INFRASTRUCTURE ELEMENT

I. INTRODUCTION

This element has been prepared to meet the requirements of the Local Government Comprehensive Planning and Land Development Regulation Act, chapter 163, F.S. In relevant part, the act requires comprehensive plans to describe: (1) sanitary sewer, solid waste, drainage, potable water and aquifer recharge potential protection, problems and needs; (2) ways to provide for future requirements; and, (3) general facilities that will be required for solution of problems and needs. In addition, the element was prepared in accordance with Rule 9J-5, F.A.C., "Minimum Criteria for Review of Local Government Comprehensive Plans and Determination of Compliance."

II. ORGANIZATION OF THE ELEMENT

The element is divided into sections containing (1) information and supporting documents, which are the technical reports summarizing the data and analysis on which the element is based; and (2) the Goals, Objectives and Policies for the element, as adopted in the comprehensive plan for the County. The support documents are presented in sub-elements for different types of facilities. The element as a whole is broken down into sub-elements. Each sub-element includes: (1) background information about relevant tens, concepts and regulatory provisions; (2) a survey of existing conditions; and (3) an assessment of existing and future needs and recommendations for meeting those needs.

SANITARY SEWER SUB-ELEMENT

I. BACKGROUND, TERMS AND CONCEPTS

A. Regional Facilities

Regional facilities are large scale sanitary sewer systems which generally provide service to densely populated areas. These facilities are comprised of three components which perform the basic functions of collection, treatment and disposal of sewage.

The collection system is composed of a network of sewer pipes which collect sewage (also called wastewater) from individual establishments and convey it to an area for treatment. The collection network is analogous to the branching pattern of a tree. Major components of the collection network include trunk mains and force mains. Force mains are defined as sewers which connect directly to and convey sewage to the treatment plant through the use of pumping stations. Trunk mains take the form of gravity lines that are defined as sewers which connect to and convey sewage to a force main. Due to the level terrain, County pumping stations are necessary to convey the sewage under pressure against the force of gravity for long distances at minimal slopes.

The treatment plant is the component of the regional sanitary sewer facility which functions to remove solid and organic materials from the sewage. There are a large number of processes that can accomplish this, but they are generally grouped into one of the following three categories depending on the proportion of materials removed:

1. ***Primary Treatment:*** This refers to the removal of between 30 and 35 percent of the organic materials and up to 50 percent of the solids from the sewage. This is also commonly referred to as physical treatment because screens and settling tanks are most common methods used to remove solids.

2. ***Secondary Treatment:*** Secondary treatment processes remove between 80 to 90 percent of total organic materials and suspended solids from sewage. This level of treatment generally requires multiple steps involving one biological process and one or more processes for removal of suspended solids.

3. ***Tertiary Treatment:*** Sewage may also contain large quantities of synthetic organic compounds or inorganic chemicals which may create pollution problems if not removed. Tertiary treatment adds steps to primary and secondary processes to remove these pollutants. The most common tertiary processes remove compounds of phosphorus and nitrogen. The effluent of advanced treatment processes often approaches potable water purity.

Effluent and sludge are the waste products of the treatment process. Effluent is the treated wastewater which flows out of the treatment plant. Effluent disposal alternatives include discharge to a water body, irrigation, reuse or injection to into deep aquifers. Sludge refers to the accumulated solid residues of the treatment process. Prior to final disposal, sludge is usually subjected to an additional biological treatment process to remove pathogens and to physical dewatering to facilitate transportation and disposal.

B. Package Treatment Plants

Package treatment plants are essentially small treatment systems which have a collection network, treatment plant and disposal system. Package plants may be designed to provide any level of treatment, but plants providing secondary treatment are most commonly used. Package plants are available in a range of capacities up to a million gallons per day although none in Wakulla County reaches this volume of flow. These plants are generally used to serve isolated development and are usually partially or completely preassembled by the manufacturer prior to the shipment to the site of use.

C. Septic Systems

Septic tank systems are usually used to serve single housing units although relatively large-scale systems have proven successful. The system consists of two components; the septic tank and drainage field. The tank receives waste water from the home and provides a period for settling, during which time a significant portion of the suspended solids settle out. The settled solids are gradually decomposed by bacteria in the tank. The remaining liquids are discharged through underground drainage pipes into the drain field and percolate into the soil where microorganisms and filtration processes purify liquids. Septic tanks usually require cleaning every three to five years to remove accumulated solids. These solids, called septage, are generally transported to regional sanitary sewer facilities for treatment prior to disposal.

D. Regulatory Framework

1. Federal

The Federal Water Pollution Control Act (PL 92-500) is the controlling national legislation relating to the provision of sanitary sewer service. The goal of this act is restoration and/or maintenance of the chemical, physical, and biological integrity of the nation's waters. The act establishes the national policy of implementing area wide waste treatment and management programs to ensure adequate control of sources of pollutants. Under 201 of PL 92-500, grants are made available to local governments to construct facilities to treat point sources of pollution which include effluent from sewage treatment processes. The U.S. Environmental Protection Agency is responsible for implementing the act.

