Appendix A: Withlacoochee River Water Supply Availability

APPLIED SCIENCES

DATE: Wednesday, April 24, 2024

TO: Suzannah Folsom, PE, Executive Director, Withlacoochee Regional Water Supply Authority

FROM: Mark A. Hammond, PE, Applied Sciences Consulting, Inc.
Harry C. Downing, PE, Applied Sciences Consulting, Inc.

SUBJECT: Withlacoochee River Water Supply Availability

Purpose

The purpose of this memorandum is to provide a summary of the potential flows available for water supply from the Withlacoochee River.

Background

The Withlacoochee Regional Water Supply Authority (WRWSA) is an independent special district of the state of Florida. WRWSA, one of four water supply authorities in the Southwest Florida Water Management District (SWFWMD), is comprised of Citrus, Hernando, Marion and Sumter counties and municipalities within the region. WRWSA is charged with planning for and developing cost-efficient, high-quality water supplies for its member governments, and promotes environmental stewardship through its water conservation programs. It is anticipated that WRWSA will partner with its member governments to develop water sources to augment current supplies to meet the region's long-term needs.

WRWSA is updating its Regional Water Supply Plan (RWSP), last updated in 2019, to provide water supply options and strategies to meet projected water demands. Alternative water supply project options including surface water from the Withlacoochee River were identified in the 2019 RWSP. The average annual quantities available for river withdrawal at the Croom, Wysong, and Holder gauges were estimated at approximately 21 mgd, 29 mgd, and 33 mgd, respectively. The quantities were estimated based on a SWFWMD proposed Minimum Flows and Levels (MFL) for the upper and middle river developed in 2010, which split the year up into three periods and had varying flow percentages at each gauge and for each flow period above a minimum flow. SWFWMD has not adopted MFLs for the upper and lower Withlacoochee River. These are scheduled for adoption in 2025 and 2026 respectively.

WRWSA met with SWFWMD in February 2024 to discuss options for estimating the potential supply availability from the Withlacoochee River prior to MFL adoption. Given the time since the proposed MFL was developed in 2010 and the changes in the analysis, SWFWMD has started using an alternative approach for estimating supply availability until the new MFLs are adopted. The method is described in their 2020 Regional Water Supply Plan in Chapter 4, Appendix 4-2. SWFWMD uses the approach to estimate potential surface water availability if the minimum flow for a river has not been established.

SWFWMD's alternative approach is to utilize a period of record from 1965 to present, when data is available. A planning level criterion used in the absence of a minimum flow is to assume a minimum flow that is equaled or exceeded 85 percent of the time (P85). Fifteen (15) percent of the time, typically in April, May and early June, flows would not be available for withdrawals to ensure that sufficient water would be available for the environmental systems. The availability is further constrained by limiting withdrawals to ten (10) percent of the daily flows when the flows are above the P85. SWFWMD has found these criteria to be considered reasonable when compared to available yields calculated using established minimum freshwater flows. Additionally, maximum withdrawals are capped at twice the median (P50) as a practical engineering limitation for estimating water supply availability.

WRWSA contracted with Applied Sciences Consulting, Inc., for technical support and requested Applied Sciences assistance in estimating the potential flows available for water supply from the Withlacoochee River for use in the updated RWSP.

Approach

For this assessment, WRWSA decided to utilize a 30-year period of record from 1994 to 2023. The 2019 RWSP evaluated yields from the Withlacoochee River based on three time periods (1940 to 1969, 1970 to 1999, and 2000 to 2017) and found the 2000 to 2017 period to be the most appropriate for planning and reliability purposes.

Two methods used for this assessment include: 1) SWFWMD's planning level criteria with a period of record from 1994 to 2023, and with a maximum withdrawal capped at a practical pump station maximum 2) SWFWMD's planning level criteria described above with a period of record from 1994 to 2023 capped at twice the median flow (2 x P50).

Potential flows available for water supply were estimated at the Croom, Wysong, and Holder gauging stations **(Figure 1)**. Flow data from the United States Geological Survey was obtained on February 8, 2024, and included some provisional data at the end of 2023. Anthropogenic flow declines due to changes in land use and groundwater withdrawals were not considered in this assessment, consistent with the 2019 RWSP.

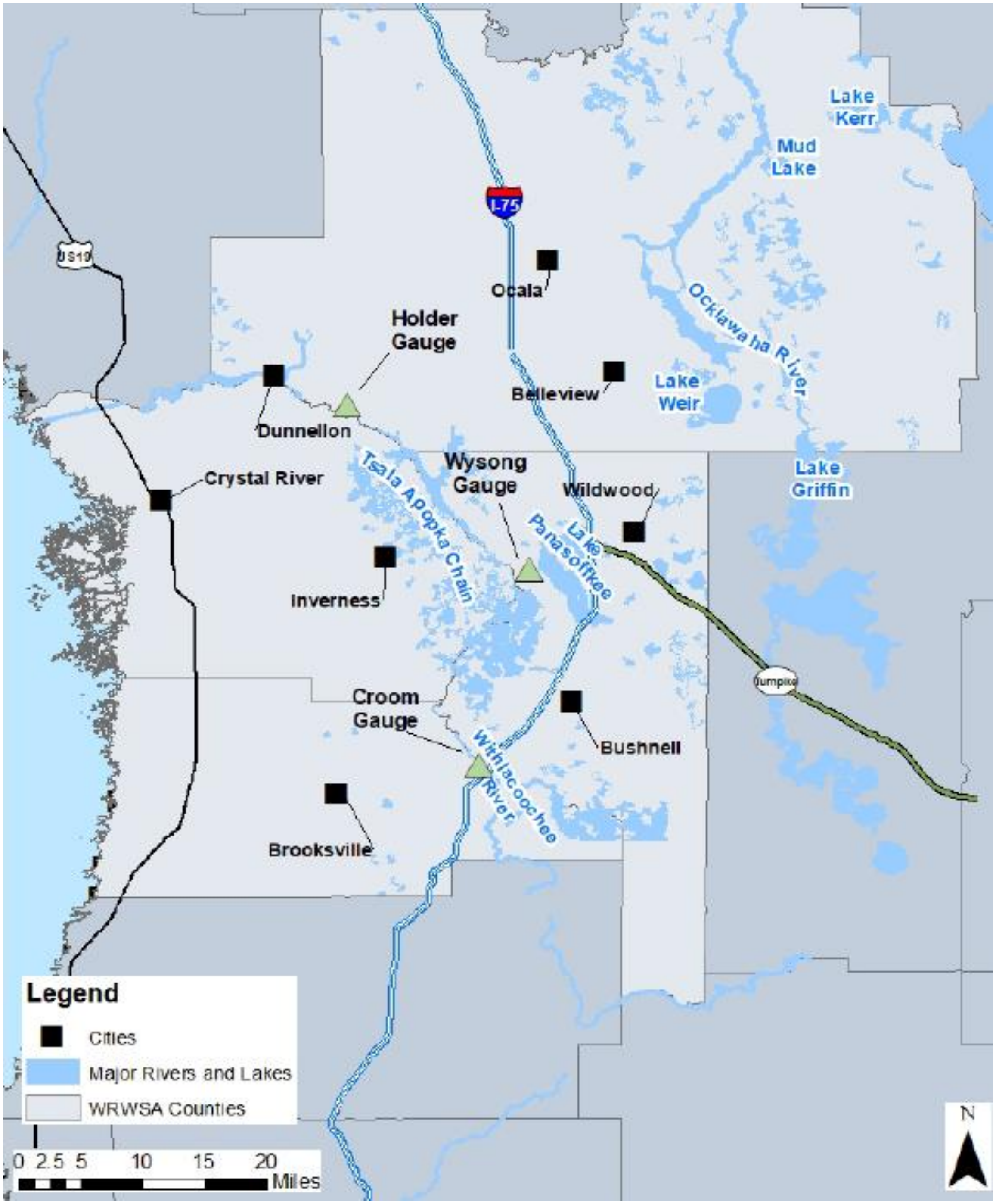

Figure 1: Gauge Locations on the Withlacoochee River

Results

Croom Gauge is located downstream of Silver Lake at the I-75 overpass. For the 30-year period, daily flows averaged 338.3 cubic feet per sec (cfs) with a minimum of 0 cfs, and a maximum of 4,280 cfs. The P85 exceedance is 20 cfs (daily flows equaled or exceeded 85 percent of the time) and the P50 (50 percent of the daily flows are above and 50 percent of the daily flows are below this value) is 140 cfs (90.49 mgd). The maximum withdrawal capped at a practical pump station maximum at Croom was assumed at 37.5 mgd or 58.0125 cfs, which occurs when flows at Croom exceed 580 cfs.

The average annual yield available for water supply is estimated at 14.3 mgd using a maximum withdrawal of 37.5 mgd (practical pump station maximum for Croom).

The average annual yield available for water supply is estimated at 21.4 mgd using twice the P50 as a maximum withdrawal. The yield using a maximum withdrawal of 37.5 mgd is more conservative than the yield using twice the P50 as the maximum withdrawal and is considered more appropriate for planning and reliability purposes.

Figure 2 presents the average daily flows available for water supply, based on the practical pump station maximum for Croom, for each year, with a minimum annual yield of 0.3 mgd and a maximum annual yield of 30.6 mgd.

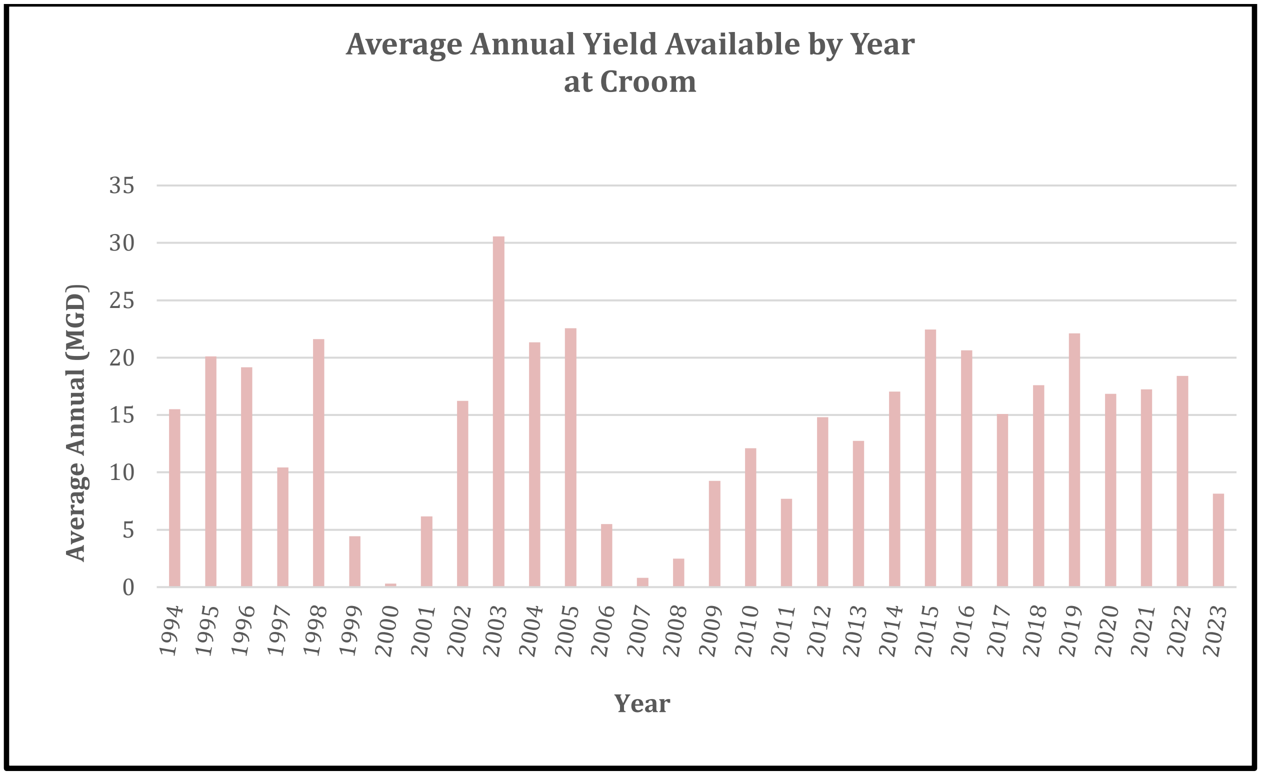

Figure 2: Average Annual Yield Available for Water Supply at Croom by Year

Figure 3 provides information regarding the seasonal variations of the average daily withdrawals for the 30-year period for each month utilizing “Box Whisker Plots”. The boxes represent the inter-quartile range where 50 percent of the daily withdrawals will occur. The whiskers represent the ± outer 25 percent of expected daily withdrawals. The line through the more centroid part of the boxes is the median of daily withdrawals representing the 50 percent probability (50 percent of daily withdrawals are above and below this line). Average daily withdrawals for the month are represented by “X” on the chart. For the months March, April, May, and June, there are a significant number of days that flows would not be available for withdrawal at Croom or would be very low. Any water supply developed at this location would need storage to meet demands during periods when flows are not available for withdrawal. For example, a constant 12.5 mgd demand could only be met 31 percent of the time without storage.

