

# COMPREHENSIVE PLAN

## INFRASTRUCTURE ELEMENT



Amended  
December 11, 2023 | Ordinance 2023-06  
Chapter IV | Infrastructure Element

**PREPARED BY**  
CITY OF WINTER SPRINGS  
COMMUNITY DEVELOPMENT DEPARTMENT



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CHAPTER IV  
INFRASTRUCTURE ELEMENT

**IV-A GOALS, OBJECTIVES AND POLICIES**

**SANITARY SEWER**

**GOAL 1:** To provide an effective system of wastewater collection, treatment, and treated effluent disposal or reuse to meet the needs of all City residents and non-residential establishments within the City service area while protecting the environment and public health.

**Objective 1.1:** *Existing Wastewater Treatment.* The City shall correct existing deficiencies; ensure that the minimum Level of Service (LOS) for sanitary sewer is met; and, provide a level of treatment that meets the water quality standards for effluent limitations established by the FDEP.

**Policy 1.1.1:** Adopt LOS standards for sanitary sewer treatment at 100 gallons per person per day.

**Policy 1.1.2:** Use the following peaking factors based upon the average design flow (ADF), when evaluating collection force main and lift station capacity: flows to 0.050 MGD ADF use a 3.5 factor, flows 0.050 to 0.250 MGD ADF use a 3.0 factor, and flows above 0.250 MGD ADF use a factor of 2.5.

**Policy 1.1.3:** Maintain an active sanitary sewer system mapping program and update the model annually to prioritize needed replacements.

**Policy 1.1.4:** Require all improvements and/or additions to sanitary sewer facilities to be compatible and adequate to meet the adopted LOS standards.

**Policy 1.1.5:** Require all land use amendments to include an analysis of the impact of such amendment on the adopted LOS standard and existing sanitary sewer facilities.

**Policy 1.1.6:** Plan construction of new sanitary sewer treatment facilities when capacity allocation of existing facilities is at seventy five percent (75%) of available capacity, and have new facilities ready for operation when capacity allocation of existing facilities is at ninety percent (90%) of available capacity.

**Policy 1.1.7:** Maintain a quarterly monitoring program to evaluate wastewater treatment efficiencies and submit quarterly operating reports to the FDEP documenting results, including data relating to average and maximum daily flows.

**Policy 1.1.8:** Maintain a quarterly groundwater monitoring program to evaluate groundwater quality and submit the results to FDEP.



**Policy 1.1.9:** Comply with bond covenants to ensure the maintenance and operations of facilities, and to provide recommendations for system maintenance and improvements.

**Policy 1.1.10:** Encourage continuing education of operating staff to ensure proficiency with respect to optimization of treatment and disposal processes.

**Policy 1.1.11:** Require that all City owned wastewater treatment plants be operated and maintained by State-certified operators. Allow trainees under the supervision of State-certified operators to be used, when allowed by regulatory requirements.

**Objective 1.2:** *Future Wastewater Treatment.* The City shall reserve sewer capacity and coordinate the extension of facilities and increased capacity for approved and vested developments.

**Policy 1.2.1:** Define regulations for sewer allocation vested rights and the period of vesting in the City's Code of Ordinances.

**Policy 1.2.2:** Ensure reserved capacity and adequate sanitary sewer facilities are in place with the impact of development, by requiring payment of applicable sewer service availability fees after a determination of concurrency and upon development approval prior to permit application, or allow payment of a reservation fee with subsequent payment of sewer service availability fees at time of permitting.

**Policy 1.2.3:** Implement the Schedule of Capital Improvements (SCI) to avoid future deficiencies and update the SCI annually in conjunction with the City's budgeting process.

**Policy 1.2.4:** Define the City's sewer service area by the corporate limits of the City and those other areas located outside the corporate limits, which are established by the City Commission by a written instrument. Require that property owners of properties located in unincorporated Seminole County execute and record an annexation agreement approved by the City Commission, before they are provided sanitary sewer service. Provide wholesale sanitary sewer service to other cities and Seminole County, as appropriate, feasible, and by written agreement.

**Policy 1.2.5:** Coordinate with the County and the FDOT to plan to provide all future sewer pipes and/or sleeves required for subsurface road placement.

**Policy 1.2.6:** Coordinate the utility and transportation planning efforts to take advantage of the most economical construction and maintenance costs possible when installing utility lines, roads and sewers.

**Objective 1.3:** *Maximize Existing Facilities.* The City shall maximize existing sanitary sewer facilities within its service area and shall promote compact efficient growth patterns.

- Policy 1.3.1:** Require new developments to connect to the central sanitary sewer system where available and to design and construct all sanitary sewer facilities in accordance with the City's Code of Ordinances.
- Policy 1.3.2:** Incorporate means and methods in the City's Code of Ordinances to ensure connection to the City's sanitary sewer system, where available, for those properties that lie within the service area.
- Policy 1.3.3:** Discourage development in the service area from utilizing septic tanks and prohibit the use of package wastewater treatment plants.
- Policy 1.3.4:** Require new development to extend the central sewer system at the developer's expense to service subject property.
- Policy 1.3.5:** Maintain adequate sanitary sewer service availability charges and user rates to ensure funding for new treatment, collection and effluent disposal systems.
- Policy 1.3.6:** Undertake a utility rate structure study in 2009 and make recommendation on appropriate adjustments for sewer rates. Update the rate study every five (5) years.

**Objective 1.4:**        **Septic Tanks.** The City shall mandate connection to the central sewer system by ordinance, when available, for existing residences and commercial establishments, which are served by septic systems and are deemed to be detrimental to the health, safety, and welfare of the general public.

- Policy 1.4.1:** Sewer shall be deemed "available" pursuant to ordinance. (Cross Reference: See Future Land Use Element, Policy 1.2.4)
- Policy 1.4.2:** Identify and map those areas within the City's service area, which are served by septic systems, and prioritize areas which may require central sewer service based on soil suitability, density, and environmental concerns. (Cross Reference: See Future Land Use Element, Policy 1.2.5)
- Policy 1.4.3:** Prioritize and incorporate line extensions into the SCI to connect existing septic areas to the central sanitary sewer system. Require the participation of the existing residents and/or developers in the cost of the sewer main line extensions and explore all possible means of funding the line extensions and connections.
- Policy 1.4.4:** Coordinate with the Seminole County Health Department to ensure that where central sewer service is available, no new septic system permits shall be approved for any new development or for any existing systems which have been determined to be inoperable or detrimental to the health, safety and welfare of the general public.

**Objective 1.5:** *Effluent Disposal.* The City shall continue to prevent the discharge of wastewater into state and local waters through the continued utilization and expansion of its reclaimed water system.

**Policy 1.5.1:** Maintain treatment facilities to provide for “unrestricted access” levels of treatment to allow for reuse of reclaimed water for irrigation of landscaped areas, as well as use in allowable industrial applications.

**Policy 1.5.2:** Follow the exclusive authority of SJRWMD to regulate consumptive use.

**Policy 1.5.3:** Require the installation of reclaimed water systems for all new development, which contain or abut existing or planned reclaimed water routes. Allow connection of the reclaimed system to the potable water system when reclaimed water is not provided until such time as reclaimed water becomes available.

**Policy 1.5.4:** Provide backup storage and disposal of excess reclaimed water (during wet periods) by the City’s existing spray fields and percolation ponds.

**Policy 1.5.5:** Consider applying for permits to allow discharge of reclaimed water into wetlands during periods of “emergency”.

**Policy 1.5.6:** Maintain a public awareness and education program regarding the use of reclaimed water.

## POTABLE WATER

**GOAL 2:** To plan for and assure an adequate supply of excellent quality potable water to meet the needs of all City residents and non-residential establishments within the City and within the City’s service area during the 2030- planning horizon.

**Objective 2.1:** *Central System.* Based upon adopted Level of Service (LOS) standards, analysis in the City’s *Water Supply Plan 2007*, and the SJRWMD’s *District Water Supply Plan 2005 and 2006 Addendum*, the City shall determine timing for upgrading the Central System (Supply and Treatment System) based on the following evaluation criteria:

**Policy 2.1.1:** Adopt LOS standards for potable water supply at 115 gallons (minimum) per person per day. (Cross Reference: See Capital Improvement Element, Policy 1.2.1-d.)

**Policy 2.1.2:** Require total well capacity to equal or exceed the Maximum Day Demand (MDD), including design fire flow demand. *Maximum Day Demand (MDD) = Total Water Consumed, divided by 365 days, x Maximum Day Peak Factor (2.0).* (Cross Reference: See Infrastructure Element, Policy 2.8.4)

- Policy 2.1.3:** Require that even with the largest well out of service, total well capacity will equal or exceed the Average Daily Demand (ADD). *Average Daily Demand (ADD) is the total water consumed during a calendar year divided by 365 days.*
- Policy 2.1.4:** Maintain the capacity of the aeration system equal to or greater than the Maximum Day Demand (MDD).
- Policy 2.1.5:** Use a peak factor of 1.1 GPM per equivalent residential connection (ERC) in the calculation of the system's ability to meet the LOS standard, when evaluating system pump capacity.
- Policy 2.1.6:** Rate the wellfield capacity at the average daily demand with the assumption that the largest well is out of service.
- Policy 2.1.7:** Require that any new wells be constructed to produce capacities between 1200 and 2400 gallons per minute.
- Policy 2.1.8:** Maintain a storage tank capacity of at least one-half (1/2) of the average daily consumption volume.
- Policy 2.1.9:** Provide water distribution system peak flow storage for the difference between peak flow and well flow for the duration of the fire flow, with a buffer of 10%. Fire flow is the flow of water required to fight a major fire. (Cross Reference: See Infrastructure Element, Policy 2.8.4)
- Policy 2.1.10:** Maintain a minimum high service pump capacity at least equal to the maximum daily peak factor demand, assuming that the largest high service pump is out of service.
- Policy 2.1.11:** Maintain the water distribution system to be capable of delivering the peak hour flow (without fire demand) with a minimum residual pressure of twenty (20) pounds per square inch (psi).
- Policy 2.1.12:** Restrict the maximum velocity through any pipe to 8 feet per second.
- Policy 2.1.13:** Meet the Florida Department of Environmental Protection (FDEP) criteria of providing half the maximum daily flow for auxiliary power.

**Objective 2.2: Operations & Maintenance.** The City will annually adopt programs and activities to maintain the central system.

- Policy 2.2.1:** Maintain the City's potable water treatment facilities in optimum condition by the implementation of a preventive maintenance program.
- Policy 2.2.2:** Review water fee methodology and user rates annually during the budget process to ensure adequate funding for treatment, storage and distribution facilities.

- Policy 2.2.3:** Undertake a utility rate structure study in 2009 and make recommendation on appropriate adjustments for water conservation rates for reclaimed water and potable water. Update the rate study every five (5) years.
- Policy 2.2.4:** Develop a system to review individual customer water meters to ensure proper readings of those meters.
- Policy 2.2.5:** Institute a replacement or “change out” schedule for meters in the field to ensure replacement when accuracies exceed the industry tolerance range. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 1)
- Policy 2.2.6:** Implement improvements and/or additions to potable water facilities as needed to correct LOS deficiencies, based upon data and analysis in the City’s *Water Supply Plan 2007*, and the SJRWMD’s *District Water Supply Plan 2005*.
- Policy 2.2.7:** Implement improvements and/or additions to potable water facilities which comply with, as a minimum, the standards recognized and approved by the Florida Department of Environmental Protection, specifically including the American Society of Civil Engineers and the American Water Works Association.

**Objective 2.3: Future Demand.** Based upon population projections and analysis in the City’s *Water Supply Plan 2007*, the City shall ensure the supply and treatment of safe potable water through the 2030-planning horizon to meet the adopted Level of Service (LOS) standards, as well as the requirements of both the City’s Water Supply Work Plan (Exhibit IV-C-1) and SJRWMD’s *District Water Supply Plan 2005 and 2006 Addendum*. The City’s consumptive use permit is pending approval with SJRWMD. Should the CUP process result in any changes to the City’s projected water demand, the Water Supply Work Plan will be updated accordingly.

- Policy 2.3.1:** Review future demands to verify that there are no needs for future expansion of potable water facilities, based upon the adopted LOS and data and analysis in the City’s *Water Supply Plan 2007*.
- Policy 2.3.2:** Cap the City’s potable groundwater demand at 2013 levels and determine the most cost-effective option for augmenting this system with an alternative water source. Pursue cooperative efforts with SJRWMD, Seminole County, and other local jurisdictions, in providing cost-effective solutions. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 1, 5 & 6)
- Policy 2.3.3:** Reevaluate the potable water system capacity and ensure that the central water system can meet LOS standards prior to issuance of a development order, if new development would result in a significant increase in population beyond current projections. (Cross Reference: See Future Land Use Element, Policy 1.2.2)

**Policy 2.3.4:** Continue to monitor groundwater supply conditions in conjunction with the SJRWMD. (Cross Reference: See Infrastructure Element Policy, 5.1.4; and Water Supply Work Plan [Exhibit IV-C-1], Item 1)

**Policy 2.3.5:** Encourage and require, as needed, the interconnection and looping of existing and proposed segments of the potable water distribution system.

**Objective 2.4:** **Capital Improvements.** The City shall plan capital improvements to meet future needs and projected deficiencies.

**Policy 2.4.1:** Maintain the mathematical model of the transmission system in the files for subsequent computer analysis to determine the water use demands.

**Policy 2.4.2:** Implement the five-year Schedule of Capital Improvements (SCI) for potable water facilities adopted in the Capital Improvements Element.

**Policy 2.4.3:** Review the SCI annually and adopt a City budget that prioritizes needed potable water improvements to meet the demands of future growth and approved developments.

**Policy 2.4.4:** Update the City's *Water Supply Plan, 2007* at intervals coinciding with the *District Water Supply Plan, 2005* updates, to ensure consistency between the State, regional, and local levels.

**Policy 2.4.5:** Evaluate the production, expansion capabilities, and life expectancy of the water treatment plants in each update to the *Water Supply Plan, 2007*.

**Objective 2.5: Wells.** The City shall evaluate water supply sources and quality considerations when developing new wells, as well as repairing or improving the existing central potable water system.

**Policy 2.5.1:** Maintain a five hundred (500) foot minimum spacing between wells, where practicable. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C- 1], Item 8; and Conservation Element, Policy 1.2.2)

**Policy 2.5.2:** Consider surrounding land uses when making the final selection of any well site. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 8)

**Policy 2.5.3:** Require well placement to have a 100-foot minimum setback from sewer lines. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 8)

**Policy 2.5.4:** Require a 200-foot minimum setback for well placement from septic tanks. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 8)

**Policy 2.5.5:** Conduct an investigation by a geohydrologist to estimate the recommended well size and depth, pumping capacity, casing length,

projected aquifer drawdown, and any other site specific considerations to be utilized in the final design. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 8)

**Policy 2.5.6:** Investigate and pursue the acquisition of property near Water Treatment Plant #2 and Water Treatment Plan #3, for future treatment needs and protection of wellfields. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 8)

**Policy 2.5.7:** Conduct a detailed analysis of potential well contamination sources.

**Objective 2.6:** **Service Area.** The City shall adopt a service area boundary for potable water and shall discourage leapfrog development and urban sprawl.

**Policy 2.6.1:** Define the City's potable water service area by the corporate limits of the City, except as otherwise established by the City Commission by written agreement.

**Policy 2.6.2:** Require before providing potable water service to properties located in unincorporated Seminole County, that the property owners receiving service execute and record an annexation agreement approved by the City Commission.

**Policy 2.6.3:** Provide or receive wholesale potable water service to or from other cities and Seminole County by written agreement.

**Policy 2.6.4:** Continue to be the provider of potable water to residents and nonresidential establishments within the City's service area except as otherwise established by the City Commission by written agreement.

**Policy 2.6.5:** Continue to maximize the efficient use of the City's potable water treatment facilities as a unified city water system.

**Policy 2.6.6:** Discourage urban sprawl by delineating a Service Area boundary. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 1)

- Require all new developments within the City's Service Area to connect to the City's existing centralized water supply/treatment facilities, except as otherwise established by the City Commission by written agreement.
- Provide service only to those areas included in the City's delineated Service Area, except as otherwise established by the City Commission by written agreement.
- Require new home construction to connect to City water service when it is available in an adjacent right-of-way.

- Prohibit reconnection to private well service in lieu of City potable water once connected to City service, except for irrigation purposes.

**Objective 2.7:** *Reclaimed Water.* When reviewing applications for development orders within the City limits, the City shall consider impact on the environment, including the ability to be served by the City's existing water facilities. The City shall maintain initiatives to conserve potable water resources, which ensure that existing level of service standards for potable water, do not increase more than twenty (20) gallons per person per day. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 1)

**Policy 2.7.1:** Maintain a progressive water rate structure to ensure conservation of potable water and to provide an incentive for the use of treated wastewater for irrigation purposes. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 3 & 7)

**Policy 2.7.2:** Maintain the reclaimed wastewater effluent program whereby wastewater is treated to standards consistent with Florida Department of Environmental Protection (FDEP) requirements for "unrestricted public access" irrigation of private and public areas. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 3)

**Policy 2.7.3:** Prohibit potable water for irrigation use in areas where reclaimed water is available for such irrigation. (Cross Reference: See Infrastructure Element, Policy 1.5.2; and Water Supply Work Plan [Exhibit IV-C-1], Item 1 & 3)

**Policy 2.7.4:** Implement the five-year SCI for reclaimed water facilities adopted in the Capital Improvements Element. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 5)

**Policy 2.7.5:** Maintain the requirement that all new developments, which contain or abut existing or planned routes of the City's reclaimed water distribution system, connect to the reclaimed water system prior to occupancy. (Cross Reference: See Infrastructure Element Policy 5.1.8; and Water Supply Work Plan [Exhibit IV-C-1], Item 3 & 4)

**Policy 2.7.6:** Maintain specific requirements for the use of low consumption plumbing devices in the Code of Ordinances. (Cross Reference: See Infrastructure Element, Policy 5.1.6; Water Supply Work Plan [Exhibit IV-C-1], Item 1, 2 & 7; and Conservation Element, Policy 1.2.4)

**Policy 2.7.7:** Adhere to SJRWMD emergency water shortage restrictions.

**Policy 2.7.8:** Require fifty (50%) percent of the required landscaping area, as indicated in the Land Development Regulations to be Xeriscaping™ or site suitable native plant material. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 2 & 7)

**Objective 2.8:** *Fire Protection.* Provide adequate delivery and distribution of potable water to meet fire protection demand within the City and the City's service area.



**Policy 2.8.1:** Monitor, evaluate, repair and replace the existing water delivery and distribution system to ensure the system can deliver the needed gallon per minute flows to meet fire protection demands.

**Policy 2.8.2:** Maintain an active water system and fire hydrant mapping and numbering program.

**Policy 2.8.3:** Extend water distribution mains to areas within the City's service area and provide adequate fire protection service to residents and non-residential establishments located within the service area provided the residents/developers participate in the costs.

**Policy 2.8.4:** Provide fire flows in single family detached residential areas of 500 GPM at 20 psi residual pressure and fire flows in non-residential and multi-unit residential of 1,250 GPM at 20 psi residual pressure.

**Policy 2.8.5:** Provide a fire flow duration of 10 hours. (Cross Reference: See Infrastructure Element, Policy 2.8.4)

## SOLID WASTE

**GOAL 3:** To provide efficient and safe Solid Waste disposal facilities and collection services on a regular basis for all City residents and commercial establishments within the City to protect the environment and public health.

**Objective 3.1:** *Solid Waste Disposal.* The City shall coordinate the disposal of solid waste throughout the planning horizon in a safe and efficient manner.

**Policy 3.1.1:** Adopt minimum LOS for municipal solid waste at 3.7 pounds per person per day, and utilize the LOS to plan for future demand.

**Policy 3.1.2:** Provide solid waste franchise administration and coordination of billing matters.

**Policy 3.1.3:** Contract or perform all solid waste disposal in a manner that complies with all applicable city, regional, state and federal solid waste disposal standards.

**Policy 3.1.4:** Mandate solid waste collection for all residential, commercial and industrial land uses within the City through the use of contracted haulers.

**Policy 3.1.5:** Continue to monitor complaints regarding residential and commercial solid waste collection by the contracted hauler to ensure that the most efficient, orderly, sanitary and environmentally sound service is being provided.

**Policy 3.1.6:** Ensure that the City's waste collection provider utilizes adequate equipment to maintain the City's LOS.

