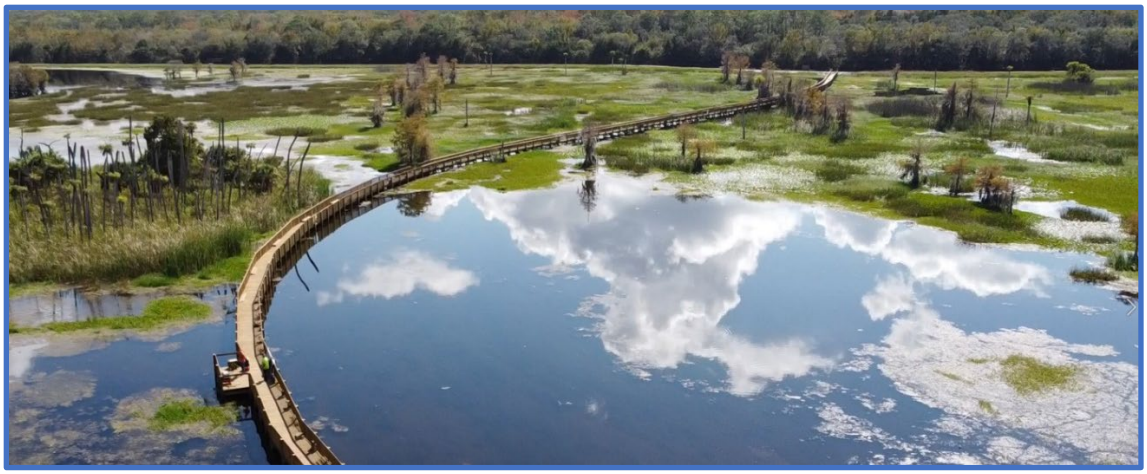
Chapter 4

Efficient and Well-Maintained Infrastructure




Contents

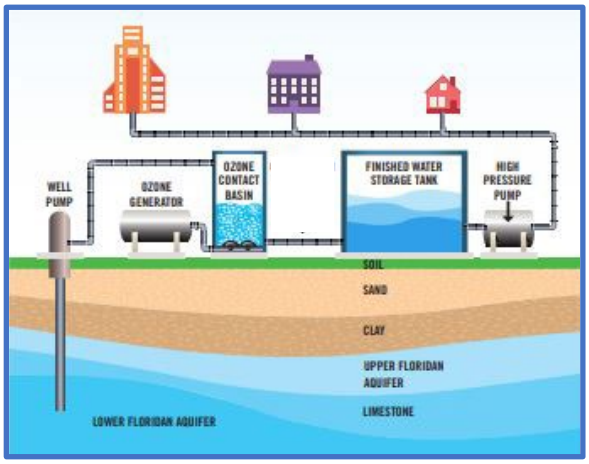


Orlando Wetlands Park

CHAPTER INTRODUCTION

The City of Orlando is committed to providing its citizens, businesses, and visitors with highly reliable, well-maintained, efficient, and environmentally sustainable, resilient, and responsible infrastructure services. This Chapter contains the core infrastructure elements of the GMP, including guidance for the provision of water-related services including **Stormwater & Aquifer Recharge**, **Potable Water**, and **Wastewater** (or water reclamation), as well as **Solid Waste** services. This Chapter includes key data reflecting trends, as well as the goals, objectives, and policies that will influence urban growth in Orlando for the 2050 planning horizon.

The Importance of Our Water Resources



Water is life. Water not only supports the lives of people and wildlife, but it is also an incredibly valuable resource that can provide greater opportunity for economic development, recreation, and livability. While there are large areas of freshwater in Central Florida, water availability and lake water quality continue to be a concern as the region experiences severe and prolonged periods of drought as well as episodes of intense rainfall and floods. Orlando is fortunate to have a clean, accessible source of water from the Floridan Aquifer. However, our current demand for water, coupled with a rapidly growing population, exceeds the rate at which water underground can be naturally replenished.

Water Resources – What We Want to Accomplish

As described in Orlando's 2018 Green Works Orlando Community Action Plan, Orlando needs to continue water conservation investments and begin searching for new supplies of drinking water so that it will be available to support future economic growth in the City and the region. To achieve this, the Green Works Community Action Plan details the following goals and targets to guide the preservation of our water resources:

- Enhance Orlando's reputation as "The City Beautiful" by promoting sustainable landscaping practices.
- Reduce gross potable water consumption per capita by 20%.
- Increase the number of lakes meeting good water quality standard (Trophic State Index less than 61).
- Expand education and outreach efforts to increase understanding of how to manage water resources and pollution prevention.
- Ensure Orlando mitigates inland flooding during future extreme weather events.

Metrics	2010 (Baseline)	2018 (Targets)	2040 (Goals)
Water used per capita per day	166 gallons	3%	20%
Meeting good quality water standards (Tropic State Index)	Less than 41%	85%	100%

The Importance of Becoming a Zero Waste Community

Orlando continues to strive to become a "zero waste" community, as described in the 2018 Green Works Orlando Community Action Plan, by aiming to eliminate sending solid waste to landfills by the year 2040. Everything that we throw away has potential value. It takes energy, water and natural resources to make these products. Finding ways to reduce, reuse and recycle these materials makes a positive impact on the environment and helps to save money.

Zero Waste – What We Want to Accomplish

We are finding innovative ways to put your waste to work and find solutions for our continually evolving waste stream, such as employing next-generation waste and recycling technology, increasing commercial and residential recycling participation, developing food waste diversion and composting programs, and creating policies and standards that reduce overall waste generation.

LEED for Cities

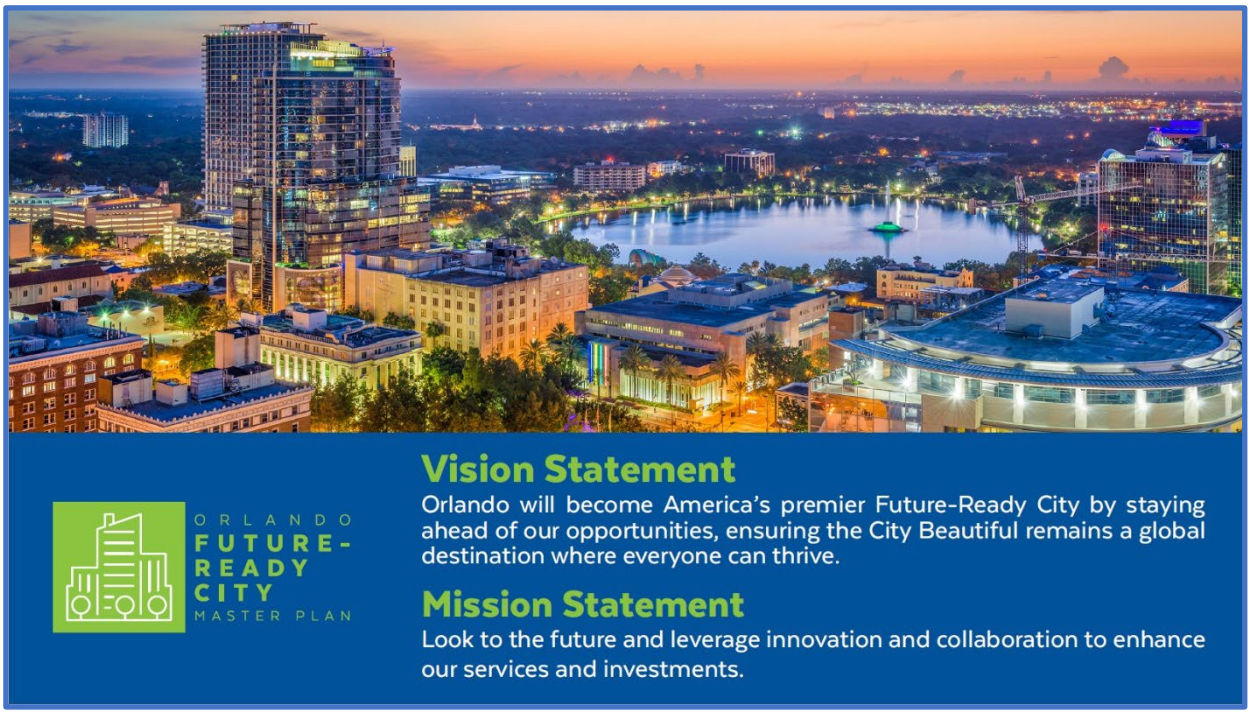
In January 2020, the City of Orlando was recognized for achieving the LEED For Cities Gold certification for its citywide sustainability and resiliency efforts, the highest level of performance for any city in the Southeast United States. Orlando is part of a growing group of

cities to be certified using the LEED for Cities and Communities rating system developed by the U.S. Green Building Council (USGBC). LEED, or Leadership in Energy and Environmental Design, is the most widely used green building and sustainability rating system in the world.

Orlando has achieved LEED certification for implementing practical and measurable strategies aimed at improving sustainability and quality of life for residents. LEED is designed to help buildings, communities, and cities achieve high performance in areas that impact environmental and human health.

Orlando's Future-Ready City Master Plan

On May 17, 2021, Orlando's first Future-Ready City Master Plan was accepted by City Council. The Plan is organized around seven pillars including: connectivity, energy, health & safety, mobility, place-making, materials, and water.



The Water pillar includes strategies for water re-use, conservation and monitoring, while the Materials pillar includes strategies to recycle and re-use in order to achieve our long-term goal of becoming a Zero Waste community.

The GMP infrastructure elements contained in this Chapter, in concert with the 2018 Green Works Community Action Plan and 2021 Future-Ready City Master Plan, provide essential guidance in Orlando's efforts to become a truly sustainable and resilient community.

Stormwater & Aquifer Recharge Element

OUR GUIDANCE

- Section 163.3177, Florida Statutes – Required and optional elements of the comprehensive plan; studies and surveys.
- Chapter 187, Florida Statutes – State Comprehensive Plan.
- East Central Florida Regional Planning Council's 2060 Strategic Regional Policy Plan.
- Florida Statutes – National Pollution Discharge Elimination System (NPDES), Section 402; Wekiva Parkway, Section 369, Chapters 163, 298, 373,380, 387, and 403 – Water Pollution, Safe Drinking Water, and Environmental Control.
- City Engineering Standards Manual (ESM, Ch. 7).
- Florida Administrative Code, (F.A.C.), Chapters 9, 10, and 62.
- Orange County Code of Ordinances, Chapter 15.
- Land Development Code – Chapters 31 (Stormwater Utility Code), 59 (Concurrency), and 63 (Environmental Protection).

Our Trends:

The primary purpose of the Stormwater & Aquifer Recharge Element is to review and analyze the City's stormwater management programs and to establish goals, objectives, and policies to protect water quantity and quality.

The City of Orlando is home to more than 120 lakes either partially or wholly within its boundaries. These lakes are the ultimate discharge point for approximately 90% of all stormwater runoff. Because these lakes are a vital amenity to the city residents, city officials have recognized the need to halt the water quality degradation process which urbanization has caused over time. The City has broadened its stormwater management efforts into a multi-faceted program that emphasizes innovative approaches to design, construction, maintenance and funding of public stormwater management facilities, together with the strict regulation of private facilities.

In 1984, the City enacted the Orlando Urban Stormwater Management Manual (OUSWMM), which controlled the stormwater management for all new development, and later in 2003, those regulations were added to Chapter 7 of the City's Engineering Standards Manual (ESM). The current 5th edition of the ESM, Chapter 7 includes the Stormwater Management information.

In July 1989, the City implemented a stormwater utility fee, which bills all property owners based on the amount of runoff that is discharged from their properties. The utility applies credits for properties that meet current ESM requirements and encourages retrofit for those who do not. The utility provides a guaranteed source of revenue that can only be spent for stormwater management purposes, thus assuring that the program may be perpetuated and enhanced.

Since 1980, the City has done considerable retrofitting of the stormwater management system utilizing accepted Best Management Practices (BMP's) and pioneering the use of other innovative techniques for both flood control and water quality enhancement. Examples include aerators in lakes, screening devices at lake outfalls, sedimentation traps, exfiltration trenches, alum injection, wetlands, stormwater re-use, shoreline revegetation, filtration, lake drawdowns, aquatic weed control, and biological controls including triploid grass carp and alligator weed beetles.

The City has upgraded its maintenance program through increased manpower and equipment levels, made possible by the creation of the stormwater utility fee. New facilities are designed for ease of maintenance and activities are being focused to minimize flooding and enhance water quality. In the area of flood control, lake level controls and interconnects are being installed to facilitate the creation of additional storage in advance of a severe storm. During normal conditions, excess water is transferred from one lake to another to help maintain lake levels in neighborhood environments. Emergency plans are in place in the event of a hurricane or severe storm, to help minimize flood damage.

Facilities are maintained at regular intervals. Trouble spots have been identified and receive increased preventive maintenance and/or immediate attention in the event of a significant rainfall. Street sweeping is done around lakes to help attenuate the pollutant loadings and aquatic weed control.

The public's role in stormwater management is also very important. Community engagement and education is practiced through numerous programs for students and community organizations. For example, local residents can become trained in lake sampling and participate in a citizen volunteer lake monitoring program sponsored by University of Florida by collecting valuable data on water quality.

The City is very reliant on drainage wells for the ultimate disposal of stormwater. Many of these drainage wells are located in or adjacent to lakes. These wells provide lake level control by discharging overflow water into the aquifer at varying depths. A number of drainage wells receive runoff directly from City streets. The City recognizes the potential for groundwater contamination via the drainage wells and has completed a Drainage Well Monitoring Plan. This Plan was developed in conjunction with, and has been approved by, Florida Department of Environmental Protection (FDEP). In addition, the City is working with Orange County, FDEP, St. Johns River Water Management District (SJRWMD), and South Florida Water Management District (SFWMD) to identify drainage wells with a high risk for polluting the underlying

groundwater. The City has committed funds to retrofit or replace those wells deemed a high risk.

The City will continue to maintain a high-quality stormwater management program. The City's ESM provides reasonable assurance that new development will not adversely affect existing conditions, but pre-1984 construction has created many drainage systems which provide for no pollution abatement of stormwater runoff and there are still some occurrences of street and yard flooding, and even occasional structure flooding during very intense storms.

As mentioned, the OUSWMM was the master drainage plan for the City of Orlando and was divided into three parts: the inventory and water quality analysis, Volume I contained all the background information, specifically as it applied to Orlando including the purpose, objectives, and problems to be encountered. Volume II included the procedures and criteria for designing the stormwater system for new developments.

In 2003, the Engineering Standards Manual was adopted. The ESM sets forth engineering, design, development and material standards that align with more generally accepted standards found in SJRWMD's "Applicants Handbook" and SFWMD'S "Permit Information Manual". While the OUSWMM Inventory and Water Quality Analysis, together with Volume I of OUSWMM still exist, Volume II of OUSWMM has been incorporated into Chapter 7 of the City's Engineering Standards Manual. Level of Service for providing stormwater facilities was based on a reference to OUSWMM. Any facilities built prior to 1984 require a different level of service standard because they were built without stormwater management regulation. All facilities built after 1984 were required to meet OUSWMM "pre-1984" and after 2003, the ESM "post-1984".

SURFACE WATER

Surface runoff is the direct result of rainfall and is dependent upon the intensity, duration, and frequency of the storm event. Figure SA-1 shows the depth of rainfall for several storm frequency events at given storm durations. These figures are for rainfalls occurring at a single point and assume a uniform rainfall over the entire basin. This assumption holds because of the relatively small drainage basins in the Orlando area.

Figure SA-1: Depth of Rainfall for Likely Storm Event Frequencies, Across Various Durations

Frequency	30 min.	1 Hour	2 Hour	3 Hour	6 Hour	12 Hour	24 Hour
1 Year	1.50”	1.90”	2.30”	2.50”	2.80”	3.30”	3.80”
2 Year	1.75”	2.20”	2.70”	2.95”	3.35”	4.20”	4.70”
5 Year	2.10”	2.70”	3.20”	3.65”	4.30”	5.20”	6.25”
10 Year	2.45”	3.00”	3.75”	4.20”	5.20”	6.25”	7.48”
25 Year	2.80”	3.40”	4.25”	4.80”	5.95”	7.25”	8.60”
50 Year	3.00”	3.80”	4.70”	5.25”	6.60”	8.10”	8.95”
100 Year	3.20”	4.10”	5.10”	5.80”	7.30”	9.60”	10.40”

Source: City of Orlando, 1984 and NOAA Atlas 14.

Not all rainfall becomes surface runoff. The formation of runoff is affected by factors such as topography, soil, and land cover. Topography describes the slope, basin size and configuration which affects the velocity and time of accumulation of runoff. Depressional storage must be filled before excess rainfall will sheet flow into rivers, lakes and storm sewers as runoff. Soil affects runoff by determining the amount of rainfall that will infiltrate into the soil, and land cover affects the amount of water that can infiltrate into the ground, since natural vegetation has less impervious surface than developed urban lands.

The amount of runoff can be calculated for individual storm events by knowing the drainage basin area, the intensity and duration of the storm, topographic factors that affect time of concentration, and land use covers that affect infiltration or the runoff volume. Engineering formulas have been developed which relate these factors to approximate the volume of runoff that will result from development. The size of stormwater management systems can then be designed to handle the anticipated volume of runoff for selected storm frequencies and duration. Problems with existing development can be analyzed by reversing the formula. The ESM contains the necessary engineering standards and criteria to calculate runoff volumes and stormwater management system capacities.

Surface water management systems (SWMS) encompass a wide variety of functions including the protection from land development, and urban design and use considerations. Impacts from land development include flood protection, water quality protection, and erosion and sedimentation protection. Urban design and use considerations include visual amenities and multiple uses of drainage facilities to improve the livability of an area by providing recreation and open space opportunities. The goal of SWMS’s is to make sure stormwater volumes, peak discharge rates and pollution loads leaving the site are no greater after development than before development.

Floodplain Management

In addition to SWMS, the City manages floodplain functions by participating in the National Flood Insurance Program (NFIP), Community Rating System (CRS) program and building code. The NFIP was established by Congress under the National Flood Insurance Act of 1968 and has been administered by the Federal Emergency Management Agency (FEMA). The NFIP is a partnership between the federal government and communities with the objective of reducing flood losses by encouraging communities to adopt and enforce minimum floodplain development regulations under Title 44 Code of Federal Regulations (CFR) § 59, 60, and 65. In exchange, the City residents become eligible to purchase federally-backed flood insurance policies through the program.

Subsequently, the NFIP CRS was implemented in 1990 as a voluntary program for recognizing and encouraging community floodplain management activities that exceed minimum NFIP standards to: (1) reduce flood damage to insurable property; (2) strengthen and support the insurance aspects of the NFIP; and (3) encourage a comprehensive approach to floodplain management. By participating in the CRS program, the community CRS classification is awarded based on credit points, which provides respective flood insurance premium reduction or discount. The City has been participated in the NFIP and the CRS program to provide City residents' eligibility for federal flood insurance policies and flood insurance premium rate reductions.

Under Title 44 CFR § 59, 60, and 65, the City manages the Special Flood Hazard Area (SFHA) and floodway and regulate development with the intended to reduce future flood losses. Most notable regulations are for the 100-year flood or the 1% annual-chance flood, which is regulated largely through local ordinance, CFR, CRS manual, and Florida Building Code. Several regulations and engineering designs can be utilized to reduce future flood losses such as freeboard, foundation protection, compensatory flood storage, hydrologic and hydraulic analysis, and building elevation.

WATER QUALITY

Runoff in itself does not cause pollution of lakes, streams and aquifers, it is the water's ability to pick up and transport other substances that creates pollution. The type and amount of pollutants that contaminate stormwater depend on the source. Sources of pollutants are lawns, roadways and parking lots, effluent disposal, septic tanks, commercial and industrial discharges, landfills, illegal dumping, leaking underground storage tanks and spills, among others.

These pollutants increase in the natural eutrophication process by adding to the quantity of nutrients and sediments in surface waters. These in turn promote growth of algae, floating and

submerged vegetation and the establishment of terrestrial plants upon newly made land. Hazardous waste can cause fish and plant kills. Over time, pollutants degrade the quality of lakes and streams to the point that their use for active and passive recreation is eliminated. Orlando's lakes are not used for potable water or industrial uses; however it is not uncommon to see people fishing from these aquatic habitats.

The natural environment has the ability to assimilate a certain amount of pollutants without long-term negative effects, the process is called the carrying capacity of the system. Natural processes can reduce contaminant concentrations in surface water and groundwater, through dispersion and dilution of chemicals, precipitation, absorption and adsorption of suspended solids and heavy metals, and the natural die-off of bacteria. Water, soil, bedrock and vegetation interact to reduce and incapacitate contaminants. Infiltration of contaminated runoff into the soil will filter sediments and adsorb nutrients and some heavy metals. Vegetation retards the overland flow and allows sediments to settle while permitting water to infiltrate into the soil, where plant roots can absorb the nutrients. The sedimentation process deposits nutrients and heavy metals into the muck layer of lakes, wetlands, and streams.

Once the process of cultural eutrophication begins, expensive long-term artificial maintenance programs must be administered. This can include a combination of periodic spraying with herbicides, flocculating agents (a method to remove particles from the water), aeration and mechanical removal of aquatic plants, among other.

Water quality is difficult to assess, primarily because what constitutes good water quality is relative, depending upon the use of the water, if used for drinking purposes would require better quality than if used for recreation. Water quality standards have been set based upon potable water needs and the biological, chemical, and physical properties of lakes. The Trophic State Index (TSI) was developed by EPA and classifies lakes according to their primary productivity, or "fertility". The biological productivity classifies lakes as Oligotrophic, Mesotrophic, or Eutrophic. Oligotrophic lakes are deep and have low primary productivity; eutrophic lakes are generally shallower and have greater primary productivity; and Mesotrophic lakes are those classified between the two. Lakes naturally evolve from an oligotrophic state to a eutrophic state. The TSI estimates the trophic state of lakes based upon concentration of Chlorophyll A (algae concentrations), total phosphorus concentration (nutrient concentrations) and Secchi disk depth (transparency).

While this method is sufficient in describing the trophic state of an individual lake, it does not allow the comparison of one lake to another. The Carlson TSI can be used to determine which

lake is more polluted than another. For more information on both indexes, please visit: https://www.epa.gov.

Cultural eutrophication of a lake can be controlled, by reducing nutrient input. It is recommended to perform a quantitative survey of nutrient and other pollutant sources and a limnological study of impacted lakes, before taking any corrective actions.

IMPROVEMENTS TO SURFACE WATER RUNOFF

Improvements to surface water runoff must provide treatment, to control quantity and quality of stormwater. This is accomplished through Best Management Practices (BMP's). The primary BMP's are infiltration through retention, and detention, and nature-based solutions (NBS) including Green Infrastructure (GI) and Low Impact Development (LID). Stormwater retention is a permanent storage mechanism that allows water to percolate into the ground over time, and detention is defined as temporarily storing water during and after storm events to prevent flooding and excess water being released to streams. The use of these methods will reduce stormwater volumes, peak discharge rates and pollution loads. Infiltration through retention is exemplified by swales, dry retention ponds, and underground percolation or French drains, that provides 100% treatment of stormwater and provides for groundwater recharge. These methods may only be used in areas with porous soils and where groundwater is well below the land. Retention areas can be incorporated into the development's overall design to provide passive recreation, open space and landscaping. Detention facilities control peak discharge rates and can be used to provide stormwater treatment, are best used where soil percolation is low, the water table is high and the terrain is flat. The most commonly used are detention with filtration, detention areas, and wetland systems. Detention areas are usually wet and designed to form lakes that are integrated into the overall project as an amenity, detention with filtration involves a detention area with a soil filter, it's not recommended by FDEP. Lastly, nature-based solutions (NBS) including GI and LID are sustainable planning, design, environmental management, and engineering practices that implement natural features or processes into the built environment to promote adaptation and resilience. For stormwater management, NBS is a strategic use of natural features or processes to improve water quality or manage water quantity rather than using conventional "grey" water infrastructure.

Natural wetland systems can be used to effectively store stormwater and filter out pollutants. These are the natural functions of wetlands; however, the natural mechanisms must be protected to ensure that the carrying capacity of the system is not overcome by excess nutrient, heavy metals and sediment loadings. The major advantages of using wetlands for stormwater management are the reduced operation and maintenance needs, the preservation of wetlands, the restoration of drained wetlands and the use of uplands for development.

The “dual pond” system is the most effective stormwater method. The first flush of runoff is routed to a retention area where the most polluted stormwater is allowed to percolate into the ground under favorable conditions. The remaining flood volume is routed to a detention area and released at the pre-development peak discharge rate. Other innovative BMP’s include the use of grass swales with stormwater inlets, turf block and porous concrete are technological innovations that have potential to also reduce runoff. Larger scale methods include alum injection into lakes in order to increase adsorption of nutrients with storage in the bottom sediment and regional stormwater facilities that would handle the stormwater from the entire basin or several basins. Stormwater facilities must be designed to include the increase in runoff volume from increases in impervious surfaces. Figure SA-2 shows the assumed increase in runoff generation by increases in the percentage of impervious cover and increases in the percentage of storm sewers. The figure shows that increases in impervious surfaces and storm sewers increases runoff up to six times over natural ground cover.

Figure SA-2: Assumed Runoff Generation Increases as a Result of Increases in Impervious Surfaces and Areas Served by Storm Sewers

	Assumed Runoff Generation - (Increase in Mean Annual Flood)					
Percentage of Impervious Cover	**% of Area Served by Storm Sewers**					
0-2 ½	[1.0]	1.1	1.1	1.1	1.1	1.1
2 ½-5	[1.1]	1.2	1.2	1.2	1.2	1.2
5-10	[1.2]	1.3	1.4	1.4	1.4	1.4
10-20	[1.3]	1.4	1.7	2	2.1	2.1
20-33	1.4	[1.8]	2	2.4	2.5	2.5
33-50	1.5	2.2	[2.4]	2.7	2.8	3
50-75	1.8	2.5	3	[3.8]	4	4.2
75-100	2.5	3	4.2	5	[5.4]	6

Note: Bracketed numbers indicate the mix of impermeable cover and storm sewer drainage area most common to that range of impervious surfaces. Source: Tourbier, 1981.

BMP’s can be used to increase the overall aesthetic and multi-use benefits of a development or area. The creation of lakes can be designed to provide public access and create visual amenities. Dry stormwater facilities can be used for non-structural recreation, such as recreation fields, or picnic areas and other passive recreational and open space uses. Wetlands and adjacent detention lakes can serve as wildlife sanctuaries and visual amenities. Strategies are also available for waterfront property owners, such as: shoreline (re)vegetation, swale and

berm systems, on-site retention/detention, backyard design and landscaping. The use of these BMP's can easily be incorporated into the design of new development.

Nature-based solutions (NBS) including GI and LID for stormwater is a principle of engineering practices that use natural "green" infrastructure and bioengineering to mimic natural processes in order to improve water quality or manage water quantity. Implementation of NBS can be cathorized in watershed-scale and site-scale. NBS for watershed-scale is a large-scale practice such as floodplain restoration, regional stormwater facility, stormwater parks, greenways, wetland restoration and protection program, and land conservation. NBS for site-scale is a localized-scale practice by using GI/LID, especially in urban stormwater management.