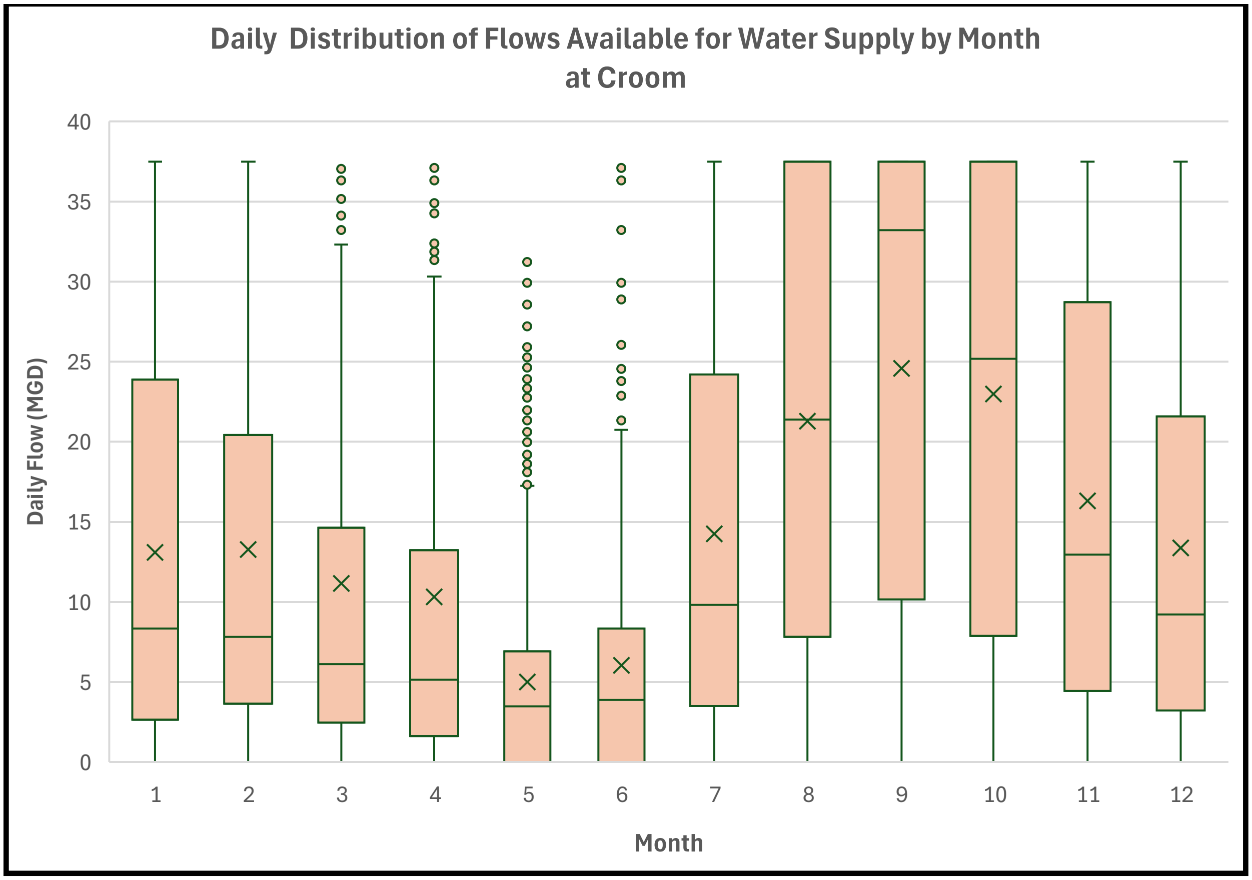

Figure 3: Daily Distribution of Flows Available for Water Supply by Month at Croom

Wysong Gauge is located just downstream of where the outfall of Lake Panasoffkee joins the Withlacoochee River at the Wysong Fabri-Dam. For the 30-year period, flows have averaged 511.5 cubic feet per sec (cfs) with a minimum of 0 cfs, and a maximum of 4,880 cfs. The P85 exceedance is 76 cfs and the P50 is 298 cfs (192.6 mgd). The maximum withdrawal capped at a practical pump station maximum at Wysong was assumed at 50 mgd or 77.35 cfs, which occurs when flows at Wysong exceed 773.5 cfs.

The average annual yield available for water supply is estimated 23.4 mgd using a maximum withdrawal of 50 mgd (practical pump station maximum for Wysong).

The average annual yield available for water supply is estimated at 32.6 mgd using twice the P50 as a maximum withdrawal. The yield using a maximum withdrawal of 50 mgd is more conservative than the yield using twice the P50 as the maximum withdrawal and is considered more appropriate for planning and reliability purposes.

Figure 4 presents the average daily flows available for water supply for each year, based on the practical pump station maximum for Wysong, with a minimum annual yield of 0.64 mgd and a maximum annual yield of 45.37 mgd.

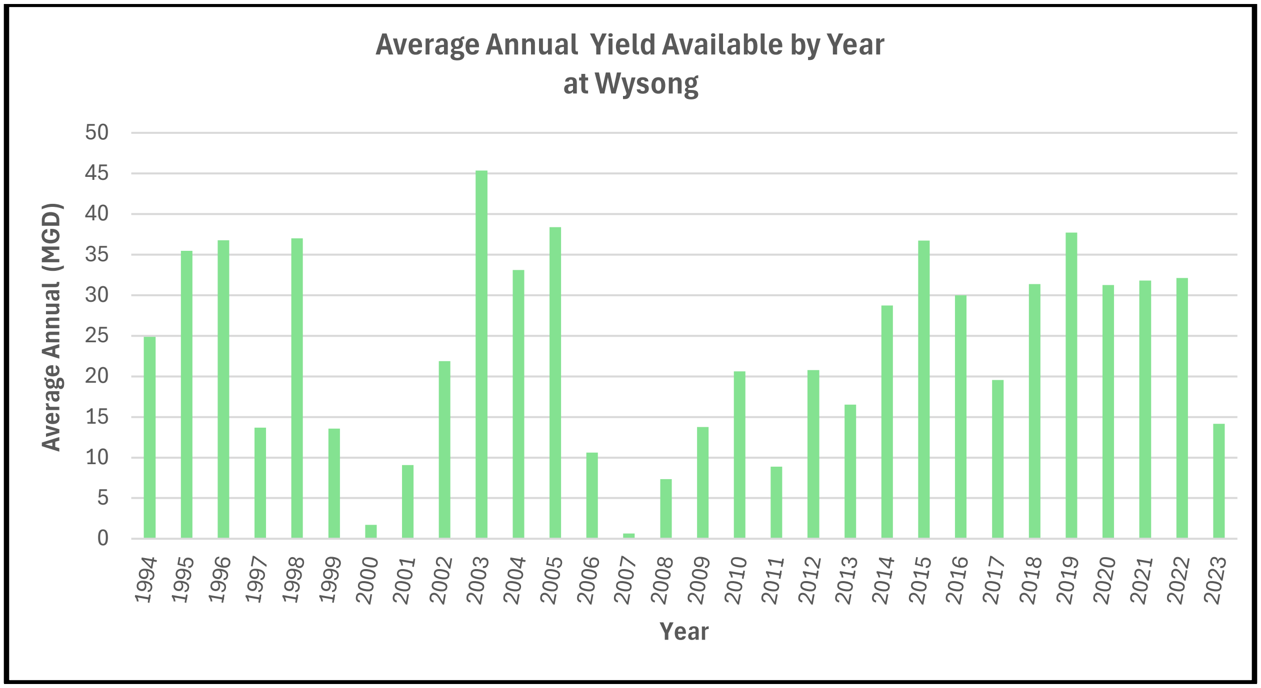

Figure 4: Average Annual Yield Available for Water Supply at Wysong by Year

Figure 5 provides information regarding the seasonal variations of the average daily withdrawals at Wysong for the 30-year period for each month utilizing "Box Whisker Plots". For the months May and June, there are a significant number of days that flows would not be available for withdrawal at Wysong or would be very low. Any water supply developed at this location would need storage to meet demands during periods when flows are not available for withdrawal. For example, a constant 16.7 mgd demand at Wysong could only be met 41 percent of the time without storage.

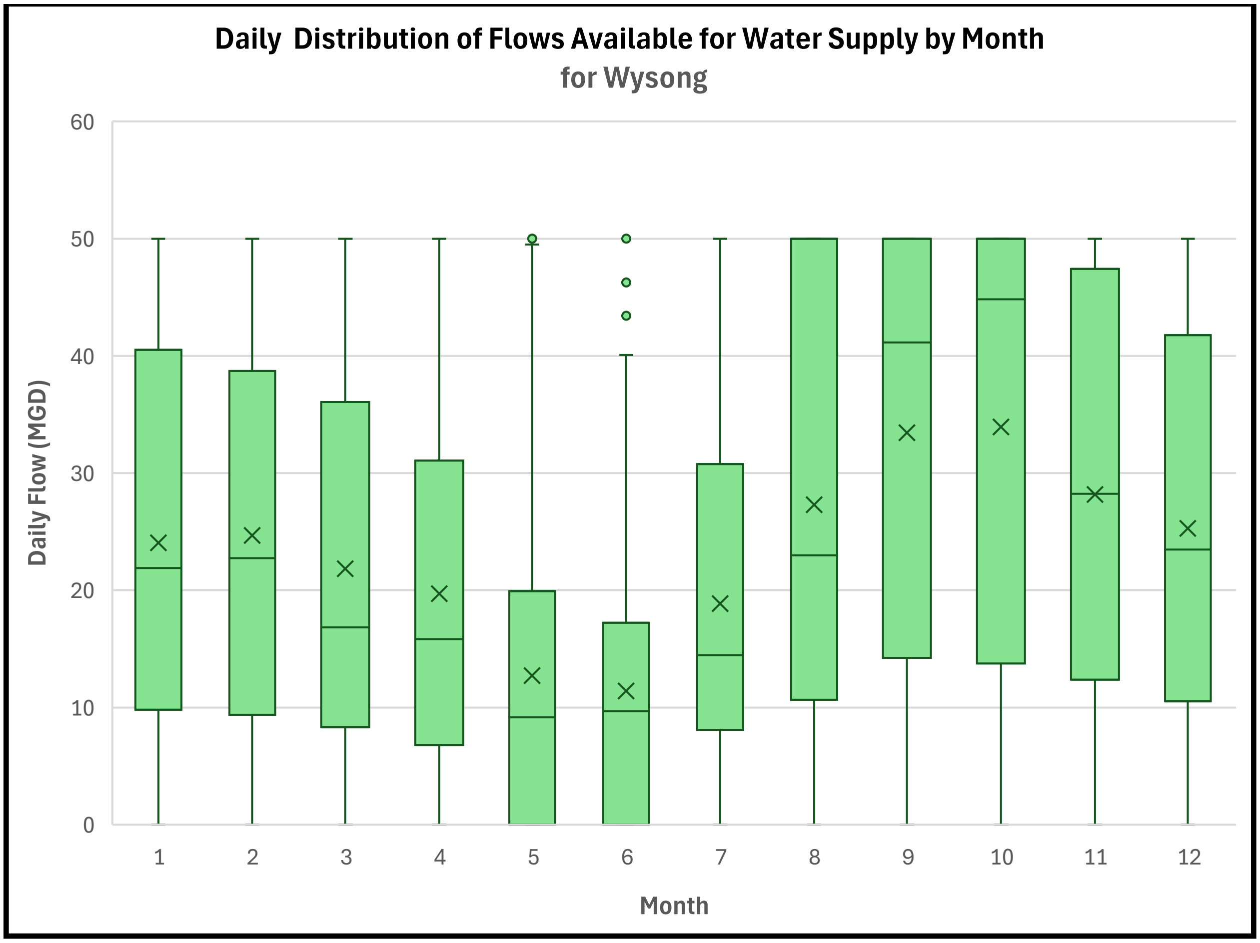

Figure 5: Daily Distribution of Flows Available for Water Supply by Month at Wysong

<u>Holder Gauge</u> is located near the SR 200 crossing of the Withlacoochee River near Holder. For the 30-year period, flows have averaged 729 cubic feet per sec (cfs) with a minimum of 33 cfs, and a maximum of 5,430 cfs. The P85 exceedance is 180 cfs and the P50 is 497 cfs (321.27 mgd). The maximum withdrawal capped at a practical pump station maximum at Holder was assumed at 75 mgd or 116.025 cfs, which occurs when flows at Holder exceed 1,160 cfs.

