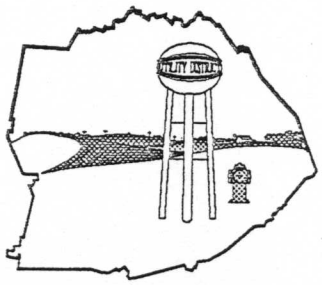
1997

RURAL WATER IMPROVEMENT PLAN



CUMBERLAND COUNTY

TENNESSEE

CUMBERLAND COUNTY
RURAL WATER IMPROVEMENT PLAN

Prepared by the

CUMBERLAND COUNTY REGIONAL PLANNING COMMISSION

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LOCAL PLANNING ASSISTANCE OFFICE
TENNESSEE DEPARTMENT OF
ECONOMIC AND COMMUNITY DEVELOPMENT

James A. Mills, Community Principal Planner

NOVEMBER, 1997

RESOLUTION OF THE CUMBERLAND COUNTY REGIONAL PLANNING COMMISSION TO ADOPT A RURAL WATER IMPROVEMENT PLAN FOR CUMBERLAND COUNTY, TENNESSEE

WHEREAS, the Cumberland County Regional Planning Commission has completed a study and prepared a plan for improving the supply and distribution of public water in the unincorporated areas of Cumberland County, Tennessee; and

WHEREAS, said plan includes analyses and examinations of Cumberland County's existing water supply and distribution systems; presents an improvements program with recommendations for future improvements in the provision of water in rural Cumberland County; and includes maps reflecting the recommendations for future improvements.

NOW, THEREFORE, BE IT RESOLVED by the Cumberland County Regional Planning Commission that the Rural Water Improvement Plan for Cumberland County, Tennessee is hereby adopted and certified to the Board of Commissioners of Cumberland County, Tennessee for its review and consideration as required by Tennessee Code Section 13-3-304.

Steven C. Douglas

Secretary, Cumberland County
Regional Planning Commission

11-4-97

Date

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INTRODUCTION

The adequate supply and distribution of potable water are essential for the growth and development of any community. In addition, the provision of public water significantly influences the quality of life for the residents of a community by improving health conditions and by allowing for the expansion of fire protection. When public water is not available, the intensity and diversity of land use in a community are severely restricted.

The primary intent of this Rural Water Improvement Plan is to provide a general guide for local officials and other decision makers for improving the supply and distribution of public water in the unincorporated areas of Cumberland County, Tennessee. For this study the unincorporated areas of Cumberland County are considered to be all areas of the county located outside the corporate limits of the City of Crossville. Much of the information presented in this study was obtained from the water systems serving Cumberland County through a series of interviews and surveys conducted by the Local Planning Assistance Office in July and August of 1997.

A systematic approach to planning water supply and distribution improvements should provide considerable benefits for Cumberland County. A well-conceived improvements plan will promote the optimum effectiveness of the taxpayer or customer's dollar; help focus attention on community goals, needs, and capabilities; provide for the better use and scheduling of services and facilities; and enhance opportunities for participation in various federal and state grant-in-aid programs. This improvement plan is designed to formulate a coordinated, long-term (through the year 2010) program for enhancing rural water service in Cumberland County.

To accomplish the purposes of this document, background and demographic information on Cumberland County are first reviewed. An overview of the public water systems serving the unincorporated areas of the county is then presented. Next, an analysis of the county's water supply systems is completed. This is followed by an examination of the county's water distribution systems. From this analysis and examination, an improvements program for future improvements in the provision of water in rural Cumberland County is presented.

BACKGROUND INFORMATION

Cumberland County is located in the Upper Cumberland Region of Tennessee on the extreme eastern edge of Middle Tennessee. It is situated almost entirely on the Cumberland Plateau Physiographic Province. Encompassing a land area of approximately 682 square miles, it is the fourth largest county in the state. Major thoroughfares in the county include Interstate 40, U.S. Highways 70, 70N, 70S and 127, and State Highway 68.

The 1990 Census population count for Cumberland County was 34,736, which is a 21.1 percent increase from the 1980 Census count of 28,676. According to the 1990 Census figures, Cumberland County is the fifth fastest growing county in the state and it is by far the fastest growing county in the Upper Cumberland Region. The average household size in Cumberland County, based on the 1990 Census, is 2.55 persons.

The U.S. Census Bureau estimates the 1996 population of Cumberland County at 42,048, which is an increase of 7,312 or 21.1 percent since 1990. This estimated increase represents an average growth of over 1,000 persons per year. It is anticipated that the county's population will exceed 45,000 by the year 2000.

Although Cumberland County is experiencing substantial population growth, its population density remains relatively small at approximately 51 persons per square mile. It is also still primarily a rural county with 80 percent of its population, according to 1990 Census figures, located outside incorporated areas. The county's land area outside the City of Crossville is generally characterized by pockets of concentrated development scattered throughout large sections of comparatively undeveloped areas. A significant percentage of the unincorporated population is located within one of the many resort communities situated in the county. The most intensely developed of these are the Fairfield Glade and Tansi Communities. Other areas of concentrated population in the county are the Towns of Crab Orchard and Pleasant Hill. There are also smaller clusters of development located in the numerous unincorporated communities dispersed throughout the county.

OVERVIEW OF PUBLIC WATER SYSTEMS

The purpose of a public water system is to provide a sufficient quantity of potable water to meet the residential, commercial and industrial demands for a community for a maximum day, while maintaining a reserve for fire protection. A water system is typically composed of several components. These usually include a raw water source, a treatment facility, storage tanks, pumps, and water mains. In some instances rural utility districts purchase treated water from other water systems.

There are currently seven (7) individual public water systems serving the unincorporated areas of Cumberland County. These are the Bon de Croft, Catoosa, Crab Orchard, Grandview, South Cumberland (formerly Lantana), and West Cumberland (formerly Pleasant Hill) Water Utility Districts and the City of Crossville Water System. Illustration 1 in Appendix A depicts the general location of the water service boundaries for each of the water systems serving Cumberland County.

Summary of Water Systems

In this section a summary of information is presented for each of the water systems serving the residents and businesses of Cumberland County.