GI/LID is a practice of managing rainfall at the source, and mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate and detain runoff as close to its source(s) as possible to reduce stormwater runoff and pollutant loadings through engineering designs that reduce and disconnect impervious surfaces, restore the ability of soils to infiltrate stormwater, and incorporate small distributed landscape and stormwater features that filter, detain or infiltrate stormwater. GI/LID approaches can be applied to open space, rooftops, streetscapes, parking lots, sidewalks and medians. Examples of GI/LID practices include low impact site design; rain gardens; tree tranches; green roofs; rainwater harvesting (cisterns and rain barrels); vegetated swales and bioswales; stormwater reuse as a source of irrigation water; and the use of permeable pavement to allow water to partially infiltrate beneath the pavement.

The City's ESM references WMD stormwater requirements. As this changes to reflect GI/LID practices, the City will be able to approve development consistent with the changes. Changes at the WMD level are needed because developers are resistant to implementing practices that require special WMD approval and/or are more expensive than the minimum requirements.

EXISTING SURFACE WATER MANAGEMENT SYSTEM

Runoff is transported through a system of conveyance facilities such as gutters, pipes, ditches and canals. The conveyance system within the City of Orlando contains five levels, with two local governments having operational jurisdiction. The system contains Orange County's Primary Water Control System, and the City's Primary, Secondary, Tertiary and roadway conveyance facilities. The St. Johns River and the South Florida Water Management Districts oversee all water resource management within the City of Orlando.

The Orange County Roads and Drainage Division, of the Public Works Department, maintains the primary drainage system county-wide, which encompasses lake interconnects, lake outfalls,

and pumping stations County-wide. Figure SA-5 depicts the major drainage basins within the City boundaries and landlocked sub-basin areas within these major drainage basins.

The County has control of some stormwater facilities contiguous to the City that can cause conflicts during peak runoff events. Intergovernmental coordination between the City and County is crucial for the management of the stormwater drainage system. The City has operational responsibility for all other systems not under County or private ownership. The City stormwater system is divided into five categories:

1) Primary Conveyance Facilities, which are all other systems, outfalls and/or control structures in the City of Orlando, not maintained by Orange County,
2) Secondary Conveyance Facilities are all other systems in the City which drain an area greater than 10 acres,
3) Tertiary Conveyance Facilities are other systems which drain an area less than, or equal to 10 acres,
4) Roadway Conveyance Facilities consist of curb, gutter and inlets which are the beginning of the drainage process, and
5) Retention and Detention facilities, that act as the pollution abatement facilities.

INVENTORY

The physical stormwater system for the City contains collection, storage, disposal, and pollution control facilities. Collection facilities include pipes, swales, inlets, ditches and canals (see Table SA-3 Stormwater Assets). Collection and disposal is augmented by pumps and force mains. Design storms and capacities of collection facilities are known for some collection facilities built after 1984, when OUSWMM was adopted.

Storage facilities include retention and detention ponds, lakes and wetlands. There are approximately 100 holding ponds that are maintained by the City. The number of private facilities is somewhere between 2000-2500. Of the approximately 120 lakes either partially or wholly within the City, the City maintains approximately 94 acres of shoreline and approximately 231 acres of open ditches, canals and swales.

Disposal of stormwater is accomplished by streams, lakes, wetlands, and drainage wells. Many of the basins are landlocked and rely totally on lake storage augmented by drainage wells. The City has approximately 150 drainage wells. High capacity inlet filters have been installed to reduce some of the pollution potential of runoff to lakes and the aquifer. BMP's include screens, sediment traps, aerators and created wetlands. Natural wetlands are also an integral part of the City's overall stormwater management plan.

All aspects of the stormwater management system require maintenance. The Streets and Stormwater Division of the Public Works Department performs the maintenance, rehabilitation and construction of the stormwater system. The lack of proper maintenance of drainage facilities can increase pollutant loadings, reduce capacity, cause back-ups creating flooding and create visual and noxious odor nuisances. Access is also a problem for proper maintenance, since often it is difficult to access canals and ditches because of inadequate rights of way. Private facilities must also be properly maintained to provide the correct level of service. Often retention and detention ponds fill in with sediment. This reduces the capacity of the ponds and allows polluted water and greater volumes to discharge into other receiving waters. The City currently inspects private drainage facilities to ensure that the facilities are operating as designed.

Figure SA-3: City of Orlando, Stormwater Assets

Asset	Total # of Structures
Dry Retention/Detention Systems	26
Exfiltration Trench/French Drains	46
Grass Treatment Swales	5
Wet Detention Systems	52
Underdrain Filter System	2
Alum Injection System	5
Pollution Control Boxes	548
Stormwater Pump Stations	12
Major Stormwater Outfalls	491
MSA4 Pipes/Culverts (miles)	916
Inlets/Catch Basins/Grates	55,029
Ditches/Conveyance Swales	96
Source: Stormwater Management Program- Financial Plan and Rate Study, January 2024	

General Description of Local Surface Water System

The City of Orlando is uniquely situated at the divide of two major river basins: the St. Johns River and the Kissimmee River. The City does not accept runoff from any other municipality, or local government, which places a special burden upon the City to keep runoff from polluting waters of other jurisdictions.

Figure SA-4 shows the eight (8) major watershed drainage basins within the City, its service area, and its estimated acreages. Each basin is divided into sub-basins and assigned numbers corresponding to the OUSWMM classification, and each sub-basin can be further divided into sub-systems that correspond to individual storm sewer outfalls.

Figure SA-4: Basins and Sub-Basins with Total Acreage

Major Basin	# of Sub-Basins Within	Total Acres Per Basin
Big Econ	0	9,441.27
Boggy Creek	48	22,188.99
Howell Branch	29	4,126.65
Lake Hart	1	16,534.40
Little Econ	69	14,481.61
Little Wekiva	27	5,715.20
Shingle Creek	34	15,334,14
Wekiva River	8	210.87
Total	**216**	**88,033.13**

Source: GIS & Engineering/Streets and Drainage Division

The drainage boundaries have been adjusted to accommodate changes in drainage patterns due to development. Land within the large landlocked area in the center of the City was assigned to basins according to flow direction, in the event that this landlocked basin were to fill up.

During the 2004 Regular Session, the Florida Legislature passed the Wekiva Parkway and Protection Act (WPPA). Section 369.319 and 369.321 F.S. requires each local government within the Wekiva Study Area to develop a master stormwater plan and amend the appropriate elements of the Growth Management Plan, including the Capital Improvements Element, to ensure implementation of the master stormwater management plan. In November 2005, the Wekiva Parkway and Protection Act Master Stormwater Management Plan Support Document, prepared for St. Johns River Water Management District, provided master stormwater management plan recommendations, together with a recommended schedule for the local governments located within the Wekiva Study Area. The Master Stormwater Management Plan (MSMP) was developed to satisfy the requirements of the statute.

Groundwater and Aquifer Recharge

Groundwater is the primary source of drinking water for the Orlando area. In addition, most non-potable demands such as irrigation and industrial uses utilize groundwater. Groundwater is also the receiving body for much of the surface runoff, through drain wells. The injection of runoff controls flooding, but also introduces contaminants that may pollute Orlando's drinking supply. The availability of an abundant and pure water source is paramount to the future of Orlando and the surrounding area. The Floridan Aquifer is composed of the Upper and Lower zones. The upper zone is between 150' and 600' below land surface. The lower zone is between 1,100' and 1,500' below land surface. Both zones are composed of hard brown

dolomitic limestone, or dolomite and relatively soft cream limestone. These limestones correspond to the Avon Park, Lake City, Ocala, Suwannee, Tampa and permeable parts of the Hawthorne formations. An outcrop of the upper zone generally occurs in a 50 mile wide band along the western gulf coast from Wakulla County to Hillsborough County.

The lithologic and hydrologic character of the Floridan aquifer is not uniform horizontally or vertically because of karst processes, bedding planes and fracture lines. Freshwater is available to approximately 2,000 feet below Orlando. The relative thickness of the freshwater aquifer generally declines to the east, until it reaches the St. Johns River. Groundwater flow is generally to the northeast, with piezometric highs in the Green Swamp area near the four corners of Orange, Osceola, Lake and Polk counties. Flow rates are measured in inches per year. Average yields from wells vary between 1,000 gpm to 5,000 gpm, with drawdowns of 10' to 25' for 20" to 24" wells. Approximately 75% of all public supply wells are in the upper zone. The Orlando Utilities Commission and Winter Park are the primary users of the lower zone.

To protect the future water supplies of the area, knowledge of recharge processes and recharge areas is necessary if development in Orange County is to be maintained. It has been estimated that of the 52" of annual rainfall in Orange County only 10% infiltrates into the ground. This amount equals approximately 210 million gallons per day (MGD) at an annual rate of 2" to 10" per year, depending upon soil conditions (Phelps, 1984). Figure SA-4 represents recharge areas in the Orlando area.

Three factors are needed to ascertain the recharge potential of an area as: the altitude and configuration of the piezometric surface of the Floridan aquifer, the direction and magnitude of the hydraulic gradient and, the thickness and permeability of the confining beds. Other factors includes evapotranspiration, land use, soil, topography and drainwells.

Before urban and agricultural influences, the Floridan aquifer was in equilibrium: recharge equaled discharge. Water pumping, however, created a new discharge, which must be balanced by a reduction in natural discharge, or an increase in recharge, or a combination of the two to reach a new equilibrium. Increases to impervious land surfaces increase surface runoff and increased recharge may be lost or negligible. Drainage wells are used to offset this loss and explain the high recharge rate for the developed areas within Orlando.

Water Quality of the Floridan aquifer is more easily obtained where the water producing formations are higher in altitude and in, or near the recharge area. Geology is the major factor in determining the natural background water quality. Chemical quality varies laterally and with depth. As water percolates through the soil and rock layers, it dissolves the limestone and

other mineral and organic constituents. Mineralization generally increases with depth and lateral movement to the east. The Upper zone has greater mineral water quality than the Lower zone. In Orange County, the chemical quality is generally good with < 150 mg/l of dissolved solids.

The City continues to work in collaboration with Orange County, the Water Management Districts and the USGS to develop new strategies aimed to implement the most equitable remedial actions that would enhance groundwater quality, while protecting land uses from flooding.

A groundwater management system's purpose is to determine safe yields by controlling excessive withdrawals, and to reduce contamination. Since Orlando and the majority of Florida obtains potable water from the ground, it is important to have a sound groundwater management strategy. Unlike surface water, groundwater cannot be seen or smelled and therefore it is easy to overlook the need to protect the area's groundwater resources. The interconnectedness of surface and ground waters is an important concept in the management of ground and surface waters. Water is stored in the ground until it resurfaces through seeps, lakes, rivers, springs and wells. The storage time varies from years to thousands of years, but eventually returns to participate in the earth's hydrologic cycle. The surface water will eventually evaporate and return to the surface as rainfall, where some will infiltrate back into the aquifer, or produce runoff to repeat the cycle. As with surface water, development has the ability to impact and alter natural processes affecting groundwater.

Urbanization has greatly influenced the amount of aquifer recharge in the Orlando area. Development increases the amount of impervious surface and alters the natural drainage patterns. This decreases the amount of water that can infiltrate into the ground and actually removes water from the area through improved surface drainage. On the other hand, Orlando uses drainage wells to inject water directly into the upper Floridan aquifer. It has been estimated that drainwells are responsible for the high recharge classification for the Downtown area and for 40% of all recharge in Orange County. Recharge is also accomplished through the disposal of reclaimed wastewater. Additional recharge, by using wastewater effluent may be a possible solution to postpone the adverse impact of excessive withdrawals of the aquifer. Aquifer levels are further impacted by water withdrawals for domestic, industrial, agricultural and recreational uses. The capacity of the Floridan aquifer has not been established. The surface level of the aquifer is monitored by the Orlando Utilities Commission (OUC) to ascertain the impacts of withdrawal on the aquifer level. This is an indirect measure of the capacity of the aquifer.

As of 2020, the OUC had a Consumptive Use Permit (CUP) allowing the withdrawal of up to 100.1 million gallons per day (MGD) from the aquifer for potable water uses. The OUC service area encompasses approximately 200 square miles and includes the City of Orlando, Edgewood, Belle Isle and portions of Unincorporated Orange County, with a total service population of approximately 464,700 residents. OUC's current demand is less than the CUP allocation, but the average daily demand is projected to increase to 106.0 MGD by the year 2040. Many other jurisdictions also depend upon the aquifer for drinking water and the total impact from the cumulative withdrawals is not known. However, when the projected demand for water exceeds recharge, the aquifer storage capacity is reduced and impacts will be increased.

Individual land uses increase the potential for groundwater contamination. All developed land uses create pollution, but not to the same extent. Those land uses located within the high recharge area have a greater chance of polluting the aquifer than those located in low recharge or discharge areas. Land uses near or within the same drainage basin as lakes and drainage wells also have high potential for contamination. Although those drainage basins that discharge into lakes can use the lakes for dilution, this has detrimental impacts to the surface water body.

Water conservation and reuse can be an effective method in reducing the impact of land development. Improving water efficiency and reducing demand will reduce the amount of withdrawal from the aquifer. This will prolong the detrimental impacts of excessive water withdrawals. The Potable Water Element covers water conservation initiatives in more detail.

Groundwater can be improved by concentrating on three areas: control of surface water runoff; potable water well head protection; and drainage wells. The City has established a Stormwater Utility fee to provide a constant and consistent source of funds for surface water improvement and maintenance. The ESM requires that the first flush of runoff be retained. This requirement enhances recharge potential and prevents contaminants from entering lakes and drainage wells. Pollutants that affect health include nitrates, sodium, and coliform bacteria. Significant reductions in phosphorus and nitrogen loading can be achieved through retrofitting of existing stormwater systems with retention ponds, that act as barriers to heavy metal and hazardous material spills. Surface waters and groundwater should display better water quality as a result of such retrofitting.

OUC wells are usually located within the water plant compound that offers two or three hundred foot buffers to other land uses. This is not necessarily the case in the older plants, especially Highland Avenue. The cone of depression has been estimated to be within a 500' radius of the well, more for multiple wells, although total impact from pumping can be

detected for several miles. Land uses should be examined within a 1,000' diameter to minimize the chances of accidental contamination. OUC has an ongoing program to inspect supply well casings with TV cameras, to ensure integrity of the casings.

The Safe Drinking Water Act requires EPA to develop and publish regulations on minimum requirements to prevent underground injection that may endanger underground sources of drinking water. FDEP has been delegated the State lead agency in the administration of this act in Florida. Chapter 62, F.A.C., contains the State's responses to the Federal Act. These rules set water quality standards for the design and installation of wells. The City has established a continuous program for taking corrective action to close some wells, re-route stormwater into existing conveyance systems, or pre-treat runoff going into drainage wells found to be indispensable in stormwater management. Remedial action should be implemented on a priority basis. Factors to be considered in the prioritization of drainage wells should include penetration into the Lower Floridan aquifer; location in relation to supply wells; the percentage of basins accepting road drainage; use for lake level control; hydraulic gradients; and land uses within drainage basins.

The safe yield of an aquifer can be developed to indicate the volume of water that can be pumped without the creation of serious water problems. The determination of a sustained aquifer yield is dependent upon the volume of water that can be feasibly extracted from the hydrologic cycle. A reliable estimate can be accomplished through a water budget analysis, that takes into consideration the following variables: 1) Seasonal and geographical irrigation demand; 2) Soil moisture stresses under which vegetation can survive; 3) Prediction of stream flow and water table elevation; and 4) The economic and ecological feasibility of various schemes for using or manipulating land and water resources (Dunne and Leopold, 1978).

Failure to balance the water budget will result in a loss of storage and pressure which must be equaled somewhere in the system, usually by saltwater intrusion. Since the water balance assumes that recharge must equal discharge, groundwater outflow and other discharges will further reduce the component of recharge that is available for consumptive uses. In addition, urban activities that divert water from recharging the aquifer further reduce the availability of water.

The Floridan aquifer has a large storage capacity although the exact volume is not known. The impact of water withdrawal has shown a long term trend of aquifer level reductions in the Orange County area. Although impacts are not affecting Orlando water users, their demands, when combined with other aquifer users create effects that are being felt downgradient, manifested as salt water intrusion, increased sinkhole activity and reduced spring flow.

Orlando has a responsibility to reduce its impacts to the aquifer and to those communities that are affected, just as Orlando has a responsibility to reduce surface water impacts.

Water conservation methods should be employed to increase the efficiency of water use, reduce water demand, increase recharge and improve water quality. Several alternatives to meet these ends have been outlined in this Element, the Wastewater, Potable Water and the Conservation Element. By making intelligent, long range decisions on the efficient use of Orlando's water resources, the City of Orlando may not be faced with the need for emergency actions.

EXISTING LEVEL OF SERVICE

Level of Service (LOS) is defined as the capacity per unit of demand for a public facility, usually expressed in terms of per capita per day, or land use unit per day. This LOS is an indicator of the extent or degree of service provided by a stormwater facility. It is difficult to express a stormwater LOS in meaningful terms as a per capita or land use unit per day LOS. A stormwater LOS is best described in terms of the physical characteristics of the system, and must address the needs for capacity and performance criteria for water quality and flood control, for new and existing systems. Additional criteria are that the LOS must not conflict with requirements of the Water Management Districts and the FDEP; they must allow for traffic movement; be cost effective; and maintain the relationship with the environment. A capacity LOS can be expressed as the design storm condition. This will require the selection of a storm frequency, duration and the antecedent soil condition for conveyance and storage facilities. A performance or water quality treatment LOS should establish specific pollutant load reduction goals, requiring treatment of runoff volumes, or reduction in the total runoff volume. The LOS must consider the impacts from both new and existing development.

The City has been developed under two different stormwater LOS: development before the implementation of OUSWMM in 1984 (majority of the City); and development after. Existing storm sewer LOS are not known because of the lack of design criteria in the City prior to 1984. As a condition of the City's National Pollution Discharge Elimination System Permit (NPDES) from the U.S. EPA, the City will update its inventory of storm sewer facilities. The capital improvement projects list will then be revised to reflect any deficiencies determined in the NPDES study. In prioritizing facilities for improvements, a number of criteria should be considered, such as the number of people affected, improvement to water quality, coordination with other capital infrastructure projects, reduction in maintenance and available funding.

The LOS standards for OUSWMM contained quantity and quality criteria that contained storm frequencies and durations relating to conveyance and roadway facilities. Design criteria and regulations pertaining to stormwater management within the City of Orlando can now be found in the ESM. For the design criteria to be used as the City's post-1984 LOS see Policy SA 1.1.2 within this document. The LOS and the other design criteria primarily address the rates of discharge rather than the issue of volume increases and their impact to existing stormwater facility capacities. There are two concerns with the volume issue: the impact to conveyance capacities and lake storage within the City, and the impact to conveyance capacities and lake storage outside the City.

Fully developed basins may or may not be of concern. This would depend upon the existing LOS for that basin and the occurrence of flooding. Landlocked basins are susceptible to flooding, especially if the lake level is controlled by drainage wells. Reliance on drainage wells may not be acceptable because of the possibility of blockage or failure. As discussed earlier, this can lead to severe flooding during minor storms. Landlocked basins should be studied as to flood elevations at a specific storm design, without drainage wells, to ascertain what will be at risk and if this is acceptable. LOS for basins with positive outfalls must also be ascertained in regard to acceptable flooding protection.

NEEDS ASSESSMENT

The purpose of a needs assessment analysis is to determine the capital improvement projects needed to maintain the adopted LOS and the costs of those projects. This assessment will first select a feasible and practical pre-1984 LOS that will be used to identify existing deficiencies in flood and water quality protection of the pre-1984 stormwater system. Any development built after the adoption of OUSWMM is considered to meet the post-1984 LOS for flood and water quality protection.

The pre-1984 standards should be based upon the physical impact of stormwater upon the population and the land. Environmental concerns must also be addressed in the pre-1984 LOS standard. The lack of pollution abatement facilities and the interconnection of surface waters to groundwaters make environmental impacts an important consideration. These impacts, according to priority, are: 1) immediate health and safety issues, 2) property damage, 3) environmental contamination, and 4) inconvenience to travel. However, a lack of design information prior to 1984 on stormwater facilities necessitates the City taking a different interim approach.

A water quality LOS for pre-1984 systems is complicated by the dependence of drain wells for flood control in most of the older (and some of the post-1984) sections of the City. In addition, post-1984 pollution abatement facilities may continue to add to the contamination of the City's surface waters and groundwaters, through inefficient designs and lack of maintenance.

Existing flooding areas have been delineated by the City's Engineering Division based upon the prioritization system employed by the Division. See Capital Improvement Element Figure CI-5 for the 5-year lists the projects, locations, and cost for each. The majority of projects are capital improvements. However, many are environmental, or repair and replacement projects, with many projects having dual functions.

Revenue Analysis

Prior to the implementation of the Stormwater Utility Enterprise Fund in fiscal year 1990, stormwater management was funded by the general fund. All maintenance, repair, replacement and new construction of the City's stormwater management systems have been funded by the stormwater utility since that time. The fee is applied City-wide based upon the amount of impervious surface area on each parcel. Funds from this revenue source can only be used for the operation, maintenance and construction of the City's stormwater management system. Each year a portion of the funding may be allocated for capital improvements, while the remainder will be used for operating and maintenance expenses.

Historically, the City has experienced a steady increase in population and is expected to continue at a rate of approximately 20% increase per decade, according to the City's Growth Projections Report. With population increases comes more demand for public infrastructure services. The city's current stormwater fee is insufficient to provide enough revenue to address future stormwater management costs. This was the conclusion of the Stormwater Management Program-Financial Plan and Rate Study of January 2024. Based on the study, after 20 years, the Stormwater Utility Code was amended to include a rate increase to the stormwater utility fee. Based on the total current parcels and the approved rate, the total Stormwater Utility Fee assessed across the City is projected to generate approximately $35.4M in total revenue for FY 2025, $45.2M for FY 2026, $55.5M for FY 2027, and $59.6M for FY 2028 and thereafter. This will help fund the expenditure requirements of the stormwater management program, help address flooding issues, and preserve the water quality for future generations.

Goals, Objectives and Policies: Stormwater & Aquifer Recharge

The following goals, objectives and policies have been developed for the use of local policy makers to help guide and direct the decision-making process pertaining to Orlando's stormwater and aquifer recharge resources and systems. For purposes of understanding, goals are generalized statements of desired end states toward which objectives and policies are directed. The objectives provide the attainable ends toward which specific efforts are directed and typically include a timeframe. Policies are the specific recommended actions that the City will pursue to achieve the stated goal.

The following goals, objectives, and policies are consistent with the requirements of Chapter 163, Florida Statutes, the State Comprehensive Plan (Chapter 187, Florida Statutes), and with the goals and policies of the East Central Florida Regional Planning Council's 2060 Strategic Regional Policy Plan. The goals, objectives, and policies are the legally adopted portions of the Growth Management Plan and are used to evaluate development proposals and City investments.

STORMWATER & AQUIFER RECHARGE GOAL SA-1

To provide efficient and economic stormwater management which will protect the public and property from flooding and which will maintain and improve water resource quality.

Objective SA.1.1 The City shall annually evaluate existing Special Flood Hazard Area (SFHA), floodplain, and flooding areas within the city and formulate a five-year program, for input into the Capital Improvement Element, outlining the appropriate retrofit or development strategies to alleviate flooding problems.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.1.1.1 The City shall continue to accept existing conditions as the pre-1984 Level of Service (LOS) standard and shall comply with requirements of the National Pollution Discharge Elimination System (NPDES) permit to outline deficiencies, to schedule needed capital improvements and to include a water quality component for existing and new development which is in compliance with the State statutes, as applied by FDEP and the Water Management Districts.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103, Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.1.1.2 The City shall apply all criteria contained within the Engineering Standards Manual (ESM) and associated documents as the post-1984 LOS standard including:

Facility	LOS
City Primary, Secondary and Tertiary	Design Storm: 25 year / 24 hour Max. Flood Stage: 100 year storm 1 foot below floor elevations Max. Hydraulic Grade Line (HGL): at gutter elevation for 25 year / 6 hour storm Max. HGL: 1 foot below gutter elevation for 10 year / 6 hour storm
Arterial Road	Roadway Section and Inlet Design: 10 year/ 6 hour storm Minimum 2 feet between seasonal high water table and bottom of base course
Collector Road	Roadway Section and Inlet Design: 5 year/ 6 hour storm Minimum 1 foot between seasonal high water table and bottom of base course
Minor Road	Roadway Section and Inlet Design: 3 year / 6 hour storm Minimum 1 foot between seasonal high water table and bottom of base course
Travel Lane Spread	12 feet maximum for all roads; roads with parking lane, width measured from face of curb to centerline outermost travel lane; clearance between design water surface and top of curb - 1 inch
Maximum Run Distance	400 feet to first inlet
Retention Ponds	Per Water Management District criteria or ESM, whichever is more restrictive.
Detention Ponds	Per Water Management District criteria or ESM, whichever is more restrictive.
Detention Ponds (landlocked basins)	Per Water Management District criteria or ESM, whichever is more restrictive.

SFHA and Floodplain	Development allowed in SFHA and floodplain with demonstration of no adverse impact, reasonably safe from flooding, and no compensatory storage loss for floodplain, no development in the floodway and per floodplain management criteria in Code of Federal Regulations (CFR), National Flood Insurance Program (NFIP), and Community Rating System (CRS).

(Amended June 29, 1998, Effective July 30, 1998, Doc. No. 31329; Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103, Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.1.1.3 The City shall maintain up to date data on the cost and effectiveness of stormwater facilities to facilitate future stormwater management and floodplain strategies.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.1.1.4 The City shall upgrade and retrofit stormwater facilities with roadway reconstruction wherever feasible.

Policy SA.1.1.5 The City shall periodically review revenue charges for the Stormwater Utility to ensure that all costs for implementing and maintaining the stormwater management plan of the City are met.

Policy SA.1.1.6 The City shall meet State water quality standards in Chapters 62-302 and 62-520, F.A.C., as applied by FDEP and the Water Management Districts through compliance with the ESM for all development and redevelopment without exception for size or type of development.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103)

Policy SA.1.1.7 The City, consistent with OUC implementation practices, shall engage in best practices identified in the Central Florida Water Initiative Regional Water Supply Plan, which address stormwater and conservation practices.
(Amended April 24, 2017, Effective May 25, 2017, Doc. No. 1704241203)

Objective SA.1.2 The City shall continue to update its stormwater inventory through its computerized Geographic Information System to include the International Airport, annexations and to verify the accuracy of the existing inventory of the stormwater system infrastructure.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636)

Policy SA.1.2.1 The City shall update its inventory of stormwater facilities as annexations occur.