The average annual yield available for water supply is estimated 36.1 mgd using a maximum withdrawal of 75 mgd (practical pump station maximum for Holder).

The average annual yield available for water supply is estimated at 45.8 mgd using twice the P50 as a maximum withdrawal. The yield using a maximum withdrawal of 75 mgd is more conservative than the yield using twice the P50 as the maximum withdrawal and is considered more appropriate for planning and reliability purposes.

Figure 6 presents the average daily flows available for water supply for each year, based on the practical pump station maximum for Holder, with a minimum annual yield of 1.96 mgd and a maximum annual yield of 68.12 mgd.

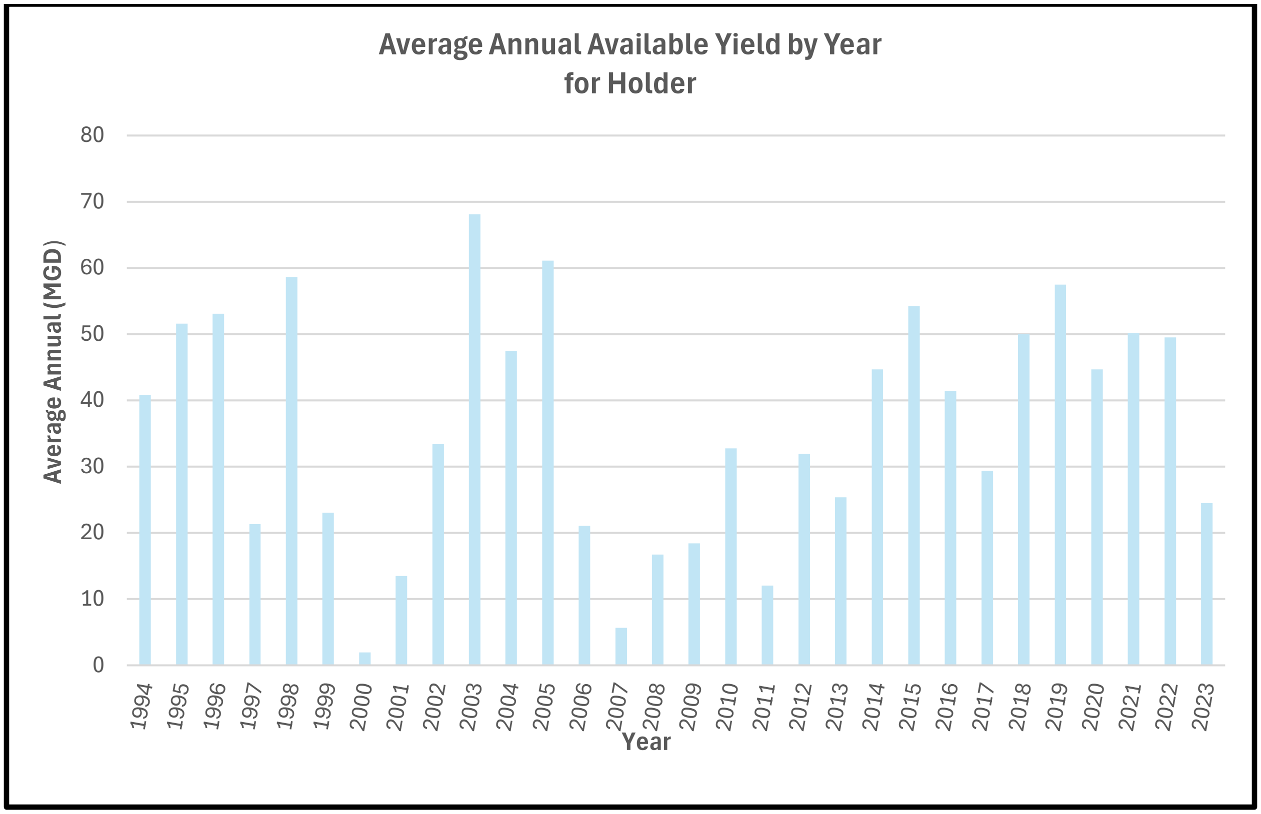

Figure 6: Average Annual Yield Available for Water Supply at Holder by Year

Figure 7 provides information regarding the seasonal variations of the average daily withdrawals at Holder for the 30-year period for each month utilizing “Box Whisker Plots”. For the months April, May and June, there are a significant number of days that flows would not be available for withdrawal at Holder or would be very low. Any water supply developed at this location would need storage to meet demands during periods when flows are not available for withdrawal. For example, a 25 mgd supply at Holder could only be met 42 percent of the time without storage.

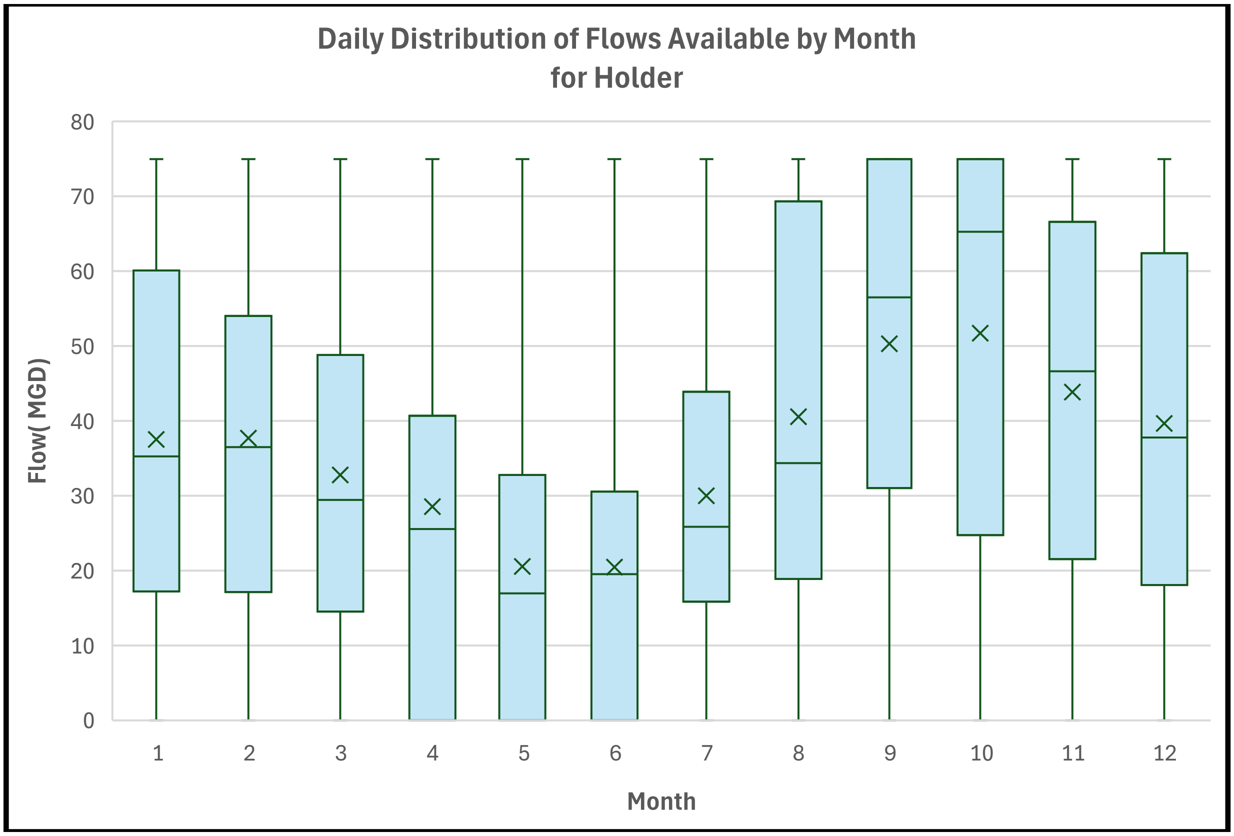

Figure 7: Daily Distribution of Flows Available for Water Supply by Month at Holder

Comparison of potential flows available for water supply from the Withlacoochee River are presented in **Table 1.** These include from the 2019 RWSP, using twice the P50 as a maximum withdrawal, and using a practical pump station maximum withdrawal.

Recommendation

The benefits of storage for water supply options for the Withlacoochee River should be further evaluated as part of the RWSP update. The variability of flows from the river, as described above at each gauge location, indicates that storage will be a critical element in the development of any water supply options to ensure the water supply has a high reliability.

Table 1: Comparison of Potential Yields Available for Water Supply

	2019 RWSP	**Twice the P50 as Maximum Withdrawal**	**Practical Pump Station Maximum Withdrawal**
Gauge Location	**Potential Yield (MGD)**		
Croom	21	21.4	14.2
Wysong	29	32.6	23.4
Holder	33	45.8	36.1