Bon de Croft Water Utility District

Address:	9100 Crossville Highway Sparta, Tennessee
Office Location:	Same
Phone:	(931) 935 - 8543
Manager/Contact Person:	Danny Brock
Board of Directors:	Harold Hensley, Chairman Mike Crawford, Vice-Chairman Bobby Brown, Secretary
Consulting Engineer:	Robert Stigall, SEC
Maintenance/Service Person:	Danny Brock
Source of Water:	Billy's Branch Lake (White County)
Current Treatment Capacity:	648,000 gallons
Current Water Storage Capacity:	200,000 gallons
Current Daily Water Usage:	380,000 gallons
Current Number of Customers:	960 (16 in Cumberland County)
Current Charge for Water Usage:	$10.63 for first 1,500 gallons, then $4.65 per 1,000 gallons to 5,000 gallons
Current Tap Fee:	$685 plus $30 connection fee

Catoosa Water Utility District

Address:	P. O. Box 2689 Crossville TN 38557
Office Location:	Plateau Road
Phone:	(931) 277 - 5126
Manager/Contact Person:	Jerry Garrison, Operations Manager
Board of Directors:	John Crowder, President Bill Wheeler, Vice-President Tom Kidwell, Secretary
Consulting Engineer:	Robert Stigall, SEC
Maintenance/Service Person:	Jerry Garrison
Source of Water:	City of Crossville
Current Water Storage Capacity:	500,000 gallons
Current Daily Water Usage:	450,000 gallons
Current Number of Customers:	2,408
Current Charge for Water Usage:	$9.90 for first 1,500 gallons, then $5.00 per 1,000 gallons
Current Tap Fee:	$600.00 plus $25.00 meter deposit

Crab Orchard Water Utility District

Address:	P.O. Box 78 Crab Orchard, TN
Office Location:	Old Rockwood Road (Crossville)
Phone:	(931) 484 - 6987
Manager/Contact Person:	Jewell N. Harris
Board of Directors:	Jimmy Kemmer, Chairman Wendell Oakes, Secretary-Treasurer Jim Sebastian
Consulting Engineer:	Robert Stigall, SEC
Maintenance/Service Person:	Bill Aytes
Source of Water:	Otter Creek Impoundment
Current Treatment Capacity:	2 million gallons per day
Current Water Storage Capacity:	1,500,000 gallons
Current Daily Water Usage:	950,000 gallons
Current Number of Customers:	4,800
Current Charge for Water Usage:	$10.30 for first 2,000 gallons, then $4.35 per 1,000 gallons
Current Tap Fee:	$650

City of Crossville Water System

Address:	104 Henry Street Crossville, TN 38555
Office Location:	Same
Phone:	(931) 484 - 5113
Manager/Contact Person:	Ken Knott
Board of Directors:	City of Crossville
Consulting Engineer:	Varies
Maintenance/Service Person:	Les Sherrill
Source of Water:	Meadow Park Lake and Lake Holiday
Current Water Treatment Capacity:	1 million gallons per day at Meadow Park Lake 3 million gallons per day at Lake Holiday
Current Water Storage Capacity:	4,083,000 gallons
Current Daily Water Usage:	2,500,000 gallons
Current Number of Customers:	5,985 (2,270 outside city)
Current Charge for Water Usage:	Inside City: $3.90 per 1,000 gallons Outside City: $4.50 per 1,000 gallons
Current Tap Fee:	Inside City: $350 Res., $600 Com. Outside City: $450 Res., $1,000 Com.

Grandview Water Utility District

Address:	General Delivery Grandview, TN 37337
Office Location:	None
Phone:	(931) 456 - 0706
Manager/Contact Person:	Richard Durham
Board of Directors:	Carlos Wyatt, President Troy Pilgrim, Vice-President Howard Lamon, Secretary
Consulting Engineer:	J. B. Spaulding
Maintenance/Service Person:	Richard Durham
Source of Water:	City of Crossville
Current Water Storage Capacity:	270,000 gallons
Current Daily Water Usage:	60,000 gallons
Current Number of Customers:	440 (140 in Cumberland County)
Current Charge for Water Usage:	$3.45 per 1,000 gallons
Current Tap Fee:	$500.00

South Cumberland Water Utility District

Address:	P.O. Box 2630 Crossville, TN 38557
Office Location:	Dunbar Road (Tansi)
Phone:	(931) 788 - 2612
Manager/Contact Person:	Kim Brown
Board of Directors:	Randy Tinch, President James Blackwood, Secretary Robert Martin, Treasurer
Consulting Engineer:	J. B. Spaulding
Maintenance/Service Person:	Jack Davis
Source of Water:	City of Crossville
Current Water Storage Capacity:	1,020,000 gallons
Current Daily Water Usage:	450,000 gallons
Current Number of Customers:	2,600
Current Charge for Water Usage:	$10.45 for first 1,000 gallons, then $4.50 per 1,000 gallons
Current Tap Fee:	$600.00 plus $50.00 meter fee

West Cumberland Water Utility District

Address:	P.O. Box 94 Pleasant Hill, TN 38578
Office Location:	Main Street (Pleasant Hill)
Phone:	(931) 277 - 5376
Manager/Contact Person:	Melissa White, Office Manager
Board of Directors:	Laura Williams, Chairman Steven Blalock, Vice-Chairman Robert Austin, Secretary
Consulting Engineer:	Ronnie Reece, PES, Inc.
Maintenance/Service Person:	Ronnie Campbell, Field Manager
Source of Water:	City of Crossville Bon de Croft Utility District
Current Water Storage Capacity:	250,000 gallons
Current Daily Water Usage:	180,000 gallons
Current Number of Customers:	1,320
Current Charge for Water Usage:	$5.00 per meter plus $5.50 per 1,000 gallons
Current Tap Fee:	$600.00

WATER SUPPLY

A water supply is dependent on a raw water source (such as a river, lake, or stream impoundment) and a water treatment or purification facility. Water is supplied to the residents of Cumberland County from four different sources. The City of Crossville operates two water treatment facilities that supply water to the City of Crossville and its water service area. In addition, the Crossville Water System is the sole supplier of water for the Catoosa, Grandview, and South Cumberland Utility Districts, and it is a partial supplier of water for the West Cumberland Utility District. The Bon de Croft Utility District, which is located in White County, also supplies water to the West Cumberland Utility District. Water is supplied to the Crab Orchard Utility District from the district's own water treatment facility.