Objective SA.1.3 The City shall maintain consistency between the GMP, Land Development Code (LDC), and ESM in order to protect natural drainage features, such as lakes, wetlands and rivers. Wetland standards, urban design criteria, and ESM variance criteria shall remain unified. Post-construction monitoring for design effectiveness shall be required for innovative designs and shall include criteria for non-compliance.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103, Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.1.3.1 The LDC and/or ESM shall encourage reductions in impervious surfaces through reduced parking standards, where appropriate, and innovative stormwater and site design.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.1.3.2 The City shall maintain design criteria within the LDC to allow the multiple use of stormwater management facilities for recreation, conservation and open space. The City shall consider innovative technologies and best management practices for urban spaces in its LDC and/or ESM amendments.
(Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103, Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.1.3.3 The LDC and/or ESM shall incorporate and use Best Management Practices (BMP), non-structural stormwater management strategies, nature-based solutions, and xeriscaping to manage stormwater and its environmental impacts when they are feasible.
(Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.1.3.4 The City shall provide technical information and administrative support in any comprehensive surface water and groundwater basin management plan initiated by the Water Management Districts (WMD).
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.1.3.5 All land use planning and development approvals which impact water resources shall conform to or exceed the development practices within City plans and WMD comprehensive basin management plans.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective SA.1.4 The City shall continue its comprehensive maintenance plan for City maintained stormwater management facilities throughout the planning period, as required by the NPDES permit. This includes the periodic inspection of all pipes, canals, retention/detention facilities, inlets, drainwells and any other stormwater facility maintained by the City for general condition and pollution sources. The results of the inspections are to be included into the stormwater inventory/database as the information becomes available.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103)

Policy SA.1.4.1 The City shall maintain its stormwater management facilities in such a manner that the impacts to natural systems shall be minimized.

Policy SA.1.4.2 The City shall maintain its stormwater facilities based upon the LOS criteria in Policies SA.1.1.1 and SA.1.1.2.

Policy SA.1.4.3 The City shall continue to enforce its regulations in Chapters 28 and 31, which prohibit the depositing of leaves and other yard wastes into the City's stormwater system.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective SA.1.5 The City shall continue to implement an inspection program for the City's stormwater management facilities and code enforcement programs for privately operated stormwater management facilities within the City. Private facilities shall be operated and maintained by the private facility owners (e.g. land owners, private utilities, Community Development District (CDD), or Associations such as Condominium Associations, Homeowners Associations (HOA), or Master Associations. The City shall inspect private stormwater facilities and/or require submittal of periodic inspection and maintenance records from private stormwater management facility owners to ensure effectiveness, continued compliance, and function consistent with permitted conditions. The facilities shall be upgraded for pollution abatement to meet ESM and WMD requirements upon redevelopment.
(Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.1.5.1 The City shall require that all private stormwater management facilities be operated and maintained such that the effectiveness for stormwater abatement and water quality improvement are maximized.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a

Policy SA.1.5.2 The City shall continue to provide incentives to multi-family, commercial, industrial and other business property owners to upgrade their stormwater management facilities to exceed the minimum local, state, or federal standards, such as those provided for in the Stormwater Utility Program.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective SA.1.6 Throughout the planning period, the City shall continue to enhance the stormwater education and outreach program to educate the public on aspects of stormwater management.
(Amended May 16, 1994, Effective July 28, 1994, Doc. No.27538; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.1.6.1 The City's educational and outreach program shall include public service announcements, websites, phone applications, mail-outs, demonstrations and neighborhood meetings.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective SA.1.7 The City shall continue to propose interlocal agreements or coordination with Orange County and other appropriate agencies relating to flood control of Primary Conveyance Facilities, water quality of lakes and regional stormwater projects within the Wekiva Study Area.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended April 7, 2008, Effective June 24, 2008, Doc. No. 0804071001; Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.1.7.1 The City shall notify the downstream jurisdictional agency for any stormwater action undertaken by the City which will impact any Primary Control Facility.

Policy SA.1.7.2 The City shall retrofit and/or repair drainwells or conveyance facilities which fall under the City's jurisdiction. The County, FDOT and any other appropriate agency may have jurisdiction over such facilities within the City limits and costs will be shared among the appropriate agencies for such retrofits or repairs.
(Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103)

Objective SA.1.8 The City shall protect aquifer recharge areas to maintain suitable groundwater levels and to protect groundwater quality. Protection measures will address the impacts of groundwater withdrawals on water quality, sinkhole formation, and supply well protection. This objective will work in conjunction with the applicable Potable Water and Wastewater objectives.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636)

Policy SA.1.8.1 The City shall encourage stormwater reuse systems and water reduction strategies to minimize water withdrawals. Lake water withdrawals shall be considered an appropriate form of stormwater reuse, subject to City oversight and City Code.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.1.8.2 The LDC shall prohibit land uses which have a high potential risk for water contamination in primary groundwater recharge areas. Existing development in primary groundwater recharge areas shall be required to retrofit on-site storage areas to contain 120% of any stored regulated substance or generated waste in case of an emergency. Land uses with high potential risk include any uses or activities which are considered large or small quantity hazardous waste generators under the Resource Conservation and Recovery Act.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636)

Policy SA.1.8.3 The City shall protect the groundwater supplies both upgradient and downgradient of Orlando through intergovernmental cooperation.

Policy SA.1.8.4 The City shall protect its groundwater resources by controlling increases in post-development runoff volumes in prime groundwater recharge areas.
(Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103)

Policy SA.1.8.5 The City shall consider prime recharge areas as having high priority in the retrofitting of stormwater facilities to protect groundwater resources.

Policy SA.1.8.6 The City shall coordinate with the OUC and the appropriate Water Management Districts to determine the extent to which groundwater withdrawals can be made without resulting in harm to the water resources and associated natural systems.
(Amended May 16, 1994, Effective July 28, 1994, Doc. No. 27538; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective SA.1.9 Throughout the planning period, all City departments shall explore and implement procedures to reduce their use of pesticides, herbicides and artificial fertilizers.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636)

Policy SA.1.9.1 Any Department using substances which have the potential to contaminate water resources shall review the need for these substances and, where appropriate, use available alternatives such as organic fertilizers and biological controls for pest and weed control wherever possible. In accordance with the City's NPDES permit, the City shall continue to require licensing for contractors that apply pesticides and herbicides on City property, train employees regarding pesticide use, and educate the public about pesticide use through outreach efforts including the Keep Our Lakes Clean Program under the Streets and Stormwater Division.
(Amended February 7, 2000, Effective March 9, 2000, Doc No. 32636; Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.1.9.2 The City shall incorporate xeriscape design into publicly maintained land to minimize water withdrawals, reduce the use of chemicals, and reduce the cost of labor.

Objective SA.1.10 Throughout the planning period, the City shall maintain a continuous program for identifying high risk drainage wells and taking corrective action to upgrade these drainage wells. The installation of pollution and control devices, rerouting of stormwater runoff and, in some cases, creating alternative methods of discharge and closing wells, are examples of the type of remedial measures which would be undertaken.
(Amended May 16, 1994, Effective July 28, 1994, Doc. No. 27538)

Policy SA.1.10.1 The City shall continue to coordinate with other agencies having an interest in drainage wells in the City of Orlando.
(Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103)

Policy SA.1.10.2 The City will continue to reduce its dependence upon drainage wells that take direct street run-off, converting such wells to lake level control wells where possible, and will preserve the use of existing lake level control wells.
(Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103)

Policy SA.1.10.3 Recognizing the groundwater recharge benefits of drainwells, the City shall address water quality concerns through retrofitting and upgrading of drainage wells where necessary.

Objective SA.1.11 Throughout the planning period, the City shall, where required, address the requirements of the Wekiva Parkway and Protection Act Master Stormwater Management Plan Support Document ("MSMP"), dated November 2005, together with the Little Wekiva River Watershed Management Plan, dated November 2005 ("WMP").
(Amended April 7, 2008, Effective June 24, 2008, Doc. No. 0804071001, Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Policy SA.1.11.1 The City shall identify subbasins within the Wekiva Study Area where future pollutant loads are predicted to exceed existing conditions, and evaluate the need for additional pollutant controls beyond the typical requirements of the Engineering Standards Manual, consistent with the best management practices identified in the MSMP.
(Amended April 7, 2008, Effective June 24, 2008, Doc. No. 0804071001; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.1.11.2 Throughout the planning period, the City shall implement the recommendations identified in the MSMP and WMP for the prioritized deficiencies.
(Amended April 7, 2008, Effective June 24, 2008, Doc. No. 0804071001)

Policy SA.1.11.3 The City shall apply strategies recommended by St. John's River Water Management District in the MSMP to identify and prioritize capital improvements projects annually for stormwater facilities within the Wekiva Study Area. These strategies include:

- Surface Water Conservation
- Groundwater Protection
- Reuse Management, and
- Surface Water Treatment.

(Amended April 7, 2008, Effective June 24, 2008, Doc. No. 0804071001)

Policy SA.1.11.4 For those areas outside the City's reclaimed water service area, and inside the Wekiva Study Area, the City shall identify large potential users such as golf courses, parks, and recreation areas, as part of the Technical Review Committee approval process. Such users shall be required to implement stormwater irrigation practices unless demonstrated that such practices are impracticable and/or financially infeasible.
(Amended April 7, 2008, Effective June 24, 2008, Doc. No. 0804071001)

STORMWATER & AQUIFER RECHARGE GOAL SA-2

To preserve the quality of Orlando's surface water bodies, recognizing the importance of lake beauty, cleanliness, and recreational use as a natural asset contributing to the general appeal of Orlando as a residential and business community.

Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a

Objective SA.2.1 The City shall continue to fully implement a water quality monitoring plan as a basis for determining water quality and prioritization of lake and drainwell retrofit and/or upgrading.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636)

Policy SA.2.1.1 The City will participate in the development of Basin Management Action Plans, along with the Florida Department of Environmental Protection and other stake holders, for any City lake which fails to meet the minimum criteria of Chapter 62-303, F.A.C. (Impaired Water Rule). The City will then implement projects and/or programs identified in the Impaired Water Body's Basin Management Action Plan to reduce the City's allocation of pollutant loading which exceeds the Florida Department of Environmental Protection's established Total Maximum Daily Loading (TMDL).
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103)

Policy SA.2.1.2 For the existing privately operated stormwater facilities that currently comply with all local, state, and federal regulations, the City shall provide incentives to property owners to implement higher stormwater management design of BMP's or retrofit individual stormwater management facilities to reduce nutrient loads which will impact water quality of receiving bodies. Stormwater utility fees should be reduced for the site, which stormwater management system is designed to exceed all the local, state, and federal standards and demonstrate significant reductions in runoff or improvement to water quality from the site.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.2.1.3 The City shall provide technical assistance to lakefront property owners to maintain and increase the use of natural vegetation along lakeshores.

Policy SA.2.1.4 The City shall annually publish a quantitative report on the variability of water quality including the trophic state of each City lake.

Policy SA.2.1.5 The City shall encourage citizen and neighborhood involvement in addressing lake water quality concerns for those lakes wholly and/or partially within the City of Orlando.
(Amended February 7, 2000, Effective March 9, 2000, Doc No. 32636)

Objective SA.2.2 By 2040, the City shall increase the number of lakes meeting good water quality standards (Trophic State Index less than 61).
(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Policy SA.2.2.1 The LDC shall incorporate Low Impact Design (LID) standards that improve groundwater recharge and minimize runoff.
(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.2.2.2 The City shall pursue the implementation of Integrated Water Resources Management (IWRM) policies in coordination with intergovernmental

entities that share the same watershed basin.
(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Objective SA.2.3 Throughout the planning period, the City shall implement the water treatment and water conservation policies described in the Green Works Community Action Plan and Future-Ready City Master Plan to the greatest extent practicable.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy SA.2.3.1 The City shall implement the water-related strategies described in the Green Works Community Action Plan and Future-Ready City Master Plan to ensure community health and safety.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

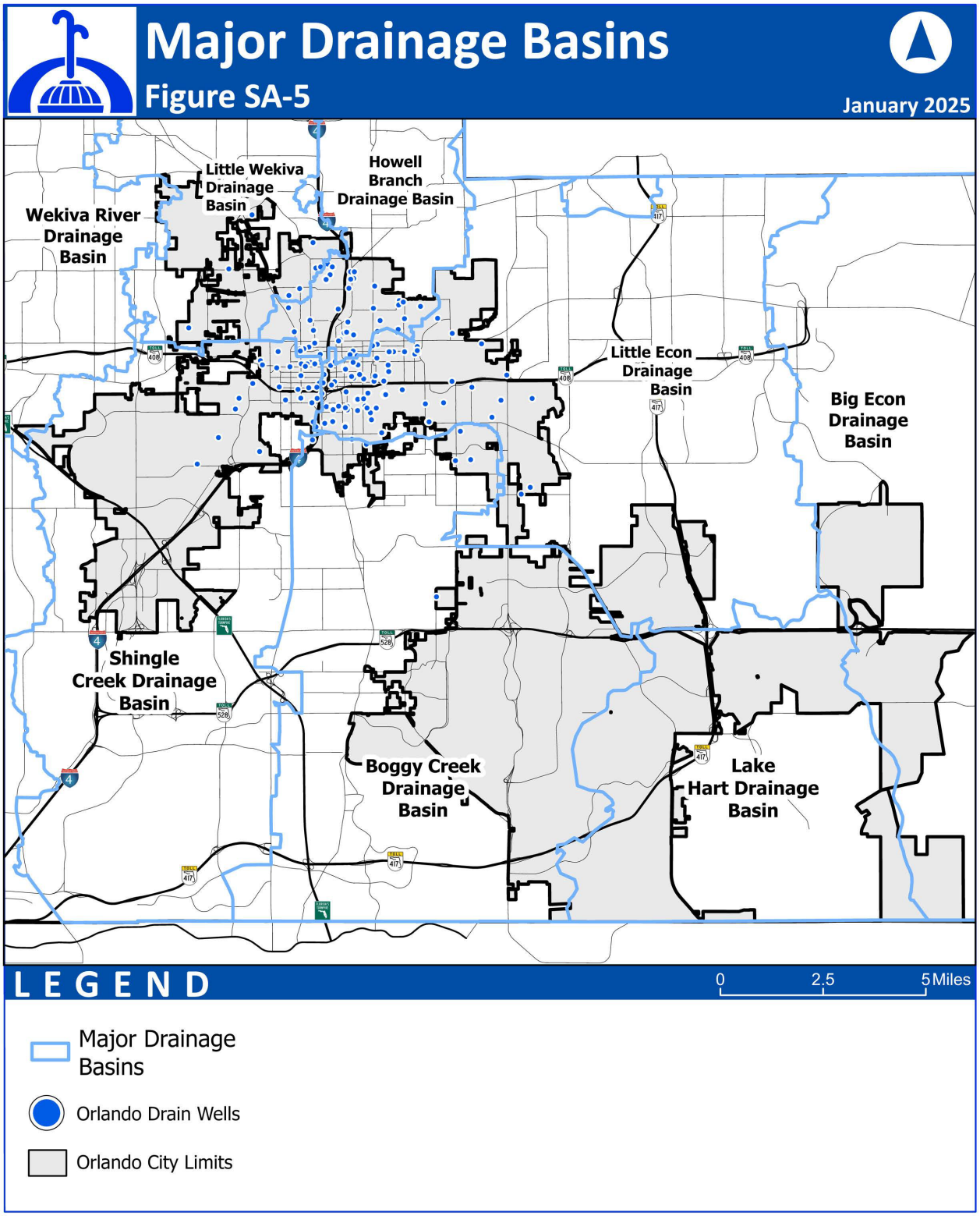
Maps & Figures: Stormwater & Aquifer Recharge

Maps & Figures that support this Element include:

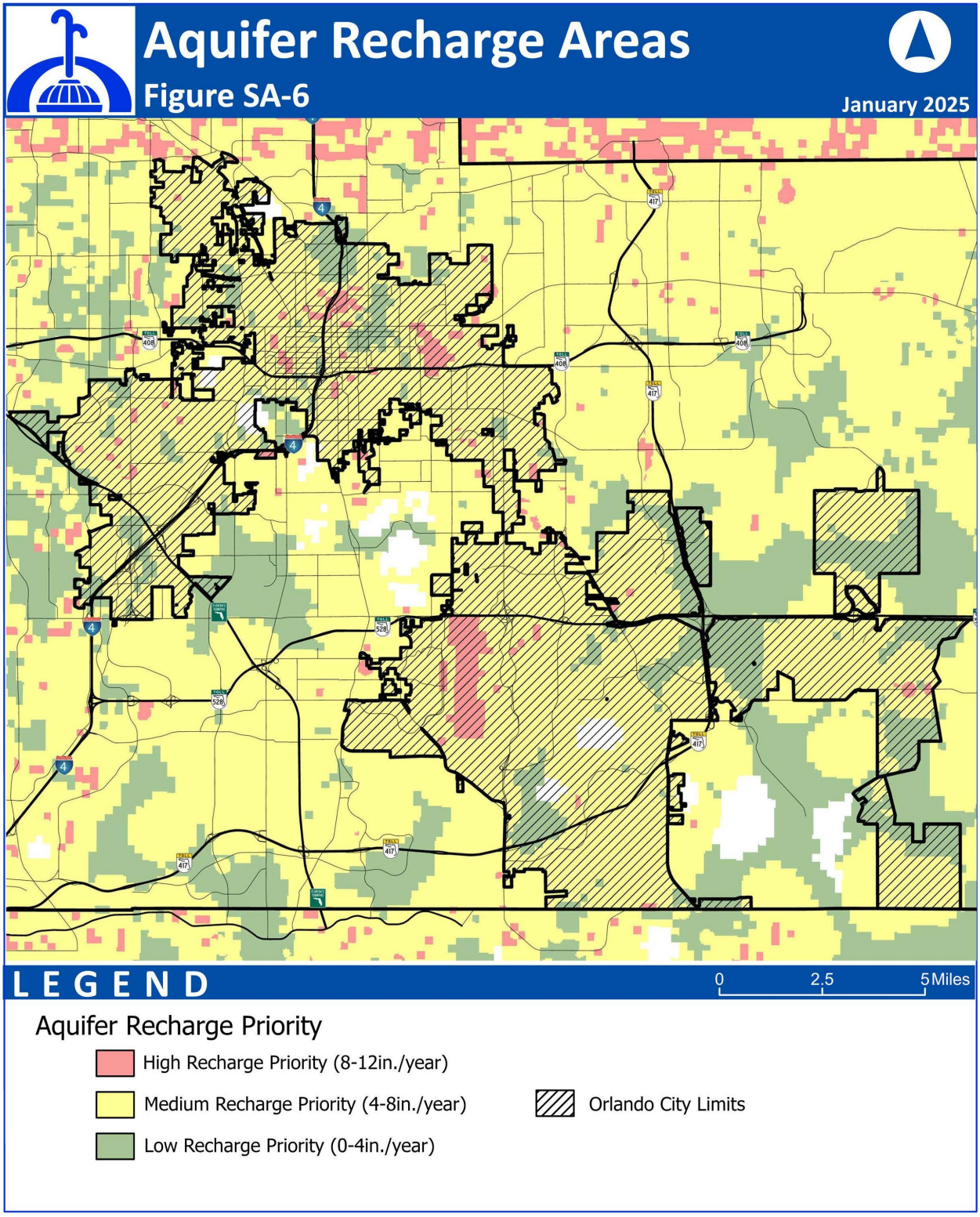
Figure SA-1: Depth of Rainfall for Likely Storm Event Frequencies, Across Various Durations
Figure SA-2: Assumed Runoff Generation Increases as a Result of Increases in Impervious Surfaces and Areas Served by Storm Sewers
Figure SA-3: City of Orlando, Stormwater Assets
Figure SA-4: Basins and Sub-Basins with Total Acreage
Figure SA-5: Major Drainage Basins Map
Figure SA-6: Aquifer Recharge Areas Map

Figures SA-5 and SA-6 are adopted parts of the Growth Management Plan (Orlando's comprehensive plan) and any amendments to those figures will be adopted by ordinance. The remaining figures are provided for reference and are not regulatory in nature.

(Adopted Figures Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)



(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)



(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Potable Water Element

OUR GUIDANCE

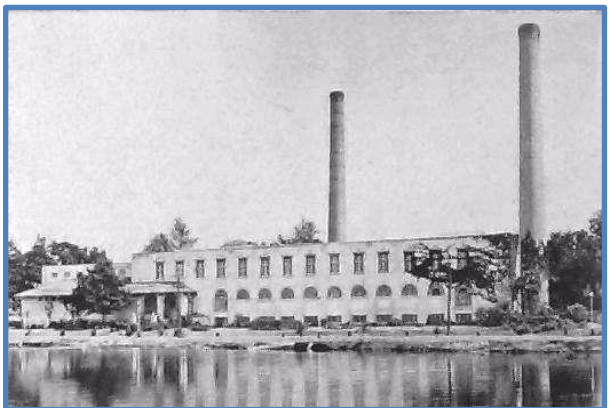
- Section 163.3177, Florida Statutes – Required and optional elements of the comprehensive plan; studies and surveys.
- Florida Statutes, State Safe Drinking Water Act, Sections 403.850 - 403.864.
- Florida Administrative Code (F.A.C.), Chapters 62-550, 62-555, and 62-560.
- Wekiva Parkway and Protection Act 2004, Chapter 369 FS.
- 2022 City of Orlando Water Supply Facilities Work Plan.
- Central Florida Water Initiative, Regional Water Supply Plan, 2020.
- SJRWMD Strategic Plan, 2024-2028.
- SFWMD Strategic Plan, 2022-2027.

Our Trends:

The purpose of the Potable Water Element is to protect the supply of fresh water; ensure that sufficient water is available for current needs and future growth; and estimate the capital facility needs for the water system, including the transmission, distribution, and plant components. The City of Orlando has analyzed the water supply and water needs to 2050.

Water is supplied to the City of Orlando primarily by the Orlando Utilities Commission (OUC), which also serves other municipalities and unincorporated areas. The Orange County Utilities Department (OCUD), Winter Park Water and Wastewater Utilities Department and the Taft Water Association provide less than 10% of the City of Orlando's water supply, and their services are fully addressed in the 2022 City of Orlando Water Supply Facilities Work Plan.

The Orlando Utilities Commission (OUC) and its facilities, programs and projects will be the focus of this analysis. Since all OUC plants and storage tanks are interconnected by large transmission lines, the OUC water system is best analyzed as one large, integrated network. Consequently, the City's portion of the OUC water system cannot be factored out without considering the remainder of the OUC system.



OUC's first Electric & Water Plant (1926) – facing Lake Ivanhoe, the building is now a local historic landmark.

As part of this update, OUC has conducted a full analysis of its facilities and operations to: forecast future water demand, determine future water supply consistent with current and future OUC storage, pumping and transmission main improvements and general operations, identify conservation programs to

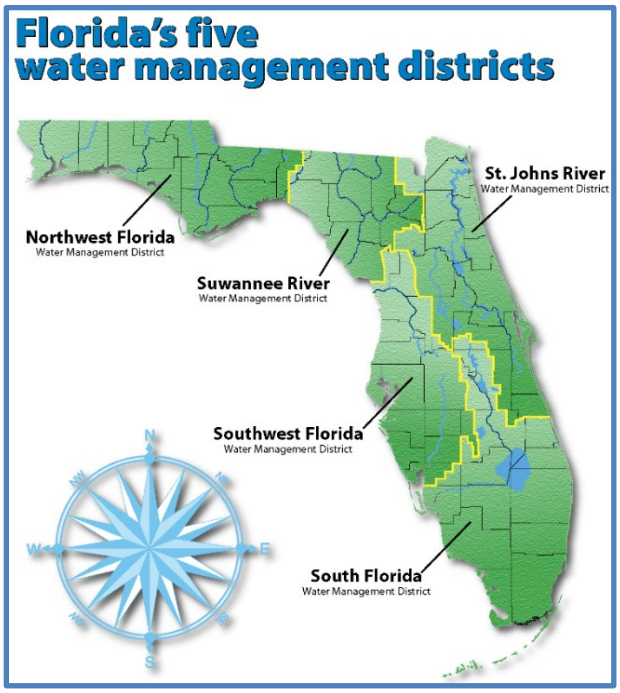
`reduce demand as well as support alternative supplies to decrease impacts to the Floridan Aquifer, and develop a Capital Improvement Plan for the next 5 years. This initiative will identify projects needed to upgrade existing facilities and to expand the system to meet growth projections. Also included will be estimated costs for the 5-year Capital Improvement Plan and implementation schedules. While comprehensive, the OUC analysis did not separate demands and recommended system improvements between "inside City" and "outside City" components. Therefore, the City's Planning Division has prepared projections for the City's portion of the OUC service area, to provide a comparison to the OUC projections.

To meet future water needs, the City should:

- Continue to coordinate closely with OUC to ensure that the needs of existing and future sustainable development are met.
- Continue to develop and expand its reclaimed water program and facilities that treat wastewater so as to meet retail and public demand and reduce pressures on the traditional potable water supply. The City should also explore water conservation initiatives.
- Support the implementation of various strategies to reduce water demand and increase healthy and sustainable water efficiency in partnership with OUC. These strategies should also include water conservation education through the Greenworks Community Action Plan (CAP) as well as compliance with the City's progressive building and landscaping codes, along with the continued implementation of concurrency.

Water Management Districts and Other Water Initiatives

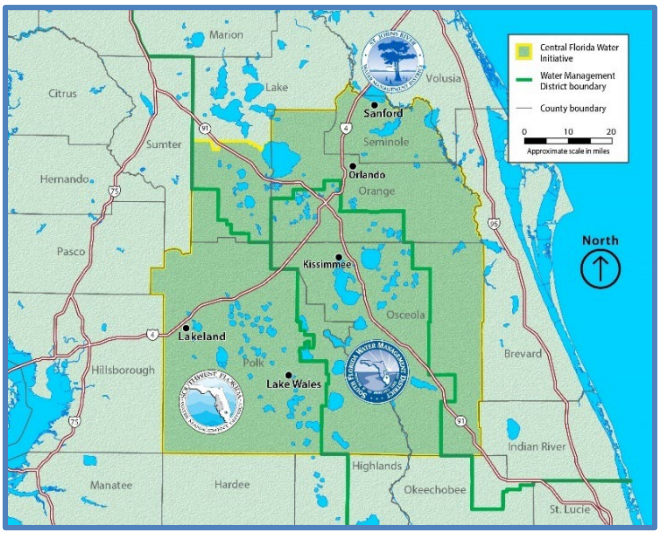
In 1972, the Florida Legislature established five water management districts, which serve to preserve and manage water resources. Each district has responsibilities in four broad categories: water supply, water quality, natural systems management and flood protection. The City of Orlando falls within two water management district jurisdictions: the St. Johns River Water Management District (SJRWMD) and the South Florida Water Management District (SFWMD).



The boundaries of these districts, including the Southwest Florida Water Management District, intersect within the Central Florida Water Initiative Planning Area (CFWI). Each district

had previously developed water supply plans that included their respective jurisdictions within the CFWI Planning Area.

CFWI is a collaborative water supply planning effort among the state's three largest water management districts: St. Johns River, South Florida and Southwest Florida WMDs; the Florida Department of Environmental Protection (DEP), the Florida Department of Agriculture and Consumer Services (DACS) and water utilities, environmental groups, business organizations, agricultural communities and other stakeholders.



CFWI implements effective and consistent water resource planning, development and management initiatives for the benefit of Central Florida. Below is a summary of the WMD's water supply planning activities, findings, and recommendations.

The SJRWMD encompasses all or part of 18 counties in northeast and east-central Florida. As of 2020, it included 119 local governments and had a total population of 5.6 million. In accordance with Chapters 163 and 373 of the Florida Statutes, the SJRWMD must conduct water supply planning for at least a 20-year planning horizon for those regions where it determines that existing sources of water are not adequate to meet all existing and future reasonable-beneficial uses and to sustain the water resources and related natural systems through the planning period.