Appendix B: Reclaimed Water Evaluation

Table B-1: Reclaimed Water by Facility and Reuse Type

Location	Wastewater Facility	Facility Code	Allocated to Potable Supply Offsetting Activities					Unallocated to Potable Supply Offsetting Activities		Beneficial Flow (MGD)					Non-Beneficial Flow (MGD)				
			Golf Course Irrigation	Residential Irrigation	Other Reuse	Wetlands	Industrial	Sprayfields	Rapid Infiltration Basins	2020	2025	2045	Change (2020-2045)	% Change (2020-2045)	2020	2025	2045	Change (2020-2045)	% Change (2020-2045)
Citrus	Rolling Oaks Beverly Hills	FLA011869							0.46						0.46		0.54	0.08	18%
Citrus	Citrus County - Point O Woods	FLA011893	0.01						0.01	0.01	0.01	0.02	0.01	82%	0.01	0.01	0.01	0.00	25%
Citrus	Citrus County - Brentwood Regional	FLA011844							0.45			0.51	0.51		0.45	0.45		-0.45	
Citrus	Citrus County - Meadowcrest	FLA011845	0.37						0.30	0.37	0.39	0.48	0.11	29%	0.30	0.30	0.39	0.09	29%
Citrus	Citrus County - Sugarmill Woods (SWR)	FLA011903							0.69			0.71	0.71		0.69	0.81		-0.69	
Citrus	Inverness	FLA011847	0.20					0.33		0.20		0.23	0.03	13%	0.33		0.38	0.04	13%
Citrus	Crystal River	FLA011848					0.30	0.36		0.30		0.32	0.02	7%	0.36		0.39	0.03	7%
Citrus	Citrus County Total		0.58				0.30	0.69	1.91	0.88		2.27	1.38	157%	2.61		1.71	-0.90	-35%
Hernando	Hernando County - Airport	FLA017223							1.64						1.64	2.77	2.90	1.26	76%
Hernando	Hernando County - Glen	FLA012069							1.05		1.73	4.49	4.49		1.05	0.17	0.25	-0.80	-76%
Hernando	Hernando County - Ridge Manor	FLA012031							0.25						0.25	0.28	0.43	0.18	73%
Hernando	Hernando County - Brookridge	FLA012028							0.19						0.19			-0.19	
Hernando	Hernando County - Springhill	FLA012043	1.33						0.09	1.33			-1.33		0.09			-0.09	
Hernando	Brooksville (William S. Smith WWRF)	FLA012036	0.12	0.10	0.03		0.76			1.01		1.29	0.28	28%					
Hernando	Hernando County Total		1.45	0.10	0.03		0.76		3.22	2.33		5.78	3.45	148%	3.22		3.58	0.36	11%
Sumter	Wildwood (includes Coleman Correctional)	FLA013497							0.04			2.32	2.32		0.04		0.42	0.38	938%
Sumter	Continental Country Club	FLA043699						0.10							0.10		0.41	0.31	297%
Sumter	Villages North Sumter Utility Company WWTF	FLA281581	3.12						0.07	3.12		4.80	1.68	54%	0.07			-0.07	
Sumter	Villages Central Sumter Utility Company WWTF	FLA499951	1.24						0.04	1.24		1.60	0.36	29%	0.04			-0.04	
Sumter	Villages Little Sumter	FLA017133	1.22		0.32					1.54		3.00	1.46	95%					
Sumter	Villages South Sumter (Leesburg/Turnpike WWTF)	FLA105147	0.32	1.46	0.12					1.90		4.48	2.58	136%					
Sumter	Gibson Place Utility Company	FLAB07202										4.00	4.00						
Sumter	Sumter Correctional	FLA013558			0.17			0.12		0.17		0.57	0.40	243%	0.12		0.41	0.29	243%
Sumter	Bushnell	FLA188697						0.28							0.28		0.96	0.68	243%
Sumter	Sumter County Total		5.90	1.46	0.60			0.50	0.15	7.96		20.77	12.80	161%	0.66		2.20	1.54	235%
Marion (SWFWMD)	On Top of the World - Bay Laurel	FLA012683	0.42		0.07			0.09		0.49	0.55	1.07	0.58	120%	0.09	0.35	0.61	0.53	605%
Marion (SWFWMD)	Ocala Plant #3 (West - SWFWMD)	FLA190268	0.25		0.68	1.36				2.29	2.59	3.59	1.31	57%					
Marion (SWFWMD)	Marion County Northwest Regional	FLA272060	0.08							0.08		0.11	0.03	38%					
Marion (SWFWMD)	Oak Run (Marion County)	FLA012697	0.49						0.38	0.49		0.67	0.19	38%	0.38		0.52	0.14	38%
Marion (SWFWMD)	Dunnellon	FLA126594						0.17							0.17		0.23	0.05	31%
Marion (SWFWMD)	Dunnellon Rainbow Springs	FLA012693						0.17							0.17		0.22	0.05	31%
Marion (SWFWMD)	Marion County West Total		1.23		0.75	1.36		0.42	0.38	3.34		5.44	2.10	63%	0.80		1.57	0.77	97%
Marion (SJRWMD)	Belleview	FLA010678	0.44					0.01		0.44		0.56	0.12	28%	0.01		0.02	0.00	28%
Marion (SJRWMD)	Marion Correctional Institute	FLA010789			0.10			0.39		0.10		0.14	0.04	45%	0.39		0.57	0.18	45%
Marion (SJRWMD)	Marion County Silver Springs Shores	FLA296651	0.30					0.60	0.32	0.30		0.43	0.14	45%	0.93		1.35	0.42	45%
Marion (SJRWMD)	Marion County Stonecrest	FLA010741	0.17						0.02	0.17		0.24	0.08	45%	0.02		0.03	0.01	45%
Marion (SJRWMD)	Ocala Plant #2 (East SJRWMD)	FLA010680	0.10	0.03	0.15	0.99		2.67		1.28	1.28	1.28	0.00	0%	2.67	2.67	2.67	0.00	0%
Marion (SJRWMD)	Marion County East Total		1.01	0.03	0.25	0.99		3.68	0.35	2.28	1.28	2.66	0.38	17%	4.02		4.63	0.61	15%
		Grand Total	**10.17**	**1.59**	**1.63**	**2.35**	**1.06**	**5.30**	**6.01**	**16.79**		**36.92**	**20.12**	**120%**	**11.31**		**13.69**	**2.39**	**21%**

Table B-2: Reclaimed Water GPCD Methodology Results

Location	Utility Name	Beneficial Flow (MGD)		Baseline GPCD						Reclaimed Water GPCD						Potable Water GPCD						Adjusted GPCD						GPCD to MGD					
		2020	2045	2020	2025	2030	2035	2040	2045	2020	2025	2030	2035	2040	2045	2020	2025	2030	2035	2040	2045	2020	2025	2030	2035	2040	2045	2020	2025	2030	2035	2040	2045
Citrus	Rolling Oaks	-	-	134	134	134	134	134	134	0	0	0	0	0	0	134	134	134	134	134	134	134	134	134	134	134	134	1.50	1.59	1.65	1.70	1.74	1.77
	Citrus County - Point O Woods	0.01	0.02	86	139	139	139	139	139	12	11	14	16	19	22	74	128	125	122	120	117	85	139	136	133	131	128	0.08	0.13	0.12	0.12	0.12	0.12
	Citrus County - Charles A. Black	0.37	0.99	180	158	150	141	143	143	14	12	13	13	14	15	166	146	137	128	129	128	177	158	149	140	141	140	4.66	5.21	6.39	7.54	8.59	9.39
	Citrus County - Sugarmill Woods	-	0.71	167	176	176	176	176	176	0	0	11	23	34	46	167	176	165	154	142	131	167	176	165	154	142	131	2.17	2.44	2.41	2.35	2.17	2.04
	Inverness	0.20	0.23	107	107	107	107	107	107	22	22	22	22	22	22	85	85	85	85	85	85	107	107	107	107	107	107	0.97	1.01	1.04	1.07	1.09	1.10
	Crystal River	0.30	0.32	131	131	131	131	131	131	53	53	53	53	53	53	78	78	78	78	78	78	131	131	131	131	131	131	0.75	0.76	0.77	0.78	0.79	0.80
Hernando	Hernando County	1.33	4.49	131	124	128	127	127	126	9	10	12	14	16	18																		
	Brooksville	1.01	1.29	77	77	77	77	77	77	58	58	58	58	58	58	19	19	19	19	19	19	77	77	77	77	77	77	1.33	1.40	1.48	1.56	1.64	1.70
Sumter	Wildwood	-	2.32	110	140	142	143	144	145	0	10	21	31	41	51	110	130	121	112	103	93	120	140	131	122	113	104	1.80	3.37	3.80	4.20	4.49	4.67
	The Villages	5.90	9.40	246	214	213	213	213	212	66	73	81	88	96	103																		
	South Sumter	1.90	4.48	159	52	52	59	66	72	236	213	191	169	146	124																		
	Gibson Place	-	4.00	0	79	77	74	72	72	0	14	29	43	58	72																		
	Bushnell	0.17	0.57	129	129	129	129	129	129	47	47	47	47	47	47	82	82	82	82	82	82	129	129	129	129	129	129	0.45	0.74	1.01	1.21	1.39	1.56
Marion (SWFWMD)	Bay Laurel	0.49	1.07	239	239	239	238	264	287	31	32	33	34	36	37	208	207	206	204	229	250	240	239	238	236	261	282	3.80	4.68	5.38	6.00	7.20	8.30
	Ocala Plant #3	2.29	3.59	179	182	182	182	182	182	92	100	107	115	122	130																		
	Marion County West	0.57	0.78	132	127	127	127	127	127	11	11	11	11	11	11	121	117	117	117	117	117	132	127	127	128	128	128	6.83	8.82	8.99	9.15	9.32	9.47
	Dunnellon	-	-	157	157	157	157	157	157	0	0	0	0	0	0	157	157	157	157	157	157	157	157	157	157	157	157	1.07	1.16	1.24	1.30	1.36	1.41
Marion (SJRWMD)	Belleview	0.44	0.56	97	96	96	96	96	96	43	43	43	43	43	43	53	52	53	53	53	53	97	96	96	96	96	96	0.98	1.04	1.11	1.16	1.21	1.26
	Marion County East	0.56	0.82	124	132	132	132	133	133	11	11	12	12	12	12	113	120	120	121	121	121	124	132	132	132	132	132	6.22	6.94	7.45	7.96	8.47	8.97
	Ocala Plant #2	1.28	1.28	179	182	182	182	182	182	32	31	30	30	29	28																		

Appendix C: Benchmark Utility Conservation Plans

Hazen

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Citrus County Utilities Conservation Plan

December 2025

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List of Acronyms

Abbreviation	Definition
AWE	Alliance for Water Efficiency
CII	Commercial, Industrial, and Institutional
CPC	Conservation Planning Committee
EPAct	U.S. Energy Policy Act of 1992
ET	Evapotranspiration
gpd	Gallons per Day
gpf	Gallons per Flush
gpm	Gallons per Minute
HE	High Efficiency
HET	High Efficiency Toilet
HET+	Ultra High Efficiency Toilet
HEU	High Efficiency Urinal
MGD	Million Gallons per Day
MGY	Million Gallons per Year
MF	Multifamily
NR	Nonresidential
PSAR	Public Supply Annual Report
RWSP	Regional Water Supply Plan
SF	Single-Family
SWFWMD	Southwest Florida Water Management District
ULFT	Ultra-Low Flow Toilet
WF	Water Factor
WRWSA	Withlacoochee Regional Water Supply Authority
WS	WaterSense

1. Introduction

This Conservation Plan was developed to identify cost-effective strategies for reducing water demand through 2045, supporting long-term water supply sustainability for Citrus County Utilities. Conservation is essential for extending existing water sources, reducing peak demand, and deferring or avoiding costly new supply projects. The plan was prepared as part of the Withlacoochee Regional Water Supply Authority (WRWSA) 2025 Regional Water Supply Plan (RWSP), funded through a cooperative funding agreement between WRWSA and the Southwest Florida Water Management District (SWFWMD). While supporting regional planning efforts, this document also serves as a stand-alone plan for Citrus County Utilities.

The plan was developed collaboratively with the WRWSA Conservation Planning Committee, which included representatives from Citrus, Hernando, and Marion Counties, the City of Ocala, and The Villages. This collaborative approach ensures regional consistency while allowing each utility to tailor programs to local needs and priorities.

A wide range of residential and nonresidential water efficiency measures was evaluated, including fixture and appliance upgrades, irrigation improvements, landscape practices, system evaluations, and education/outreach initiatives. Programs were selected based on local relevance, expected water savings, feasibility, and cost-effectiveness.

Water savings potential was assessed using three scenarios:

- Tier 1 (Low): Passive conservation from natural replacement of fixtures, new construction standards, and market-driven adoption of efficient technologies.
- Tier 2 (Medium): Passive efficiency plus a targeted portfolio of active conservation programs, reflecting a practical and achievable level of effort.
- Tier 3 (High/Regional): Expanded conservation with higher participation and broader regional application, illustrating the upper bound of achievable savings.

These tiered scenarios provide a transparent framework for evaluating conservation potential and integrating savings into demand projections and regional planning. The Alliance for Water Efficiency (AWE) Tracking Tool was used to estimate baseline water use, remaining efficiency potential, program-level savings, and costs, with local data incorporated where available.

Overall, this plan supports Citrus County Utilities' long-term water supply planning by identifying feasible, cost-effective conservation strategies. These efforts help defer capital-intensive supply projects, reduce long-term costs, and ensure reliable service for current and future customers, while supporting compliance with regulatory requirements.

2. Baseline Housing, Population, and Water Demand

Establishing baseline housing, population, and water demand conditions provides the foundation for evaluating conservation potential and understanding how future demands are expected to evolve in the absence of additional conservation efforts. These baseline conditions represent the reference case against which conservation savings are measured and are critical for assessing how conservation influences long-term water supply planning. For Citrus County Utilities, baseline conditions were developed by evaluating population, housing units, service connections, and water demand across primary customer classes. This assessment supports both utility-level conservation planning and integration of conservation results into regional demand projections used in the WRWSA 2025 Regional Water Supply Plan.