2. State

The Florida Department of Environmental Protection (FDEP) is responsible for ensuring that the state carries out responsibilities assigned to it under PL 92-500. FDEP has adopted rules for the regulation of 5,000 gallons per day for domestic establishments, 3,000 gallons per day for food service establishments, and where sewage contains industrial or toxic or hazardous chemical wastes.

The Florida Department of Health (FDOH), through an interagency agreement with FDEP, regulates septic tank and drain field installation within the state. These requirements have been adopted by rule in Rule 100-6, FAC.

3. Local

Wakulla County follows federal and state standards and requires that "no septic tank or drain field system shall be constructed on lots or parcels lying within 300 feet of any accessible sewer line, and no septic tank or drain field system shall be constructed within 100 feet of any body of water in the County" (Ord. No. 88-25). In 2006, the Wakulla County Commission passed an ordinance requiring performance-based septic systems for all new construction in the County. These systems are required to reduce nitrogen levels to 10mg/l.

II. EXISTING CONDITIONS

When determining the CMS for the sanitary sewer system, the consultant team utilized the Wakulla County Wastewater Facilities Plan (FY 2006). The Plan found that the existing wastewater treatment facility is adequate for the current customer base. The existing wastewater treatment facility has a capacity of 0.6 Million Gallons Per Day (MGD) and is using approximately 0.35 MGD.1

There are currently four (4) separate providers of sanitary sewer service in Wakulla County. While there are general service areas for these providers, there are no defined or specific service boundaries. The billing system for sewer usage is in the process of transitioning from a flat rate to one billed based on actual usage.

[1] As reported by Dale Dransfield, Eutaw Utilities, Inc.

A basic collection system map has been completed by the County's utility consultant. The map shows locations of service lines (gravity and force main) in a few areas of the County, including portions of Crawfordville, Panacea, and south Panacea, but no Master Plan or complete inventory of the system has been completed. Based on this rough analysis, Eutaw Utilities, Inc. has identified properties within the County with access to existing sewer pipes and system but are not connected to the system. Property owners are being informed that they have one year to connect to the service at a cost of $3800 per unit. It should also be noted, however, that about six (6) out of every seven (7) homes within Wakulla County are connected to private septic system.

III. FUTURE SYSTEM NEEDS

The following facilities improvements were identified within the Plan in an effort to reduce the reliance on septic systems and to meet anticipated demand through year 2029:

Wastewater Collection System: Wakulla County intends to design, permit, construct, operate, and maintain a wastewater collection system in the Wakulla Gardens subdivision area.

Cost: $14,958,235

Wastewater Treatment Facility: Wakulla County proposed to expand their existing 0.6 MGD wastewater treatment facility to a 1.6 MGD facility that will provide the greatest amount of nutrient removal to yield low levels of nitrogen.

Cost: $3,957,673

Wastewater Effluent Disposal: An existing spray field and additional 160 acre tract owned by Wakulla County is proposed to be converted to a Rapid Infiltration Basins (RIB) system.

Cost: $653,110

The total construction cost of these proposed improvements is $19,569,018. The operation and maintenance costs for these facilities total $174,536 per year.

IV. OUTSTANDING NEEDS

As determined in the Wastewater Facilities Plan, there is sufficient capacity to meet current demand. Applicants for development approval will need to demonstrate that there continues to be sufficient capacity to meet future demand as new projects come online. It will also be important for the County to track the planned wastewater facility improvements that are committed as part of new developments.

In addition to the facilities plan recently completed, the County will need to complete an inventory of its existing sanitary sewer system and an overall Master Plan. Without this information, it will not be possible to track existing capacity, or what additional capacity is planned to come online and how this is impacted by demand caused by development.

SOLID WASTE SUB-ELEMENT

I. BACKGROUND, TERMS AND CONCEPTS

The materials dealt with in this element fall under the definition of solid waste adopted in Rule 9J-5.003, F.A.C., which provides:

A. ***Solid waste*** means sludge from waste treatment works, water supply treatment plants, or air pollution control facility or garbage, rubbish, refuse or other discarded material including solid, liquid, semisolid or contained gaseous material resulting from domestic, industrial, commercial, mining, agricultural or government operations.

In addition this section will also address hazardous waste, or a combination of “hazardous waste” as defined in Rule 9J-5, F.A.C., which provides:

B. ***Hazardous waste*** means solid waste, or a combination of solid wastes, which, because of quantity, concentration, or infectious characteristics, nay cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness or may pose a substantial present or potential hazard to human health or to the environment when improperly transported, disposed of, stored, treated, or otherwise managed.

For the purpose of this element, the term solid waste will exclude hazardous waste and has been used to include the classification which indicates general characteristics of the waste materials and source of generation.

C. ***Residential waste*** means mixed household wastes, including yard wastes, generated by the general population.

D. ***Commercial waste*** means waste generated by the commercial and institutional sectors. Physical characteristics of these wastes are similar to those of residential wastes in that they consist largely of combustible materials in the form of paper and food waste from offices, restaurants, retail establishments, schools, motels, and churches.