Historically, SJRWMD has prepared water supply plans that encompass the entire district. However, in order to address local resource concerns, the SJRWMD has changed direction and now creates three water supply plans for five planning/data collection regions, rather than a single district-wide plan. This approach addresses local resource concerns expressed by stakeholders, improve planning efficiency and reduce costs. Each regional water supply plan (RWSP) includes the most recent water supply assessment. The results of the updated assessment will determine the extent of planning needed for a particular planning region. The three water supply plans include the Central Florida Water Initiative (including the City of Orlando), the North Florida Regional Water Supply Planning Partnership, and the Central Springs and East Coast Planning area. The initial SJRWMD RWSP was completed in 2000 and was updated in 2005; subsequent updates were completed annually from 2006 through 2009

with addenda. In Central Florida, this plan has been superseded by the 2015 and 2020 CFWI RWSPs.

SJRWMD's water supply planning and assessment investigations have documented that withdrawal of groundwater in certain areas of the district is approaching the maximum sustainable rate that will cause unacceptable adverse impacts to the water resources and related natural systems. To meet the future water use demands, the 2020 RWSP identified several water supply and water resource development options/projects. These include increased use of reclaimed water, development of brackish groundwater sources, as well as surface water storage through reservoirs and conservation.

The SFWMD encompasses all or part of 16 south Florida counties, covering a total area of 17,930 square miles. Approximately 9 million people live within the district's boundaries. The portion of the SFWMD that falls in the CFWI Planning Area was included in the Kissimmee Basin Water Supply Plan. The initial Kissimmee Basin plan was completed in 2000, was updated in 2006, and its findings have been included in the 2015 CFWI RWSP, later updated in 2020.

In an effort to better manage water resources, the Central Florida Water Initiative (CFWI) was created in 2009. Consistent with F.S. Section 373.709, addressing water supply planning requirements, South Florida Water Management District (SFWMD), St. Johns River Water Management District (SJRWMD), and Southwest Florida Water Management District (SWFWMD) worked with the CFWI technical teams and other stakeholders to establish the first 2015 CFWI Regional Water Supply Plan. The RWSP was updated in 2020. The 2020 RWSP reflects the collaborative water supply planning effort to protect, develop, conserve and restore Central Florida's water resources. Projecting supply and demand to 2040, it is estimated that a total of 855 million of gallons per day (MGD) total water will be needed. It is also estimated that 95 MGD will have to be secured through alternative water supply, such as surface waters. For additional information on the CFWI, please see the 2022 City of Orlando Water Supply Facilities Work Plan.

OUC Service Area And Service Population

Service Area

OUC's water service area measures approximately 200 square miles, which includes the cities of Orlando, Edgewood and Belle Isle, plus portions of unincorporated Orange County (please see Figure PW-5 for a map of the OUC service area and surrounding service areas). In 2020, OUC's total service population was estimated to be approximately 464,700 residents, of which

291,573 are City residents. In 2019, the average daily demand was approximately 88.1 MGD. By 2040, OUC expects average daily water demand to increase to 106.0 MGD. The OUC service area is defined by a water service territorial agreement between OUC and Orange County and the various municipalities within Orange County. This agreement was established to avoid and eliminate duplication of water service facilities as well as needless and wasteful expenditures of capital and water resources. OUC's policy has been to extend pipelines in response to growth, as opposed to using them as a means to encourage growth. As part of this policy, and as detailed through the City's impact fee ordinance, all or a defined portion of the costs of line extensions must be paid by the developer. Moreover, OUC's territory is contained within Orange County's Urban Service Area. These factors tend to minimize any urban sprawl.

There are two areas within the boundary of the OUC service area that are served by Orange County Utilities. They include an area between Lake Conway and SR 436, and the Hidden Beach subdivision near Conroy Road and the Turnpike. Orange County provides for long term service to both of these areas. OUC did not include any portion of the Orange County Service area in its analysis, but does leave open the possibility for OUC to serve areas outside its existing service area if the need arises in the future. A significant change since the last update is that the City annexed large areas generally located south of SR 528 and east of the SR 417. As determined through agreement, Orange County Utilities will be serving this area when development occurs.

Inventory

Delivery of water to individual customers requires the construction of water supply wells, a water plant and transmission facilities. OUC operates seven (7) water supply/treatment plants within its water service area. These plants include of the Southwest Plant, the Kirkman Plant, the Pine Hills Plant, the Lake Highland Plant, the Sky Lake Plant, the Navy Plant, and the Conway Plant. Water is delivered through an interconnected system of transmission lines. Each facility includes wells, ozone generating equipment, ozone contact tanks, chemical feed equipment, ground storage reservoirs, high service pumps, control equipment, and emergency power facilities to run the plant in the event of an extended power outage.

Figure PW-1 includes wellfield and treatment capacity information for each of OUC's seven facilities. OUC's Southeast facility repumps water in the distribution system in order to maintain pressures in the extreme Southeast portions of the service area, including Lake Nona. There are currently a total of 31 water production wells with a combined capacity of 177.1 MGD, which pump water from the Floridan aquifer. Each treatment plant has from 2 to 7 wells. Well capacity is designed to meet peak day demand.

Figure PW-1: OUC Water Supply / Treatment Facility Capacities

Facilities and Raw Water Sources		Wellfield-Raw/Source Water		Treatment-Finished Water	
Facility Name	**Raw Water Source**	**Current Maximum Capacity (MGD)**	**Current Average Daily Capacity (MGD/AADF)**	**Current Maximum Capacity (MGD)**	**Current Average Day Capacity (MGD/ AADF)**
1. Pine Hills WSF	Lower Floridan	25.0	17.9	25.0	17.9
2. Kirkman WSF	Lower Floridan	15.0	10.7	15.0	10.7
3. Southwest WSF	Lower Floridan	45.5	32.5	40.0	28.6
4. Lake Highland WSF	Lower Floridan	28.1	20.1	30.4	21.7
5. Sky Lake WSF	Lower Floridan	22.5	16.1	22.5	16.1
6. Navy WSF	Lower Floridan	10.0	7.1	10.0	7.1
7. Conway WSF	Lower Floridan	31.0	22.1	26.8	19.1
Total OUC Existing Capacity MGD-million gallons per day AADF- Annual average daily flow		**177.1**	**126.5**	**169.7**	**121.2**

All OUC wells tap into the Lower Floridan aquifer extending over 1,100 feet below the surface. The Lower Floridan aquifer is a source of very high quality water that requires minimal treatment. OUC also performs rigorous testing of the water it pumps from the aquifer to make sure that it is free from contaminants. The only constituent in the raw water that requires treatment is hydrogen sulfide, a gas with an offensive odor that is easily removed by the ozone treatment equipment. OUC incorporates the ozone treatment process to completely remove this water-soluble gas without discharging it into the atmosphere, which creates an odor problem for the surrounding property owners. Other treatment processes include fluoridation, pH control using sodium hydroxide (corrosion control), and chlorination before the water is pumped into the transmission system.

Approximately two decades ago, OUC started a major construction program to implement the ozone treatment process in all of its water supply/treatment facilities. Three new water supply/treatment facilities utilizing ozone treatment have been constructed (Southwest, Lake Highland, and Southeast). Ozone treatment equipment was also installed at five plants exiting at that time (Pine Hills, Kirkman, Navy, Conway, and Sky Lake). These facilities were refurbished and modernized. The total capacity of the existing plants was also increased. As part of this overall process, five older aeration plants were also abandoned and demolished to reduce the number of facilities that needed to be operated and maintained.

There are approximately 1,900 miles of transmission/distribution pipes ranging in size from 2 inches to 48 inches. There are no private systems located within the jurisdiction of the City of

Orlando. Most service to the City is provided by OUC, by far the largest system in the area, serving as mentioned, an estimated 464,700 residents in 2020, of which 63% are City residents. The Orange County Utilities Department and the Winter Park Utilities Department independently provide water to less than 16,000 City residents.

One function of OUC's transmission/distribution network is to interconnect all the water supply/treatment facilities with each other. There are three elevated water storage tanks connected to the transmission/distribution system. These tanks help maintain minimum acceptable pressure in the pipe network and supply water into the pipe network during peak demand periods.

OUC has three emergency interconnects with Orange County Utilities, which provide emergency sources of water in the event one utility unexpectedly experiences extensive loss of supply sources or treatment facilities. The water can flow either way through an emergency interconnect, depending on which utility needs the water. They are intended to be used only in an emergency and require the cooperation of both utilities to activate them. The entire water system is operated and monitored by OUC's Supervisory Control and Data Acquisition (SCADA) system located at the Operations Center on Pershing Ave. The computerized control system allows the treatment plants, wells, and storage tanks to be controlled by a single operator from one location.

LEVEL OF SERVICE AND PROJECTED DEMAND

The existing Level of Service (LOS) can be computed based upon the historical water sales. The LOS is defined as the capacity per unit demand for a public facility and physical characteristics of the facility. The LOS is generally expressed in terms of gallons per capita per day (g/c/d) or gallons per unit of land use per day but OUC does not use this information to size for water plants.

Figure PW-2 shows the level of service by land use category and PW-3 depicts the total estimated cumulative water demand within City.

Figure PW-2: Level of Service for Potable Water

Land Use	LOS Without Reclaimed Water	LOS With Reclaimed Water
Single Family	275 g/du/d	160 g/du/d
Multifamily	165 g/du/d	165 g/du/d
Office	0.15 g/sqft/d	0.15 g/sqft/d
Commercial	0.13 g/sqft/d	0.13 g/sqft/d
Hotel	138 g/rm/d	138 g/rm/d
Industrial	0.22 g/sqft/d	0.22 g/sqft/d
Government	0.15 g/sqft/d	0.15 g/sqft/d
Hospital	0.22 g/sqft/d	0.22 g/sqft/d

Figure PW-3: Total Estimated Cumulative Water Demand by Land Use (MGD)

Land Use	Base 2022	2025	2030	2035	2040	2045	2050
Single Family	12.20	12.70	13.57	14.37	14.91	15.30	15.55
Multifamily	16.58	19.39	22.54	24.26	25.02	25.53	25.93
Office (sqft)	5.36	5.68	6.04	6.42	6.68	6.84	6.94
Commercial (sqft)	4.41	4.50	4.83	4.95	5.03	5.06	5.07
Hotel (rooms)	3.97	4.31	4.62	4.94	5.10	5.16	5.22
Industrial (sqft)	11.37	12.32	13.78	14.58	15.05	15.51	15.77
Government (sqft)	3.34	3.62	3.71	3.79	3.86	3.89	3.93
Hospital (sqft)	1.71	1.81	1.99	2.43	2.67	2.84	2.87
TOTAL	**58.94**	**68.45**	**75.86**	**80.89**	**83.62**	**85.53**	**86.77**

Figure PW-3 shows the total water demand within the City limits by land use from 2022 as the baseline to 2050. Each land use category, defined by dwelling units or sq. ft. and based on the GMP Growth Projections Report (2022-2050), is multiplied by the LOS to determine the estimated total demand from each land use category. It should be noted that the City of Orlando uses the level of service multipliers to project total water demand (potable and reclaimed water), while OUC's potable water demands are based on entire service population, user characteristics and CFWI planning practices.

In 2020, OUC provided water to approximately 291,573 City residents. OUC's total service population was approximately 464,700 residents and average daily demand was approximately 83.03 MGD. By 2040, OUC expects average daily water demand to grow to 106.0 MGD. The permitted capacity of OUC's existing groundwater supply and treatment facilities would technically allow for distribution of up to 121.2 MGD on an average day basis; however, OUC's Consumptive Use Permit (CUP) limits the amount of water that OUC may withdraw from the aquifer to 100.1 MGD.

Population and water demand projections for OUC were developed during the CFWI planning process and completed in 2020. The projections are included in Table A-5a and Table A-5b of the 2020 final CFWI RWSP (please see http://cfwiwater.com/). The projections are based on the Bureau of Economic and Business Research (BEBR) medium scenario for the 5-in-10 year rainfall. Figure PW-4 includes the OUC water demand projections along with treatment capacity and CUP limitations.

Figure PW-4: OUC Forecasted Total Water Supply Needs and Sources

Potable Supply Capacity and Projected Demand Analysis					
Supplier /	**Demand, Permit Allocation, or Capacity (mgd, AADF)**				
Supply or Demand Component	**2020**	**2025**	**2030**	**2035**	**2040**
	Baseline				
ORLANDO UTILITIES COMMISSION (OUC)					
Potable Water Demand - Unincorporated Orange County (1)	38.7	43.1	45.3	47.6	48.7
Potable Water Demand - Total Service Area (2)	82.8	92.7	97.8	103.2	105.9
CUP -Permitted Allocation (3)	100.1	100.1	100.1	100.1	100.1
Current Wellfield (Source) Capacity	126.5	126.5	126.5	126.5	126.5
Current Treatment Capacity	121.2	121.2	121.2	121.2	121.2
Additional Wellfield Source Capacity (CIP Improvements)	0	0	0	0	0
Additional Treatment Capacity (CIP Improvements)	0	0	0	0	0
Alternative Water Supply (AWS) (4)	0	0	0	5	5
CUP -Permitted Surplus (Deficit)	17.3	7.4	2.3	1.9	-0.8
Wellfield/Source Capacity Surplus (Deficit)	43.7	33.8	28.7	23.3	20.6
Treatment Capacity Surplus (Deficit)	38.4	28.5	23.4	18	15.3
(1) Assumes OUC water demand is proportional to population estimates provided by BEBR on a parcel based. In 2020, the population estimate in unincorporated Orange County was approximately 46.7% of the total population for the OUC water service area. In 2040, the population estimate for unincorporated Orange County was approximately 46.0% of the total. The percentages for the years in between 2020 and 2040 were linearly interpolated.					
(2) Potable water demand projections are from the CFWI RWSP 2020, Appendix A, Table A-5b. 2020 Baseline demands are actual OUC water plant data from 2020.					
(3) OUC's CUP is currently undergoing renewal. The current allocation is 100.1 mgd. The requested allocation is 109.2 mg. If requested allocation is not granted and demands must be meet with current allocation, than a deficit may occur in 2035 and 2040 and additional reclaimed water and conservation, beyond what is currently planned, will be required until an AWS can be brought on-line.					
(4) Includes OUC's planned 5.0 mgd, AADF share of St. Johns River/Taylor Creek Reservoir AWS Project. Timing of this project is uncertain but is currently estimated to be in the 2035 to 2040 timeframe. Additional reclaimed water and conservation, beyond what is currently planned, will be required until AWS can be brought on-line. Additional AWS capacity may also be needed in 2040 and beyond.					

As mentioned previously, the capacity of OUC's existing wellfields and treatment facilities would allow for distribution of up to 121.2 mgd on an average day basis, however, OUC is restricted by the Consumptive Use Permit (CUP #3159) groundwater allocation which limits the amount of water that may be withdrawn to 100.1 mgd. In 2020, the potable water capacity surplus was 17.3 mgd which is expected to decrease overtime as the population continues to growth. The CUP is currently undergoing renewal for a requested allocation of 109.2 mgd, but the limiting capacity is based on the current allocation of 100.1 mgd. If the requested allocation is not granted, then the future demand must be meet with the current allocation of 100.1 mgd. A deficit is expected to occur between 2035 and 2040 if an alternative water supply is not brought on-line. Additional reclaimed water and conservation measures beyond what is currently planned, will be required along with an Alternate Water Supply project to meet future demand.

In order to meet future demand, OUC will continue to partner with the City to expand reclaimed water use in the OUC service area, increase conservation to reduce potable water demands, and implement alternative water supply. See the 5-year schedule of Water Supply Projects from OUC, in the Capital Improvement Element Fund Schedule.

OUC has an interagency agreement with SJRWMD and SFWMD since OUC's water service area lies in both jurisdictions. Under this agreement, SFWMD delegated to SJRWMD all of its authority to issue a single, consolidated CUP to OUC. Besides authorizing a consolidated CUP, the interagency agreement allows SJRWMD to issue Environmental Resource Permits (ERP) and water shortage restrictions to OUC, and to enforce OUC's CUP throughout the duration of the permit.

WATER SUPPLY SOURCES AND STRATEGIES

The City of Orlando and OUC have identified three major strategies for meeting water demand with sufficient water supply:

- To treat and reclaim wastewater for use as irrigation; (See, the Wastewater Element for the specific City goals and objectives).
- To encourage conservation measures to decrease demand; and
- To explore water sources other than the Floridan aquifer.

These alternative sources may include brackish groundwater, or surface water from reservoirs and rivers. All of these alternative supplies would require extensive treatment and are more costly than traditional groundwater supplies.

Initiatives

Project RENEW is a regional reuse project that is currently on hold. The project may be re-evaluated to determine the availability of reclaimed water from the City and the best location(s) for reclaimed water in the region to meet adopted Minimum Flows and Levels (MFL) prevention and recovery strategies by the St Johns River Water Management District.

The City of Orlando's **Eastern Regional Reclaimed Water Distribution System (ERRWDS)** was designed and constructed to supply approximately 33 MGD from the City's Iron Bridge Water Reclamation Facility to the OUC service area, Orange County, Seminole County, UCF, and Oviedo. The multi-phase project was constructed from 2006 through 2011. OUC partnered with the City in constructing the ERRWDS and has paid the City over $16.9 million dollars to complete plant improvements, construct reuse mains, booster pump stations, and a supplemental well. The remaining portion of the project, the Lake Nona storage and repump station, has been put on hold until it is needed when reuse demands increase.

ERRWDS transports reclaimed water from the Iron Bridge Regional Water Reclamation Facility to OUC's service area in Baldwin Park, the SR 436 Corridor, and the southeast service area which includes the Orlando International Airport and Lake Nona. Completion of this system also allows Orange County to use the reclaimed water pipeline and supply more customers in the OUC service area with reclaimed water. The city also provides the County with additional reclaimed water if they cannot meet all of their customer demands. Having more reclaimed water available to the OUC and OCUD service area for irrigation allows both service providers to conserve potable groundwater to protect the environment and help meet future demands.

Conservation Measures

Groundwater (Orlando's potable water source) is sometimes seen as a virtually infinite source of potable water for the area. However, like all natural resources it is in reality a finite supply and must be managed accordingly. Rainfall and development are the primary reasons for changes in the availability of potable water. As discussed in the Stormwater & Aquifer Recharge Element, rainfall is the ultimate source of recharge to the Floridan aquifer. Drought conditions, which are starting to occur more frequently and for longer periods, have made voluntary and mandatory water restrictions a reality in the Central Florida area. Continued population growth in the Orlando area has put an additional strain upon the area's water resources by placing additional demand upon the capacity of the aquifer. Water conservation is a means by which planning can effectively meet the challenges of drought and additional growth.

The need for water conservation from drought conditions is easily perceived and most people are willing to sacrifice in the short term. However, the need for long term water conservation is conceptually more difficult to perceive because of the notion of an infinite supply of groundwater and the desire for comfortable living. Public education is slowly changing this perception. Long term shortages, however, are a response more related to development demand than to lack of rainfall. The combination of both can have serious ramifications. The Aquifer Recharge Element discusses projected demand based upon the available capacity of the Floridan Aquifer. Many of these conservation methods are best instituted by government agencies.

OUC Conservation Measures

OUC has a comprehensive water conservation plan first approved by the SJRWMD in February 2003. OUC expanded the original plan as part of the CUP renewal with SJRWMD in 2020. The 2020 Water Conservation Plan continues to guide and expand OUC's water conservation efforts.

OUC currently has many water conservation programs and methods in progress. Some strategies include promoting water conservation through year-round multimedia and other community outreach efforts; providing tools like Usage Dashboard allowing customers to monitor their consumption; conducting landscape irrigation audits for high-volume users; offering free water conservation kits; conducting water audits to help customers increase efficiency; offering multiple rebates for water saving fixtures and products; offering cost-share programs to customers to increase their water use efficiently; proactively utilizing its AMI platform to alert customers of their water use; ensuring accurate metering to ensure accountability of water use; leak detention and making improvements to the water distribution system; and maintaining inverted block water rates and increasing rates over time if necessary.

OUC delivers year-round public information media campaigns to better educate customers and the community about the importance of water conservation. OUC implements comprehensive media campaigns that utilize print, online, television, radio and outdoor media as well as specialized approaches such as direct mail and community partnerships. OUC successfully uses social media, including Facebook and Twitter. OUC also distributes conservation resources to local schools, customers, and community organizations.

OUC's conservation specialists and marketing and community relations staff routinely attend trade shows and civic events throughout the year to promote conservation. OUC's school programs, the Water Color Project and Project AWESOME, help teach young people to respect the value of water and help them grow into environmentally conscious adults.

OUC's conservation specialists personally visit customers to perform water audits and energy surveys, with approximately half or more consisting of water audits. These audits are typically requested by the customer, or can be initiated by OUC as a result of high water use on a customer's bill. Toilets, faucets, and irrigation systems are typically checked during these audits.

Since 2009, OUC has offered rebates to residential and commercial customers for water cisterns/rain barrels and rebates to builders for homes built to Florida Water Star standards. In 2012, OUC added the Energy Star Clothes washing machine rebate, (no longer being offered), toilet and urinal rebates, air-cooled ice machines, and Florida Friendly Landscaping and Irrigation Repair rebates. OUC is currently in process of reviewing, updating and expanding its water conservation rebates.

In 2009, OUC's Reliable Plaza earned Gold Leadership in Energy and Environmental Design (LEED) certification, officially cementing the 10-story administration and customer service center as the "Greenest Building in Downtown Orlando." The non-profit U.S. Green Building Council awarded the Gold level certification after completing a review of the building's design and construction. Reliable Plaza was also one of the first commercial buildings to hold a Florida Water Star certification, a voluntary program for new and existing construction that encourages water efficiency in appliances, plumbing fixtures, irrigation systems and landscapes. The building was designed to use about 28 percent less energy and 40 percent less water than similar buildings built to code.

In 2012, water efficient landscaping signage was updated around the building to identify drought tolerant species, water cistern, irrigation practices and low-flow toilets. The revitalized signage allows tour participants to identify the green and sustainable practices. Tours are provided to local civic groups and community organizations on request.

The WaterWise Landscaping Project at OUC's Gardenia facility uses Florida Friendly Landscaping (FFL) design to set a sustainable standard for other commercial properties. OUC's Gardenia facility serves as a model facility and demonstration center for energy and water conservation. The facility showcases indoor and outdoor conservation practices, a living wall, rain harvest garden, solar panels, and a sustainability lab. A smart evapotranspiration (ET) controller was also installed to further minimize water use.

In 2019, OUC and the City of Orlando were among 25 United States cities selected to receive a $2.5 million grant from Bloomberg Philanthropies as part of its American Cities Climate Challenge. One of the projects identified as part of this collaboration was the opportunity to

build, design and implement a mobile sustainability education exhibit known as the Tiny Green Home. In partnership with the Orlando Science Center (OSC) and the City of Orlando, and funded in part by a grant from the Natural Resources Defense Council, the 200-square-foot exhibit looks like an actual tiny home located on the campus of OSC, which has more than 640,000 annual visitors. The exhibit provides a hands-on experience to promote sustainable home living. The tiny green home showcases OUC's programs and conservation education through interactive displays, including water conservation measures and rebates. It also includes a garden and a green wall to educate visitors about irrigation and landscape, along with a functioning water cistern. The exhibit is mobile and deployable to OUC, City of Orlando, and OSC community events.

OUC was an early adopter of rate structures that encourage water conservation, while at the same time keeping the price of water affordable for basic needs. Dating back to March 2001, OUC adopted an inclining block rate with 4 tiers for all residential and commercial 5/8" meter water users. This rate structure provides the customer significant financial incentives to manage their water use by charging a lower rate per 1,000 gallons for lower usage and a higher rate for higher usage. Multiple studies, including Dr. Whitcomb's 2005 research study "*Florida Water Rates Evaluation of Single-Family Homes*", firmly support the conclusion that water use decreases as price increases. (Whitcomb J.B. 2005a. Florida Water Rates Evaluation of Single-Family Homes Northwest Florida Water Management District, Havana, FL. http;//www.nwfwmd.state.fl.us/permits/waterrates report.pdf.)

One of OUC's greatest innovations was to develop and more importantly, successfully implement, a Commercial Irrigation inclining tiered rate structure that was based on customers' irrigated acreage. Again, OUC was an early adopter of this innovative concept and initiated this rate to all of OUC's Commercial irrigation customers with meters 1" and larger as of Oct. 1, 2002. The design of this rate structure provides stronger incentives to commercial customers to use less than half of the theoretical permissible irrigation water use that could occur if they simply set their irrigation timers to water twice a week. This multipronged strategy also encourages customers to water less than two times per week, install, maintain and use a rain or soil sensor, use efficient landscape design and make good choices in plant material.

Since then, OUC has instituted many rate increases and made rate structure changes to further increase the pricing signals that promote the conservation ethic. The rate increases have been more heavily weighted on the higher consumption tiers.

OUC's Efficiency Delivered Program went "live" to customers in May 2012. The goal of this program is to provide water and energy efficiency to all of OUC's customers regardless of

income level. This energy and water conservation program is an adaptation of the Home Fix-Up Program, which provided weatherization assistance to low-income homeowners and the Financed Insulation Program.

In 2018, the program was revised to three levels of customer income and each receives a different percent contribution from OUC. For example, Level 1 customers, with a household income of $40,000 or less, receive an 85% contribution from OUC, while the other 15% is the customer's responsibility. Level 3 customers, with a household income of $60,000 or more, have 100% customer responsibility, but all applicable rebates apply. The water conservation components are being tracked and include minor plumbing repairs, water flow restrictors, irrigation repair, pipe insulation, toilet replacements, and WaterSense labeled irrigation controllers.

Since 2014, more than 3,500 rental units have benefited from OUC's Multifamily Efficiency Program (MFEP). As energy and water bills rise, tenants put pressure on owners and property managers. Around 65% of Orlando residents live in rental properties, Orlando renters rank fifth-most burdened by rent payments in the U.S., and 33% of OUC customers live on less than $35,000 in annual income. OUC's MFEP is specifically designed to help multifamily property owners improve energy and water efficiency in their communities while leveraging OUC's rebates. In order to promote water conservation, property owners can install High Efficiency Toilets, Smart Irrigation Controller and/or complete the Florida Water Star Certification. Further information can be found online: https://www.ouc.com/business/business-rebates-programs/multifamily-efficiency-program.

Property owners can contact OUC's Conservation Coordinator to schedule a property assessment. The Coordinator provides a full energy and water evaluation that outlines recommended conservation upgrades and payback periods for each improvement. With the owner's or designee's approval to move forward, OUC will oversee the project completion from start to finish, utilizing OUC's Preferred Contractor Network or a contractor of the customer's choice. Communities that have participated in the MFEP are Nona Park Villages, Lexington Court Apartments, Kinneret Apartments, Primrose Terrance Apartments, Sawgrass Apartments and, Amelia Court at Creative Village.