2.1 Customer Classes and Demand Composition

Water demand is analyzed across three primary customer classes: Single-Family (SF), Multifamily (MF), and Commercial, Industrial, and Institutional (CII). Each class has distinct water use characteristics, end-use profiles, and conservation opportunities. By disaggregating demand in this way, conservation potential can be evaluated more precisely, supporting the development of targeted and cost-effective programs. Single-family residential customers account for the largest share of total water demand and exhibit the greatest seasonal variability due to outdoor irrigation. In contrast, multifamily demand is primarily driven by indoor water use and is typically less seasonal. CII demand is diverse, reflecting a range of operational drivers and conservation opportunities depending on facility type.

2.2 Baseline Data Sources and Methodology

Baseline demand projections for Citrus County Utilities were developed using data from the 2022 Public Supply Annual Report (PSAR), covering Permit Nos. 2842 (Pine Ridge), 7121 (Charles A. Black), and 9791 (Sugarmill Woods). These data established the foundation for evaluating conservation potential, with demand across single-family, multifamily, and commercial/industrial/institutional classes assumed to represent total retail sales. Population and housing forecasts align with the WRWSA Regional Water Supply Plan, and baseline projections reflect average annual conditions, incorporating only passive efficiency improvements such as fixture replacement and updated plumbing codes. The Alliance for Water Efficiency (AWE) Tracking Tool was calibrated with utility-specific data to ensure consistency between observed water use and modeled end-use distributions.

2.3 Baseline Growth and Demand Trends

Table 2-1 presents the historical and projected baseline inputs used in the AWE Tracking Tool, including population, dwelling units, service connections, and water demand by customer class over the 2025–2045 planning horizon. As shown, baseline projections indicate continued growth across all major planning inputs, with the most significant increases occurring in the single-family residential sector. While overall growth rates are moderate, the concentration of growth within single-family development has important implications for future water demand due to the associated contribution of outdoor irrigation.

Key observations include:

- Population Growth: Total population served is projected to grow by about 15.7% (10,910 people) between 2025 and 2045, with nearly all of this growth occurring in the single-family sector (97% of total).
- Housing Growth: Dwelling units are projected to increase by 4,648 (15.7%) over the same period, again dominated by single-family development.
- Service Connections: Total connections increase by about 4,700 (15.7%), with SF customers comprising nearly 96% of the growth.
- Water Demand: Total water sales are projected to increase from 10.89 MGD in 2025 to 16.13 MGD in 2045, an increase of 5.24 MGD (48.1%). Single-family customers account for 69.0% of this growth, with CII customers contributing another 17.5%.

These projections establish the baseline conditions against which conservation savings are measured and highlight the extent to which residential growth, particularly single-family development, drives future demand. Even with embedded passive efficiency improvements, projected demand increases underscore the importance of active conservation programs in moderating long-term water use and reducing the timing and magnitude of future supply needs.

2.4 Seasonal and End-Use Considerations

Baseline water demand shows seasonal variability, with outdoor irrigation in single-family homes driving peak demand during dry periods. Indoor residential use remains steady year-round, influenced by household size, fixture efficiency, and occupancy. Commercial, industrial, and institutional water use varies due to diverse operational needs. Recognizing these patterns is key for conservation planning: indoor measures manage annual demand, while outdoor programs reduce seasonal peaks. Addressing both is vital, as peak demand affects system capacity and future supply investments.

2.5 Role of the Baseline in Conservation Evaluation

The baseline conditions described in this section represent the reference case against which conservation savings are evaluated in subsequent sections of this plan. Conservation scenarios build upon these baseline projections by incorporating both passive and active efficiency improvements to estimate conservation-adjusted demands. By establishing a clear and consistent baseline, this plan ensures that conservation savings reflect true reductions relative to expected future conditions rather than reductions relative to historical use alone. This approach supports transparent evaluation of conservation benefits and facilitates integration of utility-level conservation results into regional water supply planning and avoided-cost analyses.

Table 2-1: Historical and Projected AWE Tracking Tool Inputs

Input	Class	Historical Observations		Projections					2025-2045		
		1990	2020	2025	2030	2035	2040	2045	Change	% Change	% of Change within Utility
Population	SF	35,744	57,070	67,015	70,337	73,186	75,512	77,560	10,545	15.7%	96.7%
	MF	1,197	1,977	2,321	2,436	2,535	2,616	2,686	365	15.7%	3.3%
	Total	36,982	59,046	69,336	72,773	75,721	78,128	80,246	10,910	15.7%	100%
Dwelling Units	SF	15,230	24,316	28,553	29,968	31,182	32,173	33,046	4,493	15.7%	96.7%
	MF	510	842	989	1,038	1,080	1,114	1,145	156	15.7%	3.3%
	Total	15,739	25,158	29,542	31,006	32,262	33,288	34,190	4,648	15.7%	100%
Connections	SF	15,230	24,316	28,553	29,968	31,182	32,173	33,046	4,493	15.7%	95.7%
	MF	7	12	14	15	15	16	16	2	15.7%	0.0%
	CII Mixed Meter	674	1,077	1,264	1,327	1,381	1,425	1,463	199	15.7%	4.2%
	Total	15,911	25,404	29,831	31,310	32,578	33,614	34,525	4,694	15.7%	100%
Water Sales	SF		6.62	7.51	8.57	9.62	10.42	11.13	3.62	48.1%	69.0%
	MF		0.01	0.01	0.01	0.01	0.02	0.02	0.01	48.1%	0.1%
	CII Mixed Meter		1.68	1.90	2.17	2.44	2.64	2.82	0.92	48.1%	17.5%
	UAW		1.29	1.46	1.67	1.87	2.03	2.17	0.70	48.1%	13.4%
	Total		9.59	10.89	12.42	13.94	15.09	16.13	5.24	48.1%	100%

3. Evaluation of Conservation Potential

Conservation potential is assessed by first establishing baseline water efficiency and then identifying opportunities for additional active conservation programs. Water savings result from both passive efficiency improvements, such as natural fixture replacement and regulatory standards and active utility-driven initiatives that further reduce demand. Differentiating these sources is essential for producing accurate and defensible estimates of conservation potential. By evaluating conservation relative to projected future baseline conditions, rather than historical use, the analysis ensures that estimated savings reflect true incremental reductions and avoids overstating the benefits of active programs.

3.1 Passive and Active Conservation Framework

Water efficiency improvements occur through both passive and active mechanisms.

- **Passive conservation** represents efficiency gains that occur without direct programmatic intervention. These gains are driven by plumbing codes and standards, market transformation, and the natural replacement of fixtures and appliances as they reach the end of their useful life. Passive efficiency improvements are most strongly associated with indoor water use, where fixture turnover steadily shifts the installed stock toward higher efficiency over time.
- **Active conservation** represents additional efficiency gains achieved through conservation programs designed to accelerate replacement of inefficient fixtures, influence customer behavior, or address water uses not typically affected by passive replacement. Active programs may include rebates, direct-install programs, irrigation system evaluations, landscape incentives, and education and outreach initiatives.

Separating passive and active conservation is essential for identifying the remaining market available for active water efficiency programs and for ensuring that conservation savings are incremental and not double-counted.

3.2 Establishing Baseline Water Efficiency

The baseline water efficiency assessment determines current and projected levels of technological efficiency before active conservation programs are implemented. This process quantifies passive efficiency improvements already reflected in baseline demand projections and identifies the remaining fixtures, appliances, and practices eligible for active conservation efforts.

The AWE Tracking Tool, a Microsoft Excel–based planning model, serves as the primary instrument for estimating baseline efficiency, passive water savings, and the cost-effectiveness of water-saving measures. The tool incorporates stock models for single-family, multifamily, and commercial, industrial, and institutional customer classes, estimating the distribution of key fixtures and appliances across various efficiency levels over time.

Fixtures and appliances evaluated include toilets, urinals, clothes washers (in-unit and shared), showerheads, faucet aerators, and dishwashers. The tool projects water savings from passive replacement as older, less efficient models are replaced with products that meet or exceed current standards.

The remaining inventory of conventional and standard efficiency fixtures after passive replacement establishes the starting point for estimating active conservation potential. This potential is defined by the portion of the remaining stock that could reasonably be replaced through utility-sponsored programs, considering usage intensity. The estimation of active program savings is addressed in subsequent sections of the plan.

3.3 End-Use Technology Efficiency Levels

End-use technologies evaluated in the baseline assessment are grouped into three general efficiency levels:

- **Non-conserving (conventional):** Typically the least efficient fixtures and appliances, most commonly found in homes and businesses constructed prior to 1994.
- **Conserving (standard):** Fixtures and appliances that meet minimum plumbing code or appliance efficiency standards.
- **Ultra-conserving (high-efficiency):** Fixtures and appliances that exceed minimum efficiency standards, often carrying the U.S. Environmental Protection Agency (EPA) WaterSense label.

The U.S. Energy Policy Act of 1992 (EPAct) was a pivotal milestone in advancing water efficiency, introducing maximum flow standards for toilets, faucets, and showerheads, as well as efficiency requirements for nonresidential plumbing fixtures. EPAct also set energy efficiency standards for appliances such as water heaters and air conditioners, which helped reduce water use in energy-intensive systems like cooling towers. Since its enactment, manufacturers have consistently developed products that meet or exceed these federal standards. The EPA WaterSense program has further accelerated market transformation by certifying ultra-efficient fixtures that maintain performance while using less water. Consequently, the market has steadily shifted toward higher-efficiency technologies for both fixtures and appliances.

3.4 Passive Replacement and Useful Life Assumptions

As fixtures and appliances reach the end of their useful life, they are assumed to be replaced with products that meet prevailing efficiency standards. This process drives passive efficiency improvements embedded in baseline demand projections.

Each fixture and appliance type is assigned an expected useful life, which is used to estimate an annual natural replacement rate (NRR) according to Equation 3-1:

Equation 3-1:

$$nrr = \frac{1}{Expected\ Life\ in\ Years}$$

Fixtures subject to natural replacement assumptions include toilets, urinals, clothes washers, and dishwashers. In contrast, outdoor irrigation measures and many CII technologies (e.g., cooling towers) are not typically subject to natural replacement and therefore do not exhibit significant passive efficiency improvements over time. Accounting for passive replacement is essential for avoiding overestimation of conservation potential and for isolating the remaining market that can be addressed through active conservation programs.

3.5 Data Sources and Local Calibration

Baseline efficiency estimates were developed using utility-reported data from the 2022 Public Supply Annual Report (PSAR), including service connections, population, and water demand by customer class. These data were integrated with AWE Tracking Tool stock distributions and useful-life parameters, with local information incorporated where available to accurately reflect service-area conditions. For historical demand estimates dating back to 1990, a parcel-level dataset from SWFWMD, containing year-built and land use classification, was used to assign historical population to single-family and multifamily customer classes. This approach ensured consistency between historical housing stock, population estimates, and the reporting categories used in both the PSAR and the AWE Tracking Tool. By aligning historical development patterns with modeled efficiency trends, the baseline assessment provides a robust foundation for identifying remaining conservation potential and guiding program development.

3.6 Residential Indoor Water Efficiency Baseline Assessment

Residential water use and efficiency are influenced by location-specific factors such as housing age, number of occupants, household income, and outdoor features like pools or automated irrigation systems. Housing age is especially significant, as older homes tend to have less efficient fixtures and appliances, while newer homes typically incorporate higher-efficiency technologies. The presence of automated irrigation systems also correlates with housing age and can substantially impact outdoor water use.

For multifamily properties, water use patterns are more complex due to variations in building size, occupancy, management practices, and the presence of shared facilities. Factors such as sub-metering and responsibility for outdoor maintenance contribute to greater variability in efficiency potential compared to single-family homes.

To estimate the remaining market potential for residential indoor efficiency measures, projected housing unit counts for both single-family and multifamily sectors are used. These projections help identify the number of non-conserving toilets, showerheads, clothes washers, and dishwashers available for replacement with higher-efficiency products over the planning horizon. Faucet aerators are excluded, as most are already operating at high efficiency levels. A summary of common residential end uses and location characteristics affecting water demand is provided in Table 3-1.