E. ***Industrial waste*** means wastes generated by industrial processes and manufacturing operations, excluding hazardous wastes. These wastes also include general industrial housekeeping and support of activity wastes.

F. ***Special waste*** means wastes having special characteristics or those wastes requiring special handling. These wastes include oversize bulky wastes and materials generated in demolition and construction projects, and hospital wastes.

II. SOLID WASTE FACILITIES

The primary focus of this element is to identify the facilities which the County will need in order to manage and properly dispose of solid and hazardous wastes generated in the County during the planning period. For solid wastes these include transfer stations and the landfill. For hazardous wastes only transfer stations will be addressed since disposal of such wastes within solid waste facilities is not permitted in Chapter 403, F.S.

The term transfer station refers to a facility for the temporary collection of solid wastes prior to transport to the final disposal site.

The term landfill refers to the final disposal site of solid waste, and, as it implies, involves the burial of the wastes. Landfills are classified for regulatory purposes according to the characteristics of the wastes they are permitted to receive. This element will address only the type identified as a class 1 landfill, which can receive the solid wastes typically generated in the County and is the only type currently operating in the County.

III. REGULATIONS

The potential impacts of solid waste facilities have led to the development of an extensive network of permitting requirements at federal and state levels. Impacts on air and water quality are reviewed by the U.S. Environmental Protection Agency (EPA) and the Florida Department of Environmental Protection (FDEP) and where dredging and filling might occur, by the Army Corp of Engineers (COE). The regional Technical Review Committee (TRC) coordinates all the above agencies with the local government for environmental impacts. Actual construction and operation of solid waste facilities requires further permits and review by FDEP.

For hazardous waste, the National Resource Conservation and Recovery Act (RCRA) of 1976 (as revised) directed EPA to develop a nationwide program to regulate and manage hazardous and provide incentives for states to adopt consistent programs. The National Comprehensive Emergency Response and Compensation Liability Act (CERCLA) provided EPA with authority and funds to respond to incidents requiring site clean-up and emergency mitigation (EPA “superfund” program).

A. State

At the state level, the Florida Resource Recovery and Management Act (Chapter 403, F.S.) adopted federal guidelines and directed FDEP to develop and implement a hazardous waste management program. This act provided for: (1) adoption of federal hazardous waste definitions; (2) a system to monitor hazardous waste from generation to disposal; (3) an annual inventory of large hazardous waste generators; (4) permit requirements regulating treatment, storage and disposal of hazardous waste; (5) funds for hazardous waste spill and site clean-up; (6) hazardous waste management facility site selection procedures; and, (7) fines and penalties for violators.

Amendments to the Act through 1988 provided directions and funding to establish a cooperative hazardous waste management program between local, regional and state levels of government. These changes included provisions for County-level hazardous waste management assessments, regional and statewide facility needs assessments and site selection for hazardous waste management facilities at the County, regional and state levels.

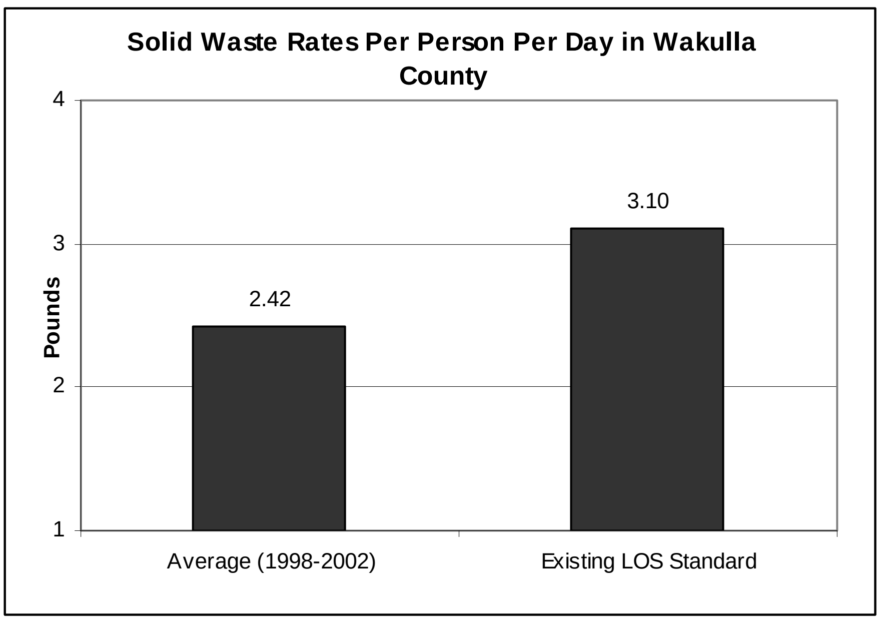
B. Local

At the local level, Wakulla County's Solid Waste Department is responsible for planning and management of solid waste facilities serving the County.

IV. EXISTING CONDITIONS

Wakulla County currently operates a transfer station on Lower Bridge Road. This transfer station also houses a recycling facility. Solid-waste pick up is addressed through contracts with private companies. Marpan currently serves the county for pick-up of construction debris.