**Objective 3.2:** **Recycling.** The City shall require a reduction in municipal solid waste final disposal in landfill facilities by maintaining and promoting its recycling program.

**Policy 3.2.1:** Continue to have a collection process in place for curbside pickup of recyclable materials, as approved by Seminole County Solid Waste Division.

**Policy 3.2.2:** Continue to have a collection process in place for curbside pickup of yard waste.

**Policy 3.2.3:** Promote the efforts of Seminole County towards the reduction of the solid waste stream.

**Policy 3.2.4:** Endeavor to coordinate with Seminole County with respect to Solid Waste Management and Waste Recycling Programs.

**Objective 3.3:** **Hazardous Waste.** The City shall coordinate with the County to monitor and control the disposal of hazardous wastes in accordance with state law.

**Policy 3.3.1:** Help the County promote and support the County's Household Hazardous Waste Program.

## DRAINAGE

**GOAL 4:** Provide a stormwater system of appropriate capacity to protect the life and property of the citizens of the City, as well as decreasing adverse environmental impacts attributable to stormwater runoff.

**Objective 4.1:** **Flood Control.** The City shall achieve and maintain the following adopted stormwater management Level of Service (LOS) standards that shall meet or exceed state and federal regulations for stormwater quality and quantity.

**Policy 4.1.1:** Adopt LOS standards as follows: Require new development and redevelopment to meet the following water quality and quantity standards.

- **Water Quantity** - At a minimum, the post-development peak discharge rate or discharge volume as applicable shall not exceed pre-development peak discharge rate or discharge volume for the design storm events identified in the City's Land Development Code. In addition, if downstream facilities (from the positive outfall of the development) are inadequate to convey the post-development peak discharge rates for the applicable design storm events, the development shall be required to accommodate its proportion of the discharge rates above

the downstream systems actual capacity.

- Water Quality - Stormwater treatment shall be required to serve the development through a stormwater treatment system which is site-specific; or serve sub-areas of the City and, if applicable, Seminole County. Regardless of the area served, the stormwater treatment system must provide a level of treatment which meets the requirements of the Florida Administrative Code (F.A.C.).
- Roadway construction - All public roadways within a development, and required as part of the development order, shall be designed and constructed to standards which do not allow any amount of water above the roadway during the following storm events for the following roadway types:
  - Local Roadway – 25-year, 24-hour design storm event (8.6 inches of rainfall).
  - Collector Roadway – 25-year, 24-hour design storm event (8.6 inches of rainfall).
  - Arterial Roadway – 100-year, 24-hour design storm event ( 11.6 inches of rainfall).

**Objective 4.2:** *Stormwater Master Plan.* The City shall maintain, and utilize the Stormwater Master Plan and its updates which establish high water elevations, addresses existing deficiencies, and coordinates the construction of new and replacement facilities.

**Policy 4.2.1:** Maintain a detailed inventory and analysis of the existing drainage facilities within the City’s municipal boundaries in the City’s Stormwater Master Plan.

**Policy 4.2.2:** Maintain a digital map of the drainage facilities within the City and require new developments to provide copies of their stormwater design for incorporation into the City’s database.

**Policy 4.2.3:** Utilize the expertise of a professional engineer to run models of the City’s stormwater system based upon critical design storm events periodically on an as-needed basis and when necessary update the Stormwater Master Plan.

**Policy 4.2.4:** Include review of stormwater quality discharged into surface water bodies and recommendations for needed improvements in the Stormwater Master Plan.

**Policy 4.2.5:** Establish priorities for stormwater system replacements, ensuring correction of existing drainage facility deficiencies, and providing for future facility needs in the Stormwater Master Plan.

**Policy 4.2.6:** Include in the Stormwater Master Plan, a funding mechanism, or mechanisms, and schedules for completing the needed improvements.

**Policy 4.2.7:** Rely on the Stormwater Master Plan to prepare the City's annual budget for funding of stormwater facility replacement and deficiency upgrades.

**Policy 4.2.8:** Utilize the Stormwater Master Plan and other sources to annually update the five (5) year Schedule of Capital Improvements (SCI) to correct existing deficiencies and prepare for future stormwater demands. Other sources for the identification of 5-year SCI projects may include items such as damage reports from severe storm events and projects receiving special grant funding.

**Objective 4.3:**        **Flood Plain.** The City shall restrict development within the 100-year flood plain to those uses, which will not adversely affect the capacity of the flood plain to store water.

**Policy 4.3.1:** Require compensating storage for flood water displaced by development below the elevation of the 100-year flood. Locate compensating storage within the same drainage sub-basin and below the 100-year base flood elevation and above the estimated seasonal high groundwater table elevation.

**Policy 4.3.2:** Require the finished floor elevation of all structures to be located a minimum of eighteen (18) inches above the 100-year flood elevation.

**Policy 4.3.3:** Reserve the flood plain for conservation, open space and recreation uses to preserve the natural flow of runoff, where feasible.

**Objective 4.4:**        **Development Impacts.** The City shall protect natural resources and the existing municipal stormwater network from the impacts of development and construction.

**Policy 4.4.1:** Review detailed calculations for new projects prepared by a registered professional engineer which show that retention and detention will be accomplished to meet the adopted LOS, and that there will be no negative impacts to downstream water quality or flow rates.

**Policy 4.4.2:** Review the characteristics and limitations of soil types for new projects with regard to percolation and infiltration.

**Policy 4.4.3:** Review the impacts of proposed topographical changes for new development.

**Policy 4.4.4:** Require that the impact from the proposed stormwater system will not have a detrimental effect on adjacent native vegetation or wetlands.

**Policy 4.4.5:** Require that erosion and sediment control practices be utilized to protect water bodies, wetlands and watercourses from siltation during construction activities.

**Policy 4.4.6:** Require the planting of littoral zone vegetation in stormwater ponds and/or lakes to provide a natural system for the uptake of nutrients and other constituents transported by stormwater runoff, where feasible.

**Policy 4.4.7:** Require adequate easements for stormwater system maintenance and conveyance.

**Policy 4.4.8:** Require new developments and redevelopment to handle upland flow, which presently discharges through the site.

**Objective 4.5:** *Intergovernmental Coordination.* The City of Winter Springs shall educate citizens and coordinate with applicable jurisdictions to address stormwater issues of mutual concern and to provide adequate LOS.

**Policy 4.5.1:** Develop the Stormwater Master Plan in coordination with Seminole County and regulatory agencies, such as the FDEP, SJRWMD, and FDOT.

**Policy 4.5.2:** Include in the Stormwater Master Plan process public participation review of the plan by affected citizens.

**Policy 4.5.3:** Coordinate with Lake Jesup Basin stakeholders regarding the restoration of Lake Jesup to remove its classification by FDEP as an impaired waterbody.

## NATURAL GROUNDWATER AQUIFER RECHARGE

**GOAL 5:** To provide, maintain, and protect, the surficial and Floridan aquifers to ensure that recharge of the natural groundwater aquifer occurs in a manner which maintains sufficient quality and quantity of the public water supply to meet current and future demands.

**Objective 5.1:** *Natural Recharge Protection and Conservation.* The City shall coordinate with other agencies and adopt measures in the Code of Ordinances that will ensure preservation of natural recharge to the City's groundwater resources, as well as conservation of our potable water sources.

**Policy 5.1.1:** Adhere to regulations established by SJRWMD to protect areas of high recharge.

**Policy 5.1.2:** Explore the feasibility of a resource protection ordinance, which would provide incentives for developers to minimize impervious surfaces. (Cross Reference: See Future Land Use, Policy 1.2.1; and Conservation Element, Policy 1.2.3)

- Policy 5.1.3:** Continue to coordinate with Seminole County, SJRWMD, and state and federal agencies to achieve regional aquifer recharge protection objectives.
- Policy 5.1.4:** Continue to cooperate with the SJRWMD in monitoring groundwater supply conditions and consumptive use review. (Cross Reference: See Infrastructure Element, Policy 2.3.4; and Water Supply Work Plan [Exhibit IV-C-1], Item 1)
- Policy 5.1.5:** Continue to educate residents on the benefits of water conservation and expand the City's water conservation efforts.
- Policy 5.1.6:** Continue to require adherence to the energy standards of the Florida Building Code to encourage minimal use of potable water. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 1 & 2; and Infrastructure Element, Policy 2.7.6)
- Policy 5.1.7:** Continue to expand the City's reclaimed water system, to the extent possible, to increase availability for all development. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 3 & 5; and Conservation Element, Policy 1.2.5)
- Policy 5.1.8:** Require installation of non-potable water systems in new developments and encourage individual connection to its reclaimed water system for irrigation purposes. (Cross Reference: See Infrastructure Element, Policy 2.7.5; and Water Supply Work Plan [Exhibit IV-C-1], Item 4 & 7)
- Policy 5.1.9:** Restrict irrigation hours to be at least as restrictive as SJRWMD's and require rain sensor devices or a switch that overrides the system when adequate rainfall has occurred. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 7)

**Objective 5.2:** *Best Management.* The City will recognize the underlying aquifer as a finite and delicate resource thereby necessitating the best management practices to promote conservation.

- Policy 5.2.1:** Adopt a local Waterwise ordinance and promote, through educational programs and publications, the use of Waterwise practices, which include low or no water landscaping, the use of solid waste compost, efficient irrigation systems, and the prohibition of non-native, invasive plant species, which will result in the conservation of water. (Cross Reference: See Water Supply Work Plan [Exhibit IV-C-1], Item 2; and Conservation Element, Policy 1.2.6)
- Policy 5.2.2:** Require detention of stormwater runoff in the Code of Ordinances to maximize groundwater recharge.
- Policy 5.2.3:** Encourage provision of environmentally-friendly features such as "green roofs", cisterns, water gardens, porous pavement, and natural landscapes (with native plants), as appropriate. (Cross Reference: See Conservation Element, Policy 1.2.9; and Housing Element, Policy 1.5.5)
-

**Policy 5.2.4:** Maintain a leak detection and repair program for its potable water utilities.



## **IV-B. SANITARY SEWER SUB-ELEMENT**

### **A. INTRODUCTION**

The City currently owns, operates and maintains a central sanitary sewer system. The City's collection and treatment system provides service to both residential and non-residential users. The City has historically been able to provide adequate sanitary sewer service to meet the demand within the City's boundaries.

Currently, the City's wastewater facilities have little or no effect on adjacent natural resources. This is due to the "zero discharge" approach that is currently being achieved by the City's wastewater program. Impacts on natural resources must be considered for the overall effects of improvements achieved by not only the City, but also for the sum of improvements achieved by all treatment facilities in areas formerly tributary to the Lake Jesup drainage basin. This information is being gathered on a continuing basis by staffs of the St. Johns River Water Management District (SJRWMD) and the Florida Department of Environmental Protection (FDEP), and results to date have shown significant positive results in regard to reduction of contribution of nutrients to surface waters.

### **B. SANITARY SEWER FACILITIES INVENTORY**

#### **1. Public Sanitary Sewer Facilities Inventory**

The City's central sanitary sewer system is comprised of two wastewater treatment plants (WWTP), 41 lift stations, 5,854 linear feet of 20" force main, 81,489 linear feet of force main ranging in size from 6 to 12 inches, and 111.51 miles of gravity sewer mains of various sizes.

Additionally, the City operates a reclaimed water system to reduce the amount of potable water utilized for irrigation purposes. The reclaimed water system consists of two treatment facilities and several miles of distribution lines. Reclaimed treatment facilities are located at both of the City's two wastewater treatment plants.

##### **a. Operational Responsibility**

The City's Public Works/Utility Department is responsible for the operations and maintenance of the central sanitary sewer and reclaimed water systems within the City's service area.

##### **b. Service Area**

As mentioned previously, the City currently operates two WWTP's. An inventory of the WWTP facilities is provided in Table IV-B-1.

The City's East WWTP is located at 1560 Winter Springs Boulevard. The location of this WWTP and the geographic service area for the plant are shown on Map IV-A-1.

The West WWTP is located at 1000 West S.R. 434. The location and the current geographic service area are identified on Map IV-B-1.

**Table IV-B - 1: Wastewater Treatment Plants**

Waste Water Treatment Plant	Location	Current Demand	Maximum Design Capacity*
East WWTP	1560 Winter Springs Blvd	1.048 MGD	2.012 MGD
West WWTP	1000 West S.R. 434	1.150 MPD	2.07 MGD
<b>Total</b>		2.198 MGD	4.082 MGD

\*The maximum design capacity could be increased with the addition of new filters at the West WWTP. Capacity is determined by the Florida Department of Environmental Protection.  
 Source: Winter Springs Utility Department, February 2009

c. Predominant Users

The East WWTP generally serves any development east of Tuskawilla Road to S.R. 434 and the Oak Forest Subdivision west of Tuskawilla Road. The West WWTP serves all development in the western section of the City including Winding Hollow, Tuskawilla Trace, Central Winds Park, St. Johns Landing and the Winter Springs High School.

There are three properties outside the City limits that are served by the City's wastewater utility. These properties, all within the City of Oviedo, include the medical center at S.R. 426 and Winter Springs Boulevard, the Tuskawilla Bend Shopping Center and the Seneca Bend Subdivision. The City provides service to these properties as required by an old PUD agreement. There are no County enclaves that are served by the City's wastewater system.

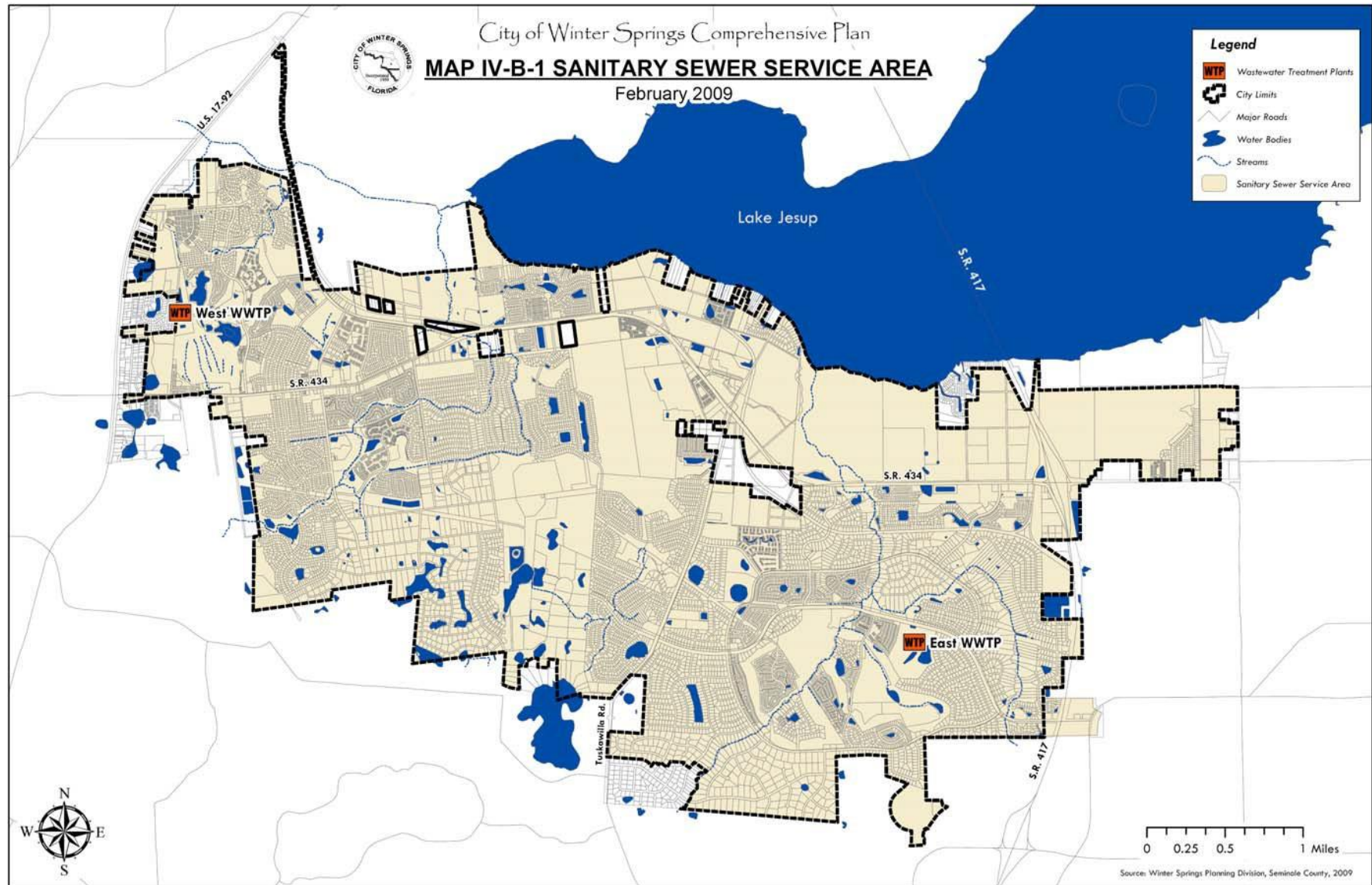
As of 2008, the City is providing service to 11,537 residential connections and 286 non-residential connections, for a total of 11,823 sanitary sewer connections. Of the residential connections, 22 are services outside of the City limits. Of the non-residential connections, 24 are services located outside of the City limits. Table IV-B-2 gives a breakdown of the City's wastewater connections. Only 0.4 percent of the City's total service is provided to properties within the City of Oviedo as detailed in the preceding paragraph.

**Table IV-B - 2: Existing Sanitary Sewer Customers**

Type of User	Within City Limits	Percentage within the City	Outside City Limits	Percentage outside the City
Residential	11,537 connections	98.3 %	22 connections	0.2 %
General Service	286 connections	1.3 %	24 connections	0.2 %
<b>Total</b>	11,823 connections	99.6 %	46 connections	0.4 %

Source: Winter Springs Utility Department, 2009.

**Map IV-B - 1: Sanitary Sewer Service Area**



d. Sanitary Sewer Facility Design and Capacity

Both of the City’s WWTP’s utilize the same process for treatment and effluent disposal. The treatment process utilized by the plants is contact stabilization. As previously described, the process for effluent disposal is rapid infiltration basins (RIBs) and spray irrigation.

(1) East Wastewater Treatment Plant

The East WWTP is a Class 1 reliability facility with a capacity of 2.012 million gallons per day (MGD). The current operating demand or annual average daily flow on the facility is 1.048 MGD. Therefore, the facility is operating at approximately half of its rated capacity.

(2) West Wastewater Treatment Plant

The West WWTP is a Class 1 reliability facility with a capacity of 2.07 MGD. The current demand or average daily flow on this facility is 1.150 MGD. Therefore, this facility is operating at slightly more than half of its rated capacity.

(3) Public Wastewater Collection System and Lift Stations

The existing wastewater collection system provides service to approximately ninety percent (90%) of the City’s households. The remainder of City residents utilizes septic systems for wastewater treatment. Most of the homes that are utilizing septic tanks are located within the Ranchlands and Seminole Pines Mobile Home Park.

The City currently operates 41 lift stations. Table IV-B - 3 identifies the address and/or general location for each station. There are two interceptors within the eastern half of the City’s collection system, lift stations 1E and 5E. The western side of the system has five interceptors; lift stations 1W, 2W, 3W, 6W & 7W.

**Table IV-B - 3: Lift Stations**

STATION #	LOCATION DESCRIPTION	STATION #	LOCATION DESCRIPTION
1W	156 Cory Lane	1E	1560 Winter Springs Blvd.
2W	619 David Street	2E	872 Chokecherry Drive
3W	600 Sheoah Blvd.	3E	728 Sybilwood Circle
4W	870 Sheoah Circle	4E	611 Tuscany Place
5W	51 East La Vista Drive	5E	800 Austin Court
6W	710 Tanglewood Road	6E	1600 Grizzly Circle
7W	607 South Edgemon Avenue	7E	1627 Wood Duck Drive
8W	306-B Panama Circle	8E	1757 Seneca Blvd.
9W	492-B Club Drive	9E	940 Old White Way
10W	800 Alton Road	10E	1163 Trotwood Blvd.
11W	500 Dolphin Road	11E	1839 Seneca Blvd.
12W	1000 West S.R. 403	12E	127 Cherry Creek Circle

STATION #	LOCATION DESCRIPTION	STATION #	LOCATION DESCRIPTION
13W	2501 Shepard Road	13E	590 Vistawilla Blvd.
14W	130-A Tuskawilla Rd.	14E	160 Nandina Terrace
15W	137-B Seville Chase Drive	15E	101-B Bridgewood Court
16W	222 Torcaso Court	16E	314 Streamview Way
17W	100 Windsor Crescent Street	17E	1109 Courtney Lane
18W	299 Constitution Way	18E	310 Tuskawilla Road
19W	701 Old Sanford Oviedo Rd	19E	1599 Wrentham Court
20W	398 Harbor Winds Court	20E	361 Pawnee Trail
21W	463 Mill Stream		

Source: City of Winter Springs Utility Department, February 2009.