Table 3-1: Common End Use and Location Characteristics Affecting Residential Water Use

End Uses	Location Characteristics
• Irrigation • Pools • Clothes/dish washing • Bathing • Toilet flushing • Eating/drinking • Leaks	• Number of occupants • Home value • Age of house and/or plumbing • Building/irrigable area • Number/ages/types of toilets, fixtures, and appliances • Price of water and income level of occupants • Alternative water sources (e.g. reclaimed water, shallow wells)

3.6.1 Residential Fixtures and Appliances

Residential water efficiency opportunities are evaluated collectively for major fixtures and appliances, including toilets, clothes washers, showerheads, faucet aerators, and dishwashers. The AWE Tracking Tool stock model simulates the gradual replacement of conventional units with higher-efficiency products, estimating both passive and active conservation potential.

- **Toilets**: Stock estimates support calculation of passive efficiency improvements and identification of remaining units eligible for replacement. With an expected useful life of 25 years (natural replacement rate of 4% per year), the share of single-family toilets exceeding 1.6 gallons per flush (gpf) is projected to decline from 4.7% in 2025 to 1.6% by 2045. Table 3-2 presents the estimated number of toilets by efficiency class for single-family and multifamily housing.
- **Clothes Washers:** High-efficiency ENERGY STAR washers use 4 gallons per cubic foot of laundry or less, compared to up to 15 gallons per cubic foot for conventional models. Approximately 50% of clothes washers in both single-family and multifamily housing are expected to remain conventional through 2045 under baseline conditions. Table 3-2 summarizes the projected distribution of clothes washers by efficiency class.

Table 3-2 provides a comprehensive breakdown of fixture and appliance stock, efficiency levels, and projected changes over the planning horizon. This table is essential for illustrating the remaining market potential for indoor water efficiency measures and guiding targeted conservation programs.

3.7 Nonresidential Indoor Water Efficiency Baseline Assessment

The CII sector encompasses a diverse range of customer types, each with unique water use characteristics. For this baseline assessment, NR service connections reported in the PSAR were used to estimate CII water demand and the remaining potential for indoor efficiency improvements.

The AWE Tracking Tool uses a statistical model to estimate nonresidential fixture counts based on the number of accounts and population served. While this provides a reasonable baseline for fixture distribution and passive efficiency trends, it does not capture the full variability across different facility types. Therefore, these estimates reflect overall baseline conditions and remaining potential for efficiency upgrades, rather than site-specific savings.

Table 3-2: Residential End Uses by Technological Efficiency Level

Class	End Use Technology	Mechanical Efficiency	Projections					2025-2045	
			2025	2030	2035	2040	2045	Change	% Change
SF	Toilets	Pre-ULFT	3,350	2,627	2,076	1,640	1,296	-2,054	-61.3%
		ULFT/HET	67,889	68,587	75,700	78,609	81,130	13,241	19.5%
		% Pre-ULFT	4.7%	3.7%	2.7%	2.0%	1.6%	-	-
SF	Showerheads	>2.5 gpm	418	247	146	86	51	-367	-87.8%
		(1.8, 2.5)	56,589	56,760	62,111	64,150	65,926	9,337	16.5%
		<=1.8 gpm	-	-	-	-	-	0	0.0%
		% >2.5 gpm	0.7%	0.4%	0.2%	0.1%	0.1%	-	-
SF	Clotheswashers	Conventional	20,414	20,545	21,874	22,394	22,840	2,426	11.9%
		High-Efficiency	21,108	20,976	22,141	22,561	22,943	1,835	8.7%
		% Conventional	49.2%	49.5%	49.7%	49.8%	49.9%	-	-
SF	Dishwashers	Conventional	8,228	6,471	5,553	4,906	4,532	-3,696	-44.9%
		High-Efficiency	31,108	32,865	36,145	37,683	38,841	7,733	24.9%
		% Conventional	20.9%	16.5%	13.3%	11.5%	10.4%	-	-
MF	Toilets	Pre-ULFT	85	67	53	42	33	-52	-61.0%
		ULFT	1,784	1,894	1,988	2,064	2,130	346	19.4%
		% Pre-ULFT	4.6%	3.4%	2.6%	2.0%	1.5%	-	-
MF	Showerheads	>2.5 gpm	13	8	4	3	2	-11	-87.8%
		(1.8, 2.5)	1,804	1,900	1,980	2,045	2,101	297	16.5%
		<=1.8 gpm	-	-	-	-	-	0	0.0%
		% >2.5 gpm	0.7%	0.4%	0.2%	0.1%	0.1%	-	-
MF	In-Unit Clotheswashers	Conventional	386	402	415	425	433	47	12.1%
		High-Efficiency	400	411	420	428	435	35	8.7%
		% Conventional	49.1%	49.5%	49.7%	49.8%	49.9%	-	-
MF	Shared Clotheswashers	Conventional	96	100	104	106	108	12	12.6%
		High-Efficiency	100	103	105	107	109	8	8.2%
		% Conventional	48.9%	49.5%	49.7%	49.9%	49.9%	-	-
MF	Dishwashers	Conventional	230	185	156	138	127	-103	-44.7%
		High-Efficiency	872	952	1,013	1,056	1,089	217	24.9%
		% Conventional	20.9%	16.3%	13.3%	11.5%	10.4%	-	-

3.7.1 Nonresidential Toilets and Urinals

Restroom fixtures, specifically toilets and urinals, are the most consistent and broadly applicable targets for indoor water efficiency improvements within the commercial, industrial, and institutional (CII) sector. These fixtures are present in nearly all nonresidential facility types, making them a central focus for baseline efficiency assessments. The AWE Tracking Tool estimates the distribution of nonresidential toilets and urinals by efficiency class, using assumptions about useful life and natural replacement rates. This allows for calculation of passive efficiency improvements and identification of the remaining stock of fixtures that do not meet current high-efficiency standards.

Table 3-3 presents the projected stock of CII toilets by efficiency class from 2025 through 2045. In 2025, about 7% of nonresidential toilets are expected to remain rebate-eligible (with flush volumes exceeding 1.6 gallons per flush), declining to approximately 3% by 2045 as older fixtures are replaced. While natural replacement reduces inefficient toilets over time, a measurable inventory of higher-volume fixtures persists throughout the planning horizon, forming the baseline pool eligible for active conservation programs.

Urinals show a different efficiency profile. The majority are assumed to operate at flow rates of 1.0 gpf or greater, with only a small share represented by ultra-low-flow or waterless models. Because urinals are less frequently replaced through passive turnover and often remain in service for extended periods, a substantial stock of higher-volume urinals remains across the CII sector. Identifying these remaining inventories of toilets and urinals establishes the foundation for evaluating nonresidential indoor conservation measures in subsequent sections of this plan.

Table 3-3: CII End Uses by Technological Efficiency Level

Class	End Use Technology	Mechanical Efficiency	Projections					2025-2045	
			2025	2030	2035	2040	2045	Change	% Change
CII	Toilets	Pre- ULFT	801	653	532	434	354	-447	-55.8%
		ULFT	10,230	10,844	11,362	11,783	12,146	1,916	18.7%
		% Pre-ULFT	7.3%	5.7%	4.5%	3.6%	2.8%	-	-
CII	Urinals	>=1 gpf	2,506	2,564	2,614	2,654	2,690	184	7.3%
		0.5 gpf	-	-	-	-	-	0	0.0%
		0.25 gpf	-	-	-	-	-	0	0.0%
		0.125 gpf	-	-	-	-	-	0	0.0%
		0 gpf	116	128	138	146	152	36	31.3%
		% >=1 gpf	95.6%	95.3%	95.0%	94.8%	94.6%	-	-

3.8 Landscape Irrigation Water Efficiency Baseline Assessment

Outdoor water use remains one of the largest opportunities for efficiency improvements in the single-family residential sector. Unlike indoor fixtures, landscape irrigation efficiency does not improve significantly through passive replacement, making outdoor use a critical focus for assessing remaining conservation potential.

Efficiency potential was evaluated by identifying single-family customers with irrigation systems and classifying them based on observed irrigation behavior relative to theoretical landscape water requirements. Customers were grouped as either average irrigators—those whose water use is at or below estimated landscape needs—or high irrigators—those who exceed these requirements. This distinction enables a more accurate assessment of where efficiency improvements are most needed.

Research by the WRWSA found that approximately 40% of single-family customers irrigate seasonally, while about 20% exhibit over-irrigation behaviors. These findings informed the assumptions used in this baseline assessment. The distribution of irrigator types is summarized in Table 3-4, and the estimated number of irrigators by category is presented in Table 3-5.

Potential improvements in landscape irrigation efficiency stem from practices and technologies such as irrigation system evaluations, smart controllers, high-efficiency nozzles, and rain or soil moisture sensors. While these measures are described in detail in Section 4, they are referenced here to define the achievable efficiency potential within the outdoor sector.

The baseline assessment indicates that the greatest remaining efficiency potential lies with high irrigators, where targeted measures can substantially reduce water use without risk of rebound. For average irrigators, program design must be carefully tailored to avoid unintended increases in water use, such as when automated controllers are provided to customers already irrigating below theoretical need.

Table 3-4: Percent Breakdown of Irrigator Types

Irrigator Type	% of Irrigators
% Total Irrigators	40%
% Total Non-Irrigators	60%
% Total High Irrigators	20%
% Total Low Irrigators	80%

Table 3-5: Distribution of Irrigators

Variable	2020	Projections					2025 - 2045	
		2025	2030	2035	2040	2045	Change	% Change
Total SF Homes	24,316	28,553	29,968	31,182	32,173	33,046	4,493	15.7%
Total SF Non-Irrigators	14,589	17,132	17,981	18,709	19,304	19,827	2,696	15.7%
Total SF Irrigators	9,726	11,421	11,987	12,473	12,869	13,218	1,797	15.7%
Total SF High Irrigators	1,945	2,284	2,397	2,495	2,574	2,644	359	15.7%
Total SF Low Irrigators	7,781	9,137	9,590	9,978	10,295	10,575	1,438	15.7%
New SF Irrigators	139	1,834	2,401	2,886	3,283	3,631	1,797	98.0%
New SF High Irrigators	28	367	480	577	657	726	359	98.0%
New SF Low Irrigators	112	1,467	1,920	2,309	2,626	2,905	1,438	98.0%
Existing SF Irrigators	9,587	9,587	9,587	9,587	9,587	9,587	0	0.0%
Existing SF High Irrigators	1,917	1,917	1,917	1,917	1,917	1,917	0	0.0%
Existing SF Low Irrigators	7,669	7,669	7,669	7,669	7,669	7,669	0	0.0%

4. Water Conservation Program Development

Water conservation program development is based on the baseline efficiency assessment and remaining market characterization presented in Section 3. The goal is to identify and evaluate a portfolio of technically feasible, locally relevant conservation measures for inclusion in planning scenarios. Measures are selected through a review of eligible fixtures, appliances, and irrigation practices, and are screened for technical applicability and cost-effectiveness. The AWE Tracking Tool is used to estimate water savings, costs, and program effectiveness, supporting prioritization and comparison with alternative supply options. Selected measures are then assembled into planning scenarios, with estimated savings and budget impacts evaluated for long-term implementation.

Water conservation program development is guided by a structured evaluation process. First, a baseline assessment identifies remaining opportunities for efficiency improvements. Potential measures, such as fixture and appliance upgrades, irrigation enhancements, and outreach, are reviewed for technical feasibility and cost-effectiveness. These measures are then assembled into program portfolios, which are evaluated using the AWE Tracking Tool to estimate water savings, costs, and overall effectiveness. This portfolio-based approach allows the utility to prioritize and implement a balanced mix of conservation strategies, ensuring both immediate and long-term demand reductions that can be compared with other alternative supply options.

The sections that follow describe the conservation measures considered (Section 4.1), followed by the assembly of those measures into planning scenarios and the resulting water savings and budget implications (Sections 4.2 through 4.4).

4.1 Water Conservation Measures

The conservation measures evaluated in this plan include a suite of indoor and outdoor water efficiency technologies and practices applicable primarily to the single-family residential sector. Measures were selected based on technical feasibility, documented performance, and alignment with the remaining efficiency potential identified in Section 3.

Table 4-1 summarizes the conservation measures evaluated, along with estimated unit costs, unit savings, and cost-effectiveness metrics. Although the AWE Tracking Tool includes 21 single-family program options, 17 measures were selected based on their applicability and potential to achieve meaningful savings.