Figure 1: Solid Waste Rates Per Person Per Day



Based on the results of the Capital Improvements Element that is being updated by the County, the future demand for solid waste is 154,070 lbs/capita/day. This equates to approximately 28,118 tons per year (1 short ton=2,000 lbs) and 421,767 tons over the planning timeframe. The Springhill Regional Landfill has an available capacity of 12.94 million tons. Therefore, there is currently enough capacity available to serve the projected population at the adopted LOS through 2030.

Wakulla County operates a Class I transfer station at the Lower Bridge Landfill. The Wakulla County Solid Waste Transfer Station Feasibility Study (Transfer Study), completed in September 2007 by consultant Jones, Edmunds, & Associates, Inc., describes the facility:

Wakulla County currently operates an open-slab, compactor style transfer station at Lower Bridge Landfill. The existing compactor frequently requires repair and is no longer efficient for the processing of the current quantities of solid waste generated by the County and accepted at Lower Bridge.

V. FUTURE NEEDS

In order to address this need, the report summarizes that:

Wakulla County has the available space to construct a new Solid Waste Transfer Station at the site of the existing Lower Bridge Landfill. The new transfer station should be designed and constructed to accommodate projected growth in the county through the year 2027. One option for funding the needs of the Solid Waste Program would be to implement a residential solid waste assessment in conjunction with a commercial tipping fee.

The capital cost of the new facility is estimated at $2,110,000 and the annual operating costs would be $1,500,000. The residential assessment fee was determined to be $112 per year, with a tipping fee of $97 per ton. The total time to complete the transfer station was estimated to be approximately 76 weeks. The County is considering an ordinance that would "require all solid ordinance generated in Wakulla County to be routed through the new transfer station."2 It should be noted that the projected need in Wakulla County as determined by the Transfer Study was based on the average rate of 2.42 pounds, and not the established LOS standard (shown in Figure 1).

The cost of residential and commercial waste collection was not outlined in the report analyzed above. The amount of solid waste collected at the transfer station was not provided. Eutaw Utilities, Inc. has completed a draft study outlining the need for a regulated franchised system of solid waste collection within Wakulla County. The system outlined by the study would involve 6-10 professional haulers with contracts to operate within specific service areas.

DRAINAGE SUB-ELEMENT

I. BACKGROUND, TERMS AND CONCEPTS

A. Drainage systems

Water flowing overland during and immediately following a storm event is called stormwater drainage or stormwater runoff. Under the effect of gravity, the drainage flows toward sea level through depressions and channels which comprise the drainage system of an area. The drainage system may consist of natural features, manmade features or a combination of both.

Natural drainage systems are defined by the topography and geography of an area. The largest feature of a natural drainage system is the drainage basin or watershed. The boundary of a basin is called the basin divide. This is the line where the natural land elevation directs runoff from the basin toward a common major drainage feature such as a river, land or bay. The major drainage feature is often called

[2] *Wakulla County Solid Waste Transfer Station Feasibility Study 2007.*

the receiving body and the smaller features are its tributaries.
Manmade drainage features are artificial structures designed to store or convey stormwater runoff. Swales, ditches, canals and storm sewers are typical conveyance structures that collect stormwater runoff and direct it toward downstream receiving waters. Stormwater storage structures are generally classified as either detention or retention facilities. Detention facilities are designed to temporarily impound runoff and release it gradually to downstream portions of the drainage system through an outlet structure. Retention facilities are impoundments which release stormwater by evaporation and by percolation into the ground, with no direct discharge to surface waters.

B. Drainage and Stormwater Management

The occurrence of stormwater runoff is variable, dependent on the amount of rain falling during each storm event and on conditions within the drainage basin. Since most storm events are relatively moderate, natural drainage features typically evolve to accommodate moderate quantities of stormwater runoff. Occasionally, severe storm events create runoff volumes in excess of what these features can handle resulting in temporary flooding of adjacent land. This periodic flooding is part of the natural cycle of events and often has beneficial effects on the basin ecosystem. Flooding is generally not perceived as a problem until development occurs in flood prone areas.

Historically, the typical strategy adopted in response to stormwater flooding in developed areas was to modify the drainage system to convey runoff away from developed sites more rapidly. Initially, this limited response may result in reducing nuisance effects and property damage. However, as urbanization of a drainage basin increases, storm events produce proportionately more and faster runoff. This is primarily due to the increase in impervious surfaces in the basin. As a result, the capacity of natural drainage features and previously constructed drainage facilities are exceeded more frequently and stormwater problems and expenditures on drainage improvements increase dramatically.

In addition to exacerbated flood problems, this strategy for coping with stormwater runoff also has detrimental effects on water quality. Soil eroding from development sites combine with materials such as oil, grease, pesticides, and fertilizers from urban land uses are washed off by runoff, thereby increasing the pollutant loading on receiving waters. The increased velocity of runoff also disrupts natural drainage features by destabilizing channels leading to further sediment loading and debris accumulation.