The water treatment facilities operated by the Crossville Water System are located at Lake Holiday and at Meadow Park Lake. Lake Holiday covers 269 acres, has an average depth of 15 feet, and has a capacity of over 1 billion gallons. The Lake Holiday Water Treatment Plant has a daily treatment design capacity of approximately 3 million gallons and produces an average of 1,500,000 gallons per day. Meadow Park Lake covers 310 acres, has an average depth of 10 feet, and has a capacity of almost 1 billion gallons. The Meadow Park Lake Water Treatment Plant has a daily treatment capacity of approximately 1 million gallons. The City of Crossville currently has plans to replace the water treatment plant at Meadow Park Lake with a facility that will have a daily treatment capacity of between 3 million to 5 million gallons.

The Crab Orchard Utility District's water treatment facility was opened in July of 1995. The facility has a daily treatment capacity of 2 million gallons. It is located on Stone Lake which is an impoundment of Otter Creek. Stone Lake covers an area of approximately 125 acres and has a water shed of approximately 1,750 acres. It is estimated that under normal circumstances 4,980,000 gallons of raw water could be drawn daily from this impoundment and that under the driest conditions 2,840,000 gallons could be drawn.

The Bon de Croft Utility District's water treatment facility is located at Billy's Branch Lake in southeastern White County. This facility has a daily treatment capacity of 648,000 gallons. The utility district has an average daily water usage of approximately 380,000 gallons of which an estimated 120,000 gallons is purchased by the West Cumberland Utility District. This accounts for approximately two-thirds of West Cumberland's daily water requirement. The Bon de Croft Utility District, according to district officials, could possibly provide West Cumberland with a limited additional amount of water, a maximum of 50,000 gallons per day, if necessary.

WATER DISTRIBUTION SYSTEMS

A water distribution system consists of storage facilities, pumps, water mains, appurtenances (control values, safety valves, fire hydrants and blow-offs) and meters. Water is distributed to the residents of Cumberland County through one of the seven water systems serving the county. These water distribution systems have a primary objective of providing safe potable water for their customers. The provision of fire protection is a secondary objective. As each of the individual water systems is responsible for the distribution of public water within their service areas, separate summaries of each are presented in the following:

Bon de Croft Utility District

The Bon de Croft Utility District serves a very small portion of western Cumberland County in the vicinity of the Todd Town Community. The vast majority of this district's service area is located in White County. This utility district was established in 1974. It operates its own water treatment facility which is located at Billy's Branch Lake in White County. This facility has a daily treatment design capacity of 648,000 gallons.

The district serves a total of approximately 960 customers, of which only an estimated 16 are located within Cumberland County. It has a current average daily water usage of 380,000 gallons. Approximately 30 percent, or an estimated 120,000 gallons, of this daily water usage is supplied to the West Cumberland Utility District. This district has a total water storage capacity of 200,000 gallons.

There are approximately 1.4 miles of water lines maintained by this district in Cumberland County. This includes approximately .3 miles of 4 inch lines, and 1.1 miles of 2 inch lines. There are no fire hydrants located within this utility district's service area in Cumberland County and the future installation of hydrants will be restricted since all water lines are under 6 inches in size.

Catoosa Water Utility District

The Catoosa Water Utility District generally serves that portion of northwestern Cumberland County located north from about one mile south of U.S. Highway 70N, northwest of the City of Crossville and west of Fox Creek and the Catoosa Wildlife Management Area. A portion of this district's service area is located within the northern corporate limits of the City of Crossville. The utility district was established in 1977. Water is supplied to the Catoosa Utility District by the City of Crossville at three points from master meters located off U.S. Highway 127 just north of Interstate 40, off U.S. Highway 70N near the Crossville corporate limits, and off Genesis Road just north of Interstate 40.

The district has approximately 2,408 customers and has a current average daily water usage of 450,000 gallons. The bulk of the customers served by this district are located along U.S. Highways 70N and 127 and along Genesis Road. Areas with concentrated population served by this district include the Mayland, Baker Crossroads, Creston, Tabor, Isoline, Elmore, and Rinnie Communities.

The water storage capacity of this district is 500,000 gallons. This storage capacity is accomplished by a 300,000 gallon ground storage tank located off Drowning Creek Road and a 200,000 gallon elevated storage tank located off U.S. Highway 127 just south of Wilson Road. Both of these storage facilities have an overflow elevation of 2,088 feet.

The district maintains approximately 145.4 miles of water lines. This includes approximately 3 miles of 8 inch lines, 40.9 miles of 6 inch lines, 73.5 miles of 4 inch lines, and 28 miles of 2 inch lines.

There are a limited number of fire hydrants located within the Catoosa Utility District's service area. The utility district has an adopted policy for the location and use of hydrants. It requires that all hydrants be used only for refilling the tanks of fire fighting equipment. With an estimated 70 percent of the water lines in this utility district's service area being less than 6 inches in size, the future installation of fire hydrants will be restricted.

Crab Orchard Water Utility District

The Crab Orchard Water Utility District generally serves that portion of eastern Cumberland County located east of Fox Creek, east of the Crossville City Limits, north from about two miles south of U.S. Highway 70, and south of the Catoosa Wildlife Management Area. This utility district was established in 1967. It operates its own water treatment facility which is located at a lake impoundment of Otter Creek near the Fairfield Glade Community. This facility has a daily treatment design capacity of 2 million gallons.

The district serves approximately 4,800 customers and has a current average daily water usage of 950,000 gallons. The Fairfield Glade Community, comprising approximately 48 percent of this district's total customers, is the largest area of concentrated population located within this district. Other areas of concentrated population served by this district are the Town of Crab Orchard and the Ozone and Westel Communities. Four master meters are maintained by the utility district in the Fairfield Glade Community to serve townhouse/condominium and mobile home park developments. Master meters are also maintained at the Cumberland Gardens Development and at Treasure Resort.

The total water storage capacity of this district is 1,500,000 gallons. This storage capacity is accomplished by two 400,000 gallon ground storage tanks (both with

overflow elevations of 2,163 feet) located off Druid Circle in the Fairfield Glade Community, by a 200,000 gallon ground storage tank (with an overflow elevation of 1,735 feet) located off U.S. Highway 70 in the Ozone Community, and by 350,000 and 150,000 gallon ground storage tanks (both with overflow elevations of 1,885 feet) located in the Town of Crab Orchard. In addition the utility district has three 40,000 gallon ground storage tanks located off Old Rockwood Road in the City of Crossville that are currently not used. Also a 50,000 gallon elevated storage tank owned by the Cumberland Gardens Development is located in this district.