Between 2013 and 2016, OUC changed out all of its 147,000 standard water meters with digital advanced metering infrastructure (AMI). OUC's Meter Data Management (MDM) system went live in 2013 to support the conversion to AMI meters. The benefits for OUC and its customers include access to daily usage information; support for high bill complaints; access to daily reads and interval data; enhanced leak detection capabilities; foundation groundwork for the

automation of remote connects and disconnects to support pre-paid metering; and the ability to streamline other business processes.

OUC obtained cost-share funding from SJRWMD for the Water Education and Irrigation Awareness Program (WEAP) Phase 1 (FY 2016-2017) and Phase 2 (FY 2018-FY 2019) of the program. This program is focused on decreasing water use for OUC's high irrigation customers with a high potential for water conservation. Three qualified contractors were selected to assist residents with a free irrigation evaluation as well as implementing irrigation improvements at discounted prices. Making use of OUC's AMI data, queries were developed to identify the suspected high-use customers who:

- Irrigated more than two days per week (Test Case 1).
- Had a sustained peak in their recent water use which could be a result of a leak (Test Case 2)
- Used more water than expected based on lot and home size from the OCPA (Test Case 3). An additional High Use test case was later added that looked at sustained usage greater than 100 gallon per day.

OUC's marketing department developed specialized postcards with targeted messages for each Test Case. Direct-mail postcards or emails are sent to inform customers of potential problems. Customers can choose to alter their behavior, fix a problem as a result of the notice – do it yourself (DIY) – or they can call a contractor for assistance.

City of Orlando Conservation Measures

Through the guidance of the **Greenworks Community Action Plan (CAP)**, approved in 2013, the City of Orlando is transitioning into one of the most environmentally-friendly, economically and socially vibrant communities in the nation. As a leader in reclaimed water use, the city views water and water conservation, as key areas of the overall plan. Consistent with the GMP Potable Water policies, and the Greenworks Plan, the City is pursuing a residential per capita water demand of 73.4 gpcd in 2050. Another important goal that emerged from the Greenworks Plan was to establish a landscaping code that would require strict watering standards.

A new conservation area is the City of Orlando's **Building Energy and Water Efficiency Strategy (BEWES)**. It is a policy that will focus on tracking the energy and water efficiency of the City's largest buildings. It is anticipated that by equipping the community's commercial property owners with this information, efficiency will improve and there will be far reaching conservation and economic benefits. BEWES calls on existing commercial, institutional, multifamily buildings larger than 50,000 square feet to track whole-building energy use, report to the City annually, and make their information transparent to the real estate marketplace.

While the policy covers less than five percent of Orlando's buildings, it accounts for more than 50 percent of total energy and water used by all buildings citywide. Electric power generation is the largest user of water, so reducing energy demand has a strong effect on preserving limited water supply. It is anticipated that building energy efficiency will conserve a critical 900 million gallons of potable water annually.

The City of Orlando adopted a new **Landscaping Code** on April 1, 2014 (LDC Sec.60-200-60.234). Through the Greenworks planning process and input from stakeholder meetings, the code was developed over a multi-year period and includes best practices from North America and Europe and addresses new State of Florida regulatory standards. Consistent with the Florida-Friendly Landscape Principles and South Florida Water Management District Xeriscape Plant Guide II, the City's landscaping ordinance specifically addresses the recommended use of Florida-friendly landscaping materials and the minimum percent of required pervious areas.

As part of the updated code, water conservation is addressed through encouraging native/drought tolerant landscaping and plants that are adapted to Central Florida rainfall, supporting the use of plants suited to the growing conditions of a particular location, and establishing standards for the efficient installation and maintenance of plants and micro-irrigation systems. Water uses are addressed in several code sections, including Section 60.223. All irrigation systems must comply with City Code Chapter 60, Part 2I, which requires efficient controls, pressure-compensating nozzles, and leak detection equipment.

While an irrigation system is not required, if selected, it must meet certain standards that may include soil-moisture~~s~~ sensors and weather-based controllers and be consistent with Florida Water Star standards. As it concerns Non-Residential and Multifamily Landscaping Requirements (Part 2G.), plants, preferably low water need native plants, are to be grouped by water need and should be watered according to need. Turf limited to 60% of the landscaped area. New development landscaping must meet a minimum point threshold for approval. Points are awarded according to broad-based criteria including evapotranspiration, soil moisture sensors, rainwater harvesting, tree conservation, and in ground system. Drought-resistant plants are also awarded higher points.

While not addressed in the landscaping code, the City of Orlando complies with mandatory year-round irrigation conservation measures, as detailed in 40E-24 Florida Administrative Code. Moreover, the City has adopted the 2012 Florida Building Code, as amended, which requires the installation of rain sensors in new irrigation systems. If irrigation is to be installed, City Code requires the use of reclaimed water as the irrigation source, where available. Where unavailable, the new code rewards the use of other non-potable sources, such as storm-water

ponds, canals, and rainwater harvesting systems. In 2013, the City adopted a fertilizer ordinance (Section 31.26 of City Code) based upon and consistent with the State of Florida model ordinance. This ordinance is crafted to lessen reliance on fertilization, and by extension, lessen demand for irrigation. Strict guidelines were included to protect natural water bodies from fertilizer nutrients.

Emergency Situations – The City of Orlando does not have separate water use code restrictions addressing "emergency situations", as declared by the pertinent Water Management Districts, to reduce water consumption, thereby alleviating a local water shortage within the City of Orlando's water system. Instead, the City follows the District's directives, as to the minimum amount of water necessary to conduct operations, and other restrictions as necessary.

Ultra-Low Volume Plumbing in Construction – Interior use of potable water can be reduced by using water efficient fixtures.

- Toilets are now designed to work efficiently with less water. Several designs using 1.5 gallons and even 0.8 gallons per flush have been developed. Studies have shown that the ultra-low-volume toilets can reduce water use by 22.6% without system blockages or increases in inconvenience.
- Shower heads can be replaced with specifically designed flows which reduce volumes but not function. Water flow is then reduced from 5-8 gallons per minute (gpm) to 2.5 gpm, which is a significant reduction.
- New faucets for the kitchen and bathroom allow variable flows for different uses, such as rinsing and filling, and add aeration to increase the efficiency. The Florida Building Code (FBC), as adopted by the City, contains all plumbing flow restriction requirements.

Concurrency Management – The City requires sufficient capacity in its concurrency management system before an applicant may receive a building permit. This ensures that the City's level of service standards are met. If a deficiency is identified, the City has the authority to deny permits. Although historically the City has not had to use this authority to address water shortages, it is an available solution of last resort. This strategy may also be useful if temporary shortages are expected while waiting for additional capacity to be built.

Reclaimed Water Rates – The City's reclaimed water ordinance (City Code, Chapter 32) requires property owners to connect to the reclaimed water system if facilities are available (defined as being within 100 feet of a residential property or 1,000 feet of a non-residential property). City actions include code revisions, retrofit programs, and xeriscape programs. The City promotes water conservation through its land development code regulations and broad based economic development and Greenworks initiatives. The City also supports OUC in its efforts to educate

the public about water conservation. Both entities have made great strides in increasing reclaimed water piping and use within OUC's service area, by completing the multi-phase ERRWDS project, as previously discussed.

Alternative Water Supplies

Potable water may be available from sources other than the Floridan aquifer. Alternative Water Supplies include surface waters such as rivers and streams, brackish groundwater, or seawater. Each of these sources requires more treatment than fresh groundwater. A number of proposed alternative water supply projects are presented in the CFWI RWSP. Of particular interest to the City and OUC is the St. Johns River/Taylor Creek Reservoir Project and the Brackish Groundwater (LLFA) project.

St. Johns River/Taylor Creek Reservoir Project- The Taylor Creek Reservoir/St. Johns River (TCR/SJR) alternative water supply project will utilize surface water from the Taylor Creek Reservoir and will also capture surface water from the St. Johns River when levels are high. OUC has been a participant in the regional TCR/SJR AWS Project since 2005 along with multiple other project partners. OUC's capacity share in the project is 5 mgd: however, additional capacity could be available during Phase 1 of the project if the City of Cocoa has excess capacity.

Lower Lower Floridan Aquifer (LLFA) Brackish Groundwater-OUC completed a feasibility study in 2019 to determine whether OUC's Southeast repump facility site would be a suitable location to consider development of a Lower Lower Floridan Aquifer brackish groundwater alternative water supply. The results were favorable for proceeding with the drilling and testing of an exploratory Underground Injection Control (UIC) well at OUC's Southeast Repump facility. The test well was completed in June 2022. Results were favorable and OUC is proceeding with the design of a brackish water treatment facility.

Capital Improvement Program

The Capital Improvement Program (CIP) provides a description of the water supply projects that the City and OUC are proposing over the next 5 years. See the Capital Improvements Fund Schedule, Figure CI-5 which lists the projects, funding sources, description of activity, and estimated cost over a five-year period. OUC's total amount for the 5-years is $266.635 million of investment in potable water projects.

Performance Assessment

The performance of a potable water system is evaluated based on the quality of the delivered water, the pressure at which it is delivered, and the physical condition of the water facilities. The physical condition of the system can have a direct impact upon the quality of the water and the pressure at which it is delivered.

The Insurance Services Office (ISO) is an agency that rates water systems and fire departments for insurance rating purposes. The ISO evaluates almost all water systems in the United States on a periodic basis. The ISO performs rigorous on-site inspections and tests, and reviews records to develop its ratings. The ISO examines risk and provides a quality rating from Class 1 to Class 10, with Class 1 being the highest rating. Sixty percent of the rating score is based on an evaluation of the fire department and emergency communication system. Forty percent of the rating score is based on the condition and performance of the water system. Since 2004, the City of Orlando has continued to maintain the highest ISO rating of Class 1. Only 11% of communities in Florida have a Class 1 rating and only 1% of communities nationwide have a Class 1 rating. In 2023, the water supply score was 38.5 points out of a possible 40, earning the City another Class 1 rating.

OUC has been performing annual water audits since issuance of the CUP in 2004. The annual results are submitted to the St. Johns River Water Management District. The resulting "unaccounted-for-water" levels are well below the District standard of 10%, so the water distribution and metering systems are considered to be efficient by the District.

OUC's multiple supply facilities increase reliability. All water supply/treatment facilities have some form of standby power. At some facilities, emergency generators provide a source of power to operate equipment for extended periods of time if permanent power is lost as a result of a natural disaster, such as a hurricane. At other facilities, two independent electrical power circuits deliver power to the facility. In the event one circuit is out of service, the other circuit can provide power to operate the facility.

Environmental Impacts & Water Quality

Central Florida's drinking water supply is primarily obtained from groundwater withdrawn from the Floridan aquifer. Aquifers can be described as huge underground, porous rocks that hold and allow water to move through the gaps within the rock. Aquifers can be composed of different types of materials, such as sand, shell and limestone. Fresh and salt water fill the various sized holes in the rock. Freshwater can be found in the uppermost part of aquifers, while salt water can be found much deeper.

In some areas, water in an aquifer is kept in place by a thick layer of clay and then by more sandy soil extending up to the land's surface. Where water in an aquifer is confined, the water is under pressure. The pressure allows water to rise in a well above the top of the aquifer and, in some places, water rises above the land's surface without a pump, resulting in an artesian free-flowing well.

The water quality within the aquifer varies. In some areas, water in the aquifer is not suitable for drinking without some type of chemical treatment because it contains various minerals or salts. Salt water, which is heavier than freshwater, can escape into drinking water wells. This process is known as saltwater intrusion, thus making the water too salty to drink. Even though salt water is present everywhere in the aquifer deep below the freshwater, saltwater intrusion occurs when wells are drilled too deep or when too much freshwater is pumped from the aquifer, allowing salt water to replace freshwater.

The aquifer in Central Florida is impacted daily by human activities. Changes in the landscape, such as paved roads, parking lots, shopping centers, housing developments and other buildings, tend to alter the quality and quantity of water that seeps into an aquifer. An aquifer's water quality is increasingly vulnerable to sources of pollutants, such as nutrients in lawn fertilizers, pesticides and other chemicals, and by animal wastes, that run off backyards or other developed areas and seep into the ground.

Contaminants that may be present in water include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.
- Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production and also can come from gas stations, urban stormwater runoff and septic systems.
- Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. All drinking water

may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk.

Water quality monitoring is required by state law. Water must meet or exceed state primary and secondary drinking water standards and other parameters set by the Safe Drinking Water Act. Orlando has a clean source of drinking water. The characteristics of untreated groundwater from the Floridan Aquifer are relatively stable. The only undesirable component is from hydrogen sulfide, which is easily removed through ozonation or activated carbon processes.

To ensure the quality and safety of drinking water, OUC's certified water quality lab conducts thousands of chemical and bacteriological water-quality tests each year, including tests for more than 135 regulated and unregulated substances. OUC's annual water quality report can be found on the OUC website at www.ouc.com/environment-community/high-quality-water-ouc/water-quality-reports.

FUTURE OF WATER AND WATER RESOURCES

The City's Growth Management Plan (GMP), in particular the Potable Water, Conservation, Wastewater and Stormwater Elements, support innovative ways to preserve sensitive resources and conservation land through best practices. Implementation is pursued by various City Departments and the Office of Sustainability.

Enormous strides have been made to address the community's growing water supply needs, particularly through Senate Bills 360 and 444 and coupled with amendments to Chapters 163 and 373, which have all served to strengthen the statutory links between the regional water supply plans prepared by the water management districts and the comprehensive plans prepared by local governments. In particular, these actions have established a broad platform on which to improve coordination between local land use planning and water supply planning. The 2020 Central Florida Water Initiative Regional Water Supply Plan provides a clear road map for collaborative efforts and effective water supply planning. And while this process has better coordinated regional planning efforts, more efficient data collection and sharing by utilities at a local level is needed to ensure full transparency.

And finally, as detailed in the City's 10-Year Water Supply Facilities Work Plan, of particular importance is the involvement by citizens in water conservation coupled with an equally robust response by businesses and industries to introduce innovative water practices that include comprehensive water audits, new technologies and a willingness to meet important green building standards. In addition to the civic and water utilities efforts, non-profits, such as Audubon Florida through its Community Steward Program, have been instrumental in helping

citizen and business volunteers to become “water messengers” and teach their communities how to conserve and protect their water resources for generations to come.

> *“(W)ater is the elixir of Florida; it brings life to the plants, wildlife, and people that call Florida home. It is the reason why we are surrounded by beautiful ecosystems that support the varied birds and other wildlife that share this magical place with us. But, we are faced with great challenges as we look for ways to provide enough clean water to meet the demands of a rapidly growing population and protect the ecosystems that are supported by our water….*
>
> *While there are many approaches to water conservation, the approach that provides the strongest protection for our water resources is land conservation …(S)pending to protect forests, wetlands, and aquifer recharge areas saves money over time as the need for costly water treatment infrastructure is avoided. As Floridians struggle to fix the many problems plaguing our waterways and look for the billions of dollars needed to fund these fixes, we should remember that conserving Florida’s special places protects our valuable resources at their source….”*
>
> *– Pam Meharg, Seminole Audubon Society Chair, “Land Conservation is the Best Way to Preserve Florida’s Water Resources” (2017)*

Goals, Objectives, and Policies: **Potable Water**

The following goals, objectives and policies have been developed for the use of local policy makers to help guide and direct the decision-making process pertaining to Orlando's Potable Water service. For purposes of understanding, goals are generalized statements of desired end states toward which objectives and policies are directed. The objectives provide the attainable ends toward which specific efforts are directed and typically include a timeframe. Policies are the specific recommended actions that the city will pursue to achieve the stated goal.

The following goals, objectives, and policies are consistent with the requirements of Chapter 163, Florida Statutes, the State Comprehensive Plan (Chapter 187, Florida Statutes), and with the goals and policies of the East Central Florida Regional Planning Council's 2060 Strategic Regional Policy Plan. The goals, objectives, and policies are the legally adopted portions of the Growth Management Plan and are used to evaluate development proposals and City investments.

POTABLE WATER GOAL 1

To provide efficient and effective potable water service in a manner which enhances the public health, safety, and welfare; is consistent with the desired urban form; and minimizes public costs.

Objective PW.1.1 The City shall establish wellhead protection areas consistent with the DEP 500 foot radial setback and continue coordination with Orange County, the City of Cocoa, and SJRWMD on future wellhead protection areas.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.1.1 The City shall prohibit potentially high risk land uses from the established cones of influence.

Policy PW.1.1.2 OUC shall periodically monitor and inspect its potable water wells to ensure they are in good repair and are not acting as conduits to potentially contaminated water.
(Amended April 24, 2017, Effective May 25, 2017; Doc. No. 1704241203)

Policy PW.1.1.3 The City shall not approve any new development classified as a large quantity generator by the Resource Conservation and Recovery Act or land uses prohibited in Conservation Policy C.1.3.1 within the established cones of depression as an interim measure until such time that an Aquifer Protection and Wellhead Protection ordinance is adopted unless adequate leak protection and spill containment up to 150% of the stored volume is guaranteed.

Objective PW.1.2 The City shall reduce residential per capita demand to 85 gpcd (gallons per capita per day) by 2050.
(Amended January 22, 2007, Effective April 9, 2007, Doc. No. 0701221004; Amended April 24, 2017, Effective May 25, 2017; Doc. No. 1704241203; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.2.1 In order to conserve potable water supplies throughout the planning period, the City Landscaping Code and its water conservation requirements shall apply. The City shall continue to improve conservation rates by periodically updating the Land Development Code to incorporate advances in water conservation practices and coordinating with the Florida Building Commission to advocate for improvements to the Florida Building Code.
(Amended January 22, 2007, Effective April 9, 2007, Doc. No. 0701221004; Amended April 24, 2017, Effective May 25, 2017; Doc. No. 1704241203; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.2.2 OUC shall periodically conduct water audits for commercial and residential customers to reduce and eliminate leaks and inefficient use.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.2.3 The City shall reduce the use of potable water for irrigation purposes throughout the planning period by adopting and enforcing regulations that require property owners in the reclaimed water service area to connect to the reclaimed water network where feasible and by promoting the use of native vegetation or other drought resistant species in new development. When determining reclaimed water feasibility the availability of reclaimed water and the net reduction in potable water use shall be considered (when potable water saved is greater than potable water flushing for water quality).
(Amended January 22, 2007, Effective April 9, 2007, Doc. No. 0701221004; Amended April 24, 2017, Effective May 25, 2017; Doc. No. 1704241203; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.2.4 OUC will continue to require the metering of all potable water to ensure accountability of water use. The City shall continue to require metering of all reclaimed water to ensure accountability of use.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.2.5 The City Planning Division and the Public Works Department shall be responsible for coordinating with the OUC to identify and implement proposals to pursue new water conservation opportunities. OUC and the City shall promote water conservation through multi-media outreach activities and supporting educational efforts including television and radio advertising, website information, and other outreach initiatives.
(Amended May 16, 1994, Effective July 28, 1994, Doc. No. 27538; Amended January 22, 2007, Effective April 9, 2007, Doc. No. 0701221004; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.2.6 The City shall permit future growth and development only within designated service areas where existing public facilities have sufficient capacity, or public/private financial commitments have been made, to support the projected service demands and to discourage urban sprawl. Improvements needed to address projected deficiencies shall be included in the Capital Improvements Element prior to development approval.
(Amended January 22, 2007, Effective April 9, 2007, Doc. No. 0701221004)

Policy PW.1.2.7 OUC shall conduct landscape irrigation audits for high-volume users on request and/or when unusual consumption increases occur.
(Amended July 7, 2008, Effective September 30, 2008, Doc. No. 0807071004; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.2.8 OUC shall maintain inverted block potable water rates and may increase such rates over time if necessary. The City shall consider water conserving rates for reclaimed water to promote efficient use and make more reclaimed water available to the OUC water service area for the future. Having more reclaimed water available will reduce the amount of potable water needed for irrigation.
(Amended July 7, 2008, Effective September 30, 2008, Doc. No. 0807071004; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective PW.1.3 The City shall cooperate in implementing the Central Florida Water Initiative Regional Water Supply Plan through regular OUC/Water Management District coordination and jurisdictional authority, throughout the planning period and through adoption of the City's Water Supply Facilities Work Plan. The City shall adopt and maintain the Water Supply Facilities Work Plan for at least a 10-year planning period. The Water Supply Facilities Work Plan, dated April 8, 2022 is herein adopted, by reference. The Water Supply Facilities Work Plan provides data and analysis necessary to support the goals, objectives and policies in this element. A 5-year schedule of water supply projects needed to meet demand in the Water Supply Facilities Work Plan is provided in Capital Improvements Figure CI-5 of this GMP. Supporting data and analysis may be attached as appendices to the Water Supply Facilities Work Plan, and updated from time to time, without the necessity of an amendment to the Growth Management Plan.
(Amended May 16, 1994, Effective July 28, 1994, Doc. No. 27538; Amended January 22, 2007, Effective April 9, 2007, Doc. No. 0701221004; Amended July 7, 2008, Effective September 30, 2008, Doc. No. 0807071004; Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103; Amended April 24, 2017, Effective May 25, 2017; Doc. No. 1704241203; Amended April 25, 2022, Effective May 26, 2022, Doc. No. 2204251201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.3.1 The City shall, through the mandated operating procedures of the Orlando Utilities Commission, and through adoption of the City's Water Supply Facilities Work Plan, cooperate in implementing the State's Water Supply Plan and the regional Central Florida Water Initiative Regional Water Supply Plan.
(Amended May 16, 1994, Effective July 28, 1994, Doc. No. 27538; Amended January 22, 2007, Effective April 9, 2007, Doc. No. 0701221004; Amended April 24, 2017, Effective May 25, 2017; Doc. No. 1704241203)

Policy PW.1.3.2 The City shall update its Water Supply Facilities Work Plan within eighteen months after the adoption of the Central Florida Water Initiative Regional Water Supply Plan, pursuant to the adoption schedule of the South Florida Water Management District, and the St. Johns Water Management District.
(Amended January 22, 2007, Effective April 9, 2007, Doc. No. 0701221004; Amended April 24, 2017, Effective May 25, 2017; Doc. No. 1704241203; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.3.3 The Water Supply Facilities Work Plan shall incorporate projected demand from all properties located within City limits, including those served by the Orlando Utilities Commission, Orange County Utilities Department, the Taft Water Association and the Winter Park Utilities Department. In addition, the Plan shall address each utility's water supply projects that are needed to accommodate the projected demand.
(Amended July 7, 2008, Effective September 30, 2008, Doc. No. 0807071004)

Policy PW.1.3.4 The City shall work with local and regional organizations to identify, and where feasible, implement alternative water supply projects as identified in the Central Florida Water Initiative (CFWI) Regional Water Supply Plan and the City's Water Supply Facilities Work Plan.
(Amended January 22, 2007, Effective April 9, 2007, Doc. No. 0701221004; Amended April 24, 2017, Effective May 25, 2017; Doc. No. 1704241203; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective PW.1.4 The City shall continue efforts to expand its wastewater reuse service areas throughout the planning period.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.4.1 The City shall develop the re-use of wastewater and/or reclaimed water wherever it is economically and environmentally feasible.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636)

Policy PW.1.4.2 The City shall coordinate extension of the reclaimed water system into residential and commercial developments where feasible.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended April 25, 2022, Effective May 26, 2022 Doc. No. 2204251201)

Policy PW.1.4.3 The City shall implement the reclaimed water capital projects described in the 10-year Water Supply Facilities Work Plan and the Capital Improvements Element.
(Amended January 22, 2007, Effective April 9, 2007, Doc. No. 0701221004)

Policy PW.1.4.4 Within the Wekiva Overlay, the City shall require new development proposals that meet the thresholds for designation as a Development of Regional Impact to evaluate the feasibility of extending reclaimed water lines to serve the property.
(Amended December 15, 2008, Effective March 10, 2009, Doc. No.0812151104; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective PW.1.5 OUC shall annually evaluate the potable water infrastructure to maximize its use. The City shall annually evaluate the reclaimed water infrastructure to maximize its use.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.5.1 OUC shall replace water production and distribution facilities based on improved efficiency, quality or reliability.