(4) Public Effluent Disposal

Both the east and west treatment plants meet the Florida “no discharge” requirements as defined in FDEP 62-610.200(41). The City’s land application system consists of a combined (4) four restricted access rapid rate filtration basins, a total of 62.8 acres, and (2) two slow rate restricted access spray irrigation sites, a total of 77 acres. The remainder of the system consists of public access slow rate application sites. These sites consist of two golf courses, five City parks, three roadway median irrigation systems, two school sites and residential/commercial irrigation.

The City maintains a reduced groundwater-monitoring program. This program requires four (4) monitoring wells at the Dayron Perk Ponds and one monitoring well at the Winter Springs Golf Course for the west treatment system. The east treatment system maintains four monitoring wells on the Tuscawilla Golf Course and four monitoring wells at the East Perk Ponds.

(5) Reclaimed Water System

The reuse irrigation method of reclaimed wastewater disposal is presently encouraged by the FDEP. The broad category of reuse of reclaimed wastewater may include such uses as agricultural irrigation, landscape irrigation, make up water for electrical power generation facilities, industrial cooling water make up and other industrial uses.

Because of existing conditions in the Winter Springs area, the City has embraced the concept of reuse, in association with existing land application methods, as the best method to provide for future effluent disposal capacity. The benefits of a reuse program include:

- 1) Cost efficiencies for wastewater customers.
- 2) More efficient use of land area for development activity rather than dedicated public land application methods.
- 3) Promotion of reuse water for irrigation purposes rather than use of potable water for irrigation.

- 4) Support of state and regional goals and policies directed toward water conservation, surface water quality protection, and efficient use of land resources.

The City has constructed and is currently operating a reclaimed water program. The City's current reuse service area boundary is indicated in Map IV-B-2. As of December 2008, there are 1,644 residential and non-residential connections to the reclaimed water system. Users of reclaimed water are required to have in-ground sprinklers systems and hose bibs are prohibited. Recently, meters were installed on all reclaimed water lines, so that the City is now better equipped to track reclaim water usage. The current average daily usage of the reclaimed water program is 1.334 MGD. The proposed total design capacity of the system is currently 4.082 MGD.

## **2. Private Sanitary Sewer Facilities Design**

### **a. Septic Tank Suitability**

The majority of City households, approximately 90%, are served by the central wastewater system. In addition, all commercial and industrial land uses within the City limits are served by the City's wastewater system with the exception of the Old Sanford-Oviedo area.

New development is required to connect to the central wastewater system where available. However, in the past several single-family developments have been permitted for septic systems. The total number of single-family homes located within the City limits utilizing septic systems for wastewater disposal is not known. However, this number represents only a small percentage of the total. In general, septic systems are not the most efficient means of wastewater disposal for urban development. Limitations of existing soils, intensive maintenance requirements, soil reclamation and/or special designs limit the effectiveness of septic systems as a means of septic service in the Winter Springs area.

## **C. SANITARY SEWER FACILITY NEEDS ANALYSIS**

### **1. Sanitary Sewer Capacity Surpluses and Deficiencies**

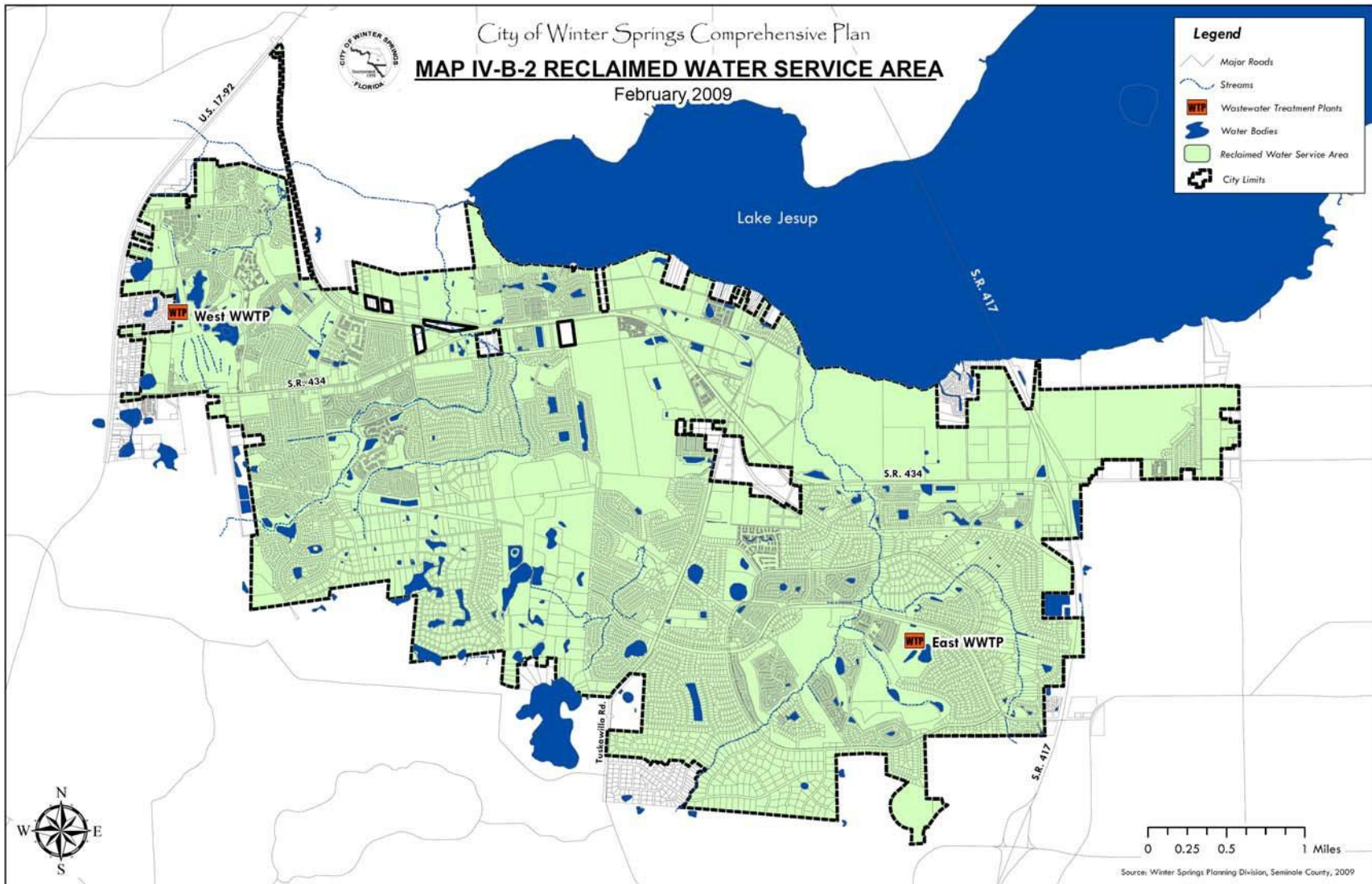
#### **a. Existing Demand Surpluses and Deficiencies**

Demand and LOS can be determined by an analysis of plant flows, billed water, number of customers, and population served. The City's adopted treatment LOS is 100 gallons per person per day.

To date, the City has not identified any LOS related existing deficiencies within the sanitary sewer collection and treatment system. The Capital Improvements Program identifies various projects scheduled to be completed within the next five years. Many of these projects represent improvements to provide for facility upgrades or existing maintenance requirements.



Map IV-B - 2: Reclaimed Water Service Area



b. Future Demand Capacity

The City's concurrency management requires an assessment of available capacity at the time of development approval. Based upon an assessment of approved projects, which will impact the system in the future, the City's has estimated that the average daily demand by the year 2010 will be 2.215 MGD. Therefore, the available sewer capacity for new project impacts is approximately 1.867 MGD.

There is no service area outside the City limits, with the exceptions of the few properties located within the City of Oviedo. The City does not plan to provide service outside the City limits in the near future.

The City's adopted LOS for sanitary sewer treatment is 100 gallons per person per day. The City has a total design capacity of 4.082 MGD through both treatment facilities. Average annual daily flows ranged from 2.2 to 2.3 MGD between 2003 and 2006, while flows ranged from 2.0 to 2.2 MGD in 2007 and 2008. The two treatment plants should have sufficient wastewater treatment capacity to meet demands for the long term planning horizon through approximately 2030. Based on projected population estimates developed for the Comprehensive Plan, the City will be providing wastewater treatment capacity of 117.5 GPCD in 2010 and 104.5 GPCD in 2020, dropping just below the adopted LOS to 99.4 GPCD of wastewater treatment capacity in 2025 and to 94.6 GPCD in 2030 without implementing any capacity expansions.

**2. Performance and Condition of Existing Facilities**

The City's central sanitary sewer system is generally in good condition and adequately meeting the demand of its users.

a. Wastewater Treatment Plants

The East WWTP was rehabilitated in 1996. The West WWTP was upgraded in 1996 as well. As both plants are Class 1 reliability facilities, there is no foreseeable need to replace either facility during the short term planning horizon.

b. Collection System Performance

A gravity system defines the boundaries of the existing wastewater service area. As with other systems, the type of construction materials used is representative of the age of the system. The existing gravity collection system for the older areas of the City is constructed using primarily clay pipe. Newer developments in the service area are served primarily by PVC pipe. The age and condition of the existing clay system is assumed to contribute a large percentage of the inflow/infiltration (I/I) currently discharging into the gravity system. During periods of heavy rainfall and high groundwater tables, the amount of I/I into the system can be significant. The City has committed to reducing I/I through a systematic I/I reduction program and the purchase of specialized equipment for repairing the lines in the system.

The City has an on-going infiltration/inflow (I/I) program to assess I/I in the City's collection system. Most minor repairs are made by either applying grout internally,



or by means of a pipe relining approach. More major repairs are accomplished by the City's "point repair" procedures, whereby short sections of collection line are replaced on an as needed basis. In extreme cases, of older, badly deteriorated gravity lines, it is sometimes more cost effective to replace much longer sections of sewer pipe, and in these cases priorities for available funding are established and funds budgeted on an as needed basis.

Given the topography of the Winter Springs area, the gravity system within each LSSA is assumed to be lateral in nature and adequate for service, except for routine repair and replacement, throughout the planning horizon. Lift stations are depreciated on a forty (40) year schedule.

### **3. Sanitary Sewer Facility Replacement, Expansion and New Facility Siting**

To meet future demand, a list of major capital improvements is presented and prioritized in the Schedule of Capital Improvements (SCI) for sanitary sewer facilities. The majority of these improvements are necessary to eliminate existing deficiencies, provide main line extensions to new wastewater customers, or to implement expansion of the reclaimed water system. During the next five years, the City will need to evaluate the potential remaining life of the water treatment plants to determine the time frame for replacement.

## **IV-C. POTABLE WATER SUB-ELEMENT**

### **A. INTRODUCTION**

The City currently owns, operates and maintains a central potable water treatment and distribution system within its corporate limits. The City's potable water system provides water for both residential and non-residential purposes, including fire-fighting demands. A Water and Wastewater Rate Study for the City was adopted in June 2002 to sets service availability fees and user fees for potable water and sanitary sewer customers. A new rate structure study is currently in review and will be adopted in 2009.

In 2007, the City completed its Water Supply Plan 2007 (Supply Plan). The Supply Plan was part of legislation adopted in 2005 for the purpose of strengthening coordination of water supply planning and local land use planning. The legislation required extensive evaluation of water supply facilities for at least a ten-year planning period. The Supply Plan's evaluation period projects an eighteen-year planning period. By extending the planning period to 2025, the Supply Plan is better able to assess future needs and utilizes compatible planning increments with the St. Johns River Water Management District (SJRWMD)'s *District Water Supply Plan 2005*.

The City is located in an area that the SJRWMD identifies as a priority water resource caution area in the *District Water Supply Plan 2005*. A priority water resource caution area is an area where existing and reasonably anticipated sources of water may not be adequate to supply water for all existing legal uses and anticipated future needs while sustaining water resources and related natural systems through 2025. In 2004, the City entered into an interlocal agreement with Seminole County and the other cities within the County to develop a county-wide water supply plan (County Plan). The County Plan identifies projects that are suitable to be included in a future update or addendum to the District Water Supply Plan 2005.

Data and analysis within the City's Supply Plan as well as future population projections, and analysis of the existing supply and treatment facilities associated with the continuation of the residential reclaimed water system program and conservation programs, indicate that the City will not need additional groundwater or other potable water sources to meet demands through 2030.

### **B. POTABLE WATER FACILITIES INVENTORY**

#### **1. Operational Responsibility**

The City's Public Works/Utility Department is responsible for the operations and maintenance of the central public water system within the City's service area.

#### **2. Service Area**

The City has historically provided potable water service to meet demands within the City's boundaries, with the exception of a few parcels at the City's perimeter. These are served by the City of Longwood, the City of Casselberry, or by Seminole County Environmental Services (SCES) and represent an insignificant portion of each utility's service capability.

Seminole County Environmental Services (SCES) supplies potable water to Tuscowilla Unit 2 and to parcel 14 at the Oviedo Marketplace. The City area served by Seminole County currently includes approximately 65 single-family homes (22,750 GPD) and one office building (4,500 GPD). Additionally, as the remainder of parcel 14 develops, the SCES will supply an additional capacity of 33,500 GPD on a wholesale basis to the City. These areas are very small in comparison with the overall SCES capacity and can be adequately served by SCES. According to information available from the Seminole County Water Supply Facilities Work Plan, the current groundwater supply and treatment facilities are sufficient to meet the demands through the 2025 projections. In general, the amount of water sold to City residents or wholesaled to the City is a small fraction of the County’s overall water demand. The City of Casselberry serves approximately seven (7) commercial/warehouse customers on Belle Avenue that are located within the City. These are direct customers of the City of Casselberry and are not part of a wholesale or interlocal agreement. These customers are adequately served and represent a small fraction of the Casselberry service capability.

Winter Springs entered into an interlocal agreement in 2006 with the City of Longwood to serve certain identified properties along US 17-92. Currently, Longwood services only a few customers that are located within the City.

Additionally, individual wells self-serve approximately 325 single family homes within the City limits. There are no plans to extend water service lines into these areas at this time. Generally, the City does not service areas outside of the City limits. The one site served outside of the City is because no other service was available. Once in a while, the City will enter into an annexation agreement to service a property that seeks to be annexed and wishes to receive City services, but is not yet contiguous to the City. In 2001, two sites were being served outside the City. However, one of these properties has since been annexed.

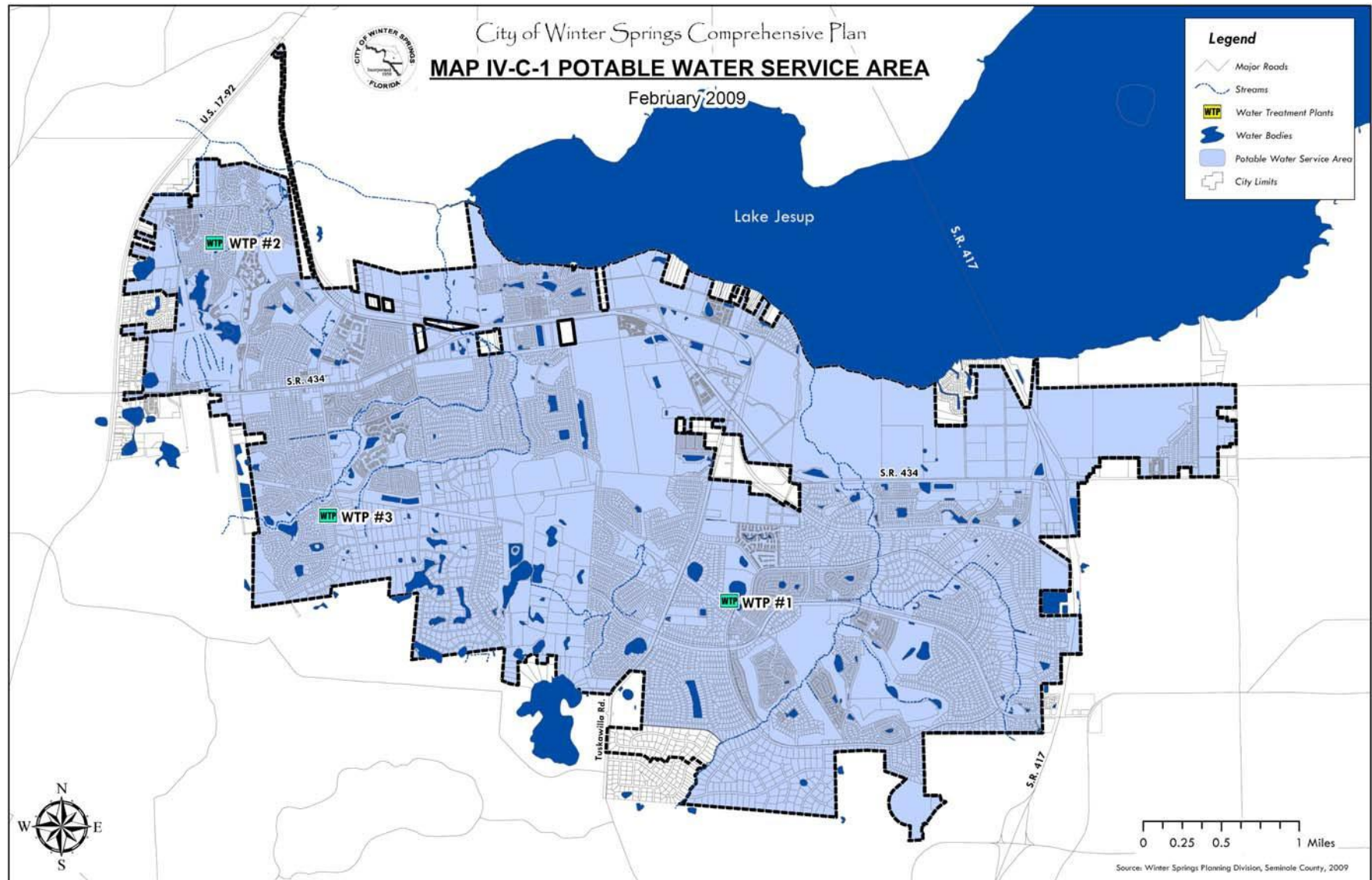
As of April 2007, the City is servicing approximately 12,409 service connections. The predominant users serviced by the central system are residential customers within the City limits. The central water system service area is identified on Map IV-C-1: Service Area. No service area growth is anticipated.

**Table IV-C - 1: Existing Potable Water Customers**

Type of User	Within City Limits	Outside City Limits
Residential	12,109 meters	0 meters
Commercial	300 meters	1 meter
<b>Total</b>	<b>12,409 meters</b>	<b>1 meter</b>

Source: Winter Springs Utility Department, February 2009

**Map IV-C - 1: Potable Water Service Area**



**3. Water Treatment Plants**

The City’s central system consists of two (2) water service areas with three (3) water treatment plants which are interconnected and which operate as one (1) system. Each of the service areas are supplied by four wells.

**Table IV-C - 2: Water Treatment Plants**

Water Treatment Plant	Location
WTP #1	851 Northern Way (east)
WTP #2	700 Sheoah Blvd. (west)
WTP #3	110 West Bahama Ave. (west)

Source: Winter Springs Utility Department, *City of Winter Springs Water Supply Plan 2007*.

WTP #1 is located at 851 Northern Way in the Tuscawilla residential planned unit development. The plant has four (4) wells (5200 GPM); two (2) storage tanks [a 500,000 gallon ground storage tank (aerator capability 3800 GPM) and a 1,000,000 gallon storage tank (aerator capability 3500 GPM)]; and three (3) high service pumps (7950 GPM). There is sufficient area for further expansion of ground storage capacity and high service pumping.

WTP #2 is located at 700 Sheoah Boulevard in the Highlands residential planned unit development. The plant has some minor room for further expansion. The plant includes two (2) wells (2200 GPM) [one onsite and one offsite]; one 500,000 gallon ground storage tank (3800 GPM of aerator capacity); and three high service pumps (4350 GPM).