The district maintains approximately 191.6 miles of water lines. This includes approximately 1.1 miles of 10 inch lines, 16.8 miles of 8 inch lines, 98.7 miles of 6 inch lines, 50.6 miles of 4 inch lines, 1.3 miles of 3 inch lines, and 23.1 miles of 2 inch lines. Approximately 79.9 miles, or over 40 percent, of the water lines maintained by this district are located within the Fairfield Glade Community. This includes all of the 10 inch lines, 8 miles of the 8 inch lines, 52.3 miles of the 6 inch lines, 8.3 miles of the 4 inch lines, all of the 3 inch lines, and 8.9 miles of the 2 inch lines.

There are numerous fire hydrants located within the utility district's service area. However, the vast majority of these hydrants are located in the Fairfield Glade Community. The utility district requires that all hydrants be located on lines of at least 6 inches in size and that they be used only for refilling the tanks of fire fighting equipment. The future installation of fire hydrants in this utility district outside the Fairfield Glade Community will be restricted because a significant percentage of the existing water lines are under 6 inches in size.

City of Crossville Water System

The City of Crossville Water System generally serves the City of Crossville and that portion of central Cumberland County located south from the current corporate limits at Interstate 40, south from One Mile Creek, south from one mile south of U.S. Highway 70N, west from slightly east of the current eastern corporate limits, east of POW Camp Road, east from the current western corporate limits, east from the intersection of Dykes and Howard Springs Roads, and north of Taylor Chapel, Lantana, Pigeon Ridge, and Sawmill Roads.

The Crossville Water System not only serves the City of Crossville and a substantial area outside the city but also provides all the water for the Catoosa, Grandview, and South Cumberland Utility Districts and a portion of the water for the West Cumberland Utility District. It operates two water treatment facilities with a combined daily capacity of 4 million gallons. As mentioned previously, Crossville plans to replace the 1 million gallon daily capacity facility located at Meadow Park Lake with a 3 to 5 million gallon daily capacity facility. This increase would provide the water system with a total daily treatment capacity of 6 to 8 million gallons.

The water system currently serves approximately 5,985 customers of which 2,270 are located outside the corporate limits. The largest concentration of customers served by this system outside the City of Crossville are located in the Homestead Community and within the numerous residential subdivisions along Spruce Loop and Lantana Road. This water system has a current average daily water usage of 2,500,000 gallons. Of this daily usage, 1,050,000 gallons, or approximately 42 percent, is purchased by the Catoosa, Grandview, South Cumberland and West Cumberland Utility Districts. Until the Crab Orchard Utility District's water treatment facility began operation in 1995, the Crossville Water System also supplied water to this utility district. The opening of this treatment facility reduced the demand on the Crossville Water System by approximately 1 million gallons per day. However, according to city officials, this reduction has already been consumed.

There are eight water storage facilities currently located within the Crossville Water System. This includes a 360,000 gallon (with an overflow elevation of 1,986.91 feet) and two 500,000 gallon (both with overflow elevations of 2,060 feet) ground storage tanks located off Lantana Road at the Crossville corporate limits, a 1 million gallon elevated storage tank (with an overflow elevation of 1,987.27 feet) located off Genesis Road near the Kentucky Fried Chicken restaurant, a 323,000 gallon ground storage tank (with an overflow elevation of 1,985.39 feet) located near the intersection of South Main and East Adams Streets, a 1 million gallon elevated storage tank (with an overflow elevation of 1,991.49 feet) located off Old Rockwood Road, a 400,000 gallon elevated storage tank (with an overflow elevation of 1,888.82 feet) located in the Crossville-Cumberland County Industrial Park, and a 500,000 gallon elevated storage tank (with an overflow elevation of 1,954.86 feet) located at the Carter Ink Building. The total water storage capacity of these eight tanks is 4,083,000 gallons, however, due to their elevations, the storage facilities located at the Carter Ink Building and the Industrial Park are not available for service. Therefore, the Crossville Water System is essentially operating with a useable storage capacity of 3,183,000 gallons.

There are approximately 74.1 miles of water lines maintained by the water system outside the Crossville corporate limits. This includes approximately 3 miles of 10 inch lines, 8 miles of 8 inch lines, 49.9 miles of 6 inch lines, 2.7 miles of 4 inch lines, .5 miles of 3 inch lines, and 10 miles of 2 inch lines.

The Crossville Water System maintains numerous fire hydrants in that portion of its service area located outside the City of Crossville. The water system has specific regulations for the location, installation and use of fire hydrants. With only approximately 17 percent of the water lines maintained by the water system outside the City of Crossville being less than 6 inches in size, the future installation of hydrants should not be a significant problem.

Grandview Water Utility District

The Grandview Water Utility District generally serves that portion of southeastern Cumberland County located on a corridor along State Highway 68 south of Cox Valley Road, east of Hinch Mountain, and south from about two miles south of U.S. Highway 70. This district also serves portions of Rhea and Bledsoe Counties. It was established in 1985. Water is supplied to the Grandview Utility District by the City of Crossville from a master meter located off State Highway 68 less than one-half mile northwest of Old Grassy Cove Road.

The district serves a total of approximately 440 customers, of which an estimated 140 are located within Cumberland County, and has a current average daily water usage of 60,000 gallons. The Grassy Cove, Alloway and Jewett Communities are served by this district. There are no large land developments or individual land uses requiring significant amounts of water located within the Cumberland County portion of this district's service area.

The total water storage capacity of this district is 270,000 gallons, which is accomplished by a 20,000 gallon ground storage tank located off Happy Top Road northwest of Sabo Road and a 250,000 gallon ground storage tank located off State Highway 68 just south of Highland Road.

There are approximately 18.3 miles of water lines maintained by this district in Cumberland County. This includes approximately 12.1 miles of 6 inch lines, 5.3 miles of 4 inch lines, and .9 miles of 2 inch or less lines.

Currently there are no fire hydrants located within this utility district's service area and the district does not have a policy regarding hydrants. However, with more than 65 percent of the utility district's water lines being 6 inches in size, a number of fire hydrants could be installed if adequate pressure is available.