Policy PW.1.5.2 The City shall use the following Levels of Service in its evaluation of future potable water infrastructure service:

Land Use	LOS Without Reclaimed Water	LOS With Reclaimed Water
Single-Family	275 g/du/d	160 g/du/d
Multi-Family	165 g/du/d	165 g/du/d
Office	0.15 g/sqft/d	0.15 g/sqft/d
Commercial	0.13 g/sqft/d	0.13 g/sqft/d
Hotel	138 g/rm/d	138 g/rm/d
Industrial	0.22 g/sqft/d	0.22 g/sqft/d
Government	0.15 g/sqft/d	0.15 g/sqft/d
Hospital	0.22 g/sqft/d	0.22 g/sqft/d

Design Flow	Pressure
Average Day	50 psi
Peak Day	40 psi
Peak Day plus Fire	25 psi

These LOS shall be based on the average day demand.
(Amended January 30, 2006, Effective March 2, 2006, Doc. No. 060130908; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.5.3 The City shall coordinate with OUC to ensure that adequate quantities of water are available to meet the demands for fire protection.
(Amended January 22, 2007, Effective April 9, 2007, Doc. No. 0701221004)

Policy PW.1.5.4 The Orlando Utilities Commission shall provide water service pursuant to the provisions of the Amended and Restated Orlando Utilities Commission/ Orange County Water Service Territorial Agreement.
(Amended September 11, 1995, Effective November 27, 1995, Doc. No. 28770; Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636)

Policy PW.1.5.5 The City shall coordinate with OUC to adjust potable water level of service standards over time to account for per-unit demand reductions caused by conservation measures and the increased availability of reclaimed water.
(Amended January 22, 2007, Effective April 9, 2007, Doc. No. 0701221004)

Objective PW.1.6 All potable water delivered by OUC within the City Limits shall meet the State's primary drinking water standards throughout the planning period.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.6.1 OUC shall periodically analyze water quality to ensure compliance with water quality criteria set forth in the Florida Safe Drinking Water Act.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636)

Objective PW.1.7 The City shall integrate land use and water resource planning to ensure that a sufficient supply of potable water is available at the time of development, throughout the planning period.
(Amended January 22, 2007, Effective April 9, 2007, Doc. No. 0701221004; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.7.1 The City shall coordinate with the SJRWMD and the SFWMD when considering GMP amendments, Sector Plans, or new DRIs or DRI amendments, that may increase demand for potable water.
(Amended January 22, 2007, Effective April 9, 2007, Doc. No. 0701221004; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective PW.1.8 Throughout the planning period, the City shall implement the water supply and conservation policies described in the Green Works Community Action Plan and Future-Ready City Master Plan to the greatest extent practicable.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy PW.1.8.1 The City shall implement the water-related strategies described in the Green Works Community Action Plan and Future-Ready City Master Plan to ensure community health and safety.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

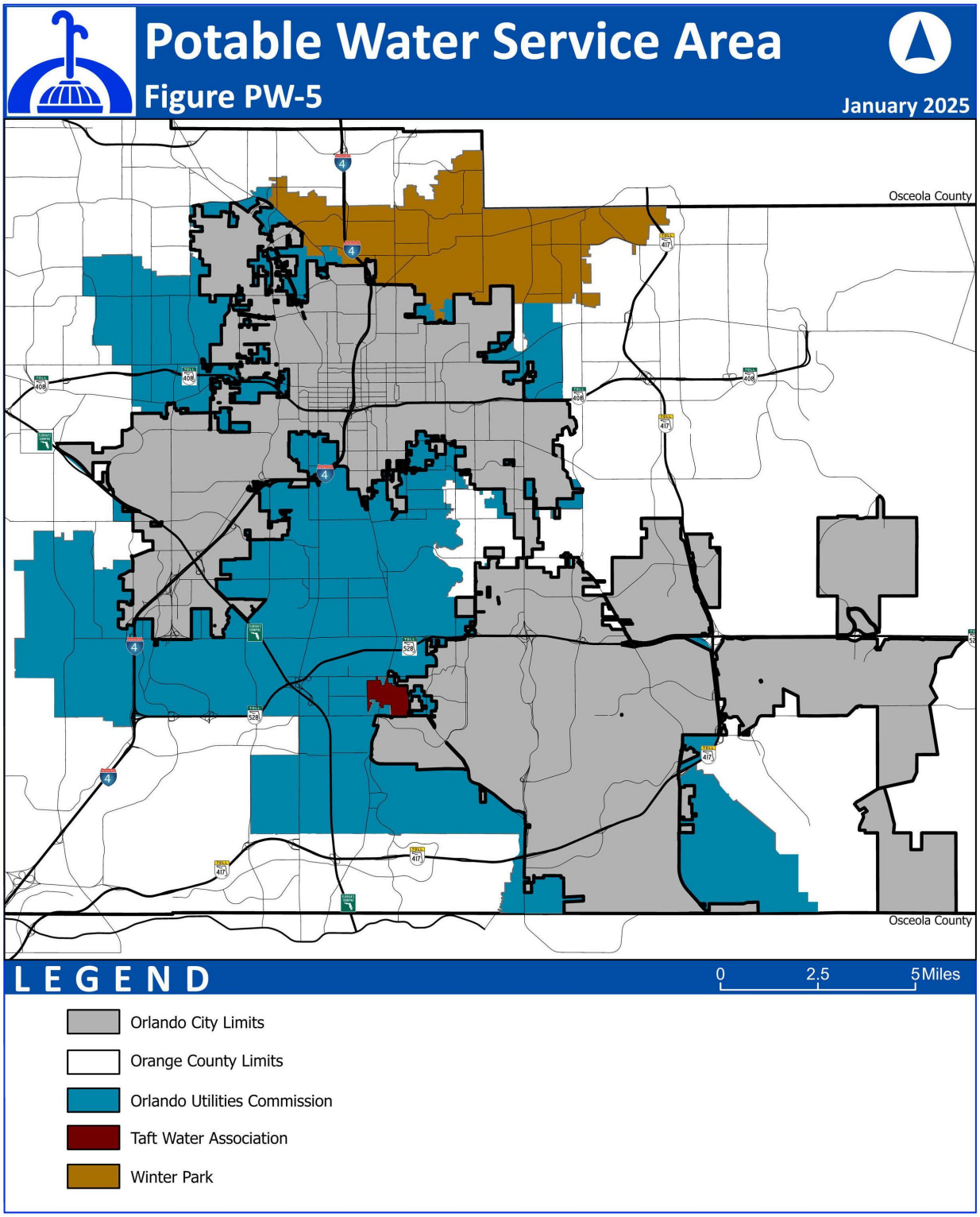
Maps & Figures: **Potable Water**

Maps & Figures that support this Element include:

Figure PW-1: OUC Water Supply/Treatment Facility Capacities
Figure PW-2: Level of Service for Potable Water
Figure PW-3: Total Estimated Cumulative Water Demand by Land Use (MGD)
Figure PW-4: OUC Forecasted Total Water Supply Needs and Sources
Figure PW-5: Potable Water Service Area Map

Figures PW-5 is an adopted part of the Growth Management Plan (Orlando's comprehensive plan) and any amendments to that figure will be adopted by ordinance. The remaining figures are provided for reference and are not regulatory in nature.

(Adopted Figures Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)



(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Wastewater Element

OUR GUIDANCE

- Section 163.3177, Florida Statutes – Required and optional elements of the comprehensive plan; studies and surveys.
- Chapter 187, Florida Statutes – State Comprehensive Plan.
- East Central Florida Regional Planning Council's 2060 Strategic Regional Policy Plan.
- Florida Statutes – Sections 403.051, 403.085-087, and 403.088, Pollution Control.
- Chapter 62 – Florida Administrative Code (F.A.C.), Sections 62-600, 62-602, 62-604, 62-610, 62-620, 62-625, and 62-640, Collection/ Transmission Systems.
- City of Orlando Land Development Code (LDC) – Chapters 30 and 32, Sewer and Reclaimed Water Systems.
- City of Orlando Wastewater Master Plan, July 2023.

Our Trends:

The purpose of this element is to project and plan for the capital facility needs of the three parts of the wastewater system: collection, treatment, and disposal. The City's Water Reclamation Division is responsible for the engineering, maintenance, and operations of the system. The City of Orlando provides wastewater treatment and reclaimed water services within the city limits, and in some areas of unincorporated Orange County (please see Figures WW-6 and WW-7 for the service area maps).

Service is provided to approximately 280,000 people in and around the city. In addition, the city provides some wastewater service to the City of Winter Park and South Seminole North Orange County Wastewater Transmission Authority (SSNOCWTA) through a bulk agreement. The service area includes land uses such as single and multi-family residential, commercial/ retail, governmental/civic, lodging, hospital, office, and industrial.

In July 2023, the city approved a Comprehensive Wastewater Master Plan, Phase I (WWMP), that addressed the entire water sanitary sewer system in a holistic way and identified the system needs and capital improvements projects for the next 20-year planning period. The major components of the WWMP included:

- the characterization of the wastewater service area and current levels of service;
- the development of wastewater flow projections through 2045;
- cataloging the water reclamation assets by risk using condition and criticality to prioritized areas for rehabilitation;
- the development of a new hydraulic model calibrated to recent flow data to simulate the impact of new developments;

- the identification of future conditions including areas of new growth and redevelopment and the capital improvements projects needed for the time period.

It is anticipated that the city will continue to grow at a steady rate, and therefore wastewater demands will continue to increase. Having a WWMP helps the city to guide its development areas and ensure that the service will be available as future development occur. Objectives and policies related to the WWMP are included as part of this element. Phase II of the Master Plan will cover the reclaimed water distribution system.

INVENTORY

The city operates three water reclamation facilities (WRFs): Iron Bridge (IB), Conservation I (Conserv I), and Conservation II (Conserv II). The locations and service areas for each are shown in Figure WW-6. The three treatment plants have a permitted capacity of 40, 7.5 and 25 (MGD), respectively, for a combined total of 72.5 million gallons per day (MGD).

The largest treatment plant is Iron Bridge, it serves an area of 27.4 square miles. As of 2020, it receives 23.7 MGD average annual daily flow (AADF), 50.2% of which is from within the city of Orlando service area. The remaining comes from contributions from several local governments that joined the City of Orlando in building this regional treatment plant, including Seminole County (4.7 MGD), Winter Park (4.3 MGD), Casselberry (2.1 MGD) and Maitland (0.7 MGD). The treatment plant has approximately 50% of its capacity reserved for those jurisdictions. This regional plant was upgraded to 40 MGD permitted capacity using advanced wastewater treatment (AWT) to reduce nutrient levels in its effluent. Effluent disposal is through a constructed treatment wetlands system and surface water discharge. The wetlands are designed to handle at least 28.0 MGD of effluent with ultimate discharge into the St. John's River.

Water Conserv I was built in 1987 and has a design permitted capacity of 7.5 MGD. It is located at 11401 Boggy Creek Rd., and serves an area of 45.3 square miles in the southeastern portion of the city. The plant uses biological and chemical methods to treat wastewater. Percolation basins and irrigation are used to dispose of the effluent.

Water Conserv II has a design capacity of 25 MGD, its located at 5420 L B McLeod Rd., and serves an area of 34.9 square miles. A bulk wastewater service agreement is maintained for up to 1.0 MGD from the City of Winter Park. The plant uses secondary treatment, tertiary filtration and disinfection methods to treat wastewater. Effluent is disposed through an innovative project in which the city works jointly with Orange County and private landowners. This project uses spray irrigation on citrus groves, residential landscaping and commercial nurseries as well

as Rapid Infiltration Basins (RIB's) to dispose of effluent. AWT is not necessary because the nutrients contained in the effluent are beneficial to the citrus growers.

The city's collection system consists of gravity pipes, force mains and lift stations that transmit wastewater from individual generators to the treatment plant. The city operates 707 miles of gravity sewer ranging in size from 4 to 54-inch, 185 miles of force main ranging in size from 2 to 84-inch and 223 City-owned wastewater lift stations, as summarized in Figure WW-1 by WRF. The city is generally dependent upon lift stations to move the wastewater to the treatment plants because of Florida's flat topography. There are also 303 private lift stations identified in the WWMP, as they are an important part of the system, however the WWMP focused only on the condition of the city-owned assets. Figure WW-2 shows the available capacity for each basin.

Figure WW-1: Wastewater Service Area Infrastructure Summary

Water Reclamation Facilities (WRFs)	Area (sqft)	Basin Sub Areas (sqft)	Gravity sewer (Miles)	Force main (Miles)	Number of City Lift Stations	Number of Private Lift Stations
Conserv I	45.3	44	101	70	79	66
Conserv II	34.9	71	229	61	82	136
Iron Bridge	27.4	48	377	54	62	101
Totals	**107.6**	**163**	**707**	**185**	**223**	**303**

Source: Water Reclamation Division

Figure WW-2: Wastewater Capacity Availability (MGD)

Wastewater Capacity Availability (MGD) July 1, 2022, through June 30, 2023			
Facility	**Capacity**	**Capacity Used**	**Capacity Available**
Iron Bridge	40.0	28.495	11.505
Conserv I	7.5	5.693	1.807
Conserv II	25.00	17.406	7.594
Totals	**72.50**	**51.594**	**20.906**

Source: Water Reclamation Division

Within each of the three service areas, a small number of parcels, mainly residential, are not connected to the water reclamation system and instead use septic tanks:

- 4,365 septic parcels in the Iron Bridge service area;
- 134 septic parcels in the Water Conserv I service area; and
- 1,909 septic parcels in the Water Conserv II service area.

LEVEL OF SERVICE (LOS)

Level of Service is defined as the capacity per unit of demand for a public facility. The wastewater LOS is an indicator of the extent or degree of service provided by the wastewater facility. The LOS is generally expressed in terms of gallons per unit per day (g/du/d) or square footage per day of land use and is based on the city land uses. This allows the City to plan and forecast for future growth based upon the anticipated land uses. These LOS standards are used to project the wastewater flow in this Element. Figure WW-3 gives the LOS and the occupancy rates, for more accuracy, for each land use. The only designation updated as part of this revision, from previous LOS, is the one for hospitals that are proposed to be measured by gallons by bed per day.

Figure WW-3: Land Use Level of Service for Wastewater

Land Use	LOS	Occupancy	Adjusted LOS*
Single Family	250 g/du/d	98.5%	246.2 g/du/d
Multifamily	190 g/du/d	92.0%	174.8 g/du/d
Office	0.08 g/sqft/d	85.0%	0.068 g/sqft/d
Commercial	0.09 g/sqft/d	90.0%	0.081 g/sqft/d
Industrial	0.12 g/sqft/d	90.0%	0.108 g/sqft/d
Lodging	119 g/rm/d	75.0%	89.25 g/rm/d
Hospital	140 g/bed/d	60.0%	84 g/bed/d
Government	0.08 g/sqft/d	100.0%	0.08 g/sqft/d

* Adjusted levels of service (LOS's) shall be applied only when calculating background flows of existing developed areas. Wastewater flow generated by proposed and future developments shall be based on full LOS.

DEMAND PROJECTIONS

The WWMP developed detailed wastewater flow projections through 2045, based on two methods: the population method (projected population growth as an indicator of the system growth), and the land use method (based on the expected developments and the future land uses) for each of the three water reclamation facilities. For more detailed information, the methodology, and assumptions see the WWMP, Chapter 3.3, Wastewater Demand Projections. In summary, the general trend of the wastewater projections in each basin shows increasing flow through 2030, then gradually slows down through 2045.

The population method used the resident and the service population (tourist, and employees that work in the city), growth projections from the GMP, Growth Projections Report 2020-2045, along with a pre-determined per-capita per day range for wastewater flow for each population type (76.01 to 111.4 gpcd). Flow data from 2019 as a base year, was utilized for the flow

estimates, providing an influent flow for the city's WRF's of 31.25 MGD average annual flow. Figure WW-4 provides a summary of the results for the projected flow for each basin.

Overall, there is capacity in the WRF's to support the population growth and the projected wastewater flows. According to the city's population projections, the resident's population for the wastewater service area, by 2045 is expected to increase by 25%, the majority of the increase will occur within the Conserv I basin. According to the Water Reclamation Division, the system includes interconnected pipes that allow the city to re-route flows as needed between plants, this will alleviate any potential future deficits in any basin.

Figure WW-4: Projected Wastewater Flows by WRF – Population Method

Projected Wastewater Flows by WRF- Population Method Annual Average Daily Flow (MGD)						
	Conserv I		Conserv II		Iron Bridge	
Year	Resident Population	Service Population	Resident Population	Service Population	Resident Population	Service Population
2019	5.39	5.39	13.96	13.96	11.9	11.9
2025	8.04	7.14	14.24	14.72	13.09	14.09
2030	8.94	8.09	14.91	15.37	13.51	14.55
2035	9.35	8.57	15.19	15.62	13.83	14.95
2040	9.44	8.7	15.25	15.66	14.01	15.14
2045	9.49	8.79	15.39	15.76	14.15	15.29

The land use method used the planned development data for residential (single family and multifamily units) and non-residential data (square footage for office, industrial, commercial, etc.) growth for 2020-2045, vacant parcels with potential for development were also taken into consideration. LOS and adjusted LOS were used in conjunction with the land uses data to determine the quantity of wastewater flows by each land use type and provided by WRF. Figure WW-5 provide the summary of the findings for the land use method.

The WWMP determined that the Land Use method projections are more balanced, and the population method represent the lower bound of the expected wastewater flows. Both methods are acceptable to determine the future wastewater flows projections. As previously mentioned, the Water Reclamation Division indicated that the system includes interconnected pipes that allow the city to re-route flows as needed between plants, this will alleviate any potential future deficits, along with the Capital Improvements projects included in the city's current Capital Improvement Program. Also, the WWMP identified projects to reduce sanitary system overflows during rain or storm events, capacity projects and renewal and replacements projects. Based on the combined permitted capacity of 72.5 million gallons per day (MGD) for

all the WRF's, and the infrastructure projects identified and programed for the future, there is sufficient capacity to support the city's future growth. It is critical for the city to use, on a regular basis, the developed hydraulic model to monitor the wastewater flows and to improve resiliency in the wastewater system.

Figure WW-5: Projected Wastewater Flows by WRF – Land Use Method

Projected Wastewater Flows by WRF-Land Use Method Annual Average Daily Flow (MGD)						
	Conserv I		Conserv II		Iron Bridge	
Year	LOS	Adjusted LOS	LOS	Adjusted LOS	LOS	Adjusted LOS
2019	5.39	5.39	13.96	13.96	11.9	11.9
2025	7.59	7.39	16.48	16.3	14.09	13.88
2030	8.69	8.42	17.42	17.43	14.57	14.34
2035	9.09	8.8	18.33	18.02	14.77	14.52
2040	9.32	9.01	18.36	18.04	14.88	14.63
2045	9.47	9.14	18.37	18.05	15.03	14.88
Buildout	12.26	11.71	25.38	24.70	17.02	16.68

Needs Assessment

The purpose of a needs analysis is to determine the capital improvement projects needed to maintain the LOS, and the costs of those projects. As mentioned before, the approved WWMP identified the capital improvements needed for the existing system and to accommodate the projected growth for the next 20-year horizon. The Wastewater Division prioritized the projects and included the main ones within the Capital Improvements Elements Figure CI-5, which is updated every year accordingly as priorities changes. The city has a continued focus on providing an efficient wastewater service in a manner which protects the public health and safety of all in the service area.

Goals, Objectives & Policies: Wastewater

The following goals, objectives and policies have been developed for the use of local policy makers to help guide and direct the decision-making process pertaining to Orlando's wastewater system. For purposes of understanding, goals are generalized statements of desired end states toward which objectives and policies are directed. The objectives provide the attainable ends toward which specific efforts are directed and typically include a timeframe. Policies are the specific recommended actions that the city will pursue to achieve the stated goal.

The following goals, objectives, and policies are consistent with the requirements of Chapter 163, Florida Statutes, the State Comprehensive Plan (Chapter 187, Florida Statutes), and with the goals and policies of the East Central Florida Regional Planning Council's 2060 Strategic Regional Policy Plan. The goals, objectives, and policies are the legally adopted portions of the Growth Management Plan and are used to evaluate development proposals and City investments.

WASTEWATER GOAL WW-1

To provide efficient and economic wastewater services in a manner which protects the public health, safety, and welfare, is consistent with the desired urban form, and minimizes public costs.

Objective WW.1.1 The City shall monitor wastewater revenues and expenditures on an on-going basis to maximize the economic efficiency of the utility and to plan for future capital outlays on a five year basis, as part of the Capital Improvement Element and Capital Improvement Fund Schedule.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy WW.1.1.1 The City shall provide wastewater service based upon the following Levels of Service:

Single Family	250 g/du/d
Multi-Family	190 g/du/d
Office	0.08 g/sqft/d
Commercial	0.09 g/sqft/d
Industrial	0.12 g/sqft/d
Lodging	119 g/rm/d
Government	0.08 g/sqft/d
Hospital	140 g/bed/day

The capacity of the collection system shall be based upon the following factors: Peak Flow with the pipe capacity at 75% for pipe diameters 18 inches or larger and 50% for pipe diameters smaller than 18 inches; lift stations with average pump run-times at 8 hours per day combined (all pumps); and force mains flowing at a rate of 5 feet per second. Treatment Plant Capacity shall be based upon the annual average daily flow.
(Amended April 14, 2003, Effective June 7, 2003, Doc. No. 030414702; Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy WW.1.1.2 The City shall monitor all wastewater rates, including surcharges and proposed modifications to reflect the current and the projected costs of treatment, maintenance, materials, labor, and services, related to the collection, operation, treatment, and beneficial reuse for the City's wastewater system.
(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy WW.1.1.3 The City shall monitor and pursue funding opportunities, such as grants and subsidized loans, from the state and federal governments to supplement system funding for the wastewater capital program.
(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy WW.1.1.4 The City shall minimize illegal connections, additions of private lift station connections, and discharges to the City's wastewater system through a monitoring system.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy WW.1.1.5 The City should continue to evaluate the City's wastewater system, including field studies, modeling and testing to verify the available capacities of the collections systems, lift stations, treatment facilities, and reclaimed water systems.
(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Objective WW.1.2 The City shall perform regular monitoring and maintenance of the collection system to ascertain the location and the nature of deficiencies to identify those elements in need of repair, upgrading, or replacement, and the existing capacities beyond those identified in this element.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy WW.1.2.1 The City shall continue to implement the existing surcharge program and to assess fees for the discharge of abnormally high strength wastes into the wastewater system.
(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Policy WW.1.2.2 To the extent feasible, the City shall minimize the amount of infiltration/ inflow (I/I) into the wastewater collection system.

Objective WW.1.3 In order to reduce inefficient wastewater service due to duplication, fragmentation, and overlapping jurisdictions, the City shall adhere to the City of Orlando-Orange County Wastewater Service Territorial Agreement approved on May 4, 1994, and as amended thereafter.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Policy WW.1.3.1 The City shall encourage the joint development and use of wastewater treatment and reclaimed water facilities without regard to political or jurisdictional boundaries, whenever such systems provide the most cost-effective services to the citizens of the City of Orlando.
(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Policy WW.1.3.2 The City shall coordinate the development of future wastewater facilities with Orange County Utilities for the Orlando Urban Area that may lie within the territorial area designated for Orange County Utilities.
(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Policy WW.1.3.3 The City shall promote the regional concept of wastewater treatment and disallow the development of new package treatment plants.
(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Policy WW.1.3.4 The City's Water Reclamation Division shall coordinate with City, Orange County and State departments or agencies that are involved with the development of infrastructure, including OUC, regulatory, planning and transportation interests, to minimize construction or future utility relocation costs.
(Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103; Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective WW.1.4 The City shall maintain a sewer system evaluation and maintenance program to identify those elements of the collection system in need of repair, upgrading, or replacement.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Policy WW.1.4.1 The City, through an ongoing program, shall evaluate the age and condition of the existing wastewater infrastructure, shall identify, to the extent possible, sewer sections, lift stations, force mains, and other facilities in need of replacement, repairs, or upgrades, and shall determine the remaining service life and replacement costs of said components.

(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Policy WW.1.4.2 The City shall develop and implement strategies to inspect, evaluate, and prioritize maintenance, repairs, and replacement of the components of the collection to assure continued effective, efficient, and economical operation.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy WW.1.4.3 The City shall implement programs for efficient issuance and tracking of work orders, maintenance, data bases, and archiving records.
(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy WW.1.4.4 The City shall develop and implement standard operating procedures (SOPs) for the operation, maintenance, tracking, and reporting of tasks related to the operation and maintenance of the wastewater system and facilities.
(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective WW.1.5 The City shall review periodically the wastewater system as delineated within the GMP to evaluate and encourage infill development, re-development, and repurposing land uses to discourage sprawl beyond the current boundaries of the approved urban service area for Orange County Utilities, and to maximize the use of existing wastewater collection facilities.
(Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103; Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy WW.1.5.1 The City shall use the hydraulic model or any other appropriate methodology to evaluate and determine on an annual basis, available capacity and deficiencies for the wastewater system.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103; Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

WASTEWATER GOAL WW-2

Reduce the environmental impacts of the wastewater system upon water resources, encourage water conservation, promote beneficial reuse of reclaimed water and biosolids, and phase out onsite septic and treatment systems.
(Amended April 24, 2017, Effective May 25, 2017, Doc. No. 1704241203)

Objective WW.2.1 The City shall evaluate the need for utilization of reclaimed water on an annual basis. The City shall review the existing reclaimed water systems, including public access distribution, wetland, and groundwater recharge systems to determine future needs, upgrades, and expansion. The annual study shall include, but not be limited to:

a. Implications of the Wekiva Parkway, Horizons West and, changing land uses within the Water Conserv II Water Reclamation Facility service area
b. Development of a long term biosolids management program, which is reliable, promotes beneficial reuse, and responds to changes in governmental regulations.
c. Implications of development and annexations in the southeast quadrant of the wastewater service area upon the capacity, operations and needs of the wastewater system.
d. Encouragement of conservation and efficient utilization of reclaimed water with innovative and efficient system operations, and measure for reducing water use and proper landscaping.

(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103; Amended April 24, 2017, Effective May 25, 2017, Doc. No. 1704241203)

Policy WW.2.1.1 The City shall conduct informational and educational campaigns to encourage industrial/commercial customers to implement water conservation programs or to use reclaimed water where practical, economically feasible, and allowed in accordance with Chapter 62-640, F.A.C.

(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended April 24, 2017, Effective May 25, 2017, Doc. No. 1704241203)

Policy WW.2.1.2 The Environmental Control Section shall coordinate the industrial pretreatment program and handling and disposal of hazardous wastes and materials with other City departments, including Permitting Services, Public Works, Stormwater, Legal Affairs and Fire.

(Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103; Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Policy WW.2.1.3 For parcels located within the City's Wastewater Service Area, and/or the Wekiva Overlay District, the City shall require connection to the wastewater system and phase out on-site septic systems wherever and whenever City wastewater service is available, in accordance with Sections 381.0065(2)(a) and 163.3177(6)(c)(3), F.S., and Chapter 30 of the City Code of Ordinances.

A. Where City wastewater service is available, the following requirements shall apply:

1. All new development and redevelopment shall connect to the City wastewater system (see Figure WW-8 for areas);
2. Existing development served by an on-site septic system shall be required to connect to the City wastewater system upon failure of the on-site system;
3. The City shall encourage existing development with an on-site septic system to connect to the City wastewater system by offering an abandonment credit program to partially offset the cost of connection.

B. Where City wastewater service is not available, the following requirements shall apply:
   1. On-site septic systems that fail shall be replaced with a Performance Based Treatment System (PBTS).
   2. All new development shall install a PBTS.
   3. All PBTS shall be maintained and inspected consistent with the approved Department of Environmental Protection permit and any associated Maintenance and Perpetuity Agreement.
   4. Conventional septic tank systems may be used only if both of the following conditions are met:
      a. The City has committed to provide wastewater service to the area within five years.
      b. The property owner has a written agreement with the City to connect to the wastewater system as soon as the service becomes available.
      c. The City shall coordinate with the Department of Environmental Protection to implement the provisions of this policy throughout the planning period, either through formal agreements or with standard operating policy.

(Amended December 15, 2008, Effective March 10, 2009, Doc. No. 0812151104; Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended March 11, 2024, Effective April 11, 2024, Doc. No. 2403111203)

Objective WW.2.2 The City shall continue to expand and upgrade the existing reclaimed water program where economically feasible and to evaluate land uses within the distribution service areas for reuse opportunities.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended August 28, 2017, Effective September 27, 2017, Doc. No. 1708281201)

Policy WW.2.2.1 The City shall promote the responsible use of the wastewater system and reductions in pollutant loadings with implementation of best management programs, spill prevention, pollution prevention initiative and waste minimization.
(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Policy WW.2.2.2 The City shall require the use of reclaimed water within the existing service areas and whenever expansion of the distribution is feasible.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Policy WW.2.2.3 The City shall encourage water conservation, promote beneficial reuse of reclaimed water, and implement policies and programs for innovative conservation and use of reclaimed water as detailed in the Central Florida Water Initiative Regional Water Supply Plan, the City's Water Supply Facilities Work Plan, and other practices.
(Amended April 24, 2017, Effective May 25, 2017, Doc. No. 1704241203; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective WW.2.3 The City shall conduct an educational program to increase public awareness of wastewater treatment, use of reclaimed water, best management programs, water conservation measures, and impacts on water resources and the environment.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Policy WW.2.3.1 The City shall perform public education programs using public service announcements, social media, websites, publications, hand-outs, demonstrations, presentations, and participation in various environmental activities, programs and festivals.
(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Objective WW.2.4 Throughout the planning period, the City shall implement the water treatment and water conservation policies described in the Green Works Community Action Plan and Future-Ready City Master Plan to the greatest extent practicable.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy WW.2.4.1 The City shall implement the water-related strategies described in the Green Works Community Action Plan and Future-Ready City Master Plan to ensure community health and safety.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective WW.2.5 Throughout the planning period, the City shall continue to prioritize the expansion and upgrading of advanced wastewater treatment facilities, to include connecting to the City's wastewater system, wherever feasible.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy WW.2.5.1 The City of Orlando must consider the feasibility of providing sanitary sewer services within a 10-year planning horizon for any development of more than 50 residential lots, whether built or unbuilt, with more than one onsite sewage treatment and disposal system per 1 acre. An onsite sewage

treatment and disposal system is presumed to exist on a parcel if sanitary sewer services are unavailable at or adjacent to the parcel boundary. The feasibility of facility capacity and projected flows on a 20-year or greater planning horizon shall be demonstrated in the Wastewater Master Plan.
Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a

WASTEWATER GOAL WW-3

To improved resiliency in the City's wastewater system and to provide effective asset management principles for accommodating future growth and system upgrades.