WTP #3 is located at 110 West Bahama Road. The plant consists of two (2) wells (3500 GPM); one 500,000 gallon ground storage tank (aeration 3800 GPM); and three (3) high service pumps (3100 GPM).

All of the City’s central system treatment facilities utilize the same basic process for water treatment. First, raw groundwater is pumped from the aquifer through a cascade aerator atop the ground storage tank for hydrogen sulfide removal. Second, the water is chlorinated/disinfected with either sodium hypochlorite (a concentrated bleach) or chlorine gas and pumped into the distribution system with high service pumping units. A phosphate inhibitor is added to the raw water and provides a “passive” coating on the interior of pipes, thereby reducing the corrosion effect and leaching of metallic constituents (lead and copper). Each of these treatment facilities consists of several distinct parts, which together comprise a complete plant system, including: wells, treatment, storage, and high service pumping.

**4. Water Quality**

The City’s raw water quality meets the maximum contaminant levels for all currently regulated inorganic and organic contaminants and is of good quality with the exception of high concentrations of hydrogen sulfide, sulfate and chlorides, at specific wells. There is no evidence of coli form bacteria. Raw water quality is described in detail in the Supply

Plan. The finished water quality produced by the central system meets all State and Federal regulations related to the production of safe drinking water. However, it is likely that new regulations by the FDEP will require removal of sulfur concentrations over 0.3 mg/l as wells are altered or new wells are constructed.

**5. Distribution System**

The interconnected distribution system consists of water mains up to 16 inches in diameter. The mains consist of various materials including: asbestos cement, ductile iron, polyvinyl/chloride, high density polyethylene (HDPE) and cast iron, depending upon location and/or design circumstances.

The distribution system is illustrated on Map IV-C-2: Water Line Distribution System.

**6. Public Wells**

The City’s central potable water distribution system is connected to eight (8) potable water wells. Draw downs in the surficial aquifer are estimated to be very low. A five hundred (500) foot minimum spacing between wells is maintained, in order to reduce possible interference between wells. The current capacity for each well is identified below:

**Table IV-C - 3: Inventory of Existing Wells**

Well Location	Well #	Well Diameter	Well Pump Capacity (GPM)	Well Depth	Casing Depth	Pump Motor H.P.	Active	C.U. Permit
WTP #1	1E	12"	1200	350'	105'	20	Yes	Yes
	2E	12"	2000	290'	119'	50	Yes	Yes
	3E	12"	2000	295'	190'	50	Yes	Yes
	4E*	16"	800*	350'	130'	25	Yes	Yes
WTP #2	3W	12"	1100	491'	123'	20	Yes	Yes
	6W	12"	1100	400'	220'	30	Yes	Yes
WTP #3	4W	12"	1100	423'	96'	20	Yes	Yes
	5W	20"	2400	440'	200'	50	Yes	Yes

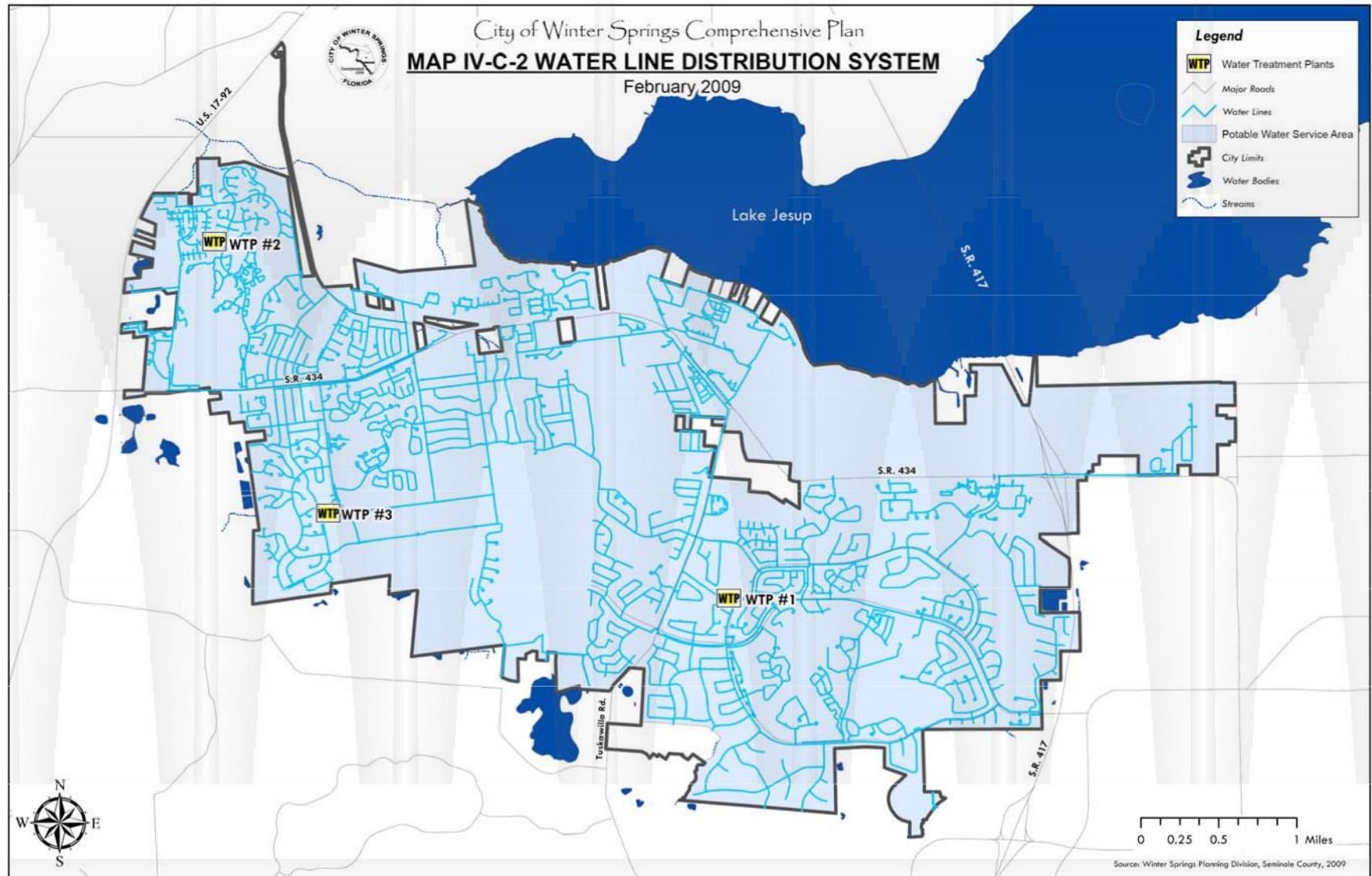
Source: \*Well capacity is permitted for 1200 GPM, but is pumping at 800 GPM; Winter Springs Utility Department, February 2009 and *City of Winter Springs Water Supply Plan 2007* Table 4-2;

The City adheres to the standards adopted for wellhead protection by the SJRWMD and the FDEP, including restricting the type of development allowed in the vicinity of a wellhead and requiring a 500-foot protection zone around each wellhead (see Future Land Use Element).

Land use surrounding a water supply site is a major consideration in the selection and protection of well sites to avoid contamination. As part of the City’s wellhead protection



**Map IV-C - 2: Water Line Distribution System**



plan the City should identify all potential sources of contamination for existing wells. The direction of groundwater flow is to the northeast toward Lake Jesup.

**7. Potable Water Storage Facilities**

The City has four (4) ground storage tanks connected to the central system. The capacity of each storage tank is identified hereinafter:

**Table IV-C - 4: Existing Potable Water Storage Facilities**

Location	Capacity (gallons)	Aerator Capacity (GPM)
WTP #1	1,000,000	3500
WTP #1	500,000	3800
WTP #2	500,000	3800
WTP #3	500,000	3800

Note: All storage facilities are ground storage.  
 Source: *City of Winter Springs Water Supply Plan 2007* Table 4-1.

**8. High Service Pumps**

There are nine (9) high service pumps connected to the central system with a capacity of 21.3 million gallons per day (MGD); however, based on “out of service” criteria (resulting in the largest unit in the system not included in the projections), the capacity is reduced to 16.5 million gallons per day (MGD).

**Table IV-C - 5: Existing High Service Pumping Facilities**

Well Location	Pump Mfg	Model #	Design Output	Head	H.P.	Aux Pwr	Plant Operating Head (psi & feet)
WTP #1	Aurora	6x18	2000	143'	125	565 KW	VFD
	Aurora	8x10x15B	3350	143'	150		62psi
	Aurora	8x10x21	2600	143'	125		143'
WTP #2	Worthington	4LR13 3/8	850	143'	50	Direct Drive on Pump 3. generator connection on Well 3	58-66 psi 143'
	Worthington	6LR13	1000	143'	75		
	Worthington	8LR14	2500	143'	150		
WTP #3	Worthington	6LR13A	1100	143'	100	300 KW Shared w/L.S. 7	56-68 psi 143'
	Worthington	6LR13	1000	143'	75		
	Worthington	6LR13	1000	143'	75		

Source: Winter Springs Utility Department, *City of Winter Springs Water Supply Plan 2007* Table 4-3



**9. Consumptive Use Permit**

Withdrawal of water from the Floridan aquifer is regulated by the SJRWMD, by the issuance of a Consumptive Use Permit (CUP). The City's CUP#8238 was issued by the SJRWMD in October 1996 and expired on October 8, 2006. The City filed an application for CUP renewal prior to the expiration date and the application is under review. The City continues to operate off of the expired permit until a new one is issued. At the time of renewal the City, if eligible, can opt for a 20-year permit. Since the City's adoption of the water restriction ordinance on February 26, 2001, the annual water usage has consistently been lower than the withdrawal allocation allowed by the CUP. Prior to the adoption of the ordinance, the annual usage exceeded the permitted capacity three out of the five years following the issuance of the 1996 CUP. For authorized average and maximum daily withdrawals under the CUP, see Table IV-C - 8: Projected Demand, Facility Capacity, and Permit Conditions.

**Table IV-C - 6: Existing Water Plant Design Capacities**

Location	Well Capacity		High Service		Ground Storage (gallons)	Aerator Capacity GMP
	GPM	MGD	GPM	MGD		
WTP #1	6000*	8.64	7950 (4600**)	11.45 (6.63**)	1,500,000	7300
WTP #2	2200	3.17	4350	6.26	500,000	3800
WTP #3	3500 (1100**)	5.04	3100	4.46	500,000	3800
TOTAL	11,700 (9300**)	16.85 (13.39**)	15,400 (12,050**)	22.17 (17.35**)	2,500,000	14,900
MAX. POPULATION SERVED	68,482 (54,487**)		60,100 (47,000**)		40,700	87,220

\* A new well was added in 2007.

\*\*Based on largest unit in the system "out of service" criteria.

Populations are rounded to the nearest 100 people.

Source: Winter Springs Utility Department, *City of Winter Springs Water Supply Plan 2007* Table 4-4 & Summary

**C. ALTERNATIVE WATER SOURCES**

The City operates two (2) wastewater treatment plants with a combined treatment capacity of approximately 4.082 MGD.

Wastewater is collected, treated, and redistributed for irrigation purposes. In 2008, the reclaimed water system had 1,644 residential connections utilizing a flow of approximately

1.334 MGD, average daily flow. The reclaimed water has also been utilized at one golf course (Tuscawilla Golf Course) a public park, and other urban landscape areas. The system has reduced demands on the City's potable water system.

New development which abuts existing or planned routes of the City's reclaimed water distribution system is required to connect to the City's reclaimed water system. New development is also encouraged to utilize storm water or surface waters for irrigation use, wherever feasible.

The system is currently constrained by the availability of wastewater in proportion to the demand for irrigation water. Current irrigation demand exceeds the amount of wastewater generated by a single family home by as much as four (4) times. Use of secondary sources of water to supplement the system (such as Lake Jesup), will allow expansion of the City's reclaimed water system.

#### **D. CONSERVATION PROGRAMS**

The City has implemented numerous conservation programs:

**Water Restrictions.** The City follows the watering restrictions recommended by the SJRWMD, which prohibit watering between the hours of 10 AM and 4 PM and more than twice a week. An ordinance implemented in 2001 addresses water shortage conditions and watering restrictions that can be imposed by the City. This restriction applies to all water uses including potable, reclaimed water use, surface water and shallow wells. SJRWMD has new watering restrictions effective beginning March 8, 2009. The City is in the process of drafting an ordinance which supports these regulations, along with restricting use of alternative water for irrigation to a similar schedule.

**Conservation Rate Structure.** Since 1998, the City has used a 5-tier water conservation promoting rate structure for the pricing of potable water use. The City also uses a 3-tier rate structure for reclaimed water use. A rate structure study will be completed in 2009 which will adjust water rates for potable, alternative and reclaimed water to support a reduction in potable water use and the implementation of the Lake Jesup Water Augmentation Project. The previous rate structure was adopted in June 2002.

**Reclaimed Water Program.** The City's reclaimed water program and the water conservation benefits of the program are promoted through literature distributed to water customers. New developments are required to construct a reclaimed or other non-potable water distribution system.

Additional water conservation practices that have been implemented include: Conducting an informal leak detection program; Use of billing software to reduce discrepancies in reported gallons billed versus gallons pumped; Requiring compliance with the Florida Building Code standards for low volume fixtures in all new development; Promotion of water efficient landscape and irrigation (Xeriscape™) practices through regulations and education; Providing sites which showcase examples of Waterwise (Xeriscape™) practices; Using native vegetation on public lands as feasible; Providing retrofit kits and making water conservation literature available; and Providing public tours of facilities.

## **E. WATER SUPPLY CONCURRENCY**

In order to ensure that water is available at time of development, a concurrency management procedure has been implemented. This procedure includes the participation of a representative from the City's Utility Department as a participant during development review. This representative addresses availability of potable and reclaimed water to new development, thus ensuring that the approval of development orders are coordinated with the availability of a water supply.

The demand per person for potable water is calculated by taking the volume of water treated and pumped and dividing it by the City's population. The City's consumption rate went from a high of 145 gallons per person per day (GPCD) (1998) to a low of 104 GPCD (2003). Demand can fluctuate considerably depending upon the weather patterns of a given year. An extremely dry year in 2006 increased demand to 135 GPCD though flows dropped back down in 2007 and 2008. This represents the volatility of irrigation demands on the water supply. Expanding the City's Reclaimed Water and Conservation Programs will ensure that the potable water demand is reduced regardless of weather patterns. The City projects that the per person potable water consumption will continue to decrease from historic patterns, given the expansion of the reclaimed water system, conservation programs, and development of infill properties with denser housing configurations, such as townhouses, apartments and condominiums, rather than large lot single family homes.

The City's level of service (LOS) for the potable water supply is a minimum of 115 gallons per person per day (GPCD).

## **F. PROJECTED WATER NEEDS AND SOURCES**

### **1. Population**

Population growth is expected to increase by 1.3 percent per year through 2030. This projection adds 10,148 people to the City from the 2008 population.

Population and corresponding water demand rates are the most important factors in determining the need for additional supply and treatment facilities. Historical rates of water usage were analyzed to better understand demand factors.

### **2. Potable Water Capacity Surpluses and Deficiencies**

As of 2008, the City of Winter Springs's central system is providing 7.913 MGD maximum daily flow. Treatment plants are rated by their ability to serve based on the limiting component. Although the limiting component was previously the storage capacity, the current limiting component is the allowable consumptive use. The storage system has a maximum capacity of 10.1 MGD (maximum daily flow criterion), resulting in an estimated 0.70 million gallons per day of surplus capacity, which is adequate to meet the City's allowable consumptive use. The existing system is able to serve all of the existing residential and non-residential units that are currently connected to private wells. Therefore, the City does not have any capacity deficiencies within the central system.

**3. Future Demand Capacity**

The ability of the City’s system to meet the consumptive demand is controlled by the maximum permitted pumping capacity as limited by the City’s Consumptive Use permit from the St. John’s River Water Management District. SJRWMD has indicated that the permitted supply of groundwater will be frozen at the 2013 level district-wide for subsequent years, based on what the Floridan aquifer can support for the region. However, it is likely, based on City staff’s current CUP negotiations with SJRWMD, that the SJRWMD will authorize the City’s CUP at a rate of 5.1 MGD, a rate similar to the City’s authorized withdrawal rate for 2005.

Future water demand was forecast based on City population projections through 2030. The City has the capacity to service the City’s potable water demands through the projected planning period, while considering the likely CUP limitations, given the expanded use of reclaimed and alternative water to reduce this demand and enables the City to meet its LOS.

**Table IV-C - 7: Projected Water Demands in MGD**

Year	2010	2015	2020	2025	2030
Population	35,857	38,363	40,319	42,376	44,538
Average Daily Flow	5.05	5.31	5.30	5.30	5.30
Max. Day	10.1	10.6	10.6	10.6	10.6
Peak Hour	15.2	15.9	15.9	15.9	15.9

Source: Winter Springs Utility Department, February 2009 and City of Winter Springs Water Supply Plan 2007 Table 5-4

The Schedule of Capital Improvements (SCI) identifies projects scheduled to be completed within the next five (5) years to enable the City to meet its LOS for potable water. Because the City does not have any capacity deficiencies, these projects represent the expansion of the reclaimed water system and provision of an alternative water source. Improvements to provide for facility upgrades or existing maintenance requirements are also included.

**4. Fire Protection**

In addition to domestic and commercial demand, the City considers the adequacy of the water supply and delivery system in terms of its ability to provide fire protection. The City embraces the fire protection standards of the NFPA (National Fire Protection Association) and the ISO (Insurance Services Office). These standards are reflected within the Potable Water Goals, Objectives and Policies.

**5. Performance and Condition of Existing Facilities**

The water quality from the Floridan aquifer is sufficiently good and only requires aeration and chlorination treatment to provide potable water. Each of the City’s three water treatment plants has consistently operated in compliance with all criteria established by the FDEP and the Florida Department of Health with respect to public water supplies.

All three of the City’s water treatment plants (WTP #1, WTP #2 & WTP #3) were constructed in 1972. Each plant continues to be maintained in good operating condition. Repairs and/or upgrades to each plant are performed as required on an individual basis. Each plant should have a minimum remaining useful life of at least 40 years.

The following table summarizes the City’s historical and projected water consumption data based on plant flow records from January 2001 to December 2008 and shows the SJRWMD’s CUP data in comparison to demand. Conservation efforts and an expanded reclaimed water system have led to a general decrease in per capita demand, with the exception of 2006 which was a particularly dry year.

**Table IV-C - 8: Projected Demand, Facility Capacity, and Permit Conditions**

Year	Population Winter Springs Data	Projected Potable Water Use (MGD)	CUP Authorized Withdrawal (MGD)	Surplus (Deficiency)	LOS (115 minimum)
2001	31,864	3.93	4.30	0.37	128
2002	32,082	3.73	4.53	0.80	118
2003	32,572	3.78	4.71	0.93	118
2004	32,955	3.93	4.91	0.98	119
2005	33,321	3.99	5.19	1.20	120
2006	33,971	4.47	5.38*	0.91	132
2007	34,433	4.37	5.38*	1.01	127
2008	34,390	4.73	5.38*	0.65	137
2009	34,895	4.96	5.38*	0.42	142
2010	35,857	5.30	5.38*	0.08	148
2015	38,863	5.30	5.38*	0.08	136
2020	40,319	5.30	5.38*	0.08	131
2025	42,376	5.30	5.38*	0.08	125
2030	44,538	5.30	5.38*	0.08	119

Notes:

\* Currently operating under the 2006 CUP rate of 5.38. Anticipated CUP authorization, once CUP is renewed.

1. Population Data (2001-2008) is based on BEBR projections. Years 2009-2030 based on EAR projections.
2. Projected Water Use is based on Table 2, “Projected Water Use” of the CUP application and includes an allocation for domestic, commercial and light industrial and other water uses.
3. “CUP Authorized Withdrawals” per day were calculated from the annual withdrawals authorized under condition 16 of CUP 8238, which expired October 8, 2006.
4. Flow reductions in “Projected Water Use” are due to conservation and reclaimed water use (1.1 MGD in 2006).
5. Per Person Actual is based on the total water pumped divided by population.

Source: City of Winter Springs Water Supply Plan 2007 Table 5-7.