Estimated water savings reflect the full useful life of each measure, with measure life and unit savings varying by technology and implementation approach. Cost-effectiveness metrics were developed to support program prioritization and comparison with alternative water supply options.

Each measure targets either indoor (e.g., toilets, clothes washers, showerheads, and aerators) or outdoor (e.g., irrigation evaluations, smart controllers, rain sensors, and landscape conversions) water use. Only a subset of measures was incorporated into the Tier 2 and Tier 3 planning scenarios, which are evaluated in subsequent sections.

Table 4-1: Portfolio of Conservation Programs and Unit Cost

Program Name & Category			Program Cost and Water Saving Parameters							
Program ID	Program Name	Units	Utility ($/unit)	Expected Savings (gpd/unit)	Life of Savings (Years)	Cost Effectiveness ($/1000 gal)	Utility Unit Cost ($/MG)	Utility Unit Benefit ($/MG)	Utility BCR
1	SFR HET Replacement	Toilet	$ 100	27.8	25	$ 0.39	$ 226.90	$ 2,289	$10.09
2	High User Irrigation Evaluation	Irrigation	$ 400	170.0	5	$ 1.29	$ 1,289.28	$ 2,289	$ 1.78
3	High User Irrigation Evaluation w/Enhancement	Irrigation	$ 450	197.0	5	$ 1.25	$ 1,251.65	$ 2,289	$ 1.83
4	High User Irrigation Evaluation w/WS Controller	Controller	$ 750	355.0	10	$ 0.58	$ 578.82	$ 2,289	$ 3.95
5	High User WS Labeled Irrigation Controller	Controller	$ 350	297.0	10	$ 0.32	$ 322.86	$ 2,289	$ 7.09
6	Average User WS Labeled Irrigation Controller	Controller	$ 100	121.0	10	$ 0.23	$ 226.46	$ 2,289	$10.11
7	SFR Irrigation Nozzle Replacement	Sprinkler Head	$ 100	32.0	10	$ 0.86	$ 856.16	$ 2,289	$ 2.67
8	Rain Sensor Replacement	Controller	$ 50	35.0	3	$ 1.30	$ 1,304.63	$ 2,289	$ 1.75
9	SFR Rain Barrel (< 200 gal) Rebate	Household	$ 50	1.7	5	$ 16.12	$16,116.04	$ 2,289	$ 0.14
10	SFR Washer Rebate (WF <=4)	Washer	$ 100	13.7	12	$ 1.67	$ 1,666.50	$ 2,289	$ 1.37
11	Florida Friendly Yard Incentive program	Landscapes	$ 725	133.0	25	$ 0.60	$ 597.38	$ 2,289	$ 3.83
12	Workshops	10 Households	$ 140	70.0	1	$ 5.48	$ 5,479.45	$ 2,289	$ 0.42
13	Public Service Announcements (PSAs)	Times Played	$ -	-	1	$ -	$ -	$ -	$ -
14	Exhibits	# Exhibits	$ -	-	1	$ -	$ -	$ -	$ -
15	Web page	#Hits	$ -	-	1	$ -	$ -	$ -	$ -
16	In-School Education	Students	$ -	-	1	$ -	$ -	$ -	$ -
17	WS Showerhead	Home	$ 10	2.4	10	$ 1.14	$ 1,141.55	$ 2,289	$ 2.00
18	WS Labeled Faucet Aerator	Household	$ 3.50	1.7	5	$ 1.13	$ 1,128.12	$ 2,289	$ 2.03
19	WS Labeled Kitchen Faucet Aerator	Household	$ 4	-	-	$ -		$ -	$ -
20	SFR Water Use Audit	Household	$ 125	33.9	5	$ 2.02	$ 3,005.31	$ 2,289	$ 0.76
21	SFR HET+ Replacement	Toilet	$ 50	8.0	25	$ 0.68	$ 171.23	$ 2,289	$13.37

4.1.1 SFR HET Replacement

Replaces existing low-efficiency toilets with high-efficiency toilets (HETs) rated at 1.28 gallons per flush (gpf) or less. Most commonly implemented through rebates, though vouchers, give-away, or direct installation approaches may also be used.

4.1.2 High User Irrigation Evaluation

Provides in-depth evaluations of high-use irrigation systems, including zone-by-zone inspection, adjustment of run cycles, and customer-specific recommendations. Participants also receive Florida-Friendly Landscaping guidance and educational materials to sustain savings.

4.1.3 High User Irrigation Evaluation with Enhancement

Expands the basic irrigation evaluation with on-site system upgrades such as installing ET sensors, replacing broken or mismatched sprinkler heads, capping unnecessary heads, and correcting alignment or pressure issues.

4.1.4 High User Irrigation Evaluation with WaterSense Controller

Adds installation of a WaterSense labeled ET controller to the irrigation evaluation, enabling irrigation schedules to automatically adjust to weather and evapotranspiration data.

4.1.5 High User WaterSense Labeled Irrigation Controller

Provides direct installation of a WaterSense labeled ET controller at targeted high-use locations, independent of a full irrigation evaluation.

4.1.6 Average User WaterSense Labeled Irrigation Controller

Offers WaterSense labeled ET controller installation to average-use households, broadening access to smart irrigation technology.

4.1.7 SFR Irrigation Nozzle Replacement

Replaces standard sprinkler nozzles with high-efficiency nozzles designed to reduce overspray, improve distribution uniformity, and lower wind drift. Programs typically provide ~20 nozzles per household via rebate, distribution, or direct install.

4.1.8 Rain Sensor Replacement

Provides new or replacement rain sensors that automatically shut off irrigation systems during rainfall events, preventing unnecessary outdoor water use.

4.1.9 SFR Rain Barrel (<200 gal) Rebate

Offers a rebate (typically $50) toward the purchase of a rain barrel (<200 gallons) or a small cistern (200–500 gallons) to capture rainwater for outdoor use and reduce potable irrigation demand.

4.1.10 SFR Washer Rebate (WF ≤4)

Replaces conventional washers (8–15 gallons/cubic foot of laundry) with high-efficiency Energy Star models using ≤4 gallons/cubic foot. Most effective for common-area washers in multifamily housing, which have higher daily use rates. Rebate levels vary by utility (e.g., $75 in Hernando County).

4.1.11 Florida Friendly Yard Incentive Program

Supports landscape conversions to Florida-Friendly or Florida Water Star standards, reducing long-term irrigation demand. Incentives are offered to all customers with potable irrigation. Savings vary by site but have been documented at ~130–140 gpd in regional studies.

4.1.12 Workshops

Provides customer education workshops on water-efficient practices, technologies, and outdoor savings techniques. Savings are modest but measurable; estimates assume ~10 households per workshop with ~3 gpd reduction per household.

4.1.13 Public Service Announcements (PSAs)

PSAs use media channels such as radio, television, social media, and digital advertising to inform and motivate customers about water conservation. These messages raise awareness of efficient practices, promote participation in rebate and retrofit programs, and reinforce conservation as a community value.

4.1.14 Exhibits

Exhibits consist of visual or interactive displays presented at community events, utility offices, libraries, or other public venues. They are designed to engage residents of all ages, demonstrate efficient technologies (e.g., WaterSense fixtures, smart irrigation controllers), and showcase the benefits of water conservation in a tangible, hands-on format.

4.1.15 Web Page

Utility conservation web pages provide customers with a centralized, accessible source of information. These sites typically include program descriptions, rebate forms, instructional videos, and efficiency calculators. Web resources extend outreach beyond in-person events and ensure customers have year-round access to tools that support efficient water use.

4.1.16 In-School Education

In-school programs bring water conservation concepts directly to students through classroom presentations, interactive activities, and curriculum support. Educating students not only builds long-term conservation awareness, but also extends influence into households as children share what they learn with their families.

4.1.17 WaterSense Showerhead

Replaces inefficient showerheads with WaterSense-labeled models rated at ≤1.8 gallons per minute (gpm). Typically implemented through direct installation or give-away kits, often bundled with other devices such as faucet aerators or leak detection tablets.

4.1.18 WaterSense Labeled Faucet Aerator

Adds or replaces aerators on bathroom faucets to achieve flows of ≤1.5 gpm. Commonly distributed as part of give-away kits or bundled with other low-cost water-saving devices.

4.1.19 WaterSense Labeled Kitchen Faucet Aerator

Installs kitchen faucet aerators to reduce flow to ≤2.2 gpm. Often distributed in efficiency kits alongside showerheads and bathroom aerators.

4.1.20 SFR Water Use Audit

Provides on-site residential water use surveys. Trained staff assess indoor and outdoor practices, recommend efficiency upgrades, and may install devices directly. Outdoor audits can include turf analysis, catch-can testing, and irrigation scheduling recommendations.

4.1.21 SFR HET+ Replacement

Enhances the traditional toilet rebate program by replacing 1.6 gpf ultra-low flush toilets (ULFTs) with high-efficiency toilets (HET+) rated at ≤1.1 gpf. Targeted once the stock of higher-flush toilets has been largely retired.

4.1.22 Education and Outreach Programs

While outreach and educational initiatives do not have directly quantified savings rates in the AWE Tracking Tool, they are included in the portfolio because they play an important supporting role. These efforts increase public awareness, encourage participation in rebate and retrofit programs, and help sustain water-saving behaviors over time. Recognizing their influence, these measures are presented below as complementary strategies, even though no standalone water savings are assigned to them in this analysis.

4.2 Conservation Planning Scenarios

To evaluate the role of conservation as part of the long-term water supply strategy, the conservation measures described in Section 4.1 were assembled into a set of planning scenarios representing increasing levels of program intensity and investment. These scenarios are not intended to prescribe implementation schedules or funding commitments; rather, they are designed to bound the range of achievable water savings and associated costs under different programmatic approaches.

Each scenario builds upon the baseline efficiency conditions and remaining eligible fixtures, appliances, and irrigation practices identified in Section 3. Measures were selected based on technical feasibility, alignment with remaining efficiency potential, and relative cost-effectiveness as estimated using the AWE Tracking Tool.

The conservation scenarios are structured to:

- Distinguish between passive efficiency gains and active program-driven savings
- Reflect differing levels of program effort and participation
- Support comparison of conservation outcomes with alternative water supply options

The three conservation planning scenarios evaluated are described below.

- **Tier 1 – Passive Efficiency (Low):** Tier 1 reflects only passive conservation achieved through the natural replacement of fixtures and appliances as they reach the end of their useful life. No active conservation programs are assumed under this scenario. Savings result from ongoing market-driven adoption of more efficient technologies and provide a baseline reference for evaluating the incremental benefits of active conservation.

- **Tier 2 – Targeted Active Conservation (Medium):** Tier 2 builds upon passive efficiency by incorporating a focused portfolio of active conservation programs. Measures included in this scenario reflect technologies and practices judged to be locally applicable, cost-effective, and feasible to implement at moderate participation levels. Tier 2 represents a pragmatic level of conservation that could reasonably be achieved through sustained program implementation under typical utility staffing and budget conditions.

- **Tier 3 – Expanded Conservation (High / Regional):** Tier 3 expands upon Tier 2 by applying a broader mix of conservation measures at higher participation rates. This scenario illustrates the upper range of water savings that could be achieved through more aggressive and coordinated conservation efforts. Tier 3 emphasizes diversification across both indoor and outdoor measures to reduce reliance on any single program and improve long-term resilience of conservation savings.

Together, these scenarios provide a structured framework for evaluating conservation as a planning resource, illustrating how varying levels of program investment and participation influence long-term water demand outcomes. The resulting water savings and associated costs are presented in the following sections and are used to assess conservation as a flexible and cost-effective strategy for managing long-term demand.

4.3 Scenario Assumptions and Program Penetration

Active conservation scenarios were developed by applying planning-level participation rates to the remaining eligible fixtures, appliances, and irrigation systems identified in Section 3. Participation rates were selected to reflect realistic implementation levels consistent with cost-effectiveness thresholds and anticipated program capacity over the 2025–2045 planning horizon.

Table 4-2 summarizes the eligible measures and assumed penetration rates for Tier 2 and Tier 3 scenarios. Penetration rates were intentionally set below the total remaining market potential to reflect conservative planning assumptions rather than maximum achievable uptake.