The ten “stormwater management” refers to comprehensive strategies for dealing with stormwater quantity and quality issues. The central tenet of the strategy is to ensure that the volume, rate, timing and pollutant loading of runoff after development is similar to conditions that existed before development. To accomplish this, a combination of structural and nonstructural techniques are utilized. Structural techniques emphasize detention and retention of stormwater to reduce runoff rates and provide settling and filtration of pollutants. Nonstructural techniques emphasize preservation or simulation of natural drainage features to promote infiltration, filtering and slowing of runoff. The objective of stormwater management is to utilize the combination of techniques which provides adequate pollutant removal and flood protection in the most economical manner.

One of the principles of stormwater management is the recognition of the need for basin-wide planning. Basin-wide stormwater management systems must be designed with the final outlet point in mind to ensure adequate capacity to facilitate all discharge from the upstream portion of the basin under the conditions present at the time of design. It is then necessary to ensure that the techniques and systems maintain predevelopment runoff conditions so that the downstream system is not overloaded. By ensuring that all development within the basin is based on, and supportive of, a plan for the entire basin, the functions and useful life of both natural and manmade components of the system will be protected and extended.

The two basic factors involved in establishing a successful stormwater management program are: (1) establishing and applying uniform design standards and procedures; and (2) ensuring adequate maintenance of system components once they are constructed. The design storm event standard specifies the intensity (rate of rainfall) and duration of rainfall to be used in the design of a facility.

Data on rainfall intensity and duration has been summarized for various regions of the state by the Florida Department of Transportation (FDOT). Curved lines on their graphs represent the frequency of rainfall events of varying intensity and duration, at intervals of 2, 3, 5, 10, 25 and 100 years. The rainfall graphs are used to specify storm events. The conventional method is to indicate the required frequency and duration of the event, which allows the intensity and total rainfall amount to be interpreted from the appropriate hydrograph for the region. Thus, for the region to which Figure 1 applies, a 10-year frequency/5-hour duration storm event would produce rainfall at an intensity of 1 inch per hour, a total 5 inches for the event. Ideally, the selection of a standard design storm balances the cost of the structures needed to avoid flooding against savings from reduced flood damage and disruption of community activities. The design storm must also be consistent with facility design for pollution abatement purposes.

Standard procedures for sizing and designing facilities should also be part of a stormwater management program to ensure that systems are structurally and functionally compatible. The program should also provide for routine inspection and maintenance of facilities to ensure proper performance during the facility life.

II. REGULATORY FRAMEWORK

A. Federal

Section 298 of the Federal Water Pollution Control Act (P1, 92-500, 1972) is the directing federal law with respect to water pollution abatement. In implementing the Act, the Environmental Protection Agency (EPA) identified pollutants carried in stormwater runoff as a major source of water contamination. To achieve the pollution abatement goals of the Act, EPA provided guidelines for state and local governments to develop Area-wide Water Quality Management Plans or “208 Plans” as they are commonly known. These 208 Plans contemplate a broad range of potential water pollution sources and abatement needs, as well as development of regulatory programs to ensure implementation.

Currently the County concurs with all regulations designated by FEMA and follows boundaries show in the Flood Insurance Rate Maps (FIRM) information.

B. State

The Florida Department of Environmental Protection (FDEP) has adopted a stormwater rule (Rule 62-25, F.A.C.) to fulfill part of the state's responsibility under Section 208 of the Federal Water Pollution Control Act. The rule's objective is to achieve 80-95 percent removal of stormwater pollutants before discharge into receiving waters. This rule requires treatment of the first inch of runoff for sites less than 100 acres in size and the first one-half inch of runoff for sites 100 acres or greater in size.

Treatment is generally accomplished through retention or through detention with filtration. Retention requires the diversion of the required volume of runoff to an impoundment area with no subsequent direct discharge to surface waters. Pollutant removal by settling and by percolation of the stormwater through the soil is successful. Detention facilities are typically within the line of flow of the drainage system. Stormwater from a site passes through the detention facility and is filtered prior to discharge to remove pollutants.

Implementation of the stormwater rule is achieved through the permitting process. Exemptions to the permit requirements are provided for: (1) facilities serving individual sites for single—family dwelling units; (2) facilities serving dwelling unit sites less than 10 acres in total land area which have less than 2 acres of impervious area; and, (3) facilities for agricultural or silvicultural lands which have approved management plans.

C. Local

Wakulla County has the following standards in the existing Land Development Code:

Section 6-21 SUPPLEMENTAL PERFORMANCE STANDARDS

(3) (a) Drainage plan: "A complete drainage plan shall be submitted by the developer and approved by the County engineer. These plans shall show sufficient documentation to demonstrate the capability of the drainage system to collect, control and dispose of stormwater runoff. The drainage system will include all catch basins, manholes, inlets, headwalls, street grades, bridges, pipes, settling basins, green belted open space, etc. It shall also include stormwater calculations used in the design and other significant details deemed necessary by the County engineer. The drainage system shall be based upon the facilities necessary to dispose of runoff according to recurrence listed below. Rainfall data shall be obtained from the Florida DOT "rainfall curves".