**Table IV-C - 9: Water Supply Needs and Sources**

Year	Total Projected Water Demand <sup>(a)</sup> (MGD)	Total Projected Supply Groundwater Sources <sup>(b)</sup> (MGD)	Total Projected Supply From Alternative Water Source <sup>(c)</sup> (MGD)	Maximum Potential (d) Reclaimed Water (MGD)	Conservation Program
2010	6.15	5.05	1.33	1.33	Y
2015	6.54	5.30	1.24	2.57	Y
2020	6.72	5.30	1.42	3.55	Y
2025	6.90	5.30	1.60	4.30	Y
2030	6.90	5.30	1.60	4.30	Y

(a) Includes all demands, potable, industrial/commercial, losses and irrigation (reclaimed/augmentation).

(b) Groundwater sources are based on Consumptive Use Permit. Value frozen at 2013 projected level.

(c) Total projected water demand less total projected groundwater sources. Alternate water sources include reclaimed water and augmentation,

(d) This value represents water available for use based on 1.334 MGD reclaimed water utilized today, plus the Lake Jesup augmentation plan/facilities. Source: City of Winter Springs, Reclaimed Water Augmentation Study, September 20, 2005. This includes all phases.

Source: Winter Springs Utility Department, *City of Winter Springs Water Supply Plan 2007* Table 1-1, and Winter Springs Planning Division, February 2009.

**G. FUTURE WATER SOURCES**

Limitations on the Floridan aquifer as a resource require the City to consider alternative water sources. The *2006 Addendum to the SJRWMD's District Water Supply Plan 2005* included alternative water source options for local jurisdictions to consider. Winter Springs is currently in the planning stages of the Winter Springs — Lake Jesup Reclaimed Water Augmentation Project. This project is projected to produce 2.25 MGD. Winter Springs has requested cost-share funding under the Water Protection and Sustainability Program and has been granted \$2.4 million over a three year period. The City's portion of the total construction cost is anticipated at \$6.7 million. Winter Springs has purchased a site for the plant on the south shore of Lake Jesup and in 2006, applied for a CUP (#105763) for the withdrawal of surface water from the Lake to supplement its reclaimed water supply. The CUP application was approved by the SJRWMD in 2007 for 2.25 MGD. The project consists of construction of filtration treatment, two 1.0 MGD ground storage tanks, pumping facilities and high level disinfectant facilities. The facility will be constructed with expansion capacity to provide treated surface water to neighboring entities not in the City's service area, through interconnects based on interlocal agreements. Completion of the initial plant is slated for 2010.

The City is continuing to expand its reclaimed water distribution system. It anticipates supplying approximately 20% of its residents with reclaimed water for landscape irrigation by 2013 and expanding to every single family detached home which is connected to City sanitary sewer service by 2025. Projections for the use of reclaimed water indicate that public reception is above average and that it is a viable source of irrigation water for the City. Reclaimed water reduces demand for potable water and will allow the City to use potable water for new development which is its highest and best use. As reclaimed water becomes available, potable water for irrigation use will be prohibited.

## **H. FUTURE CONSERVATION PROGRAMS**

Conservation Programs can impact public perception and support of good stewardship of water resources. These efforts, however, are not able to be quantified in terms of MGD reductions on a spreadsheet. If they were, they would appear to have only an insignificant impact. Their greater impact is a greater community awareness of the identity of the place in which they reside and how to better sustain it. The following summarizes key areas where the City can make improvements:

**Land Development Regulations.** The City's Land Development Regulations will be revised to reflect best practices in water efficient landscaping and the use of native plant materials.

**Water Conservation Education.** The City's website will be expanded to include information on water conservation. Water conservation materials will be displayed at City Hall. The City will continue to implement examples of water efficient landscapes (Xeriscapes™) as models for the public. The City will consider initiating an award program recognizing best practices in water efficient landscaping within Winter Springs and consider supporting City Staff training and involvement in school programs such as "Drop Savers" and "Project WET".

**Retrofits.** The City will continue its meter replacement program to retrofit meters with unaccounted water loss and consider incentives for retrofitting old plumbing fixtures with low volume fixtures.

**EXHIBIT IV-C-1**



**City of Winter Springs**  
**Water Supply Work Plan, March 2009**  
**(Planning Period through 2030)**

Winter Springs is proposing the ongoing continuation of the progressive plan that it has been implementing since its first purchase of private utilities in 1984. The City's approach to meeting the projected water demand through 2030 is based on sound solutions, both economically and environmentally. The City's projected water demand and water supply sources are provided in Tables IV-C-7; IV-C-8; and IV-C-9 in the Infrastructure Element.

1. Optimize the use of groundwater as a source of potable water, in an environmentally effective manner. (Cross Reference: Conservation Element, Policy 1.2.7; Infrastructure Element, Policies 2.3.2; 2.3.4; 5.1.4; and 2.7.3)

Require connection to the City's central system in areas where potable water lines are within the right-of-way. (Cross Reference: Infrastructure Element, Policy 2.6.6)

Continue meter replacement program to retrofit meters which have unaccounted water loss. (Cross Reference: Infrastructure Element, Policy 2.2.4)

Consider incentives for retrofitting old plumbing fixtures with low volume fixtures. (Cross Reference: Infrastructure Element, Objective 2.7; Infrastructure Element, Policies 2.7.6 and 5.1.6)

2. Implement ordinances that encourage water conservation, Waterwise landscaping and low water use devices, etc. (Cross Reference: Infrastructure Element, Policies 2.7.6; 2.7.8; and 5.1.6)

Revise land development regulations to reflect best practices in water efficient landscaping and the use of native plant materials. (Cross Reference: Infrastructure Element, Policy 2.7.8)

3. Continue implementation of the water rate structure and residential reclaimed water retrofit program to ensure conservation of potable water. (Cross Reference: Infrastructure Element, Policies 2.7.1; 2.7.2; 2.7.5 and 5.1.7; and Conservation Element, Policy 1.2.5)

Optimize participation by prohibiting use of potable water for irrigation use, in areas where reclaimed water is available. (Cross Reference: Infrastructure Element, Policy 2.7.3)



4. Continue to require new development to provide infrastructure for connection to reclaimed water or use surface water from stormwater ponds supplemented with private wells for irrigation. (Cross Reference: Infrastructure Element, Policies 2.7.5 and 5.1.8)

5. Continue evaluation and development of alternative water supplies and/or augmentation sources. (Cross Reference: Infrastructure Element, Policies 2.3.2 and 5.1.7)

Support and continue regional water supply initiatives and cooperative efforts with other jurisdictions. (Cross Reference: Infrastructure Element, Policy 2.3.2 and Intergovernmental Coordination Element, Policies 1.4.6 and 1.4.7)

The City has land available on the shore of Lake Jesup for a secondary (non-potable) water treatment facility, to provide supplemental water to its existing reclaimed distribution system. (Cross Reference: Infrastructure Element, Policies 2.3.2 and 2.7.4; and Schedule of Capital Improvements (SCI) Table IX-1)

6. Seek funding assistance on reclaimed water and alternative water supply programs to reduce burden on customer base. (Cross Reference: Infrastructure Element, Policy 2.3.2)

7. Continue the implementation of water conservation initiatives. (Cross Reference: Infrastructure Element, Objective 2.7 and Policies 2.7.1; 2.7.6; 2.7.8; 5.1.8 and 5.1.9)

Expand website to include information on water conservation. Display and make water conservation materials available at City Hall.

Continue to implement Waterwise landscape demonstration projects as a tool for public awareness.

Consider initiating an award program recognizing best practices in water efficient landscaping within Winter Springs.

Consider supporting City Staff training and involvement in school programs such as “Drop Savers” and “Project WET”.

8. Continue to ensure that existing and future wells are protected from contamination. (Cross Reference: Infrastructure Element, Policies 2.5.7; 2.5.1; 2.5.2; 2.5.3; 2.5.4; 2.5.5; 2.5.6; and Future Land Use Element, Policy 1.2.6)

**I. WATER SUPPLY PROJECTS**

The Schedule of Capital Improvements (SCI) (Table IX-1) identifies projects scheduled to be completed within the next five (5) years to enable the City to meet its LOS for potable water. Because the City does not have any capacity deficiencies, these projects represent the expansion of the reuse system and provision of an alternative water source to reduce dependence upon the Floridan aquifer. Improvements to provide for facility upgrades or existing maintenance requirements are included.

The City is located in an area that the SJRWMD identifies as a priority water resource caution area in the *District Water Supply Plan 2005*. A priority water resource caution area is an area where existing and reasonably anticipated sources of water may not be adequate to supply water for all existing legal uses and anticipated future needs while sustaining water resources and related natural systems through 2025.

<b>Project Name</b>	<b>Winter Springs - Lake Jesup Reclaimed Water Augmentation Project (DWSP Project #58)</b>
Responsible Agencies	City of Winter Springs SJRWMD
Funding Sources	City of Winter Springs Florida Water Protection and Sustainability Program
Estimated Project Cost	\$6.7 million (City capital costs)
Purpose of Project	Reuse augmentation project- to augment and expand the use of reclaimed water for irrigation purposes, as a means of reducing demand on potable water
<i>Project Development Phasing</i>	
Planning	2006
Engineering & Design	2008-2009
Permitting	2009
Construction	2010 (initial plant construction)
Operation & Maintenance	\$0.15 (in Millions per Year)
Unit Production	\$0.75 (per 1000 gallons)
Capacity ADF	2.25 MGD

## **IV-D. SOLID WASTE SUB-ELEMENT**

### **A. INTRODUCTION**

The collection and disposal of solid waste is necessary for the protection of public health, safety and welfare. In 1976, the federal government passed the Resource and Recovery Act, which empowered the Environmental Protection Agency to regulate hazardous waste and develop minimum standards for land filling solid waste. In 1980, Congress passed additional legislation, which empowered the EPA to directly respond to chemical spills or the release of hazardous substances.

Also in 1980, the State of Florida passed the Florida Resource Recovery and Management Act. This Act established hazardous waste definitions, established a permitting system, required monitoring, and provided funds for clean-up efforts. In 1988, the Florida Solid Waste Management Act was established. The Act required recycling programs and a reduction of the solid waste stream, as well as banning disposal of specified items in landfills.

Seminole County operates two solid waste facilities - Osceola Road Solid Waste Management Facility (OLF) and the Central Transfer Station (CTS). The City contracts garbage and refuse collection service for residential, commercial, and industrial customers. Waste Pro currently provides the City with solid waste collection and recycling services. Household hazardous waste is accepted at the County facilities.

### **B. SOLID WASTE FACILITIES INVENTORY**

Seminole County operates a "Class I" landfill facility as permitted by the Florida Department of Environmental Protection (FDEP). The OLF comprises over 6,000 acres and is located in Geneva, Florida. The CTS is located off of SR 419 near the municipal boundaries of the City where approximately 80% of the County's waste is transferred. The City has an interlocal agreement with the County from January 2006, in which the City commits to utilize the OLF for its residential and commercial solid waste disposal for a period of ten years. Seminole County agrees to maintain its disposal facilities to ensure adequate capacity for all of the City's solid waste disposal needs. This includes residential waste, garbage, white goods, yard waste, recycling and household hazardous waste from City residents, and offers mulch and compost free of charge. The interlocal agreement does not require the disposal of construction and demolition debris at the OLF.

#### **1. Operational Responsibility**

The City provides solid waste collection services for both residential and commercial users through Waste Pro, a private hauler. The current franchise agreement with Waste Pro is for a five year period and expires on February 28, 2011. The agreement includes the collection and disposal of bulk trash, refuse, vegetative waste, recyclable materials, white goods, and construction and demolition debris from residents, businesses, and other entities within the municipal boundaries of the City. To meet compliance with the State resource recovery statute, the City has also enacted policies for the collection and reclamation of aluminum, glass, plastic, and newspaper products. The General Services Administrator is responsible for monitoring the City's solid waste franchise and Seminole County is responsible for the operation of the landfill.

## **2. Service Area and Predominant Users**

The service area for the City includes all residential and non-residential users within the municipal boundaries. The County landfill facility accepts solid waste from City garbage collection operations, as well as garbage from other Seminole County cities, private citizens, and private haulers operating in Seminole County.

At the present, approximately 11,224 households utilize refuse collection services. The City bills these customers each month along with their water/wastewater charges. There are approximately 240 commercial and industrial customers within the municipal boundaries. Included in this classification are condominiums, apartment complexes, and other multi-family residential developments that are serviced by dumpsters and billed directly to the company. The Seminole County Landfill also serves customers outside of the municipal boundaries.

## **3. Solid Waste Facility Design and Capacity**

The OLF property extends over 6,000 acres. It is a Class I landfill with a natural clay liner. Phase I of the landfill is capped at 131 feet high. Phase II is the active landfill and is currently 73 feet high. Phase III will tie Phases I & II together and be 270 feet high. Gas Recovery and Leachate Removal Systems are installed on the site. The OLS is classified by the State Department of Environmental Regulation (DEP) as a "Class I" landfill. A "Class I" landfill accepts municipal solid wastes, including garbage, refuse, and dried sludge. Construction and demolition (C&D) debris and white goods are not accepted at the CTS, and such material is required to be separated out and disposed at the OLF, located in Geneva, Florida.

The OLF consists of an administrative office, truck maintenance facility, white goods recycling area, tire processing facility, yard waste processing facility, as well as recycling and household hazardous waste drop off facilities. These facilities were created as a result of landfill bans on white goods, tires and yard waste.

In addition to the OLF, Seminole County operates the CTS. The location of landfill sites and other solid waste facilities in Seminole County is presented on Map IV-D-1.

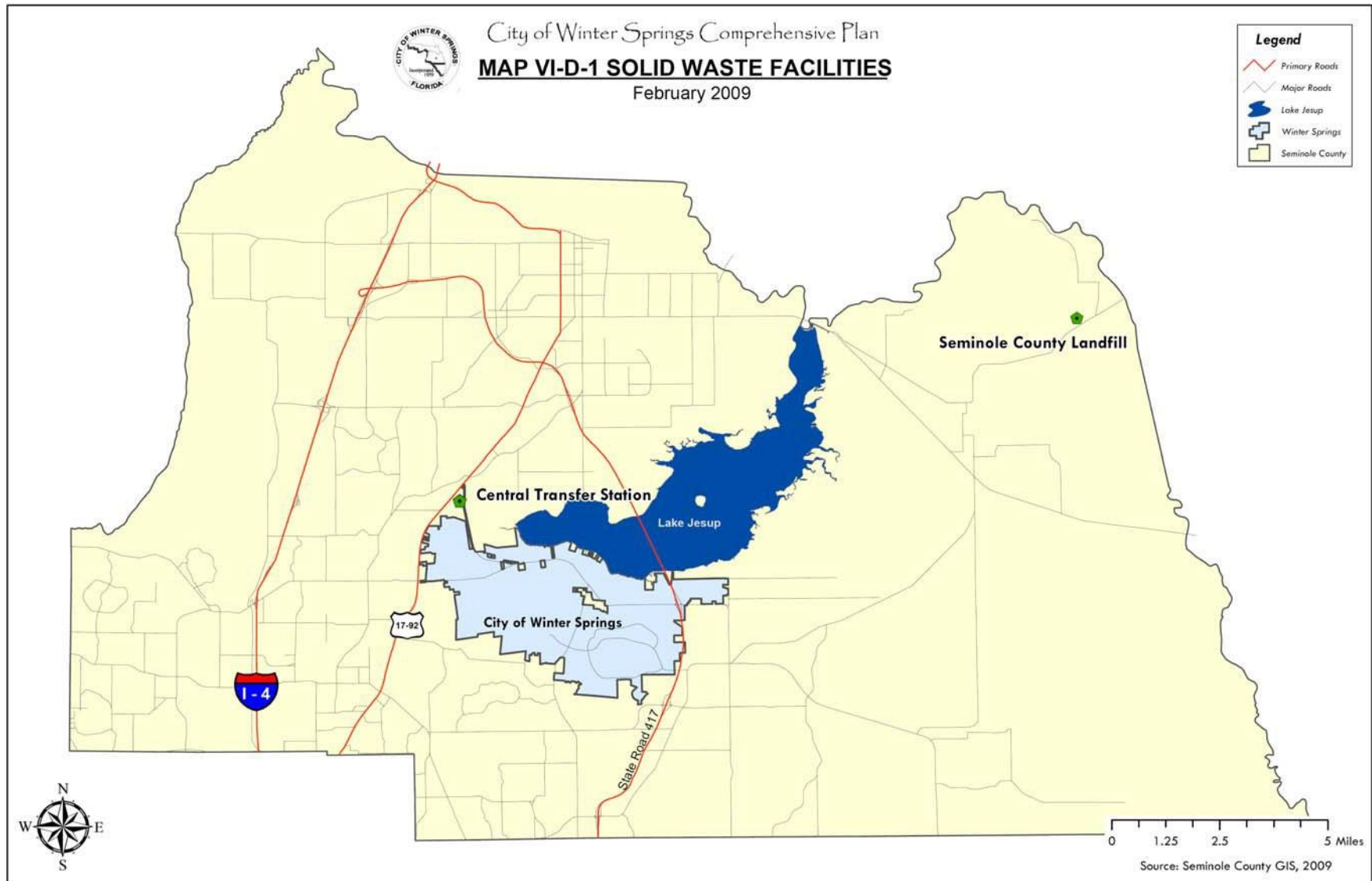
Eighty percent of all the solid waste generated in the County is delivered to the CTS. The other 20% is delivered directly to the OLF.

The CTS is a three-story building consisting of administrative offices, the solid waste tipping floor, transfer trailer tunnel, the Small Material Recovery Facility, and the Recycling and Household Hazardous Waste Drop Off Facilities.

## **4. Environmental Compliance, Assistance and Pollution Prevention Program**

The Environmental Compliance, Assistance and Pollution Prevention Program (ECAP3) is part of the Seminole County Environmental Services Department, Solid Waste Management Division (SWMD). The ECAP3 Team consists of the Environmental Programs Manager, a Compliance Coordinator, two Environmental Program Coordinators and a Household Hazardous Waste Technician. The goal of the program is to protect the citizens, employees, environment and County Landfill from exposure or contamination due to improper management and disposal of hazardous waste or other regulated waste. The program is supported by the Seminole County Solid Waste Management Division through

Map IV-D - 1: Solid Waste Service Area and Facilities



normal tipping fees. The only costs passed on to customers are those for disposal of hazardous waste and E-scrap generated by businesses. The ECAP3 Team typically deals with hazardous and other regulated chemical types of wastes. Programs do not normally include hazardous materials that are considered a product, biomedical waste or domestic waste. The ECAP3 provides the following programs:

a. Small Quantity Generator Compliance Assistance Program

The Small Quantity Generator (SQG) Compliance Assistance Program conducts compliance assistance visits (CAVs) at businesses and government facilities that potentially generate hazardous waste or other regulated wastes. The CAV:

- Determines how the facility manages and disposes of regulated waste;
- Determines if there are illicit discharges as stipulated in the County's NPDES permit;
- Advises facility operators of changes that are needed to ensure compliance with regulated waste rules;
- Offers suggestions for pollution prevention that can save the facility money;

Examples of facilities visited:

Vehicle Repair Shops	Paint & Body Shops
Dry Cleaners	Furniture Finishers
Pest Control Companies	Photo Processing
Medical Practices	Manufacturing/Processing
Laboratories	Printers
Parks Maintenance	Municipal Maintenance Shops

- Investigates citizen complaints related to environmental issues involving either businesses or private households.
- Responds to major spills and releases to ensure they are cleaned up and remediated properly. These are typically incidents that go beyond the scope of Fire and Rescue's Special Hazards and Operations Team (SHOT) and require that the responsible party hires an environmental contractor to complete the cleanup.

b. Household Hazardous Waste Programs

The Household Hazardous Waste (HHW) Programs offers private households a means to properly dispose of their hazardous wastes at no cost. A permanent HHW Collection Center is operated at the CTS from 7:30 am to 5:30 pm, Monday through Saturday. The wastes are sorted and stored until picked up by the hazardous waste contractor.

Household Hazardous Waste includes:

Paint	Solvents
Pesticides	Pool Chemicals Rechargeable
Batteries	Lead-Acid (Automotive) Batteries
Used Oil & Filters	Other Automotive Fluids

Mercury containing devices such as mercury thermometers or thermostats, fluorescent lamps and compact fluorescent lamps

- The *E-scrap Program* provides citizens with a means to recycle end-of-life electronics at no cost. It is located at the CTS with the same hours as the HHW Center. The items are sorted and stored until picked up by the E-scrap recycling contractor. The major environmental concern with E-scrap is lead and other heavy metals.