(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective WW.3.1 The City shall implement and maintain the Comprehensive Wastewater Master Plan (CWMP) dated July 2023. The CWMP provides the data and analysis of the city's wastewater system to support the goals, objectives and policies of this element. The CWMP may be updated as well as its appendices from time to time, without the necessity of a GMP amendment.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy WW.3.1.1 The City shall adopt the recommended asset management principles and continually develop new ones, as the system continues to expand, in a fiscally and environmentally sustainable manner by:

A. Utilizing the computer maintenance management system (CMMS) as developed by the CWMP, to routinely update the inventory of City assets regarding its condition;
B. Routinely updating the Business Risk Evaluation data, using the CMMS, to prioritize renewal and replacement as needed, and to add the identified projects into the annual capital improvement fund schedule of the CIE; and
C. Ensuring that the City's Planning and Water Reclamation Departments continue to work collaboratively. The hydraulic model was prepared with growth projections as reported in 2020 and known developments through 2023. As new projects are proposed in the City, collaboration between Planning and Water Reclamation is essential to apply the hydraulic model and obtain a simulation of future impacts on the City's system that will accurately demonstrate potential need for improvements.

(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

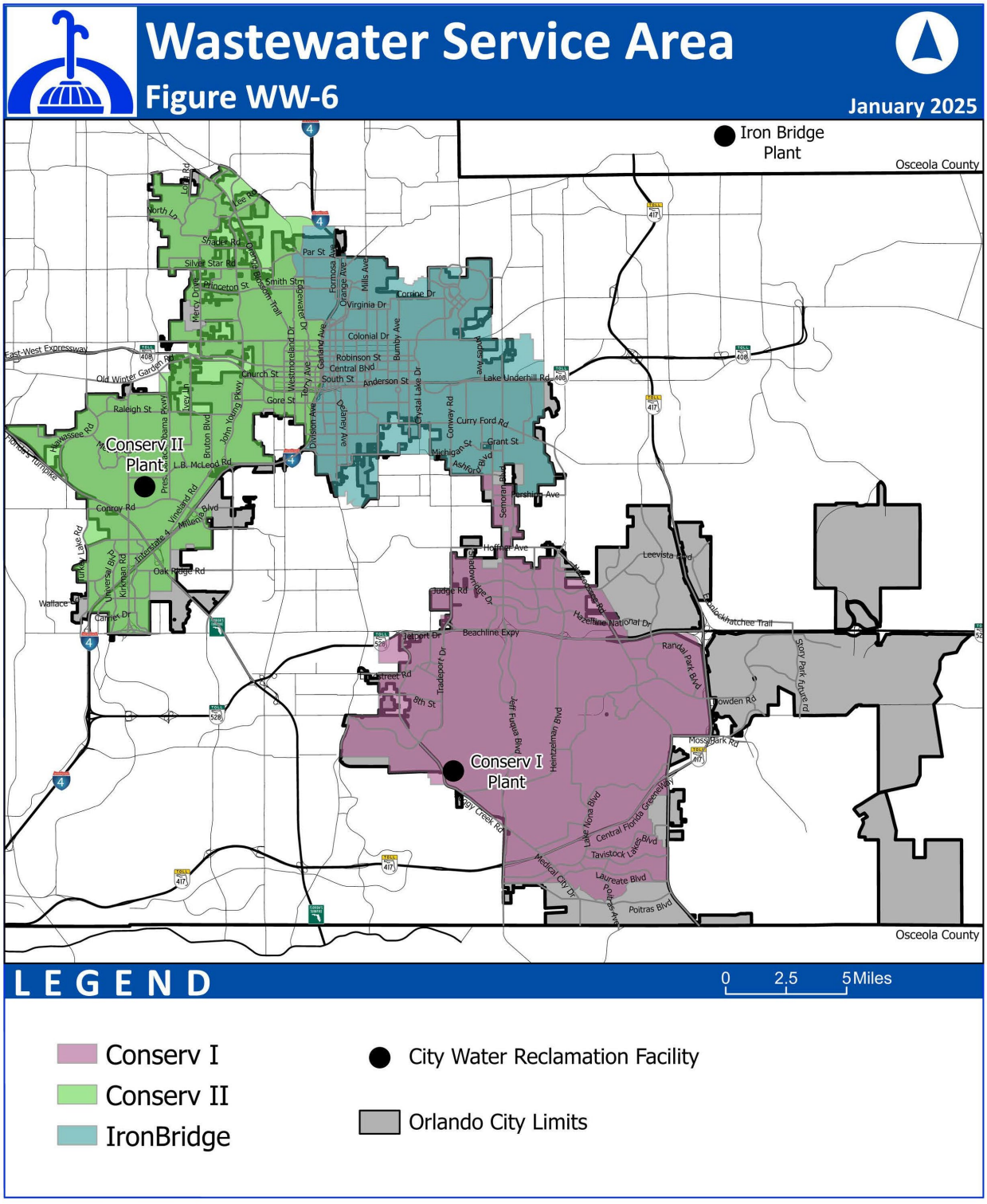
Maps & Figures: **Wastewater**

Maps & Figures that support this Element include:

Figure WW-1: Wastewater Service Area Infrastructure Summary
Figure WW-2: Wastewater Capacity Availability (MGD)
Figure WW-3: Land Use Level of Service for Wastewater
Figure WW-4: Projected Wastewater Flows by WRF- Population Method
Figure WW-5: Projected Wastewater Flows by WRF- Land Use Method
Figure WW-6: Wastewater Service Area Map
Figure WW-7: Reclaimed Water Service Area Map

Figures WW-6 and WW-7 are adopted parts of the Growth Management Plan (Orlando's comprehensive plan) and any amendments to those figures will be adopted by ordinance. The remaining figures are provided for reference and are not regulatory in nature.

(Adopted Figures Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)



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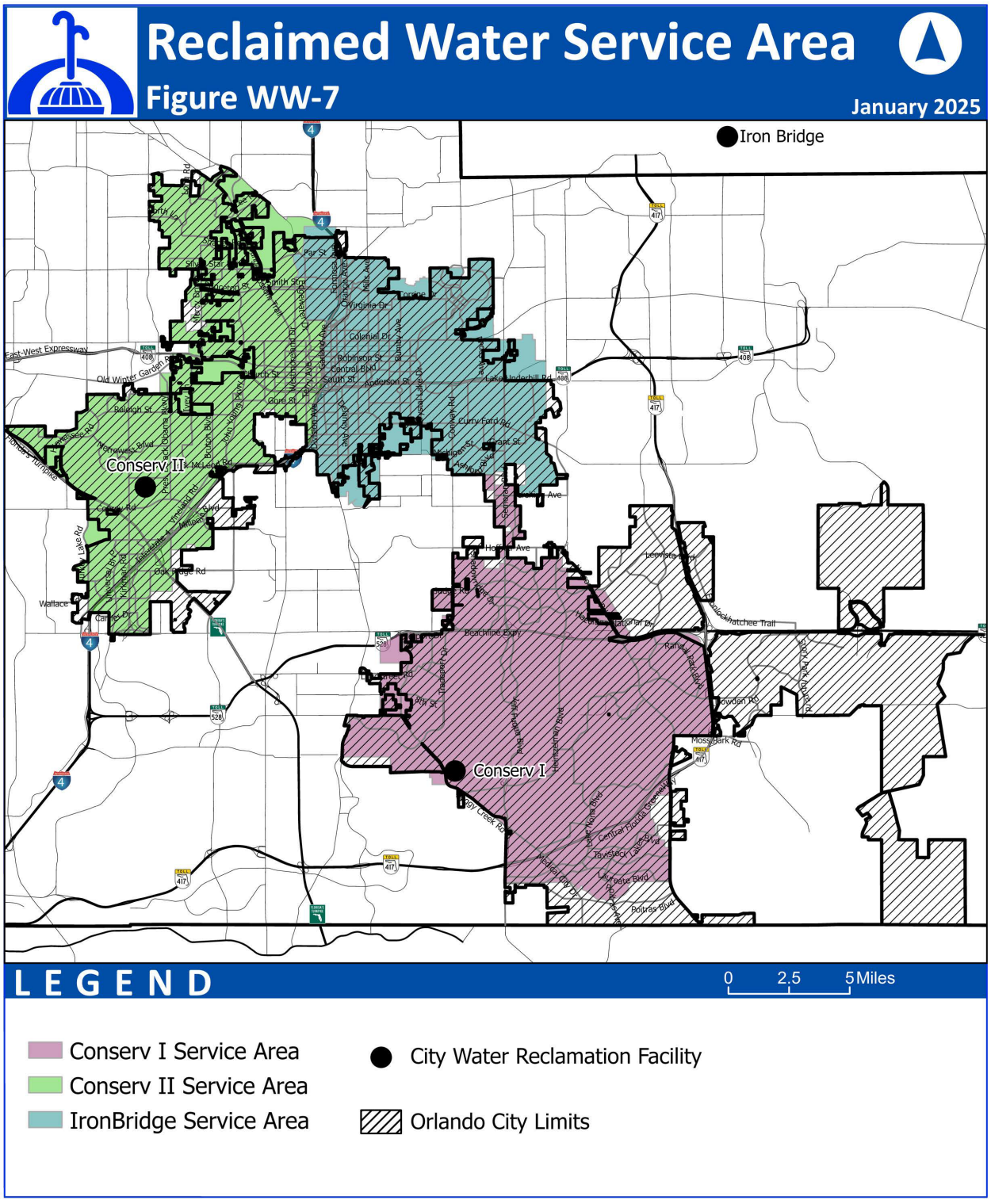


(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Solid Waste Element

OUR GUIDANCE

- Section 163.3177, Florida Statutes – Required and optional elements of the comprehensive plan; studies and surveys.
- Section 403.705, Florida Statutes – State solid waste management program
- Section 403.7049, Florida Statutes – Local solid waste management fees
- Chapter 187, Florida Statutes – State Comprehensive Plan
- East Central Florida Regional Planning Council's 2060 Strategic Regional Policy Plan

Our Trends:

The purpose of the Solid Waste Element is to address the material and financial needs of the City's Solid Waste Service; to identify the City's role in minimizing environmental impacts of waste generated within the City; and to identify a Level of Service standard which will maintain the health, safety and welfare of Orlando's residents and visitors.

Solid Waste Collection System

The City does not collect solid waste from any other jurisdiction nor does another jurisdiction collect within the City. As of January 2024, the Solid Waste Division has over 90 trucks for residential and commercial pick up including four claw trucks for bulk refuse. Residential routes collect garbage, recycling, yard waste and bulk items once per week. Residential routes run 5 days a week and vary between 25 – 32 heavy vehicles on the road each day. Commercial pick-ups are provided on a schedule based on the waste generation specific to each customer. As of the end of 2023, t here are 13 commercial garbage routes and 1 recycling route running 6 days a week. This operation will grow to 16 garbage routes and 2 recycling routes by the end of 2024.

Residential routes serve 63,200 standard residential curbside collection customers, and 7,518 commercial customers. The average number of homes per route is 900 to 1,100. There are currently 22 private companies collecting commercial solid waste within the City through non-exclusive franchise agreements. These companies are allowed to provide "roll-off" and

construction container services within the City. The franchise solid waste collection data has not been included in this analysis.

HAZARDOUS WASTE COLLECTION

The City of Orlando does not have jurisdiction in regulating hazardous wastes within its corporate limits. It also does not collect any hazardous wastes from its customers. The Florida Department of Environmental Protection and Orange County's Environmental Protection Department are the lead agencies responsible for managing any hazardous wastes generated within the City Limits. Orange County Utilities offers safe and responsible disposal options, free of charge, at community collection events and designated county drop-off locations.

RECYCLING

The most effective method for reducing the amount of waste going to the landfill is to not create it in the first place. The process for making products is not only energy intensive, but it also impacts the natural environment in various ways, such as resource extraction, transportation related emissions, and potential ground pollution from runoff. The Environmental Protection Agency (EPA) promotes the three R's, Reduce, Reuse, and Recycle. According to the EPA, the benefits of the three R's are as follows:

- Reduces greenhouse gas emissions that contribute to climate change;
- Prevents pollution caused by reducing the need to harvest new raw materials;
- Saves energy;
- Helps sustain the environment for future generations;
- Reduces the amount of waste that will need to be recycled or sent to landfills and incinerators;
- Allows products to be used to the fullest extent; and
- Saves money.

In addition to the overall recycling process, source reduction is increasing through initiatives by the retail sector. Retailers have begun to specify that goods with greatly reduced packaging should be provided by their wholesalers. Buying bulk and fresh foods is one way the individual consumer can greatly reduce their solid waste generation. Reuse is also difficult to accomplish through City initiatives because it requires changes in consumer habits. However, lobbying efforts at the state level to help push reuse and recycling legislation, such as the Beverage Container Deposit Legislation, is an area in which local governments are just beginning to exert their influence. The City can be most effective in the recycling and composting alternatives.

BENEFITS OF RECYCLING

There are several benefits of having a municipal recycling program in the City of Orlando operated by the City's Solid Waste Division. Not only can it help reduce the carbon footprint, but it also helps reduce the need for harvesting raw materials, saves energy, reduces greenhouse gases, prevents pollution, and more. Associated benefits include:

- **Climate Change –** The U.S. Environmental Protection Agency estimates that 42% of total U.S. greenhouse gas (GHG) emissions are associated with the manufacturing, use, and disposal of the goods and food produced in the United States. According to EPA, the recycling and composting of municipal solid waste (MSW or trash) saved over 193 million metric tons of carbon dioxide.
- **Energy Savings –** Making products from recyclables results in energy savings. Recycled steel saves 60% production energy, recycled newspaper 40% production energy, recycled plastics 70% production energy, and recycled glass 40% production energy.
- **Reduces Waste Sent to Landfills and Incinerators –** Recycling reduces the amount of waste sent to landfills for disposal, which preserves space and extends the life of existing landfills.
- **Waste and Pollution Reduction –** By using recycled paper, manufacturers cut their air pollution by 73% and water pollution by 35%. Additionally, mining waste can be significantly reduced by recycling glass and steel materials.
- **Conserves Natural Resources –** It takes far more work and time to mine and refine the earth's raw materials than it does to reuse them. Proper recycling helps use already extracted natural resources and protects natural habitats from being destroyed from mining. Furthermore, aluminum and glass can be recycled an infinite number of times without losing strength and without extracting more resources.
- **Sustainable Development –** By promoting resource conservation, waste reduction, and environmental stewardship, recycling contributes to the long-term sustainability and resilience of municipalities, supporting healthier and more livable communities for current and future generations. In that sense, the City of Orlando creates recycling education programs based on the compilation of data and a close communication with the residents within the city limits.
- **Economic Benefit –** According to the National recycling economic study information 2020, the recycling contribution to the economy in a single year in the United States accounted for: 681,000 jobs, $37.8 billion in wages, and $5.5 billion in tax revenues. This equates to 1.17 jobs per 1,000 tons of materials recycled and $65.23 in wages and $9.42 in tax revenue for every ton of materials recycled.

Figure S-1: Total Recycling Benefits

Year	Recycling Tons	Yard Waste Tons	Total Recycled Tons
2013	7,426	17,088	24,514
2014	7,112	13,728	20,840
2015	7,556	11,878	19,434
2016	8,658	13,575	22,233
2017	8,815	14,979	23,794
2018	9,693	10,647	20,340
2019	8,634	9,775	18,409
2020	11,417	16,638	28,055
2021	10,701	9,180	19,881
2022	9,761	4,986	14,747

Source: Solid Waste Division, 2023

RECYCLING EDUCATION

Proper education and training of the public on recycling is crucial for the success of any recycling program and to reach the zero-waste goal established. Recycling programs can greatly vary across counties and cities in terms of services available, collection methods, and accepted materials. Therefore, public education needs to be specifically designed to match the local recycling programs.

The City of Orlando's ***ReThink Your Waste*** communication campaign was created in support of our zero waste efforts (goal: zero waste sending to landfills by 2040). This ambitious goal will require more than increasing the resident's participation rate in our waste diversion programs. Efforts will need to be made to improve the quality of recycling.

To evaluate progress toward this goal, the City has started doing recycling audits. By 2023, 32% of the audits had been carried out, with an average of recycling participation of 41.7% at City level. Using an estimated 24 neighborhoods per year, projections are to complete auditing the communities' recycling participation rate by 2027 and be able to calculate Orlando's residential recycling participation rate using 100% of neighborhoods.

Figure S-2: Residential Recycling Participation Audits – Projections

Year	Neighborhoods #	% of Total
2023	39	32
2024	63	52
2025	87	71
2026	111	91
2027	122	100

The Solid Waste Division also analyzes our residents' recycling behaviors through polls and surveys and by canvasing neighborhoods and recording what is in their recycling carts. From this direct feedback and baseline research, the Orlando has created a unique approach to education and outreach that focus on materials accepted by the Materials Recovery Facility (MRF). The Division also tailors the message to the demographic of the neighborhoods. This is done by creating communication pieces in different languages to ensure that the message of how to recycle properly reached all residents regardless of the language they speak.

To achieve the goal of increasing the quality of recycling, outreach projects (door-to-door education and recycling quality audits) are developed and implemented in the neighborhoods. The projections to 2040 were calculated estimating 4 neighborhoods per project and 2 projects/year.

Figure S-3: Recycling Education and Outreach – Projections

Year	Neighborhoods #	% of Total
2023	2	7
2024	10	8
2025	18	15
2026	26	21
2027	34	28
2028	42	34
2029	50	41
2030	58	48
2031	66	54
2032	74	61
2033	82	67
2034	90	74
2035	98	80
2036	102	84
2037	108	89
2038	114	93
2039	120	98
2040	122	100

Source: Solid Waste Division, 2023

Education and information dissemination efforts through the distribution of flyers and door hangers as well as the labeling of recycling containers provides guidance on how to recycle properly. Mass media resources are available on the web page on how to recycle correctly (https://www.orlando.gov/Trash-Recycling/What-Goes-Where).

The City also has a Commercial and Multifamily Recycling Ordinance. As part of the implementation, the need arose to provide tailored educational resources to address the needs of this sector, which belongs to commercial recycling. A multifamily recycling web page was created that with educational resources that residents can access digitally (https://www.orlando.gov/Our-Government/Departments-Offices/Public-Works/Solid-Waste/Multifamily-Recycling-Education-and-Resources), with the option to request Solid Waste Division Staff to provide education on site.

GREEN WORKS ORLANDO COMMUNITY ACTION PLAN

The Green Works initiative, which was launched in 2007, is the City's commitment to sustainability with goals to enhance quality of life and wellbeing, generate diverse economic growth, and create equitable access to resources and services for the entire community.

The most recent Green Works Orlando Community Action Plan, which was updated in 2018, outlines goals, objectives and targets for Solid Waste. The 2040 goal is for Orlando to become a "zero waste" community and aims to eliminate sending solid waste to landfills by 2040.

The City has implemented several actions to increase waste diversion efforts by recycling more and focusing on food waste. Some programs and policies include:

- Residential Backyard Composter Program
- Weekly Recycling Collection Schedule
- Commercial Food Waste Collection Program
- Orlando Collects Mobile App and Website
- Expanded Recycling Bins in Downtown Orlando and Public Parks

More information and services provided regarding Greenworks initiative can be found at https://www.orlando.gov/Our-Government/Departments-Offices/Executive-Offices/CAO/Sustainability-Resilience.

LEVEL OF SERVICE CONDITIONS

Level of Service (LOS) is defined as the capacity per unit of demand for a public facility. The LOS is expressed in terms of pounds per land use unit per day (lb/unit/d). However, users perceive a solid waste LOS in terms of the frequency of pick- ups at the lowest cost. In this respect, the City offers an adopted residential LOS standard of four pick-ups per week (1 garbage, 1 recycling, 1 bulk item collection and 1 yard waste) and an adopted commercial LOS standard of six days a week and as on an "as needed basis".

The table below provides existing LOS by land use. This measure is calculated from demand and reflects the amount of service the City's customers need to dispose of all the solid waste they generate. The City commits to picking up this amount of solid waste by incorporating these results into Policy S.1.1.1, the adopted LOS standards.

Figure S-4: Solid Waste – Existing Land Use LOS

Land Use (unit)	Pounds/Day	Unit of Measurement	LOS (lbs/unit/day)
Residential (du)	429,275	63,200	6.79
Commercial (1,000 sq. ft.)	504,904	162,863,788	3.10

Source: Solid Waste Division & City Planning Division, 2023

The levels of service shown above are derived from actual collection data provided by the City's Solid Waste Division. Residential demand is based on multi-family and single-family pick-up. It should be noted that the City of Orlando does not pick up from all residential units in the City. Several residential communities have private pick up through roll-off contracts. Similarly, as it concerns commercial pick-up, the City does not pick up from all commercial sites. However, given that the total square footage of commercial customers is not available, City-wide figures were used instead. The City-wide commercial square footage includes all commercial, office, retail, hotel, industrial, hospital and civic land uses found within the City of Orlando. Hotel tonnage is calculated by multiplying hotel rooms by the average hotel room size of 400 sq. ft. to give an estimated commercial square footage equivalent.

Residential Operations

Solid Waste residential operations are based on single family house totals and the current garbage, recycling, bulk and yard waste collection schedule. Routes are determined by the number of participating houses and the type of collection vehicle. Below is the residential route breakdown per collection day. Garbage is collected for all residential homes Monday through Wednesday. Recycling is collected Thursday and Friday, and yard waste is collected

Monday through Thursday throughout the entire city. Each side-load route services between 900 to 1,100 houses per collection day.

Figure S-5: Solid Waste – Existing Residential Operations

	Monday	Tuesday	Wednesday	Thursday	Friday
Automated Side - Load	16	16	13	19	19
Rear-Load Carts	3	4	2	4	5
Rear-Load Yard Waste	6	6	7	6	0

Source: Solid Waste Division, 2023

Commercial Operations

Solid Waste commercial operations are based on total customers (businesses) and frequency of service. Commercial operations run 6 days a week. Each commercial route services between 90 and 130 dumpsters each collection day. Below is the commercial breakdown per collection day.

Figure S-6: Solid Waste – Existing Commercial Operations

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Front End - Load	14	14	13	14	14	6

Source: Solid Waste Division, 2023

Capacity Analysis

Capacity is estimated based on growth projections and average demand for service. Land use projections were taken from the 2024-2050 City of Orlando, Growth Projections Report. For each increment of growth, demand for solid waste service was calculated according to the adopted LOS standards shown in Policy S.1.1.1. The projections start from actual collection in 2023. Projections by the Solid Waste Division indicate that the volume of solid waste will generally grow by 11.75% through 2030 and then the growth rate will decrease to less than 3% annually by 2050. Projected collections through 2050 are shown below.

These projections assume no changes in behavior or technology over time. As stated previously, the City is implementing strategies to achieve its goal to become a zero waste community by 2040. The projections provided below are a “worst case” scenario if the strategies have no impact. It is more likely that the strategies will be successful in reducing waste and the City’s resources can be adjusted as needed over time.

Residential Pick-Up

Residential pick-up involves three components: Curbside garbage collection, curbside recycling collection, and curbside yard waste.

Curbside Garbage Collection – In 2023, the City of Orlando Solid Waste Division picked up garbage at 63,200 residences. The City operated twenty-two 30 cubic yard automated trucks and five rear-end loading trucks resulting in the annual collection of 49,060 tons of residential solid waste. On average, the City runs eighteen (18) trucks a day for three days a week for curbside collection or 156 pickup days a year. Based upon these assumptions, the average capacity of 34,943 pounds per residential truck per day is calculated as follows:

*49,060 T * 2,000lbs/T ÷ 18 Trucks ÷ 156 day/yr = 34,943 lbs/truck/day*

This figure can be divided into the daily projected tonnage of garbage to project truck needs to 2050. By 2050, it is estimated that the service area will grow to 91,859 households and that 71,650 tons of garbage will be collected by 31 trucks. On average, trucks will be picking up 29,632 pounds of garbage a day.

Curbside Recycling Collection – In 2023, the City of Orlando Solid Waste Division picked up recycling materials at 63,200 residences. The City operated 22 recycling trucks resulting in the collection of 13,673 tons of residential recycling. In general, each truck is running at capacity and working on a two-day work week or 104 pick-up days per year. Based upon these assumptions, the average capacity of 11,952 pounds per recycling truck per day is calculated as follows:

*13,673 T * 2,000 lbs/T ÷ 22 trucks ÷ 104 day/yr = 11,952 lbs/truck/day*

This figure can be divided into the daily projected tonnage of recycling to project truck needs to 2050. By 2050, it is estimated that the service area will grow to 91,859 households and that 20,540 tons of recycling will be collected by 31 trucks. On average, trucks will be picking up 12,742 pounds of recycling a day.

Curbside Yard Waste Collection – In 2023, the City of Orlando Solid Waste Division picked up yard waste at 63,200 residences. The City operated 6 trucks per day resulting in the collection of 12,870 tons of yard waste. In general, each truck was running at capacity and working on a four-day work week or 208 working days per year. Based upon these assumptions, the average capacity of 27,062 pounds per residential truck per day is calculated as follows:

*12,870 T * 2,000 lbs/T ÷ 6 trucks ÷ 208 day/yr = 20,625 lbs/truck/day*

This figure can be divided into the daily projected tonnage of yard waste to project truck needs to 2050. By 2050, it is estimated that the service area will grow to 91,859 households and that

18,151 tons of yard waste will be collected by 13 trucks. Trucks will be picking up 13,426 pounds of yard waste a day.