Figure 1
Drainage Facility Design Frequency
Bridges and Culverts
On arterial roads 50 Year
on collector roads 25 Year
Retention Basins 25 Year
All Other Facilities 10 Year

(b) Open Channels and Outfall Ditches. Design will be provided so channels and ditches will not overflow their banks; where flow velocities exceed two feet per second, ditches not protected with a permanent material will be dressed and seeded to provide erosion resistant embankment."

Section 7-45 STANDARDS FOR STORMWATER MANAGEMENT SYSTEMS.

“The stormwater management or drainage system for any subdivision shall provide for drainage of lots, streets, roads and other public areas within the subdivision, as well as containing any runoff from adjacent areas that naturally flows into subject area. Runoff coefficients shall be based on completed projects. All culverts, pipes or bridges installed shall have headwalls on both sides or ends of reinforced concrete or riprap 5:1 ratio in bags meeting Florida DOT standards for riprap”

SECTION 7—46. STANDARDS FOR FLOOD AREAS AND USE OF FILL.

1) Restrictions on Subdivisions. “Land subject to periodic flooding or other hazards to human life, health and safety shall not be subdivided.”

2) Restrictions on use of fill. “Natural stormwater retention areas and areas subject to poor drainage or erosion shall not be altered through the use of fill operations without specific prior approval by the planning commission.”
Applicable ordinances that address development in flood hazard areas include: Ord. No. 81-1, 82-6, and 85.4.

III. EXISTING CONDITIONS

Stormwater facilities within Wakulla County are not regulated. New subdivision and development within the County are required to provide appropriate drainage and stormwater facilities as stated within the Land Development Code. Older subdivisions did not have these requirements, and there is no County-wide plan for stormwater facilities. No LOS levels for stormwater have been established.

F. Needs Assessment

A county-wide stormwater facility plan is needed in Wakulla County to determine existing conditions. A master plan would link together stormwater plans completed at the subdivision level and would provide direction for stormwater collection in areas of the County without stormwater collection. Without a means of examining stormwater from a county-wide perspective, it will not be possible to determine if the LOS for stormwater is being met.

Specific Drainage/Stormwater LOS Recommendations

As previously outlined, the County has not established a LOS standard for stormwater/drainage. Through the following, LOS standards are recommended for potential use by the County.

Stormwater quality standard:

No discharge from any stormwater discharge facility shall cause or contribute to a violation of water quality standards as provided for in County ordinances, federal laws and state statutes. Water quality Level of Service shall be set consistent with the protection of public health, safety and welfare and natural resources functions and values.

Stormwater quantity:

Stormwater management systems shall provide for adequate control of stormwater runoff. The stormwater quantity Level of Service standard recommendations are found in the table below:

Stormwater Quantity LOS Levels

Flooding Reference	**Level of Service (flood intervals in years)**
Emergency shelters and essential services buildings	100
Habitable buildings	100
Employment/service centers	100
Roads: Roads should be passable during flooding. Roadway flooding, <6” depth at the outside edge of payment is considered passable.	• Evacuation Roads: 100 • Arterials: 100 • Collectors: 25 • Neighborhood: 25
Sites: Flooding refers to standing water in agricultural land, developed open or green space (yards and parking lots, etc.) and undeveloped lands designated for future development. This does not include areas incorporated into the stormwater or basin master plans as floodway, floodplains, or flood storage areas.	• Urban (>1 unit/acre): 5 • Rural: 2

POTABLE WATER SUB-ELEMENT

I. BACKGROUND, TERMS AND CONCEPTS

A potable water supply system normally consists of a water supply source, a treatment plant and a distribution and storage network. Either surface water stored in natural or manmade reservoirs, groundwater, or some combination of the two usually constitute the supply source for the system. The selection of a source for any system must consider the type and quality sources available and the cost for developing the source of use. Before being used for public consumption, most water must be treated. Treatment removes impurities from water to improve quality for either public health or aesthetic reasons or both. The treatment process adds to the cost of supplying water and it also expands the range of raw water resources that can be utilized.

After treatment, the water is supplied to individual users in a community by way of a network of pipes and storage reservoirs. Large transmission lines, called distribution mains, carry water to major demand areas and interconnect with a network of smaller lines which eventually supply individual establishments. Both the distribution mains and distribution network should be interconnected to ton loops to allow the water to circulate from various portions of the system to the areas highest momentary demand.

Water is delivered under pressure within the distribution system in order to ensure adequate flow meets demand. Demand fluctuates during each day, usually exhibiting peaks during the morning and evening, corresponding to periods of highest residential use. Localized demand peaks occur when the system is utilized for firefighting purposes. In order to provide adequate quantities and pressure to meet peak use and fire flow demands, storage tanks are linked with the distribution system at strategic locations. During low demand periods the tanks are filled as water is pumped into the system. During peak demand periods, water flows from the tanks back into the system to augment flows and maintain adequate pressure. Ground level and elevated storage tanks are commonly used. Elevated tanks are the most economical. Many systems also include auxiliary pumps which operate only during peak demand periods.