E-scrap includes:

Televisions	DVD Players & Video Recorders
Computers/Laptops	Monitors
Printers	Copiers/Copiers/Fax Machines

- The *Sharps Program* provides citizens that take medication by injection at home a safe and convenient means to properly dispose of used needles, lancets, etc. at no cost. Citizens can pickup and return sharps containers at a number of locations throughout the County, including all Fire Stations.
- *Waste Tire Amnesty Days* provide non-business residents an opportunity to dispose of up to 10 old tires for free. Four Tire Amnesty events are held each year. (Private citizens and businesses can dispose of waste tires at any time for a charge.)
- Special collection events for businesses, government entities and non-profit organizations to dispose of E-scrap and hazardous waste are held throughout the year. The customers are responsible to pay all costs directly to the contractor. (FDEP regulations require that facilities meet the criteria of a Conditionally Exempt Small Quantity Generator in order to transport their own hazardous waste and participate in such collection events for hazardous waste. These regulations do not apply to transporting E-scrap.)

c. Environmental Compliance and Training

Environmental Compliance and Training includes the following services:

- Ensures the SWMD facilities meet the rules and regulations of the Florida Department of Environmental Protection (FDEP), USEPA, other regulatory agencies and all related permits.
- Oversees and coordinates the SWMD Special Waste Program (SWP). The purpose of the SWP is to determine, on a case by case basis, if wastes that are not normal municipal solid waste will be accepted at SWMD facilities. Examples of special wastes include: manufacturing-processing wastes, sludges and contaminated soil.
- Assists other county and city agencies with waste determinations, disposal of hazardous waste and other environmental compliance matters.
- Coordinates the Seminole County Environmental Task Force. The Task Force meets every other month and consists of representatives from ECAP3, Stormwater, Mosquito Control, Planning & Development, Tanks-Petroleum Cleanup, Fire Department, Sheriff's Office, Code Enforcement, FDEP,

Bureau of Emergency Response, FDEP Criminal Investigation and cities within the county. The purpose of the Task Force is to discuss and coordinate on-going and/or difficult environmental cases, share information and minimize duplication of effort.

- Provides Environmental Awareness and Compliance Training for County employees. Typically 300 to 400 employees are trained per year.
- Provides environmental training to governmental entities and local businesses through participation in the Metropolitan Environmental Training Alliance (METRA).
- Conducts public outreach and training to schools, citizen groups, other municipalities within the county, etc.
- Provides support as stipulated through the NPDES permit held by the County and seven cities. This support includes:
  - Inspecting for illicit discharges conducted during CAVs.
  - Investigating citizen complaints that may affect stormwater.
  - Responding to spills and other emergency events that may affect stormwater or have other environmental impact.
  - Protection of the environment as provided through the HHW programs.
  - Training – Most of the training includes stormwater topics.

This information is included in the annual NPDES reports submitted by the County and cities.

## **5. Recycling Program**

Pursuant to Chapter 403, Florida Statutes, the City committed to a recycling program in 1991. The goal of the recycling program was to reduce the amount of solid waste disposed in the landfill by thirty percent (30%). The City successfully reduced the waste stream by over 30 percent. Although no longer mandated by Florida Statutes, the City continues to support a reduction in waste disposed in the landfill by providing the following alternatives:

- Recycling of newspaper, glass, plastic and aluminum; and
- Removing yard trash, tires, white goods, and construction and demolition debris from the landfill disposal waste stream.

Recycling requires the collection, storage, and final disposal of newspapers, glass, plastic and aluminum. This collection has resulted in an average net tonnage of approximately 133.32 average tons per month being removed from the landfill waste stream.

The City presently provides weekly household curbside pickup of newspapers (and inserts), glass (clear, green and brown), plastics (1-7), aluminum cans, steel and tin household cans, brown paper grocery bags, pasteboard and cardboard. The County



recycles 100% of the tires received at the OLF for mulch, playground equipment and other uses.

Yard waste is collected and processed at the OLF. It is stored at its own facility at the OLF where it is run through a tub grinder to form mulch. This mulch is free for residents 7 days a week.

White goods (i.e. appliances) are received at the OLF. They are banned from the landfill, yet are accepted in the recycling area. Once at the recycling area, refrigerants such as Freon are recovered from all applicable appliances, then the white goods are recycled by a scrap metal dealer.

## **C. SOLID WASTE FACILITY NEEDS ANALYSIS**

### **1. Existing Demand Surpluses and Deficiencies**

In 2008, the City was generating, on average, 48 tons of residential municipal solid waste per day and 12.61 tons of commercial solid waste per day. This amount includes residential and commercial solid waste; however, it excludes hazardous wastes, yard waste, white goods and construction and demolition material. The estimate of tons per day was calculated from an analysis of the Solid Waste Division Tonnage Report for the OLF.

The County's LOS adopted in their EAR-Based Comprehensive Plan Amendments (December 2008) is 4.2 lbs per person per day for OLF and 4.3 lbs per person per day at the CTS. This amount includes municipal residential, commercial, and industrial garbage collections, as well as sources from outside the City.

The remaining life of was determined based upon the existing grading and the proposed final grades of the Landfill. The results showed that in 2000, the OLF had 82.2% of its remaining volume available, which equated to 36,979,407 cubic yards.

### **2. Future Demand Capacity**

In 2002 Seminole County renewed its landfill permit. The current design capacity is estimated to be 45 million cubic yards.

Table IV-D-2 presents projected annual tons of solid waste generated by the City through the year 2030. Based upon the data on the remaining landfill capacity, the OLF has adequate volume to accept solid waste at existing rates well beyond the end of the 2030 planning period.

### **3. Performance and Condition of Existing Solid Waste Facilities**

There have not been any problems with leakage at the Landfill. Monitoring is an on-going process.

### **4. Solid Waste Facility Replacement, Expansion and New Facility Siting**

The County's landfill is anticipated to have adequate capacity well beyond the planning horizon. Even with projecting disposal capacity to 2030, the OLF should still have more than 50% of its disposal capacity available. Pursuant to Chapter 403, Florida Statutes,

the County is responsible for solid waste disposal unless there is an interlocal agreement, which gives municipalities the authority to operate and be responsible for solid waste disposal.

**Table IV-D - 1: Capacity, Demand and County Level of Service**

	Current 2008	Projected 2013	Projected 2030
<b>A. CENTRAL TRANSFER STATION</b>			
1 Starting Daily Processing Capacity	1,900	1,900	1,900
2 Daily tonnage processed through CTS (1)	900	1,006	1,071
<b>3 Surplus/(Deficit)</b>	<b>1,000</b>	<b>894</b>	<b>829</b>
<b>B. OSCEOLA LANDFILL</b>			
1 Starting Disposal Capacity	23,900,000	22,224,945	16,997,280
2 Annual tonnage disposed in OLF	320,000	357,527	380,791
<b>3 Disposal Surplus/(Deficit)</b>	<b>23,580,000</b>	<b>21,867,418</b>	<b>16,616,489</b>
<b>C. TOTAL MUNICIPAL SOLID WASTE</b>			
1 Annual tonnage disposed in OLF	320,000	357,527	380,791
2 Annual tonnage recycled/diverted by/from CTS/OLF	70,000	78,209	83,298
<b>3 Total Reported MSW</b>	<b>390,000</b>	<b>435,737</b>	<b>464,089</b>
<b>D. LEVEL OF SERVICE (2)</b>			
1 Service area population (Total county population)	415,876	446,291	500,582
2 CTS Processing LOS (lbs/cap/day)	4.3	4.3	4.3
3 OLF Disposal LOS (lbs/cap/day)	4.2	4.2	4.2
4 Recycled/Diverted (lbs/cap/day)	0.9	0.9	0.9
<b>5 Total Daily MSW Production (3+4)</b>	<b>5.1</b>	<b>5.1</b>	<b>5.1</b>

Note: In reviewing the Seminole County population projections for 2008, 2013, and 2030, the figures for 2008 and 2013 were actually less than shown in SOL Exhibit 2 for 2006 and 2011. Therefore, no extrapolation is needed and the only numbers adjusted in this table are the service area population (D1) for 2008 and 2013.

(1) Disposal, recycle, diverted

(2) The 2006 EAR LOS figures are used until recalculated at the next EAR, per Seminole County Policy SOL 3.1.

SOURCE: Seminole County Comprehensive Plan, Solid Waste (SOL) Exhibit 2.

**Table IV-D - 2: City of Winter Springs Solid Waste Collection**

<b>Year</b>	<b>2008</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
Population	34,390	35,857	38,363	40,319	42,376	44,538
Solid Waste Tonnage per Year*	17,509	18,257	19,533	20,528	21,576	22,677
Recycle Tonnage per Year	1,588	1,656	1,772	1,862	1,957	2,057
Remaining Total Landfill Volume (%)	75.0%	73.2%	68.7%	64.2%	59.7%	55.2%

\*Residential and Commercial Customers

Source: Winter Springs Planning Division, February 2009

## **IV-E. DRAINAGE SUB-ELEMENT**

### **A. INTRODUCTION**

The City of Winter Springs is committed to maintaining the quality of its surface waters. The purpose of this element is to provide analysis of the available data regarding the surpluses and deficiencies of the existing drainage infrastructure serving Winter Springs' residents so the City can adequately plan for the requirements of the projected population and future land use needs. The following analysis will lay the foundation for goals, objectives, and policies, which will ensure that drainage and stormwater management needs are met throughout the planning timeframe.

To adequately regulate stormwater, it is necessary to manage both the quality and the quantity of rainfall and runoff. In addition to abatement, it is necessary for drainage facilities to serve other important functions such as water quality management and aquifer recharge. Management of stormwater is important in maintaining the water quality of the City's lakes, creeks, and wetlands. Stormwater can carry a number of pollutants and is responsible for over half the pollution load entering Florida's waters. Currently, stormwater runoff is an issue of local concern for the City.

The incursion of development involves the placement of streets, sidewalks, buildings, and parking lots over soils and native vegetation. As a result, stormwater, which would naturally percolate into the ground, runs off of the impermeable surfaces, carrying with it litter, pesticides and fertilizers, heavy metals, and other pollutants. In more densely developed areas, pollutants such as oil and gasoline can be washed off in to the streets. While in more rural areas, agricultural runoff can contain excessive nutrients, which are harmful to fish and can pollute drinking water. Therefore, it is important for the City to ensure that development takes place in a manner that is consistent with the appropriate management of stormwater. The appropriate management of stormwater involves: treatment of stormwater prior to discharge into surface waters, flood water abatement to ensure that post-development run-off does not exceed pre-development runoff, and design of stormwater facilities to promote recharge to the underlying aquifer system.

To protect the quality of surface waters, the federal government enacted Section 208 of the Water Pollution Control Act for stormwater management. Additionally, Section 405 of the federal 1987 Clean Water Act requires the Environmental Protection Agency (EPA) to establish permit regulations for stormwater. A National Pollutant Discharge Elimination System (NPDES) permit program has been established by the EPA for municipal and county stormwater systems. Phase I of the program addresses cities and counties with over 100,000 persons. Seminole County was designated a Phase I entity in 1998. The City is part of a joint permit with Seminole County and has been participating in the NPDES program for approximately 10 years. Initial involvement consisted of data gathering and analysis. The State of Florida addresses surface water management in Chapter 62-40 Florida Administrative Code (F.A.C.) and defines permit requirements and management responsibilities in Chapter 62-25 F.A.C. One of the primary concerns of the State rule is to be prepared for repeat storm events. Many facilities within the State were only designed to adequately treat the first storm. The State emphasizes that capacity must be available 72 hours after the initial storm.

The Water Management Districts regulate stormwater management systems via Chapter 40C-42 F.A.C. The Water Management Districts require capturing and treatment of the first flush of stormwater in ponds or swales. The first flush is known to generally contain the majority of the pollutants.

The City has a Stormwater Master Plan (Plan), which was adopted in October 1993. An update to this document, Supplement 1 (Supplement) was prepared in 2005 to identify and describe new projects that require attention for the future. The Plan and Supplement are an example of responsible commitment to progressive City planning and resource management. These documents include discussions of site-specific drainage basin parameters used in the analysis; techniques applied; results of the hydrologic and hydraulic analysis; identification of stormwater facility capacities, deficiencies, and surpluses; specific improvement alternatives and prioritization of recommended improvements; funding evaluation and recommendations; and lastly, a proposed 10-year Capital Improvements Plan.

Discussion in these documents principally concentrates on the broad analysis of the primary drainage systems and on a detailed analysis of 6 selected secondary drainage systems, which are tributaries to the primary streams. An analysis includes identification of specific areas and projects, which will alleviate flooding and improve water quality. The Supplement also describes the National Pollution Discharge Elimination System (NPDES) program.

The topography in Winter Springs is relatively flat with some gently rolling hills, ranging from a low of 3 feet above mean sea level to 78 feet above mean sea level. Map IV-E-1 identifies the general topography in Winter Springs.

## **B. STORMWATER FACILITIES INVENTORY**

The majority of the inventory and data in this section was derived from the City's 1993 Stormwater Master Plan prepared by Conklin, Porter & Holmes Engineers, Inc. and Gee & Jenson Engineers-Architects-Planners, Inc. and the 2005 Supplement 1, also prepared by Conklin, Porter & Holmes Engineers, Inc..

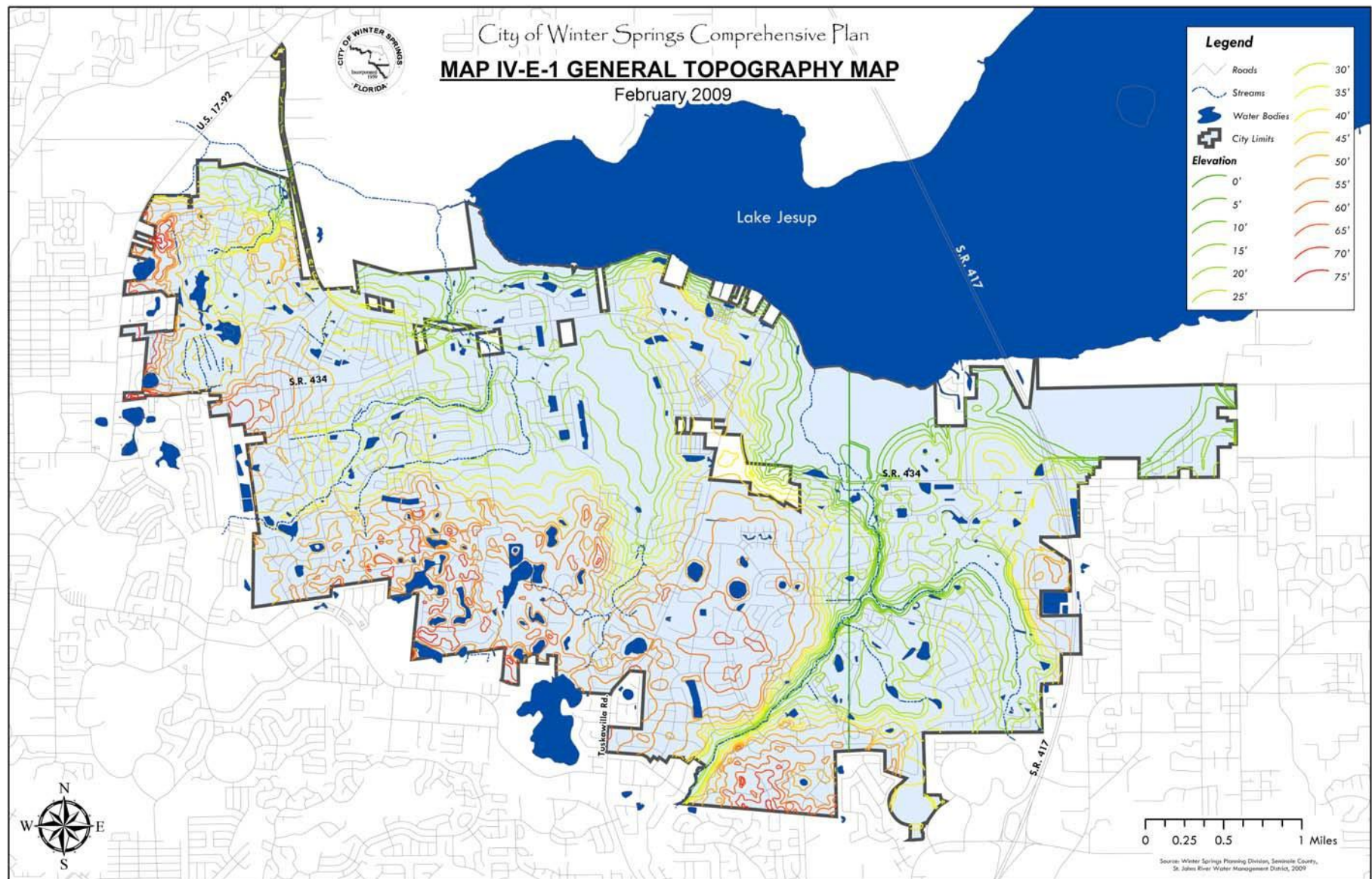
### **1. Operational Responsibility**

The City of Winter Springs, the State of Florida, the Florida Department of Transportation (FDOT), Seminole County, and SJRWMD are ultimately responsible for maintenance and permitting of the stormwater conveyance systems within and surrounding the City limits. State Roads, such as S.R. 434 and S.R. 419, which traverse the City, are completely under the jurisdiction of the FDOT. All stormwater facilities associated with these two State highways are designed, maintained, and controlled by the FDOT. Tuskawilla Road, which traverses the City in a north/south direction, is completely under the jurisdiction of Seminole County. All stormwater facilities associated with County roads are designed, maintained, and controlled by Seminole County. In addition to these publicly owned drainage facilities, the City includes more than 25 privately owned drainage facilities which are operated and maintained under a SJRWMD Stormwater Permit by either a private company, individual, or homeowner's association.

### **2. Geographic Service Area**

The City lies within three primary drainage basins served by, Gee Creek, Soldier Creek (a.k.a. Soldier's Creek), and Howell Creek, all of which extend well beyond the City's corporate limits. The Gee Creek and Soldier's Creek drainage basins are situated in the western sector of the City, while the Howell Creek drainage basin is situated in the eastern sector. Gee Creek, Howell Creek, and Soldier's Creek drain into Lake Jesup, which in turn,

Map IV-E - 1: General Topography Map



flows into the St. Johns River. The St. Johns River flows northward where it enters the Atlantic Ocean. These primary drainage basins are depicted in Map IV-E-2. A brief description of each primary drainage basin is provided below.

The topography of Howell Creek Basin is relatively flat with some gently rolling hills, and in some areas there are swamps and sinkholes. The Howell Creek Basin is located in both Orange and Seminole Counties and has a basin area of 45.5 square miles. The headwaters of Howell Creek originate in Lake Maitland, which receives inflows from three chains of lakes via ponds. The creek then flows northeasterly through Lake Howell and continues to meet Bear Creek near Winter Springs Boulevard. The convergence occurs approximately 2 miles upstream from Lake Jesup. The headwaters of Bear Creek are located in Bear Gully Lake, which receives inflows from other lakes.

The drainage area of Gee Creek is approximately 11.79 square miles and has six significant tributaries, all of which are located outside of City limits. A major portion of the City of Winter Springs, from Tuskawilla Road west, drains to this creek.

Soldier's Creek Basin consists of approximately 19 square miles of west central Seminole County and encompasses portions of the City's of Lake Mary, Longwood, Sanford, as well as unincorporated Seminole County. Only a small portion of the City of Winter Springs, located in the northwest, drains to Soldier's Creek.