South Cumberland Water Utility District

The South Cumberland Water Utility District generally serves that portion of southwestern Cumberland County located south from about one mile south of Clifty, Lowe and Taylor Chapel Roads, south of the Cumberland Mountain State Park and west of Daddy's Creek and Hinch Mountain. The utility district was established in 1972. Water is supplied to the South Cumberland Utility District by the City of Crossville primarily from a master meter located off Lantana Road at the Crossville City Limits. It also purchases water from the Crossville Water System at a master meter located at the intersection of Pigeon Ridge and South Old Mail Roads.

The district has approximately 2,600 customers and has a current average daily water usage of 450,000 gallons. The Tansi Community is by far the largest water customer for this district. Other areas of concentrated population served by this district are the Lantana, Linary, Vandever, Big Lick, and New Era Communities.

The water storage capacity of this district is 1,020,000 gallons. This is accomplished by a 320,000 gallon ground storage tank and two 300,000 gallon ground storage tanks located off Lantana Fire Tower Road and a 100,000 gallon elevated storage tank located off Vandever and Emerson Stone Roads. The ground storage tanks have an overflow elevation of 2,086 feet and the elevated storage tank has an overflow elevation of 2,150 feet.

The district maintains approximately 220.6 miles of water service lines. This includes approximately 10.4 miles of 8 inch lines, 53.3 miles of 6 inch lines, 106.7 miles of 4 inch lines, and 50.2 miles of 2 inch lines. Almost half, approximately 103.5 miles, of the water lines maintained by this district are located within the Tansi Community. This includes 5.9 miles of 8 inch lines, 23.4 miles of 6 inch lines, 41.4 miles of 4 inch lines, and 32.8 miles of 2 inch lines.

There are a limited number of fire hydrants located within the South Cumberland Utility District's service area with the majority being located in the Tansi Community. All fire hydrants must be installed in compliance with the utility district's fire hydrant policy. It requires that all hydrants be located on lines of at least 6 inches in size and that all hydrants be used for refilling fire equipment tanks only. The future installation of fire hydrants within this utility district's service area will be restricted by the high percentage, approximately 71 percent, of water lines less than 6 inches in size.

West Cumberland Water Utility District

The West Cumberland Water Utility District generally serves that portion of western Cumberland County located south from about one mile south of U.S. Highway 70N, west of the City of Crossville, and north from about one mile south of Clifty, Lowe, and Taylor Chapel Roads. This utility district was established in 1965. Water is purchased by the West Cumberland Utility District from both the Crossville Water System and the Bon de Croft Utility District. The Crossville Water System supplies West Cumberland with approximately 60,000 gallons of water per day, or an estimated one-third of the district's daily usage. It is purchased from a master meter located off U.S. Highway 70 at the Crossville City Limits. The Bon de Croft Utility District supplies West Cumberland with approximately 120,000 gallons of water per day, or an estimated two-thirds of the district's daily usage. It is purchased from master meters located off U.S. Highway 70 at the Cumberland County/White County Line and off Clifty Road. The cost of purchasing water from the Bon de Croft Utility District is currently $1.65 per 1,000 gallons.

The district has approximately 1,320 customers and has a current average daily water usage of 180,000 gallons. The City of Pleasant Hill is the largest concentrated developed area served by this district. Other areas of concentrated population served by this district are the Pomona, Claysville, Browntown, and Taylor Chapel Communities.

The water storage capacity of this district is 250,000 gallons. This storage capacity is accomplished by a 150,000 gallon elevated storage tank (with an overflow elevation of 2,090 feet) located in the Town of Pleasant Hill and by a 100,000 gallon ground storage tank (with an overflow elevation of 2,105 feet) located off Cow Pen Road.

There are an estimated 88.5 miles of water service lines maintained by this utility district. This includes approximately .15 miles of 8 inch lines, 33.4 miles of 6 inch lines, 45.3 miles of 4 inch lines, and 9.6 miles of 2 inch lines.

There are less than 25 fire hydrants located within the West Cumberland Utility District's service area and the majority of these are located within the city limits of Pleasant Hill. All fire hydrants must be installed in compliance with the utility district's fire hydrant policy. The future installation of fire hydrants in this utility district's service area will be restricted by the high percentage, approximately 62 percent, of water lines less than 6 inches in size.

IMPROVEMENTS PROGRAM

An improvements program involves the preparation and continual updating of a proposed schedule of projects to be completed within a specified planning period. The program should be scheduled over a number of years to prevent a water service provider from being financially overextended during any one fiscal year. It is essential that improvement projects be properly timed. The culmination of some projects is, in many cases, contingent upon the completion of other projects, which out of necessity must precede them. For example, an adequate supply of water must be available before an extension of service can be provided. Priorities must be established so that implementation may take place in logical sequence.

To establish priorities, recommendations for water supply and distribution improvements were first obtained from officials from each of the water systems. Additional improvements were identified by the Planning Commission within each water system's service area. The recommended and identified improvements were then prioritized by the Planning Commission as to their relative need.

Illustration 2 in Appendix B depicts the proposed system improvement projects for the provision of water to the rural areas of Cumberland County. It delineates the locations of proposed treatment facilities, water line extensions, water line upgrades, and storage facilities. The projects identified on Illustration 2 are recommended for completion by the year 2010.

In the subsequent sections, general recommendations for improving water service in Cumberland County are first presented. These recommendations are followed by an examination of the county's water supply and distribution needs and the submission of prioritized projects to improve the provision of public water in the unincorporated areas of the county.

General Recommendations for Water Improvements

- It is recommended that all water system improvement projects conform to the standards of the Tennessee Public Works Construction Standards. All water mains must be sized to meet peak demand plus anticipated fire flow and future demand while maintaining a minimum of 20 pounds per square inch residual pressure at all points in the system. A minimum fire flow of 500 gallons per minute and 20 pounds per square inch residual pressure must be available in all distribution systems containing fire hydrants.

- It is recommended that all water system improvement projects be designed so as to conform to the Rules of the Tennessee Department of Environment and Conservation - Division of Water Quality Supply, Chapter 1200-5-7, Minimum Design Criteria for Public Water Systems.

- It is recommended that any water system improvements required for new subdivision developments be designed so as to conform with the applicable provisions of the Cumberland County or Crossville Regional Subdivision Regulations.

- It is recommended that any water system improvements be coordinated with other planned infrastructure improvements in order to provide financial savings. For example, new road construction or road resurfacing should be timed to occur after any water line extension or upgrade to avoid the unnecessary costs of boring under roads or repairing damages from cutting roads.