II. REGULATORY FRAMEWORK

A. Federal

The federal government has established quality standards for the protection of water for public use, including operating standards and quality controls for public water systems. These regulations are provided in the Safe Drinking Act, U.S. 93-523. This law directed the Environmental Protection Agency to establish minimum safe drinking water standards.

B. State

In accordance with federal requirements, the Florida Legislature has adopted the Florida Safe Drinking Water Act, Sections 403.850 403.864, F.S. The Florida Department of Environmental Protection (FDEP) is the state agency responsible for implementing this act. In this regard, FDEP has promulgated rules classifying and regulating public water systems under Rule 62-22, F.A.C. Primary and secondary standards of the Federal Safe Drinking Water Act are mandatory in Florida.

The Northwest Florida Water Management District is responsible for managing water supplies to meet the existing and future demands1 Regulation of consumptive use is achieved through a permitting system, through which water resources are allocated among the permitted consumers.

C. Local

The pollution control division of the County public health department unit is responsible for enforcement of the programs required by the FDEP regulations.

III. EXISTING CONDITIONS

The adopted LOS standard for potable water within the County is 94 gallons/capita/day. Similar to sanitary sewer service, there are several potable water providers in the County. Service provision, however, is conducted on an ad-hoc basis. There are no specific service areas, and no full inventory of the existing system currently exists.

Not all of the County's population is served by municipal water- approximately 37 percent of the resident's water is provided by private wells. This percentage was calculated by multiplying the number of connections by the average occupancy rate to generate the population served by potable water. The population served was then divided by the total population to generate the percentage of the total population served by potable water.

III. FUTURE NEEDS

The LOS standard in the County for potable water is currently being met. The County has determined, however, that water capacity will have to increase within the City of Sopchoppy (a potable water provided for portions of the County) within the next five years. The City is currently working with the Northwest Florida Water Management District to determine sites for a new well.

NATURAL GROUNDWATER RECHARGE SUB-ELEMENT

I. BACKGROUND

Aquifers are water—bearing layers of porous rock, sand or gravel. Several aquifers may be present below one surface location, separated by confining layers of materials which are impermeable or semipermeable to water.

The source of groundwater is rainfall. Under the force of gravity, rainfall percolates downward through porous surface soils to enter the aquifer strata. Because of the various permeability of different soils types, the rate of aquifer recharge from rainfall will vary from one location to another. The highest areas of permeability are called prime recharge areas. The presence of overlying confining beds also detentines which surface areas will be effective recharge areas for a given aquifer.

Since aquifer recharge areas are surface features, they are subject to alteration by development. Covering a recharge area with impervious surfaces such as roads, parking lots and buildings reduces the potential for rainfall percolation, altering the total rate and volume of recharge for that area. Increasing the rate at which stormwater drains from a recharge area also decreases recharge potential.

A second concern related to development within aquifer recharge areas is the potential for contamination of surface and groundwater. Just as with stormwater runoff to surface waters, pollutants picked up by runoff which enters the aquifer can degrade the quality of the groundwater. Since water flows within an aquifer in a manner similar to surface water flow, downstream portions of the groundwater may be polluted over time. This becomes particularly significant when the aquifer is tapped as a potable water supply downstream.

II. REGULATORY FRAMEWORK

A. Federal

In 1986, The Federal Safe Drinking Water Act was amended to add protection of public water systems' wellfields, and aquifers that are the sole source of drinking water for a community. The amendments for wellfield protection require states to work with local governments to map wellhead locations and develop land use controls that will provide long-term protection from pollution. The program calls for state and local governments to map these areas and develop protection plans, subject to EPA review and approval. Once a plan is approved, EPA may enter into an agreement with the local government to implement the plan.

B. State

To implement the Florida Safe Drinking Water Act, FDEP has developed rules classifying aquifers by use (Rule 62-22, F.A.C). These rules are currently being amended to strengthen protection of sole source aquifers and the wellfields tapping them. FDEP has also established regulatory requirements for facilities which discharge into groundwater sources (Rule 17-4.245, F.A.C.) or inject materials directly underground (Rule 62-28, F.A.C.).

The task of identifying the nature and extent of groundwater resources in the state has been delegated to the water management districts. Each district must prepare a Groundwater Basin Resource Availability Inventory (GwBRAI), which local governments use to plan for future development in a manner which reflects the limits of available resources. The criteria for the inventories, and the legislative intent for their use are detailed in chapter 373, F.S., which provides that each water management district shall develop a ground water basin resource availability inventory covering those areas deemed appropriate by the governing board. This inventory shall include, but is not limited to the following:

1. A hydrogeologic study to define the ground water basin and its associated discharge and recharge areas.

2. Site specific areas in the basin deemed prone to contamination or overdraft resulting from current or projected development.

3. Prime ground water recharge areas.

4. Criteria to establish minimum seasonal surface and ground water levels.

5. Areas suitable for future water resource development within the ground water basin.

6. Existing sources of wastewater discharge suitable for reuse as well as the feasibility of integrating coastal wellfields.