The scope of the Plan was limited to a general analysis of the three primary drainage basins based upon review of previous studies. Additionally, a detailed analysis of 6 selected secondary drainage basins located within and encompassing a portion of the City was performed. All six of these basins are tributaries to the three primary streams. These selected secondary systems are depicted in Map IV-E-2: Primary Drainage Basins and are identified below:

- a. Soldier's Creek Basin, Secondary Basin System 1 (Lake Audubon/Highlands Creek) – This basin is approximately 1.59 square miles and includes an area south of S.R. 434, the Winter Springs Golf Course, the Highland PUD, and an area west of the Highlands to US 17-92. The system discharges into Soldier's Creek via an existing creek, which flows northeasterly.
- b. Gee Creek, Secondary Basin System 2 (No Name Creek) – This basin is approximately 1.10 square miles and includes the easterly portion of the Ranchlands, a portion of the Mt. Greenwood PUD, and portions of North Orlando sections 2A, 9 and 10. The system discharges via an existing creek which drains easterly from the North Orlando Ranches and then northerly to Gee Creek.
- c. Gee Creek, Secondary Basin System 3 (Little Lake Howell) – This basin collects runoff from approximately 3.34 square miles and includes the southeast portion of the Ranchlands, Dunmar Estates, all of Oak Forest, a portion of Tusawilla located east of Tuskawilla Road, and the dense vegetative hammock north of Oak Forest and South of SR 434/419. This basin discharges through an existing creek into No Name Creek.
- d. Howell Creek Basin, Secondary Basin System 4 (Tusawilla Golf Course/Undeveloped Lands) – This system discharges via an existing 48" culvert under Greenbriar Lane and a connecting ditch into Howell Creek. It serves as the positive outfall for the area including Chelsea Parc, Glen Eagle Units 1, 2, 3 and 4; Tusawilla Unit 7; Fairway Oaks; Chestnut Ridge; Winter Springs Unit 3;

Greenbriar Lane; Northern Way; Tuscawilla Golf Course, and an offsite area discharging through an 18" culvert under Northern Way.

- e. Howell Creek Basin, Secondary Basin System 5 (Tuscawilla Unit 14A) – This system provides a positive outfall for a portion of Tuscawilla Unit 14. The system provides stormwater treatment and attenuation within an individual retention area prior to discharge through a control structure and into Bear Creek. Bear Creek drains northerly and into Howell Creek.
- f. Howell Creek Basin, Secondary Basin System 6 (Tuscawilla Units 11B and 12A) – This system is divided into two separate drainage areas, approximate total basin size of 51.44 acres, which drain into two common retention ponds. These ponds provide stormwater treatment and attenuation prior to discharge through control structures which outfall into an existing swale, which flows to Bear Creek and ultimately Howell Creek.

Additionally, approximately 5 acres of the City of Oviedo, in the area of Winter Springs Boulevard, drains into stormwater facilities owned and operated by the City of Winter Springs.

### **3. Capacity and Level of Service**

The areas of Winter Springs that have a paved infrastructure system under the control and maintenance of the City and have a stormwater management system with a design capacity to handle a 25-year, 24-hour storm event represent approximately 59% of the City's overall area. Approximately 95 percent of the City's drainage facility capacity is apportioned to the City; the remainder serves the cities of Oviedo and Casselberry.

The 10-, 25-, and 100-year, 24-hour storm events were considered in the analysis of the City's six (6) drainage basins (Soldiers Creek, Gee Creek, No Name Creek, Howell Creek, Bear Gully Creek and Sweetwater Creek). These storm events were selected by the City's staff to evaluate the LOS of the City's drainage basins. The approximate LOS for the City's six (6) drainage basins was determined as required by Chapter 9J-5, F.A.C. The LOS for the analysis of the secondary basins was assigned as summarized below:

- LOS A – Protection from 100-year, 24-hour storm event
- LOS B - Protection from 25-year, 24-hour storm event
- LOS C - Protection from 10-year, 24-hour storm event
- LOS D - Flooding from 10-year, 24-hour storm event

The recommendations of the SJRWMD were utilized in the Plan and Supplement to evaluate the LOS standards of drainage facilities in the City. The LOS for structures asserts that all existing structures should be free from flooding during a 100-year storm event. The LOS for roadways requires that drainage facilities for arterial roads will be designed to carry a 100-year storm event; collector and neighborhood roads will be designed to carry a 25-year storm event, per City Code.

Four flood levels for residential street systems were defined in the Stormwater Master Plan for use in the evaluation of the City's stormwater management facilities as follows:

- Flood Level 1 – Water surface at or below street grade.
-



- Flood Level 2 – Water surface above street grade, but below 6-inch depth of ponding.
- Flood Level 3 – Water surface depth greater than 6 inches above street grade, but below 12 inches.
- Flood Level 4 – Water surface depth greater than 12 inches above the street grade.

The recommendations of the SJRWMD were utilized in the Plan and Supplement to evaluate the LOS standards of drainage facilities in the City. The LOS for structures asserts that all existing structures should be free from flooding during a 100-year storm event. The LOS for roadways requires that drainage facilities for arterial roads will be designed to carry a 100-year storm event; collector and neighborhood roads will be designed to carry a 25-year storm event, per City Code.

Four flood levels for residential street systems were defined in the Stormwater Master Plan for use in the evaluation of the City's stormwater management facilities as follows:

- Flood Level 1 – Water surface at or below street grade.
- Flood Level 2 – Water surface above street grade, but below 6-inch depth of ponding.
- Flood Level 3 – Water surface depth greater than 6 inches above street grade, but below 12 inches.
- Flood Level 4 – Water surface depth greater than 12 inches above the street grade.

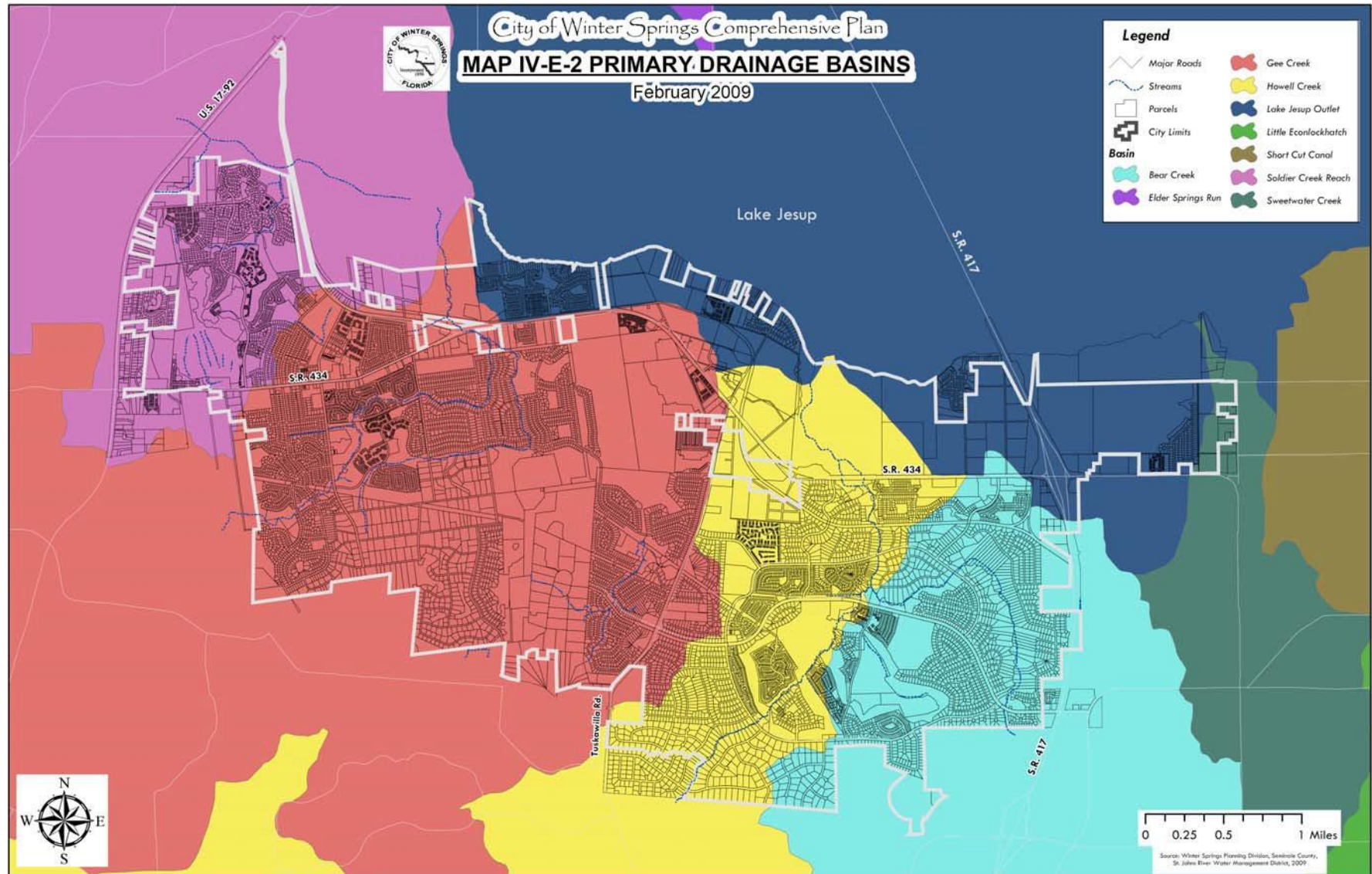
### **C. STORMWATER FACILITY CAPACITY ANALYSIS**

Winter Springs has several creeks, stormwater ponds, and drainage ditches within City Limits, some of which experience problems of flooding.

In September 2007, FEMA issued new Flood Insurance Rate Maps. (The previous map update was in 1995.) Chapter 8 of the City Code has been amended to be consistent with the new maps. Approximately 8% of the City's land area exists within Flood Zones A or AE, representing areas of 100-year flooding as identified by National Flood Insurance Maps. Flood zone maps may be found in the Conservation Element of this Plan. Strict adherence to the National Flood Insurance Program criteria is important to flood insurance rates within a jurisdiction as well as protection of life and property. All new development including building permits are reviewed for compliance with the City's flood plain management ordinances.

Florida Department of Environmental Protection (FDEP) and St. Johns River Water Management District (SJRWMD) have established Total Maximum Daily Load (TMDL) standards for water bodies in the central Florida area. The TMDL Program is a federally required water quality program administered by the FDEP under the Florida Watershed Restoration Act (Section 403.067, F.S.). The TMDL program will be incorporated with the current NPDES program. The City is currently completing a TMDL Master Plan which includes compliance options and an evaluation of each option's cost effectiveness.

**Map IV-E - 2: Primary Drainage Basins**



The TMDL program establishes water quality targets or pollutant load limits that indicate how much of a pollutant level can go into a receiving water body. In 2007, Seminole County and its municipalities approved an interlocal agreement to streamline TMDL intergovernmental cooperation and funding opportunities. The TMDL Master Plan will identify upstream water quality improvement projects for the City to consider in meeting its participation requirements toward the eventual cleanup of receiving water bodies, such as Lake Jesup.

### **1. General Performance and Problem Areas**

The Plan and Supplement identified a number of problem areas in the City that have experienced stormwater-flooding in the past. These areas were identified to bring attention to them in an effort to gain a better understanding of the existing drainage system conditions. Presented below is a listing of the identified problem areas:

- Winter Springs Boulevard Bridge crossing Bear Creek
- Northern Way Bridge Crossing Howell Creek, north of Winter Springs Boulevard
- Northern Way & Woodchuck Court
- Stormwater ponds along Seneca Boulevard
- Bridges crossing Gee Creek
- Oak Forest Units 1 through 4
- North Orlando Ranches sections 1, 2 & 2A, and 6
- Highlands section 1
- North Orlando Terrace section 5
- 434 & Parkstone/Winding Hollow Intersection

Additionally, the study of the six secondary drainage basins within the City identified specific drainage facilities with existing deficiencies and various alternatives, for correcting the deficiencies. A detailed account of prioritized improvements and cost estimates is included in the 10-year Capital Improvements Plan included in the 2005 Supplement.

Continuing annual minor renewal and replacement improvements on a system-wide basis is required in addition to the major capital improvements plan. These improvements might include repair of minor stormwater deficiencies not included as a major capital improvement, but commonly occur throughout the system. Stormwater facilities that require minor work consist of stormwater collection pipes, inlets and catch basins, manholes, swales, ditches, control structures, and erosion pipes.

### **2. Future Demand and Facility Improvements**

TMDL's will have a significant impact on the City's stormwater program. The greatest impact will be the costs to implement the requirements of this program. Most existing stormwater programs have generally addressed new development. However, the TMDL program will address both new and existing developments. This may require the retrofitting of existing systems or the installation of new systems in areas where none

currently exist. In addition to impacts to the stormwater facilities, the TMDL program may impact other discharges, whether direct or indirect discharges, to receiving water bodies. These include, but are not limited to, direct and indirect discharge from wastewater treatment plants. Indirect wastewater discharges include reclaimed water systems and percolations ponds. Other indirect discharge may include individual septic tank systems.

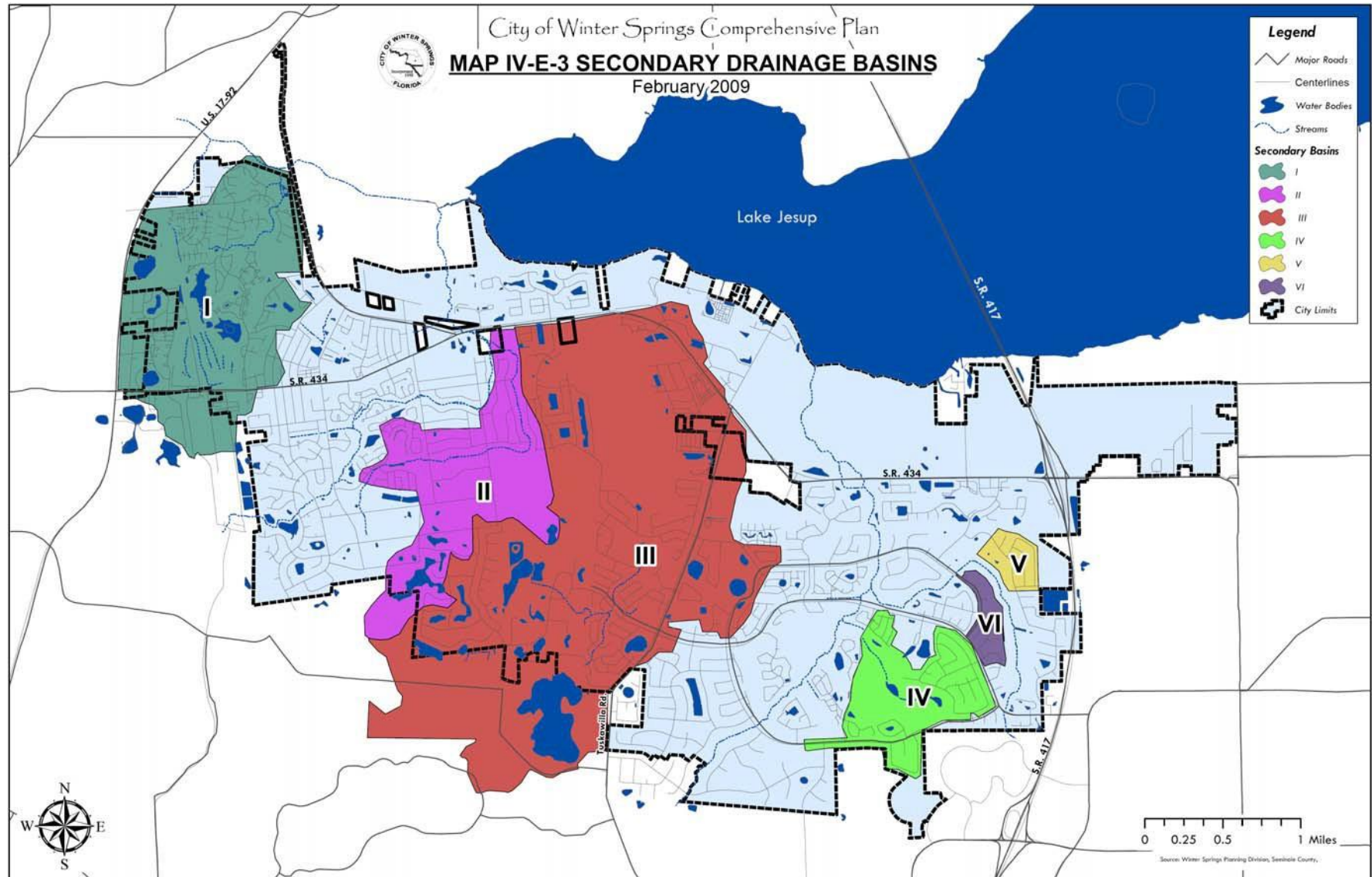
With the completion of the new TMDL Master Plan, the City should move ahead with revising the Code to include the TMDL standards. New development will require more stringent stormwater quality requirements to be imposed.

The City's 5-Year Schedule of Capital Improvements (SCI) is updated annually and contains specific capital drainage improvements, which have been identified through various sources including the Supplement and the TMDL Master Plan. Key projects on the 5-Year Stormwater Master Plan for fiscal years 2009/10 through 2013/14 include:

- Lombardy Canal Piping
- Various TMDL Water Quality Projects

Additionally, the City should continue its participation in joint studies and planning for the areas and basins that affect the City.

Map IV-E - 3: Secondary Drainage Basins





## **IV-F. NATURAL GROUNDWATER AQUIFER RECHARGE SUB-ELEMENT**

### **A. INTRODUCTION**

The protection of recharge areas is critical in locations that rely on aquifers as the sole source of drinking water. Well-drained areas are often subject to alteration by development since these areas are typically prime land for development. The development of impervious surfaces such as roads, roofs, and parking areas reduces the area available for percolation, which, in turn, reduces the quantity of natural recharge to the aquifer. The quality of the water that is recharged in to the aquifer is also a critical factor since impacts of development can compromise the quality of the water. Groundwater can absorb contaminants from development and transmit them to the aquifer. This sub-element is intended to protect the quantity of natural groundwater that is recharged back to the aquifer. The quality of the water for drinking purposes is addressed in the Potable Water Sub-Element.

### **B. AQUIFER RECHARGE INVENTORY**

The City falls within the Middle St. Johns (MSJ) groundwater basin. A groundwater basin is a particular groundwater flow system that encompasses recharge areas as well as the associated discharge areas. Three aquifer systems have been identified in the MSJ groundwater basin. These are the surficial (unconfined), the intermediate, and Floridan aquifer systems. Map IV-F-1 provides a generalized hydro-geologic cross section of the groundwater basin.

#### **1. Hydrogeology**

##### **a. Surficial Aquifer**

The surficial aquifer is composed of sand, shells, and some clays, and ranges in thickness from 20 feet near the St. Johns River to approximately 60 feet in the central part of the basin. The top of the aquifer is defined by the water table, which marks the line below which all pore spaces are filled with water, and rises and falls in response to the atmospheric pressure. Flow in the surficial aquifer usually follows the topography of the land and is an important source of water for individual domestic wells and small-scale irrigation. Since there is no overlying confining unit, groundwater recharge to the surficial aquifer system is controlled by local rainfall, land use, vegetation, topography, and local soils.

Areas characterized by highly permeable, sandy soils that transmit fluids easily and yield significant quantities of water, are typically good recharge areas for the surficial aquifer system. This aquifer system can discharge into surface streams, lakes, and rivers, or deeper aquifers.

##### **b. Intermediate Aquifer**

The intermediate system lies below the surficial aquifer but above the Floridan and occurs randomly throughout the groundwater basin. It is composed of clays and thin, water-bearing zones of sand, shell, and limestone. The intermediate aquifer is usually found within the confining unit of the Floridan and occurs at 60 to 150 feet below land surface and supplies water to some parts of the basin. This

aquifer is an important source of potable water where the Floridan aquifer contains water of marginal quality.