- It is recommended that a consolidation of one or more of the water utility districts be considered to provide financial savings and a standardization of service.

Proposed Water Supply Improvements

The current total daily water treatment capacity in Cumberland County is 6 million gallons (excluding the estimated 120,000 gallons purchased by the West Cumberland Utility District from Bon de Croft Utility District) of which 3,450,000 gallons is currently consumed. Assuming that the county's growth will continue at approximately 1,000 persons per year, that the average household size will remain at 2.55 persons, and that a household represents a water customer, then the water systems in Cumberland County will have to serve an additional estimated 400 customers a year. Assuming an average consumption of 350 gallons per customer, this would represent an annual increase in demand of 140,000 gallons per day. Based on the these assumptions, the needed daily water supply in Cumberland County in the year 2000 would be approximately 3,870,000 gallons and an estimated 5,270,000 gallons would be necessary in the year 2010. These estimates do not take into account the possible location of industries requiring large amounts of water. One industry, such as a pre-wash facility, could easily require the use of 1 million gallons per day.

The water sources for the Crossville Water System, Lake Holiday and Meadow Park Lake, should be able to adequately supply the system's raw water needs through the year 2010. However, the water system's current total daily treatment capacity of 4 million gallons will not be sufficient to meet the anticipated demand. Therefore, completing the water system's planned construction of a 3 to 5 million gallon capacity treatment facility at Meadow Park Lake is necessary. The completion of this facility will provide the Crossville Water System with a total daily treatment capacity of 6 to 8 million gallons. A treatment capacity of 8 million gallons would adequately supply the Crossville Water System and the utility district's which purchase water from Crossville through the year 2010.

As noted previously, the Bon de Croft Utility District supplies approximately 120,000 gallons of water per day to the West Cumberland Utility District, which is approximately 20 percent of its daily treatment capacity. According to district officials, the water system could provide West Cumberland with an additional daily amount of up to 50,000 gallons. This additional supply, however, should be considered a low priority since it is anticipated that Bon de Croft's first goal would be to serve the bulk of its customers which are located in White County.

The Crab Orchard Utility District's daily treatment capacity of 2 million gallons is expected to be approaching full consumption by the year 2010. Furthermore, the utility district's water source, Stone Lake, will be nearing capacity during dry weather conditions by the year 2010. Therefore, expanding the utility district's treatment capacity and increasing the current or developing an additional water source may be necessary towards the end of the planning period. An alternative to increasing the current or developing an additional water source would be to consider purchasing limited amounts of water from the Crossville Water System.

There is a concern among the utility districts that depend on the City of Crossville for the provision of water regarding the current and future costs of purchasing water. In August of 1997, Crossville raised its wholesale water rate from $1.38 to $2.16 per 1,000 gallons, or by over 55 percent. This increase has advanced the desire of those utility districts that purchase water from Crossville for constructing their own water treatment facilities. In an effort to eliminate their dependency on the Crossville Water System, at least two utility districts are already pursuing the development of their own water supplies and treatment facilities. The South Cumberland Utility District is pursuing the construction of a treatment facility on Lake Tansi and the Catoosa Utility District is considering the development of both a water reservoir and a treatment facility. However, because of environmental factors, the development of these treatment facilities may be difficult.

Currently there are efforts underway by county and utility district officials to obtain permission from the appropriate authorities for the location and development of a large capacity water source to serve the long range water supply needs of Cumberland County. These officials are considering a number of alternatives for this water source, including developing one large capacity water reservoir, creating several smaller capacity water reservoirs, utilizing a ground aquifer, or constructing a large pipe line to a water reservoir in another county. As proposed this water source would be used to supply water to a consortium of the water systems in Cumberland County and possibly to systems in neighboring counties. This consortium would be developed as a water commission or water authority consisting of representatives from the participating water systems. The process to obtain the necessary permits and to develop the water source could take several years, however, the development of a water supply for the long range needs of Cumberland County (extending beyond the year 2010) is important.

Priorities for Future Water Supply

The scheduling and completion of the priorities for improving the future water supply in Cumberland County is dependent on several factors. As noted previously, the proposed construction by the Crossville Water System of a 5 million gallon daily capacity treatment facility, combined with the other existing water supplies, should provide an adequate supply of water for the county through the year 2010. The completion of this facility would make the construction of an additional treatment facility by another utility district unnecessary if an acceptable rate schedule can be agreed upon. However, should this facility not be completed, other priorities would be become more important and additonal priorities may have to be developed. The priorities for improving the future water supply in Cumberland County are as follows:

Priority 1: Complete proposed construction of a 5 million gallon daily capacity Crossville Water System Treatment Facility at Meadow Park Lake.

Priority 2: Develop a long term agreement between the Crossville Water System and the Catoosa, Grandview, South Cumberland, and West Cumberland Utility Districts for the purchase of water at a rate acceptable to all parties.

Priority 3: Construct lagoon and upgrade pumping capacity at Crab Orchard Water Treatment Facility.

Priority 4: Increase water supply provided by the Bon de Croft Utility District to the West Cumberland Utility District.

Priority 5: Develop separate or joint water supplies and treatment facilities in the Catoosa and/or South Cumberland Utility Districts.

Priority 6: Expand treatment capacity and increase or develop additional water source for Crab Orchard Utility District.

Priority 7: Obtain permits, locate and develop a new, large capacity, water source to supply the long range needs (beyond the year 2010) of a consortium of water systems.

Proposed Water Distribution Improvements

The water systems serving the unincorporated areas of Cumberland County distribute water along an estimated total of 740 miles of water lines to a total of approximately 13,550 customers. As water lines are in most cases extended

along county roads and as there are an estimated 900 miles of county roads, then approximately 80 percent of the unincorporated land area of Cumberland County has access to public water. Furthermore, assuming that 12,000 of the total customers are residential and by multiplying the total residential customers by the average household size of 2.55, then approximately 30,000 of the unincorporated county residents have access to public water.