7. Potential quantities of water available for consumptive uses.

Upon completion, a copy of the GwBRAI shall be submitted to affected municipalities, counties, and regional planning agencies. The inventory shall be reviewed by the affected municipalities, counties, and regional planning agencies for consistency with the respective governmental comprehensive plans and shall be considered in future revisions to said comprehensive plans. It is the intent of the legislature that future growth planning reflect the limitations of the available potable water or other available water supplies, consistent with Chapter 373, P.S.

The Florida Legislature has also directed local governments to include the topographic maps of areas designated by the water management districts as prime aquifer recharge areas for the Floridan and

Biscayne Aquifers in the local comprehensive plans, and to give special consideration to these areas in zoning and land use decisions. As of this writing, the GWBRAI for Wakulla County has not been completed.

C. Local

Currently, Wakulla County has no significant regulations specifically related to protection of natural groundwater recharge areas.

III. EXISTING CONDITIONS

The predominant aquifer underlying the County is the Floridan Aquifer, which in the eastern half of the County is at or near the surface. In areas where the static head within the aquifer is higher than the surrounding overlying land, the aquifer discharges by artesian flow into lakes, streams and other aquifers. The major contributor of potable water and artesian flow is the St. Marks Aquifer which is located in the eastern and southern sections of the County and discharges into the St. Marks, Wakulla, Sopchoppy, and Ochlockonee Rivers. It also discharges into smaller streams and lakes.

Groundwater is also found in surficial aquifers above the overlying Hawthorne formation which is composed of sands and clays, but the largest source of domestic water supply comes from the St. Marks Limestone layer which is at varying depths from about 10 feet above sea level to 40 feet below sea level.

The last major aquifer is the Suwannee Aquifer. This is the deepest of the three mentioned aquifers. Few wells are able to penetrate the Suwannee limestone which is capable of supplying a larger volume of water. The top of the Suwannee limestone formation varies from 90 feet to approximately 110 feet. The Suwannee limestone is also located in all areas of the County. Nap 25 displays a cross section of the various aquifers in the County. The groundwater flow in the County generally follows a northwest to southeast flow. Naps 10, 11, and 12 show the distance to the top of the Floridan Aquifer, aquifer recharge areas, and potentiometric surface respectively.

IV. EFFECTS OF DEVELOPMENT

The effect of development on aquifer recharge is currently minor due to the rural nature of the County and the very low density development. Most development is occurring in the central corridor of the County. The areas of highest aquifer recharge are also located in the central and northeastern sections of the County. Generally, these areas are characterized by moderate to excessively drained soils. Problems are occurring in these areas though, particularly in the north central section of the County where development is occurring most rapidly. Currently, this area is being served by individual septic systems. As with all areas in the eastern section of the County, the aquifer is nearly at the surface. The potentiometric surface of the aquifer generally is less than 20 feet with most developing areas within high aquifer recharge zones. With the well drained soils of the area, considerable amounts of septic effluent may reach groundwater sources even with special modifications to the septic systems. Currently it is not known how much of an adverse effect is being caused by these factors but continued rapid development without a central sewer system can only allow the problem to worsen. No plans for a central sewer system in this area is planned although the issue will be addressed by setting large minimum lot sizes and testing and monitoring of water quality in these areas.

A second point should be made concerning this area. Not only Wakulla County is causing possible adverse effects on aquifer recharge areas. Urban runoff from Leon County may also be causing adverse effects. In the 1986 "Florida Water Quality Assessment 305(b) Technical Report', the St. Marks River Basin was reviewed for water quality and the results showed that areas just north of the Leon/Wakulla County boundary, adjacent to the central section of Leon County, were experiencing poor water quality due to runoff and other sources. Contours of the area show this area drains into Wakulla County through high aquifer recharge areas. With the two significant contributors of groundwater contamination located in this area, groundwater quality could deteriorate in the near future.

The western section of the County is an area that is characterized by virtually no aquifer recharge and poorly drained soils with much of the land area being contained in swamps. In the southern section of the County, soils are also poorly drained with most rainfall running off into surface waters.

Agricultural runoff is not a problem in the County as little land is involved in cultivation of cropland and relatively few chemicals are used for agricultural purposes in the County.

V. NEEDS ASSESSMENT - Summary and Recommendations

At the present time, insufficient information and resources are available to allow the County to institute a site—specific comprehensive aquifer recharge protection plan. Information to implement a program is also pending through the completion of the water management district's Groundwater Basin Program Resource Availability Inventory (GEPRAI).

The development trends in the County are expected to remain relatively consistent over the next few years. Even with development in the central and north central section of the County, there should not be any significant resistance to aquifer recharge given the low density of development and the large area of aquifer recharge. Given these facts, the County could still incorporate provisions in its land development codes requiring conservation of areas with the greatest recharge potential based upon the soil survey of the County and FDEP's "DRASTIC" pollution potential map to ensure maximum recharge potential with minimum pollution potential, in cooperation with the Northwest Regional Water Management District.