Figure S-7: Solid Waste – Existing/Projected Residential Collection by Component

Curbside Garbage Collection										
Year	Tons/ Year	Trucks	Work Days	Tons/Truck/ Day	Lbs/Truck/ Day	Homes (DU)	Tons/ DU/ Year	Lbs/DU/ Year	Lbs/DU/ Day	%Growth
2023	49,060	18	156	17.47	34,943	63,200	0.776	1,553	4.26	
2025	51,060	20	156	16.37	32,731	65,462	0.779	1,560	4.27	4.08%
2030	57,059	24	156	15.24	30,480	73,153	0.779	1,560	4.27	11.75%
2035	62,758	27	156	14.90	29,800	80,459	0.779	1,560	4.27	9.99%
2040	66,672	28	156	15.26	30,528	85,477	0.779	1,560	4.27	6.24%
2045	69,604	30	156	14.87	29,745	89,236	0.779	1,560	4.27	4.40%
2050	71,650	31	156	14.82	29,632	91,859	0.779	1,560	4.27	2.94%

Curbside Recycling Collection										
Year	Tons/ Year	Trucks	Work Days	Tons/Truck/ Day	Lbs/Truck/ Day	Homes (DU)	Tons/ DU/ Year	Lbs/DU/ Year	Lbs/DU/ Day	%Growth
2023	13,673	22	104	5.98	11,952	63,200	0.216	433	1.19	
2025	14,637	22	104	6.40	12,795	65,462	0.224	447	1.23	4.08%
2030	16,357	24	104	6.55	13,107	73,153	0.224	447	1.23	11.75%
2035	17,991	27	104	6.41	12,814	80,459	0.224	447	1.23	9.99%
2040	19,113	29	104	6.34	12,674	85,477	0.224	447	1.23	6.24%
2045	19,953	30	104	6.40	12,790	89,236	0.224	447	1.23	4.40%
2050	20,540	31	104	6.37	12,742	91,859	0.224	447	1.23	2.94%

Curbside Yard Waste Collection										
Year	Tons/ Year	Trucks	Work Days	Tons/Truck/ Day	Lbs/Truck/ Day	Homes (DU)	Tons/ DU/ Year	Lbs/DU/ Year	Lbs/DU/ Day	%Growth
2023	12,870	6	208	10.31	20,625	63,200	0.267	534	1.46	
2025	12,935	8	104	7.77	15,547	65,462	0.198	395	1.08	4.08%
2030	14,455	9	104	7.72	15,443	73,153	0.198	395	1.08	11.75%
2035	15,899	10	104	7.64	15,287	80,459	0.198	395	1.08	9.99%
2040	16,890	11	104	7.38	14,764	85,477	0.198	395	1.08	6.24%
2045	17,633	12	104	7.06	14,129	89,236	0.198	395	1.08	4.40%
2050	18,151	13	104	6.71	13,426	91,859	0.198	395	1.08	2.94%

Source: Solid Waste Division, 2023

Commercial Pick-Up

As of 2023, the City operated 14 commercial trucks collecting 92,039 tons of waste. Commercial collection is accomplished on a 6-day work week or 260 workdays with each truck running at capacity. Based upon these assumptions, the average capacity of pounds per commercial truck per day is calculated as follows:

*92,039 T * 2000 lbs/T ÷ 14 trucks ÷ 260 day/yr = 50,571 lbs/truck/day*

This figure can be divided into the daily projected tonnage of recycling to project truck needs to 2050. By 2050, it is estimated that the 171,865 tons of commercial waste will be collected by 26 trucks. On average, trucks will be picking up 50,848 pounds of garbage a day. The table below provides the projected demand for pick-up based on these assumptions.

Figure S-8: Solid Waste – Existing/Projected Commercial Collection

Commercial Collection										
Year	Tons/ Year	Truck	Work Days	Tons/ Truck/ Day	Lbs/ Truck/ Day	Square Feet	Tons/ sq. ft./ Year	Lbs/ sq. ft./ Year	Lbs/1000 sq. ft./ Day	% Growth
2023	92,039	14	260	25.29	50,571	162,863,788	0.001	1.13	3.09	
2025	104,757	16	260	25.18	50,364	166,322,224	0.001	1.13	3.09	10.41%
2030	115,660	17	260	26.17	52,335	176,697,531	0.001	1.13	3.09	10.41%
2035	127,698	19	260	25.85	51,700	185,343,620	0.001	1.13	3.09	10.41%
2040	140,989	22	260	24.65	49,297	193,989,709	0.001	1.13	3.09	10.41%
2045	155,663	24	260	24.95	49,892	202,635,799	0.001	1.13	3.09	10.41%
2050	171,865	26	260	25.42	50,848	211,281,888	0.001	1.13	3.09	10.41%

Source: Solid Waste Division, 2023

Revenue Projections

Revenues are generated from service charges and do not include additional revenues, if any, from the sale of recycled materials. The City solid waste program is funded through an enterprise fund.

In 2023, the City charged single family residents $20.85 per month per month for four weekly pick-ups (2 garbage, 1 yard waste, and 1 recycling). The fee for multi-family is lower but is only a small percentage of the service population and was not included in the calculations. Commercial and non-standard multi-family units are charged $8.04 per cubic yard on an as needed basis.

Chapter 28 of City Code states that fees for commercial and residential premises "shall be automatically increased by four (4.0) percent on October 1 of each year unless City Council affirmatively acts not to impose the scheduled increase in any given year."

Figure S-9: Revenue Sufficiency for Projections for the Addition of Capital (Trucks) Through 2040

Year	Residential Units	Residential Fee (Rate)*	Residential Revenue	Commercial Revenue	Total Revenue	Annual Revenue Increase
2023	61,000	$20.85	$15,262,200	$22,932,084	$38,194,284	-
2024	63,440	$21.68	$16,504,550	$23,849,368	$40,353,918	$2,159,634
2025	65,978	$22.55	$17,851,322	$24,803,342	$42,654,664	$2,300,746
2026	68,617	$23.45	$19,307,990	$25,795,476	$45,103,465	$2,448,802
2027	71,361	$24.39	$20,883,522	$26,827,295	$47,710,816	$2,607,351
2028	74,216	$25.36	$22,587,617	$27,900,387	$50,488,004	$2,777,187
2029	77,184	$26.38	$24,430,766	$29,016,402	$53,447,169	$2,959,165
2030	80,272	$27.43	$26,424,317	$30,177,058	$56,601,375	$3,154,207
2031	83,483	$28.53	$28,580,541	$31,384,141	$59,964,682	$3,363,307
2032	86,822	$29.67	$30,912,713	$32,639,506	$63,552,220	$3,587,538
2033	90,295	$30.86	$33,435,191	$33,945,086	$67,380,277	$3,828,058
2034	93,907	$32.09	$36,163,502	$35,302,890	$71,466,392	$4,086,115
2035	97,663	$33.38	$39,114,444	$36,715,006	$75,829,450	$4,363,057
2036	101,569	$34.71	$42,306,183	$38,183,606	$80,489,789	$4,660,339
2037	105,632	$36.10	$45,758,367	$39,710,950	$85,469,317	$4,979,529
2038	109,858	$37.54	$49,492,250	$41,299,388	$90,791,638	$5,322,321
2039	114,252	$39.04	$53,530,818	$42,951,364	$96,482,181	$5,690,543
2040	118,822	$40.61	$57,898,932	$44,669,418	$102,568,350	$6,086,169

* Multifamily units are charged a slightly lower rate but make up a small percentage of pick up and are not reflected in the above chart.

Source: Solid Waste Division, July 2023

Performance Assessment

Performance of the solid waste service in the City of Orlando is best judged by the number of pick-ups that are missed during the year. As reported earlier, the City had 63,200 residential customers and 7,518 commercial customers as of December 2023. This entails 12,224,719 residential stops and 425,167 commercial stops per year. Only 00.049% (5,974) of the residential stops and 1.17% (4,982) of the commercial stops were missed.

In addition, an industry standard of 900 homes per route is considered average. The City of Orlando has an average number of homes per route of 1,100 with the largest route containing

1,450 homes. Monthly service charges are also indicative of the performance of the system. The City of Orlando has a very low service charge compared to other local jurisdictions.

Opportunities For Service Improvement

The City of Orlando's Solid Waste Division has identified a series of opportunities intended to provide more efficient Solid Waste service to the public.

Recycling Labels & Guidelines

The City of Orlando is dedicated to fostering cooperation among stakeholders to create a coalition for standardizing recycling labels and guidelines in the state of Florida along with raising public awareness and educating the public about waste reduction, recycling, and proper disposal practices leading to behavior change and increased sustainability.

Waste Disposal & Human Health

The City of Orlando is committed to ensuring the health of our people and our ecosystems, reducing greenhouse emissions, and creating new initiatives that ensure residents have 100% access to recycling, effective recycling education programs, all resulting in better quality recycling materials and fewer recyclables lost to trash. We understand that collaboration among government, businesses, neighborhoods, and individuals to develop comprehensive and sustainable waste management strategies is critical and that our efforts will be essential in achieving Orlando's goal of becoming a zero-waste city by 2040.

Technology Advances

Orlando will utilize efficient, cost-effective technologies to manage and dispose of waste in a sustainable manner. We intend to partner with private entities working in the development of new automated technologies in waste management and we will test and adjust such technologies consistent with the City's current and future operational needs.

Social Equity & Recycling

The City's recycling initiatives aim to address racial disparities, environmental justice, social equity, and systemic challenges by promoting meaningful community engagement. We understand that engaging people in waste management decisions can foster local community-based solutions and increase accountability.

Landfill Space

Organic waste, including food scraps and yard waste, typically accounts for around 30-40% of the total municipal solid waste generated in the United States. Consistent with

recommendations from the U.S. Environmental Protection Agency (EPA), and our Green Works initiative, Orlando is dedicated to implementing organic waste diversion programs such as composting, anaerobic digestion, and waste to energy alternatives to reduce the amount of waste sent to landfills, extending the lifespan of existing landfill infrastructure, and reducing associated environmental impacts.

Recycling Infrastructure

The City of Orlando is committed seeking out opportunities for investment in the development of recycling facilities, technologies, and programs. Such opportunities include private, state, and Federal sources such as The Infrastructure Investment and Jobs Act, which provided $275 million for Solid Waste Infrastructure for Recycling grants.

Volume & Type of Solid Waste

Orlando is dedicated to reducing the amount of solid waste generated concurrently with efforts in reducing the amount being land-filled by working with businesses to reduce packaging and by educating and encouraging individuals to buy "greener". In addition to reducing the overall amount, citizens should be encouraged to decrease the total amount of household waste and increase the total amount of non-vegetative recycled materials.

Goals, Objectives, and Policies: **Solid Waste**

The following goals, objectives and policies have been developed for the use of local policy makers to help guide and direct the decision-making process pertaining to the City's Solid Waste service. For purposes of understanding, goals are generalized statements of desired end states toward which objectives and policies are directed. The objectives provide the attainable ends toward which specific efforts are directed and typically include a timeframe. Policies are the specific recommended actions that the city will pursue to achieve the stated goal.

The following goals, objectives, and policies are consistent with the requirements of Chapter 163, Florida Statutes, the State Comprehensive Plan (Chapter 187, Florida Statutes), and with the goals and policies of the East Central Florida Regional Planning Council's 2060 Strategic Regional Policy Plan. The goals, objectives, and policies are the legally adopted portions of the Growth Management Plan and are used to evaluate development proposals and city investments.

SOLID WASTE GOAL S-1

To provide efficient and economical solid waste service in a manner which protects the public health, safety, welfare, and lowers the operational carbon footprint.

(Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Objective S.1.1 The City shall throughout the planning period continue to identify ways of maximizing the efficient use of Orange County's existing solid waste facilities based upon land use patterns projected through 2050. In addition, the City shall coordinate with the County, and shall build upon the success of its current education programs to encourage recycling.
(Amended May 16, 1994, Effective July 28, 1994, Doc. No. 27538; Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103, Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy S.1.1.1 The City shall have trucks available to collect solid waste at the following Level of Service standards at the time of building permit issuance:

Residential	6.79 lb/unit/d
Commercial	3.10 lb/1,000 sqft/d

This is to be accomplished based upon a one pick-up per week minimum for residential trash carts, and on an as needed basis for dumpster customers.
(Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103, Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy S.1.1.2 The City shall review its revenue sources for solid waste as required by ss. 403.7049 F.S. on an annual basis for the purpose of providing revenue through equitable customer service charges sufficient to recover all operation, replacement, and maintenance costs and to provide for the modification and expansion of facilities to meet the needs of the projected growth trend.

Objective S.1.2 Throughout the planning period, the City shall implement the solid waste and materials policies described in the Green Works Community Action Plan and Future-Ready City Master Plan to the greatest extent practicable.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy S.1.2.1 The City shall implement the solid waste and materials strategies described in the Green Works Community Action Plan and Future-Ready City Master Plan to ensure community health and safety.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

SOLID WASTE GOAL S-2

To reduce tonnage and environmental impacts of solid waste contribution to the Orange County landfill.

Objective S.2.1 By ~~2040~~ 2050, the City shall coordinate with Orange County to ensure that at least 30% of the total solid waste stream and 75% of the residential solid waste stream is diverted to recycling, composting, or aerobic digestion and capture facilities in lieu of being sent to a landfill, consistent with the requirements of the State's Solid Waste Management Act.
(Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103, Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201; Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy S.2.1.1 The City shall continue to encourage residents and businesses to voluntarily participate in recycling and composting programs.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636)

Policy S.2.1.2 The City shall determine the feasibility of having a private entity design, build, own and operate innovative technologies and facilities that will separate valuable material from the waste stream and utilize them to their highest and best use.
(Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103, Amended August 28, 2017, Effective October 27, 2017, Doc. No. 1708281201)

Objective S.2.2 Throughout the planning period, the City shall continue efforts to support and expand the recycling program and shall evaluate alternative methods of recycling collection as incentives, such as commingled recycling.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636; Amended June 8, 2009, Effective August 25, 2009, Doc. No. 0906081103)

Policy S.2.2.1 The City shall provide incentives to recycle, such as providing recycling containers to customers and building upon the success of its current education programs.
(Amended May 16, 1994, Effective July 28, 1994, Doc. No. 27538)

Objective S.2.3 Throughout the planning period, the City shall continue to introduce programs to monitor and maintain its efforts to reduce its solid waste environmental impacts.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636)

Policy S.2.3.1 The City shall reduce illegal disposal of hazardous waste within the City by working with Orange County's Solid Waste Division.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy S.2.3.2 The City shall provide the necessary information and administrative support to the appropriate agencies to determine the potential for water contamination from active and inactive landfills which are inside and adjacent to the City's corporate limits.

Policy S.2.3.3 The City shall consider the need for localized hazardous waste storage/transfer facilities in business/industrial park development during construction plan review, where appropriate. This will be done in conjunction with the County's Solid Waste Division and Environmental Protection Department.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Policy S.2.3.4 The City shall include the impact of possible water resource contamination in its decisions relative to future land use designations.

Policy S.2.3.5 The City shall, in cooperation with the County, establish regular, neighborhood hazardous and electronic waste collection sites and times to provide a household hazardous waste collection program for residential uses.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective S.2.4 The City shall continue to provide an educational program to increase awareness of the impacts and costs of solid waste to City users.

Policy S.2.4.1 The City shall use mass media and innovative techniques, along with demonstrations and/or participation in Orange County's solid and hazardous waste education program to educate citizens on the issues of solid waste.
(Amended September 8, 2025, Effective October 9, 2025, Doc. No. 25090812a)

Objective S.2.5 Throughout the planning period, the City shall coordinate with Orange County to implement a hazardous waste management and accident response plan.
(Amended February 7, 2000, Effective March 9, 2000, Doc. No. 32636)

Policy S.2.5.1 The City shall update its existing data base on hazardous materials and hazardous wastes to facilitate the monitoring of potential hazardous materials or waste accidents and to benefit the overall safety of the citizens of Orlando.

Policy S.2.5.2 The City shall include in its hazardous waste management plan considerations of impacts upon the area's natural resources.

Maps & Figures: Solid Waste

Maps & Figures that support this Element include:

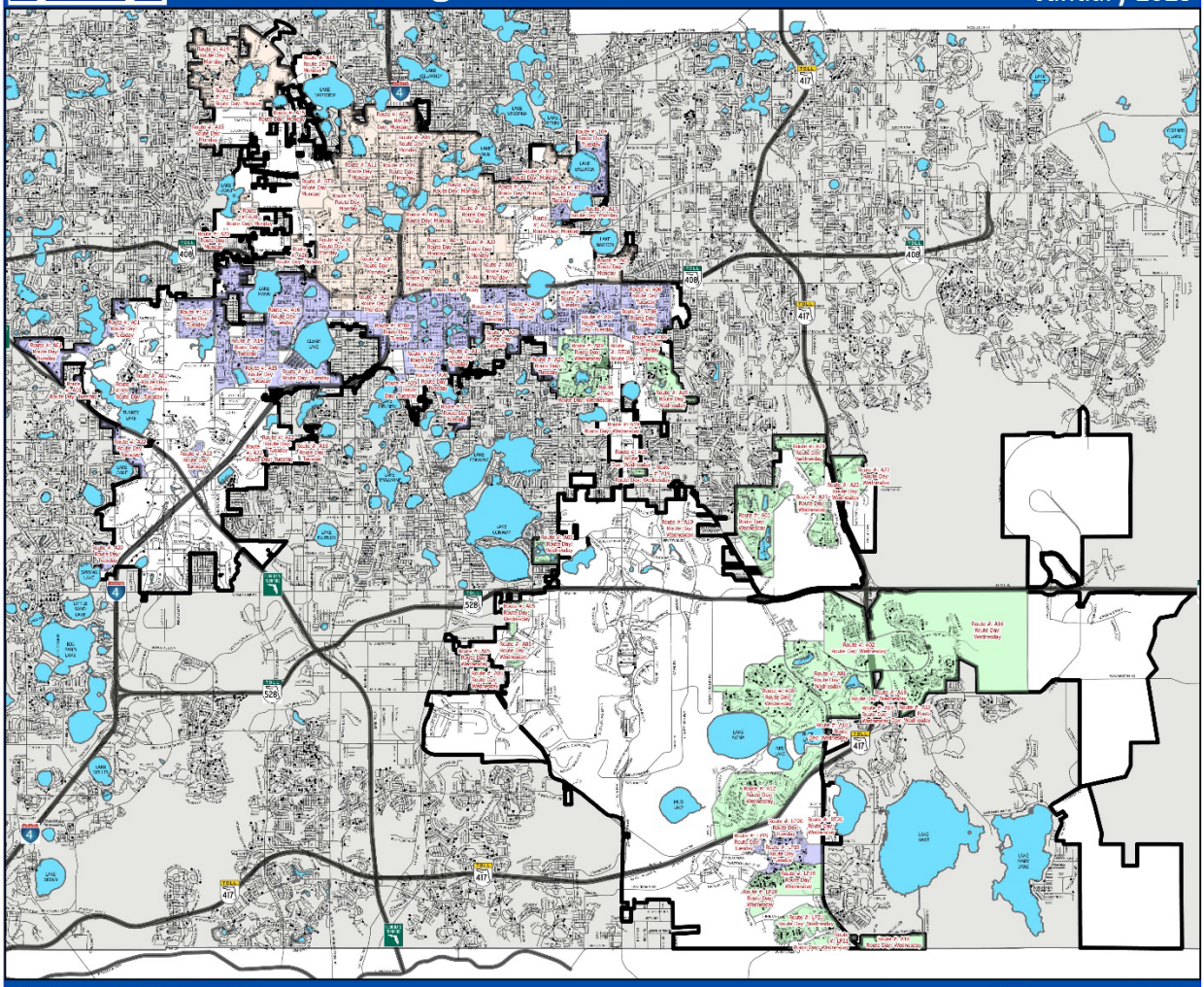
Figure S-1: Total Recycling Benefits
Figure S-2: Residential Recycling Participation Audits - Projections
Figure S-3: Recycling Education and Outreach - Projections
Figure S-4: Solid Waste – Existing Land Use LOS
Figure S-5: Solid Waste – Existing Residential Operations
Figure S-6: Solid Waste – Existing Commercial Operations
Figure S-7: Solid Waste – Existing/Projected Residential Collection by Component
Figure S-8: Solid Waste – Existing/Projected Commercial Collection
Figure S-9: Revenue Sufficiency for Projections for the Addition of Capital (Trucks) Through 2040
Figure S-10: Residential Garbage Collection Map
Figure S-11: Yard Waste Collection Map
Figure S-12: Recycling Collection Map

Figures in the Solid Waste Element are not adopted parts of the Growth Management Plan (Orlando's comprehensive plan); they are provided for reference and are not regulatory in nature.

Residential Garbage Collection Map

Solid Waste Figure S-10

January 2025

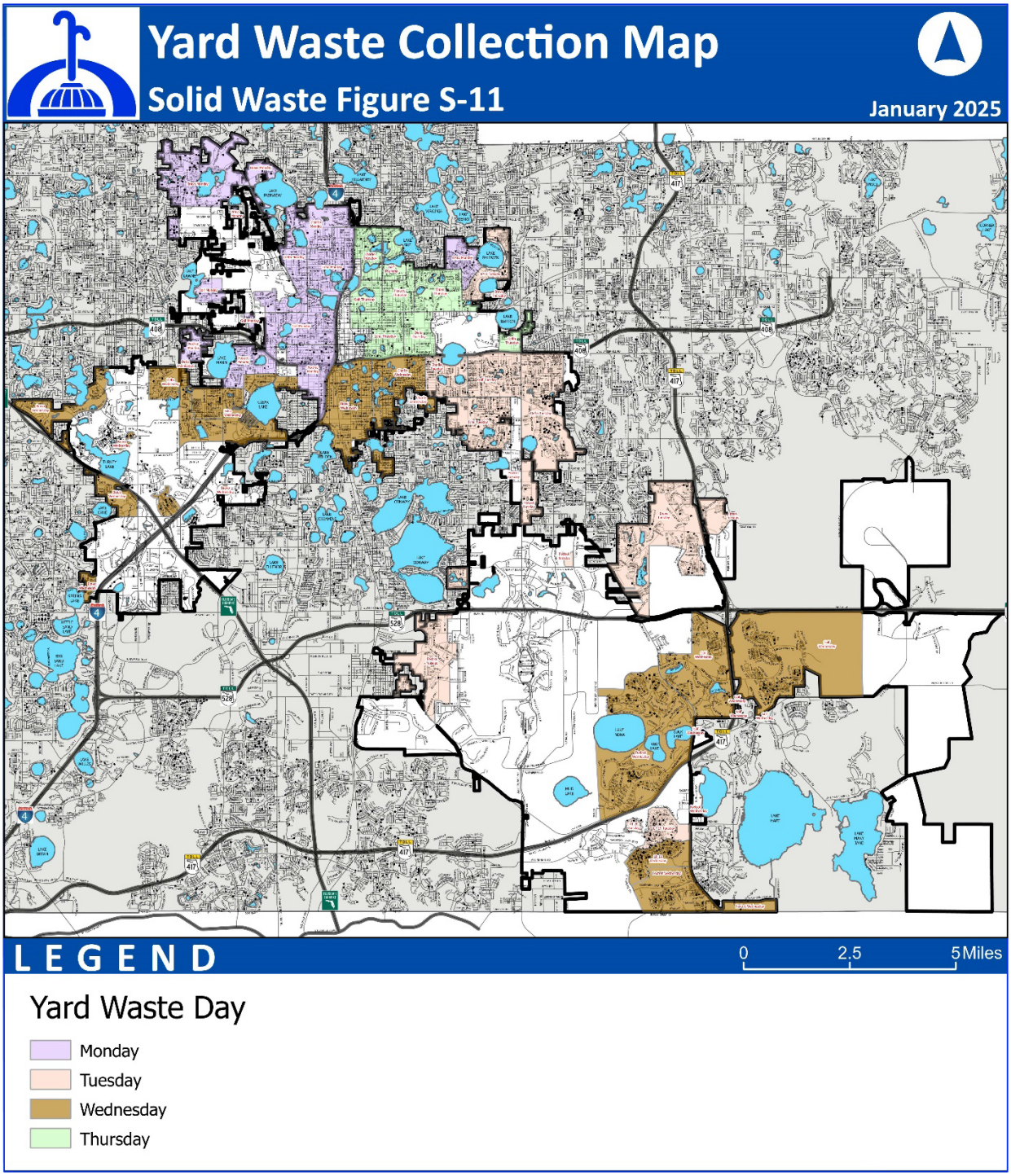


LEGEND

0 2.5 5 Miles

Garbage Day

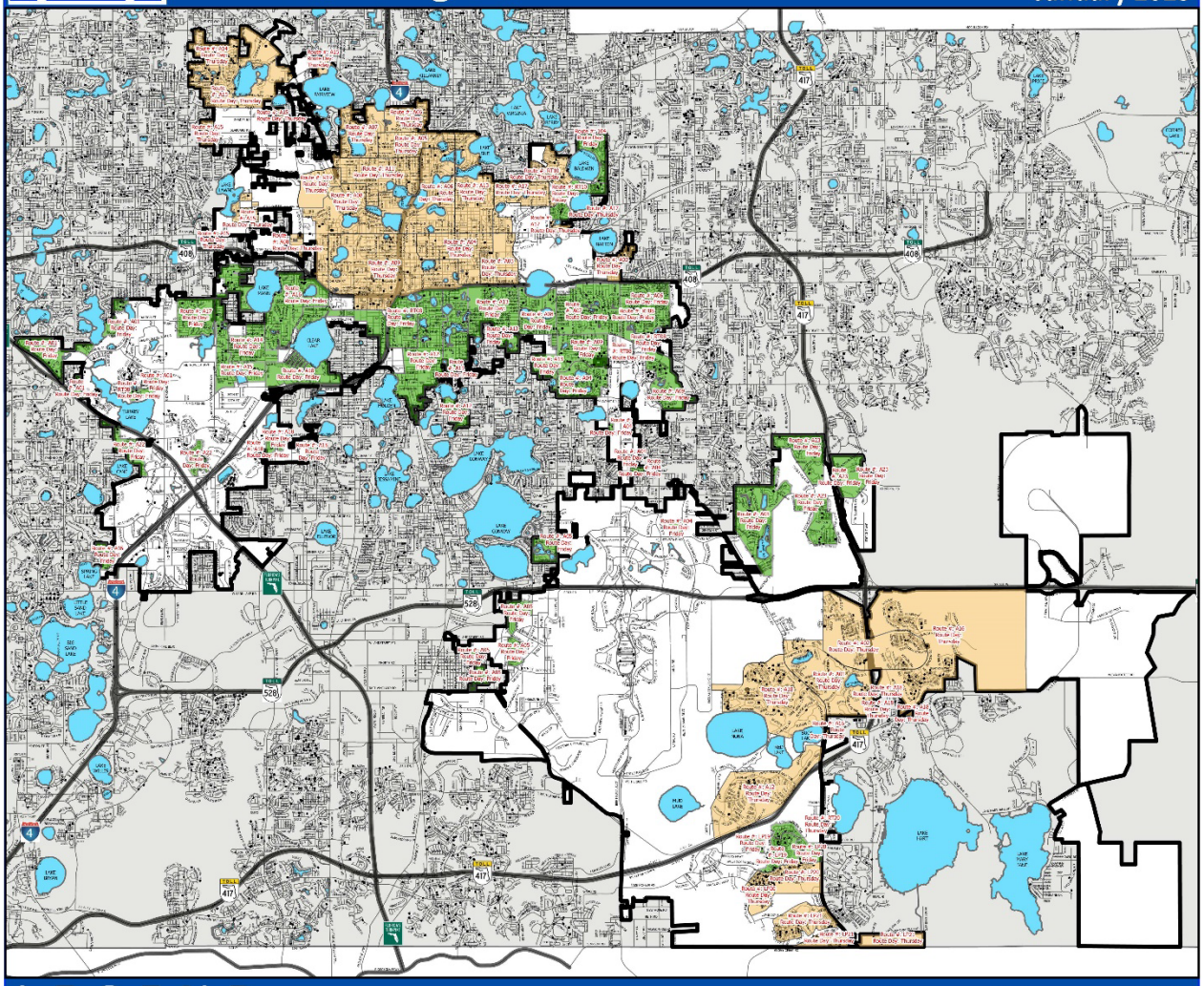
- Monday
- Tuesday
- Wednesday


Yard Waste Collection Map
Solid Waste Figure S-11
January 2025
LEGEND
0
2.5
5 Miles
Yard Waste Day
Monday
Tuesday
Wednesday
Thursday

Recycling Collection Map

Solid Waste Figure S-12

January 2025



LEGEND

0 2.5 5 Miles

Recycling Day

- Thursday
- Friday