Although from the above estimates it would appear that the unincorporated areas are well covered, there still are significant portions of the county that do not have access to public water. However, many of these areas are sparsely populated, making it cost prohibitive to extend water service. Some of these unserved areas have potential for development if water was available. A summary of the proposed water distribution improvements within each of the water service areas in Cumberland County is presented in the following:

Bon de Croft Utility District

The Bon de Croft Utility District serves a only small portion of Cumberland County in the Todd Town Community. Currently this district has no system improvement projects planned within Cumberland County. The only unserved areas of Cumberland County where this utility district could potentially extend service are the Clifty, Erasmus, and Flat Rock Communities, however, these areas are sparsely populated. Furthermore, these communities are located within the South Cumberland Utility District's service area and an agreement would have to be reached before they could be served by the Bon de Croft Utility District.

Catoosa Utility District

Approximately 70 percent of the service area of the Catoosa Water Utility District is currently provided water. The most significant unserved areas within this district are the Cumberland Cove and Cumberland Lakes Subdivisions located on the western edge of the county. There are several hundred undeveloped lots located within these developments. Other unserved areas are located along Dripping Springs, Junior Camp, Jim Garrett, and Ryan Roads.

The Catoosa Utility District estimates that it will have a daily water demand of 560,000 gallons in the year 2000 and of 810,000 gallons in the year 2010. System improvement projects planned in this district within the next year or two include line extensions in the Mayland and Cumberland Cove Communities along Junior Camp Road and U.S. Highway 70N, an extension on Ryans Loop, and extensions in the Foxwood and Windridge Park Estates Subdivisions located off Plateau and Rector Roads. Also the utility district has plans for the construction of a 200,000 gallon elevated storage tank to be located off Genesis Road.

Crab Orchard Utility District

Approximately 75 percent of the service area of the Crab Orchard Water Utility District is currently provided water. The most significant unserved areas in this district are located along Hebbertsburg, Hedgecoth, Millstone Mountain and Smith Mountain Roads and the eastern portion of Peavine Road. Also, the Interstate 40 interchange located at State Highway 299 on the Cumberland County/Roane County Line and the Rockwood Municipal Airport are currently unserved.

The Crab Orchard Utility District estimates that it will have a daily water demand of 1,200,000 gallons by the year 2000 and of 2 million by the year 2010. System improvement projects planned in this district within the next year include an extension of a 4 inch water line on Ozone Access Road and replacing existing lines on Dayton Spur Road. Other longer range improvements proposed in this district are the construction of an additional 400,000 gallon water storage tank in the Fairfield Glade Community, the replacement of an existing 4 inch line on Firetower Road with a line of either 6 or 8 inches in size, and the installation of a water line along Hebbertsburg Road looping and connecting with an existing line on Peavine Road. Also the construction of a lagoon and the upgrading of the pumping capacity at the water treatment facility are proposed.

City of Crossville

Approximately 95 percent of the service area of the Crossville Water System is currently provided water. The are no significant unserved areas within this water system's service area.

The Crossville Water System estimates that it will have a daily water demand of 3,400,000 gallons in the year 2000 and of 5 million gallons in the year 2010. System improvement projects planned by this water system within the immediate future include the construction of the proposed treatment facility at Meadow Park Lake, the construction of 500,000 to 1 million gallon storage tanks in the Homestead and Taylor's Chapel areas, the replacement and upgrading of numerous substandard lines (those of between 1 and 4 inches in size), and the upgrading of lines located on U.S. Highway 127, and on Genesis and Hamby Roads.

Grandview Utility District

Approximately 80 percent of the Cumberland County portion of the Grandview Water Utility District's service area is currently provided water. The most significant unserved areas of Cumberland County in this district are located along Kemmer and Dogwood Roads. Both of these areas are relatively sparsely populated.

The Grandview Utility District estimates that it will have a daily water demand of 80,000 gallons in the year 2000 and of 100,000 gallons in the year 2010. Currently the district has no system improvement projects planned within Cumberland County.

South Cumberland Utility District

Approximately 80 percent of the service area of the South Cumberland Water Utility District is currently provided water. The Breckenridge and Retreat Subdivisions are the most densely populated unserved areas located in this district. Residents of the Retreat Subdivision, which has a private water distribution system supplied by wells, have previously approached the utility district about supplying water. Other unserved areas are portions of the Flatrock, Thomas Springs, Newton, and Burke Communities, however, these areas are sparsely populated. Also currently unserved are relatively undeveloped areas along Old Highway 28 and Hinch Mountain Road.

The South Cumberland Utility District estimates that it will have a daily water demand of 600,000 gallons in the year 2000 and of 1,000,000 gallons in the year 2010. System improvement projects planned in this district within the immediate future include the construction of an elevated storage tank off U.S. Highway 127 between Turner and Gordon Roads and the installation of a pump station off Lantana Road near Hutoha Drive. The storage tank is necessary to alleviate pressure problems in the Linary Community and should have a minimum capacity of 100,000 gallons.

West Cumberland Utility District

Approximately 75 percent of the service area of the West Cumberland Water Utility District is currently provided water. The most significant unserved areas in this district are located along Browntown, Clifty, Flatrock and Red Roads.

The West Cumberland Utility District estimates that it will have a daily water demand of 200,340 gallons in the year 2000 and of 273,600 gallons in the year 2010. System improvement projects planned in this district within the next year include the construction of a 500,000 gallon elevated storage tank located off U.S. Highway 70S in the Pomona Community. Other planned improvements are the installation of a 10 inch supply line from the Crossville master meter to the proposed elevated storage tank, a 4,600 foot extension of a 6 inch water line along Taylor Chapel Road, a 20,000 foot extension along Glade Creek Road, and a 1,000 foot extension in the Frasier-Browntown Road area.

Priorities for Future Water Distribution

The priorities for improvements in the future distribution of water in Cumberland County presented in this section were either recommended by the water service providers or identified by the Planning Commission. The future water distribution improvement projects were prioritized by the Planning Commission based on the following time schedule:

First Priority	Within 1 year
Second Priority	Within 1 to 3 years
Third Priority	Within 3 to 5 years
Fourth Priority	Within 5 to 10 years

In general, those projects identified by the water service providers were given a higher priority. The projects identified by the Planning Commission were prioritized primarily on the total number and number per mile of customers that could potentially be served. No attempt was made to further prioritize each individual project within each of the four priority schedules. Determining the order in which the projects within a particular priority schedule should be completed is dependent on numerous factors such as the cost for a particular project, the availability of local funds and the eligibility of a specific project for grant monies. The priority schedule for improvements to the distribution of rural water in Cumberland County is presented on the following pages.