**Map IV-F - 1: Generalized Hydrologic Cross Section**

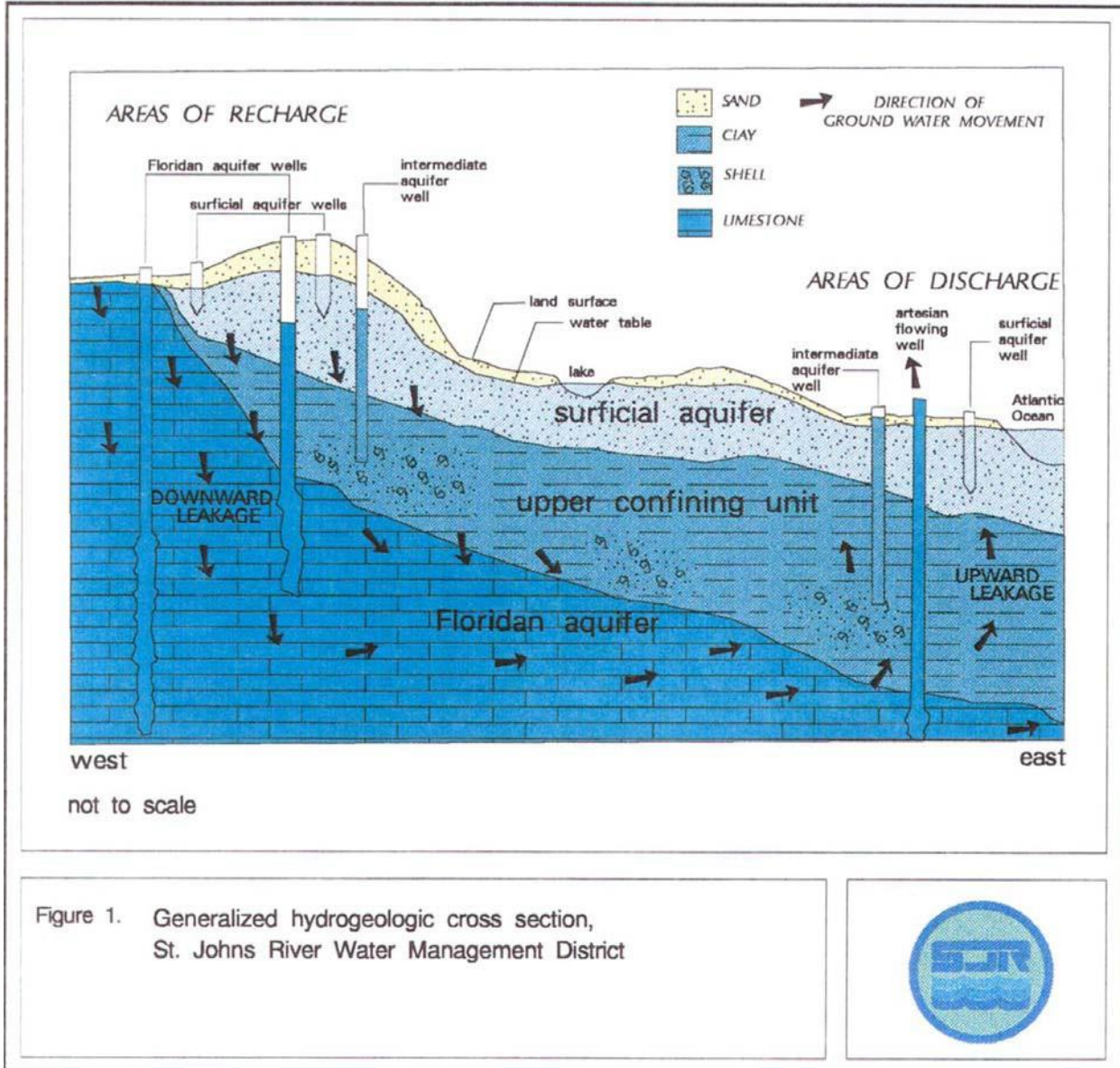


Figure 1. Generalized hydrogeologic cross section, St. Johns River Water Management District



c. Floridan Aquifer

The Floridan aquifer is the principal source of water for consumptive use in the MSJ groundwater basin and is the aquifer from which the City draws its public water supply. The Floridan aquifer is an artesian aquifer composed of limestone and dolomite. Characteristically, artesian aquifers contain groundwater that is under pressure that is greater than the atmospheric pressure. This pressure is demonstrated by the potentiometric surface level, which is the level to which water will rise in tightly enclosed wells that penetrate the aquifer.

The Floridan aquifer usually has two permeable zones containing potable water in the MSJ groundwater basin. The upper permeable zone consists of cavernous Ocala and Avon Park limestone and extends from approximately 200 to 500 feet below land surface. Withdrawals from the upper permeable zone are generally limited to small public supply and domestic wells. This zone provides the public water supply for the City, as the City's wells are generally in the 350-foot range. The lower permeable zone consists of cavernous Lake City limestone and extends from about 1,000 to 1,300 feet below land surface. In most areas, the public water supply comes from this zone.

d. Groundwater Quality of the Floridan Aquifer

The natural quality of groundwater in MSJ groundwater basin varies greatly depending on the location and the depth from which water is obtained. A major concern in this basin is saltwater intrusion in areas of Seminole County. Although the MSJ groundwater basin is inland from the sea, and bordered on the west by the peninsular divide, there are some patches of connate saltwater in the Floridan aquifer. The potential exists for this saline water to migrate upward within the aquifer system in response to declines in the potentiometric surface, the magnitude of groundwater withdrawals, and climatic changes. However, the City is located outside the areas in Seminole County that have associated chloride and sulfate concentrations of equal or greater than 250 mg/l., the recommended limit of chloride and sulfate for public water supplies set by the Department of Environmental Protection (DEP). Therefore, the Floridan aquifer underlying the City is of good water quality and only aeration and chlorination treatments are required to provide the City with potable water for distribution.

### **C. AQUIFER RECHARGE ANALYSIS**

Groundwater recharge is vital for providing adequate groundwater supplies for future uses and for preserving the quality of groundwater resources. Recharge to the Floridan aquifer occurs in areas where the elevation of the water table within the surficial aquifer is higher than the elevation of the potentiometric surface elevation of the Floridan aquifer. The elevation of the potentiometric surface is approximately forty-five (45) feet above mean sea level (MSL) within the Winter Springs service area and fluctuates in response to rainfall amounts within the recharge areas. Normally, the potentiometric surface level fluctuates about five (5) feet, with the highest levels being recorded in September, just after the rainy season. The lowest levels are normally in May, after the dry season.

In areas where the elevation of the water table is higher than the potentiometric surface, water moves from the surficial aquifer in a downward direction through the upper confining unit to the Floridan aquifer. Recharge rates are highest in areas where the hydraulic pressure difference and permeability are greatest. Recharge rates are directly proportional to the hydraulic pressure difference and upper confining unit hydraulic conductivity and inversely proportional to the upper confining unit thickness.

Recharge also occurs directly from infiltrating rainfall where limestone of the Floridan aquifer is at or near land surface. The amount of water available as recharge to the Floridan aquifer is that part of rainfall, after losses to runoff and evapotranspiration that infiltrates to the water table and continues to move downward to the Floridan aquifer. Generally, when rainfall exceeds



evaporation by approximately two inches (2") per year, and the difference between water table elevation and the potentiometric surface is about ten (10) feet, conditions which are conducive to recharge exist, and recharge to the Floridan aquifer occurs. Soils having high infiltration potential with little or no runoff due to the lack of surface drainage features are most conducive to recharging groundwater systems. Areas of groundwater recharge to the upper Floridan aquifer in Winter Springs are depicted in Map IV-F-2.

## 1. Regulatory Framework

Regulations have been enacted to prevent negative impacts of excessive water consumption. Extreme lowering of aquifer levels and surface water flows can adversely impact ecosystems by lowering lake levels, degrading wetlands and other natural systems and habitats. Other related negative impacts can include increased sinkhole frequency and saltwater intrusion in coastal areas.

### a. State Regulation

Groundwater within the State of Florida has been classified into four categories in Section 62 Florida Administrative Code (F.A.C.). These classifications and their designated uses are, as follows:

CLASS F-I Potable water use, groundwater in single-source aquifers described in Rule 62-520.460 F.A.C., which have a total dissolved solids content of less than 3,000 mg/l and were specifically reclassified as Class F-1 by the Commission.

CLASS G-I Potable water use, groundwater in single-source aquifers which have a total dissolved solids content of less than 3,000 mg/l.

CLASS G-II Potable water use, groundwater in aquifers which have a total dissolved solids content of less than 10,000 mg/l, unless otherwise classified by the Environmental Regulation Commission.

CLASS G-III Non-potable water use, groundwater in unconfined aquifers which has a total dissolved solids content of 10,000 mg/l or greater, or which has total dissolved solids of 3,000-10,000 mg/l and either has been reclassified by the Commission as having no reasonable potential as a future source of drinking water, or has been designated by the Department as an exempted aquifer pursuant to Section 62-28.13(3), F.A.C.

CLASS G-IV Non-potable water use, groundwater in confined aquifers which has a total dissolved solids content of 10,000 mg/l or greater.

The State delegates powers to agencies to regulate well construction and ensure that wells are contaminant free. The potable water, provided by the public wells, within the City is of a good quality requiring minimal treatment.

The Water Management Districts within the state designate areas that are Priority Water Resource Caution Areas (PWRCA) and Restricted Allocation Areas (RAA). The City is located in an area that the St. Johns River Water Management District (SJRWMD) identifies as a priority water resource caution area in the *District Water Supply Plan 2005*. A priority water resource caution area is an area where

existing and reasonably anticipated sources of water may not be adequate to supply water for all existing legal uses and anticipated future needs while sustaining water resources and related natural systems through 2025. The regional water supply plan for the Priority Water Resource Caution Area (District Water Supply Plan 2005) was approved by the District Governing Board on February 7, 2006, and an addendum affecting some local governments was approved on October 10, 2006. Seminole County and all municipalities located in the County are affected by the PRWCA. In 2004, the City entered into an interlocal agreement with Seminole County and the other cities within the County to develop a county-wide water supply plan (County Plan). The County Plan identifies projects that are suitable to be included in a future update or addendum to the District Water Supply Plan 2005. In addition, the City adopted its 10-year Water Supply Facilities Work Plan and update to its Comprehensive Plan on July 23, 2007 meeting the mandated deadline of August 7, 2007.

The SJRWMD has produced a series of GIS maps regarding aquifer recharge, water use, and related natural resource protection.

The SJRWMD has the authority to establish consumptive use permitting within its district, under Section 373.216 of the Florida Statutes. The basic principal of the consumptive use permit (CUP) review is as follows:

- 1) The use must be beneficial.
- 2) The use must not interfere with a pre-existing legal use.
- 3) The use must be in the public interest.

The City's CUP was issued by the SJRWMD in October 1996 and expired on October 8, 2006. The City filed an application for the Consumptive Use Permit (CUP) prior to the expiration date and the application is under review.

The City continues to operate off of the expired permit until a new one is issued. At the time of renewal the City, if eligible, can opt for a 20-year permit.

Since the City's adoption of the water restriction ordinance on February 26, 2001, the annual water usage has consistently been lower than the withdrawal allocation allowed by the CUP. Prior to the adoption of the ordinance, the annual usage exceeded the permitted capacity three out of the five years following the issuance of the 1996 CUP.

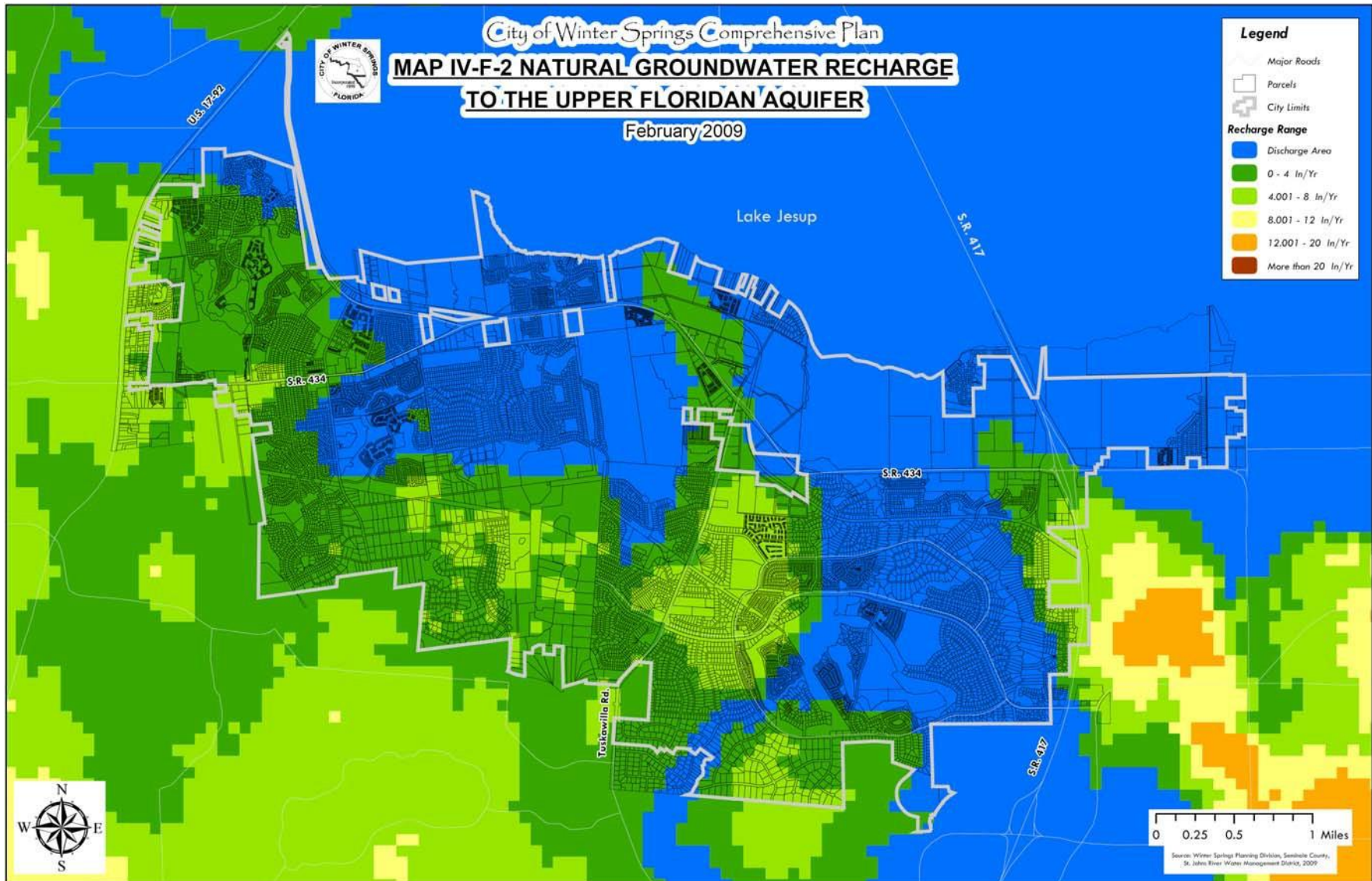
b. Local Regulations

The City adheres to the standards adopted for wellhead protection by the SJRWMD and the FDEP, including restricting the type of development allowed in the vicinity of a wellhead and requiring a 500-foot protection zone around each wellhead (see Future Land Use Element).

Land use surrounding a water supply site is a major consideration in the selection and protection of well sites to avoid contamination. As part of the City's wellhead protection plan, the City should identify all potential sources of contamination for existing wells. The direction of groundwater flow is to the northeast toward Lake Jesup.

The City has addressed other policies that implement groundwater protection efforts, most significantly, a water reuse program. While the City itself does not have problems with the saltwater intrusion or other contamination of its wells, the impact of excessive pumping of the City's wells may affect areas of susceptibility in Seminole County. Therefore, water reuse is an important consideration since it means less water is pumped out of the aquifer. Currently, the City operates a reclaimed water system, which services 1,644 residential connections, one golf course, the city's parks, and public rights of way. This approach to supplementing water supply demands by utilizing reclaimed water can conserve significant quantities of fresh water for higher priority use.

Map IV-F - 2: Natural Groundwater Recharge to the Upper Floridan Aquifer



#### **IV-G. INFRASTRUCTURE TERMS AND CONCEPTS**

The following terms and concepts are provided to assist with review of the Solid Waste, Drainage and Aquifer Recharge Sub-Elements.

##### **A. SANITARY SEWER TERMS AND CONCEPTS**

Pursuant to Rule 9J-5.003, Florida Administrative Code (F.A.C), the following definitions are used for assigning classifications for sanitary sewer collection systems:

*Sanitary Sewer Interceptor* – A sewage conduit that connects directly to, and transmits sewage to, a treatment plant.

*Sanitary Sewer Trunk Main* – A sewage conduit that connects directly to, and transmits sewage to, an interceptor.

##### **B. SOLID WASTE TERMS AND CONCEPTS**

*Solid Waste* is defined, pursuant to Rule 9J-5.003 (88), F.A.C., as “sludge from a waste treatment works, water supply treatment plant, 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 governmental operations.” Other definitions, pursuant to Rule 9J-5.003 F.A.C., applicable to Solid Waste Sub-Element are:

*Leachate* – The liquid derived from the leaching of buried refuse in sanitary landfills and dumps by percolating water derived from rain. It frequently contains large numbers of inorganic contaminants and high concentrations of total dissolved solids, as well as many organic contaminants.

*Solid Waste Facilities* – Structures or systems designed for the collection, processing or disposal of solid wastes, including hazardous wastes, and includes transfer stations, processing plants, recycling plants, and disposal systems.

*Solid Waste Processing Plant* – A facility for incineration, resource recovery, or recycling of solid waste prior to its final disposal.

*Solid Waste Transfer Station* – A facility for temporary collection of solid waste prior to transport to a processing plant or to final disposal.

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

##### **C. STORMWATER AND DRAINAGE TERMS AND CONCEPTS**

*Stormwater* is defined, pursuant to Rule 9J-5.003 (88), F.A.C., as “the flow of water which results from a rainfall event.” Other definitions, pursuant to Rule 9J-5.003. F.A.C., applicable to this Stormwater Sub-Element are:

*Attenuation* – To limit stormwater flow to reduce downstream impacts.

*Basin* – A drainage area with the characteristics of either having a single outfall to the receiving waterbody or being located adjacent to another basin, and conveying its runoff through a drainage structure.

*Closed Drainage Basin* – A drainage basin with no structural outfall. The discharge from a closed drainage basin is limited to percolation (and other groundwater flow), evaporation and evapotranspiration.

*Conveyance* – Transport of stormwater via pipe and/or open channel system(s).

*Design Capacity* – The amount of flow a storm sewer system is designed to manage, usually expressed in cubic feet per second for flow and cubic feet or acre feet for storage.

*Design Storm Event* – The design storm event is calculated by the frequency, duration, volume, and distribution of the storm.

*Detention Basin or Structure* – A basin or structure, which collects and temporarily stores storm water for the purpose of treatment through physical, chemical, or biological processes with subsequent gradual release of the storm water to reduce downstream quality and quantity impacts.

*Ditch* – An open storm water conveyance facility with typical side slopes steeper than three units horizontally to one unit vertically.

*Drainage Basin* – Any land area defined by topographical boundaries from which the runoff collects at a common point and contributes stormwater to a drainage system or receiving waterbody.

*Drainage Facilities* – A system of human-made structures designed to collect, convey, hold, divert or discharge storm water; including, stormwater sewers, canals, detention structures, and retention structures.

*Exfiltration Trench* – A sub-surface facility designed to convey stormwater into the underlying soil, providing treatment through filtration and volume reduction.

*Flood Plain* – An area inundated during a 100-year flood event or identified by the national Flood Insurance Program as an area of flooding on Flood Insurance Rate Maps or Flood Hazard Boundary Maps.

*Impervious* – Land surfaces which do not allow (or minimally allow) the penetration of water. An increase in the amount of impervious area will increase the rate and volume of runoff from a given drainage basin.

*Inlet* – A structure which collects stormwater runoff and connects into a conveyance system.

*Natural Drainage Features* – Naturally occurring features of an area which accommodate the flow of stormwater, such as streams, rivers, lakes, and wetlands.

*Outfall* – Location where stormwater flows out of a given system. The ultimate outfall of a system is generally a receiving waterbody.

*Percolation* – The ability of water to pass through a porous medium; in most cases, the soil.

*Pervious* – Land surfaces which allow the penetration of water. A decrease in pervious area will increase the rate and volume of runoff from a given drainage basin.

*Retention* – To store stormwater to prevent its discharge into receiving waters or to provide a storage facility for stormwater where no outfall is available.

*Retention Basin or Structure* – A stormwater facility which has no structural outfall and the discharge from which is limited to percolation, evaporation, and evapo-transpiration.

*Sub-basin* – A large neighborhood drainage area, which represents the subdivision of a basin on the basis of natural and/or man-made flow patterns within the basin.

*Surcharge* – Flow out of a stormwater facility resulting from flow in excess of its designed capacity at a point upstream from the outfall.

*Swale* - An open stormwater conveyance facility with side slopes typically equal to or greater than three units horizontally to one unit vertically (generally very shallow).

#### **D. AQUIFER RECHARGE TERMS AND CONCEPTS**

Terms and concepts applicable to the review of the Aquifer Recharge Sub-Element are:

*Aquifer* – A water bearing geologic formation.

*Potentiometric surface* – The elevation that water would reach in a well penetrating into the aquifer.

*Recharge* – Renewal of the groundwater resource.

*Water Recharge Area* – Land or water areas through which groundwater is replenished.

*Water Table* – A level below which the ground is saturated with water.