FIRST PRIORITY

PROJECT DESCRIPTION	DISTRICT	LOCATION	LENGTH / SIZE	POTENTIAL CUSTOMERS TOTAL	POTENTIAL CUSTOMERS PER MILE
Line extension	Catoosa	Junior Camp Road & U.S. Highway 70N	3.7 miles	50	13.5
Storage facility construction	Catoosa	Genesis Road	200,000 gallons		
Line upgrade	Crab Orchard	Peavine Fire Tower Road	3.8 miles	51	13.4
Line extension	Crab Orchard	Ozone Access Road	1 mile	7	7
Line extension	Catoosa	Ryans Loop	3 miles	27	9
Storage facility construction	South Cumberland	Linary Community	100,000 gallons		
Storage facility construction	West Cumberland	Pomona Community	500,000 gallons		
Line extension / loop	West Cumberland	Taylor Chapel Road	.87 miles	4	3.5
Line extension / loop	West Cumberland	Glade Creek Road	3.8 miles	7	1.8
Line extension / loop	West Cumberland	Browntown Road	.19 miles	0	0
Line extension	Grandview	Kemmer Road	2.9 miles	21	7.2

SECOND PRIORITY

PROJECT DESCRIPTION	DISTRICT	LOCATION	LENGTH / SIZE	POTENTIAL CUSTOMERS TOTAL	PER MILE
Storage facility construction	Crab Orchard	Fairfield Glade	400,000 gallons		
Storage facility construction	Crossville	Homestead Community	500,000 gallons		
Storage facility construction	Crossville	Taylor Chapel Road	500,000 gallons		
Line upgrade	Crossville	U. S. Highway 127			
Line extension	South Cumberland	Breckenridge Subdivision	6.1 miles	76	12.5
Line extension	Crab Orchard	Turkey Oak Road/ Chestnut Lane & Court area	1.6 miles	40	25
Line extension	Catoosa	Legion Road & Legion Loop	.81 miles	22	27.2
Line extension	Crab Orchard	Sportsman Club Road	.83 miles	20	24.1

THIRD PRIORITY

PROJECT DESCRIPTION	DISTRICT	LOCATION	LENGTH / SIZE	POTENTIAL CUSTOMERS TOTAL	POTENTIAL CUSTOMERS PER MILE
Line extension	Catoosa	Foxwood and Windridge Park Estates Subdivisions	3.9 miles	40	10.3
Line extension	Catoosa	Rector Road	1 mile	11	11
Line extension	West Cumberland	Taylor Hollow Road	.6 miles	10	16.7
Line extension	West Cumberland	Yellow Cliff Creek Road	.56 miles	11	19.6
Line extension	Catoosa	Keyes Road	.7 miles	10	14.3
Line extension	Catoosa	Wallop Lane & Wallop Drive	1.1 miles	20	18.2
Line extension	Crab Orchard	Fire Tower Lane	.25 miles	6	24
Line extension	Catoosa	Linder Road	.2 miles	7	35
Line extension	Catoosa	Linder Loop	.26 miles	6	23
Line extension	Catoosa	Custer Road	.27 miles	5	18.5
Line extension	Catoosa	Raines Road	.21 miles	6	28.6
Line extension	South Cumberland	Retreat Subdivision	2.7 miles	82	30.4
Line extension	Catoosa	Hubert Conley Road	.65 miles	11	16.9
Line extension	South Cumberland	Southwood Drive	.56 miles	12	21.4
Line extension	Catoosa	Bowman Road	.95 miles	15	15.8
Line extension	Crab Orchard	Kerrigan Road	.56 miles	13	23.2
Line extension / loop	Crab Orchard	Hebbertsburg and Peavine Roads loop	9.9 miles	15	1.5

FOURTH PRIORITY

PROJECT DESCRIPTION	DISTRICT	LOCATION	LENGTH / SIZE	POTENTIAL CUSTOMERS TOTAL	POTENTIAL CUSTOMERS PER MILE
Line extension	Grandview	Alloway Creek Road	.25 miles	5	20
Line extension	South Cumberland	Hale Road	.47 miles	6	12.8
Line extension	South Cumberland	Martin Burgess Road	.49 miles	10	20.4
Line extension	South Cumberland	Pete Dixon Road	.41 miles	7	17.1
Line extension	South Cumberland	Pine Ridge Road	.33 miles	5	15.2
Line extension	South Cumberland	Steve Tabor Road	.28 miles	9	32.1
Line extension	South Cumberland	Ike Burgess Road	.32 miles	9	28.1
Line extension	South Cumberland	Samson Road	.26 miles	7	26.9
Line extension	Catoosa	Little Shoe Drive	.24 miles	5	20.8
Line extension	Catoosa	Brown's Lane	.22 miles	4	18.2
Line extension	Catoosa	Virgil Smith and Benton Dixon Roads	.55 miles	10	18.1
Line extension	Catoosa	Carry Road & Carry Court	.37 miles	9	24.4
Line extension	Catoosa	Hall Road	.17 miles	5	29.4
Line extension	Crab Orchard	Fairview Road & Brown Creek Drive	2.3 miles	17	7.4
Line extension	Crab Orchard	Detour Road	.37 miles	6	16.2
Line extension	West Cumberland	Casteel Road	.61 miles	6	9.8
Line extension	Crab Orchard	Denny Oaks Road	.6 miles	6	10

SUMMATION

This Rural Water Improvement Plan, and the recommendations and priorities presented herein, is intended as a framework to assist local officials as they make decisions regarding the provision of water to the unincorporated areas of Cumberland County. The plan is not intended to supersede the responsibility or authority of any person, board, or agency. Implementation of the recommendations presented in this plan is primarily dependent upon the water systems serving the county.

It is important to note that the utility district system is not a function of local government. Utility districts are independent boards operating as state charter franchises to serve as they see fit within their given area. The "Utility District Law" for the State of Tennessee is found in Tennessee Code Sections 7-82-101 through 7-82-804.

Although the Cumberland County Board of Commissioners have no direct authority over the water systems serving the county, there are means of influencing a utility district's plans for improvements. Two areas where the county can directly affect a utility district are through the endorsement of applications to various grant programs and through the approval of utility district board membership appointments by the County Executive. Other means of influence are through the administration and enforcement of Subdivision Regulations and the required review of water improvement plans by the Regional Planning Commission.