To estimate annual program activity, the total number of assumed program participants was evenly distributed across the planning horizon. Table 4-3 presents the resulting average annual interventions by measure for Tier 2 and Tier 3. This approach avoids front-loading savings and provides a stable representation of long-term program implementation.

4.4 Water Demand and Conservation Savings Results

Projected water savings and demand under each conservation scenario is summarized in Table 4-4. Under baseline conditions, potable water demand is projected to increase from 10.9 MGD in 2025 to 16.1 MGD by 2045, representing a 48.1 percent increase over the planning horizon.

- Under Tier 1, which reflects passive efficiency only, projected demand reaches 15.3 MGD by 2045, reducing demand growth by approximately 0.8 MGD relative to baseline.
- Under Tier 2, which incorporates passive efficiency plus a moderate level of active conservation, projected demand is reduced to 15.0 MGD by 2045, or 1.1 MGD below baseline.
- Under Tier 3, which assumes higher participation across selected conservation measures, projected demand declines further to 14.6 MGD by 2045, representing a 1.5 MGD reduction relative to baseline.

These results demonstrate that progressively higher levels of conservation investment yield increasing reductions in long-term demand.

4.5 Distribution of Savings Across Measures

Across all active conservation scenarios, outdoor measures account for a substantial share of total water savings, particularly in scenarios that emphasize irrigation efficiency for high-use customers. Indoor savings are driven primarily by toilet and clothes washer replacements, with additional contributions from showerheads, aerators, and audits. Indoor conservation measures tend to produce savings that are more predictable, less sensitive to behavioral variability, and more uniformly realized across customer classes. Outdoor measures, while inherently more variable, provide larger per-participant savings, greater opportunity to address seasonal and peak demand, and meaningful reductions in discretionary water use. Together, these characteristics underscore the importance of maintaining a balanced portfolio of indoor and outdoor conservation measures.

Table 4-2: Conservation Program Eligible Measures and Penetration Rates

Program Name	Units	Eligible Measures (2045)	Tier 2 Penetration Rate	Tier 3 Penetration Rate
SFR HET Replacement	Toilet	3,680	0%	15%
High User Irrigation Evaluation	Irrigation	2,574	15%	15%
High User Irrigation Evaluation w/Enhancement	Irrigation	2,574	15%	15%
High User Irrigation Evaluation w/WS Controller	Controller	2,574	15%	15%
High User WS Labeled Irrigation Controller	Controller	2,574	51%	51%
Average User WS Labeled Irrigation Controller	Controller	10,295	25%	25%
SFR Irrigation Nozzle Replacement	Sprinkler Head	12,869	25%	25%
Rain Sensor Replacement	Controller	12,869	25%	25%
SFR Rain Barrel (< 200 gal) Rebate	Household	12,869	1%	1%
SFR Washer Rebate (WF <=4)	Washer	16,349	5%	5%
Florida Friendly Yard Incentive program	Landscapes	12,869	5%	5%
Workshops	10 Households	32,173	2%	2%
PSA	Times Played	32,173	0%	0%
Exhibits	# Exhibits	32,173	2%	2%
Web page	# Hits	32,173	0%	0%
In-School Education	Students	32,173	0%	0%
WaterSense Showerhead	Home	142	2%	2%
WS Labeled Faucet Aerator	Household	142	4%	4%
WS Labeled Kitchen Faucet Aerator	Household	32,173	0%	0%
SFR Water Use Audit	Household	32,173	0%	0%
SFR HET+ Replacement	Toilet	64,416	0%	15%

Table 4-3: Tier 2 and Tier 3 Annual Planned Measures

Program Name	Tier 2					Tier 3				
	2025	2030	2035	2040	2045	2025	2030	2035	2040	2045
SFR HET Replacement	20	-	-	-	-	20	-	-	-	-
High User Irrigation Evaluation	9	9	9	9	9	18	18	18	18	18
High User Irrigation Evaluation w/Enhancement	-	-	-	-	-	18	18	18	18	18
High User Irrigation Evaluation w/WS Controller	5	5	5	5	5	18	18	18	18	18
High User WS Labeled Irrigation Controller	62	62	62	62	62	62	62	62	62	62
Average User WS Labeled Irrigation Controller	30	30	30	30	30	123	123	123	123	123
SFR Irrigation Nozzle Replacement	-	-	-	-	-	153	153	153	153	153
Rain Sensor Replacement	25	25	25	25	25	153	153	153	153	153
SFR Rain Barrel (< 200 gal) Rebate	-	-	-	-	-	6	6	6	6	6
SFR Washer Rebate (WF <=4)	-	-	-	-	-	39	39	39	39	39
Florida Friendly Yard Incentive program	-	-	-	-	-	31	31	31	31	31
Workshops	25	25	25	25	25	25	25	25	25	25
PSA	-	-	-	-	-	-	-	-	-	-
Exhibits	25	25	25	25	25	25	25	25	25	25
Web page	-	-	-	-	-	-	-	-	-	-
In-School Education	3	3	3	3	3	3	3	3	3	3
WaterSense Showerhead	75	75	75	75	75	75	75	75	75	75
WS Labeled Faucet Aerator	125	125	125	125	125	125	125	125	125	125
WS Labeled Kitchen Faucet Aerator	-	-	-	-	-	-	-	-	-	-
Water Use Audits	-	-	-	-	-	-	-	-	-	-
SFR HET+ Replacement	-	-	-	-	-	460	460	460	460	460

Table 4-4: Annual Water Demand Projections

Unit	Variable	2020	2025	2030	2035	2040	2045	2025-2045	
								Change	% Change
Water Demand (MGD)	Baseline	9.6	10.9	12.4	13.9	15.1	16.1	5.2	48.1%
	Tier 1	9.6	10.5	11.9	13.3	14.3	15.3	4.8	45.5%
	Tier 2	9.6	10.5	11.7	13.0	14.0	15.0	4.6	43.4%
	Tier 3	9.6	10.4	11.5	12.7	13.6	14.6	4.2	39.9%
Demand Reduction (MGD)	Baseline	-	-	-	-	-	-	-	-
	Tier 1	-	0.4	0.5	0.7	0.8	0.8	0.5	124%
	Tier 2	-	0.4	0.7	0.9	1.0	1.1	0.7	171%
	Tier 3	-	0.4	0.9	1.3	1.4	1.5	1.1	242%
% Reduction	Baseline	-	-	-	-	-	-	-	-
	Tier 1	-	3.4%	4.3%	4.7%	5.0%	5.2%	1.8%	51%
	Tier 2	-	3.7%	5.6%	6.6%	6.7%	6.8%	3.1%	83%
	Tier 3	-	4.1%	7.4%	9.1%	9.3%	9.5%	5.4%	131%
GPCD	Baseline	162	157	171	184	193	201	44	28.0%
	Tier 1	162	152	163	175	183	191	39	25.7%
	Tier 2	162	151	161	172	180	187	36	23.9%
	Tier 3	162	151	158	167	175	182	31	20.9%
GPCD Reduction	Baseline	-	-	-	-	-	-	-	-
	Tier 1	-	5.4	7.3	8.7	9.7	10.4	5.0	93%
	Tier 2	-	5.8	9.5	12.1	12.9	13.6	7.8	134%
	Tier 3	-	6.4	12.7	16.8	18.0	19.0	12.6	196%

The distribution of savings differs notably between conservation scenarios. In Tier 2, irrigation controller programs dominate, accounting for more than 70 percent of total savings. While this reflects the strong performance of smart irrigation technologies, it also indicates a portfolio that is heavily reliant on a single measure type. In Tier 3, conservation savings are distributed more evenly across a broader range of measures. Irrigation controllers remain an important contributor; however, substantial additional savings are achieved through high-efficiency (HET+) toilet replacements, irrigation nozzle upgrades, and Florida Friendly Yard conversions. This broader distribution reduces reliance on any single technology and improves the robustness of the conservation portfolio if participation in individual programs falls short of expectations.

Table 4-5 summarizes cumulative water savings by program for Tier 2 and Tier 3 and illustrates how expanded participation and a more diverse measure mix contribute to higher overall savings and a more balanced distribution of conservation benefits.

4.6 Annual Budget Estimates

Estimated annual program costs for Tier 2 and Tier 3 are summarized in Table 4-6. For most measures, unit costs are assumed to remain constant over the planning horizon. Tier 2 achieves moderate demand reductions at relatively low annual cost but concentrates expenditures in a small number of measures. Tier 3 requires higher annual investment but produces nearly twice the cumulative savings while distributing costs across a broader suite of programs.

Table 4-5: Tier 2 and Tier 3 Cumulative Program Water Savings Estimates (MGY)

Program Name	Tier 2							Tier 3						
	2025	2030	2035	2040	2045	Million Gallons Saved (2025-2045)	Total Distribution	2025	2030	2035	2040	2045	Million Gallons Saved (2025-2045)	Total Distribution
SFR HET Replacement	0.20	0.40	0.35	0.31	0.27	7	0.5%	0.20	0.40	0.35	0.31	0.27	7	0.2%
High User Irrigation Evaluation	0.56	2.79	2.79	2.79	2.79	53	3.4%	1.12	5.58	5.58	5.58	5.58	106	2.8%
High User Irrigation Evaluation w/Enhancement	-	-	-	-	-	-	-	1.29	6.47	6.47	6.47	6.47	123	3.3%
High User Irrigation Evaluation w/WS Controller	0.65	3.89	6.48	6.48	6.48	107	6.9%	2.33	13.99	23.32	23.32	23.32	385	10.2%
High User WS Labeled Irrigation Controller	6.72	40.33	67.21	67.21	67.21	1109	71.8%	6.72	40.33	67.21	67.21	67.21	1109	29.5%
Average User WS Labeled Irrigation Controller	1.32	7.95	13.25	13.25	13.25	219	14.1%	5.43	32.59	54.32	54.32	54.32	896	23.8%
SFR Irrigation Nozzle Replacement	-	-	-	-	-	-	-	1.79	10.72	17.87	17.87	17.87	295	7.8%
Rain Sensor Replacement	0.32	0.96	0.96	0.96	0.96	19	1.2%	1.95	5.86	5.86	5.86	5.86	117	3.1%
SFR Rain Barrel (< 200 gal) Rebate	-	-	-	-	-	-	-	0.00	0.02	0.02	0.02	0.02	0	0.0%
SFR Washer Rebate (WF <=4)	-	-	-	-	-	-	-	0.20	1.17	2.15	2.34	2.34	36	1.0%
Florida Friendly Yard Incentive program	-	-	-	-	-	-	-	1.50	9.03	16.55	24.08	31.60	348	9.2%
Workshops	0.64	0.64	0.64	0.64	0.64	13	0.9%	0.64	0.64	0.64	0.64	0.64	13	0.4%
PSA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exhibits	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Web page	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In-School Education	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WaterSense Showerhead	0.07	0.39	0.66	0.66	0.66	11	0.7%	0.07	0.39	0.66	0.66	0.66	11	0.3%
WS Labeled Faucet Aerator	0.08	0.39	0.39	0.39	0.39	7	0.5%	0.08	0.39	0.39	0.39	0.39	7	0.2%
WS Labeled Kitchen Faucet Aerator	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Use Audits	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SFR HET+ Replacement	-	-	-	-	-	-	-	1.34	8.06	14.78	21.49	28.21	310	8.2%
Total	10.6	57.7	92.7	92.7	92.6	1545	100%	24.7	135.7	216.2	230.6	244.8	3764	100%

Table 4-6: Tier 2 and Tier 3 Conservation Plan Estimated Annual Budget

Program Name	Tier 2			Tier 3		
	Annual Budget[1]	Total Expenditures (2025-2045)	Distribution Within Utility (2025-2045)	Annual Budget[1]	Total Expenditures (2025-2045)	Distribution Within Utility (2025-2045)
SFR HET Replacement	-	$4,500	0.6%	-	$4,500	0.2%
High User Irrigation Evaluation	$3,600	$75,600	9.4%	$7,200	$151,200	5.1%
High User Irrigation Evaluation w/Enhancement	-	-	-	$8,100	$170,100	5.8%
High User Irrigation Evaluation w/WS Controller	$3,750	$78,750	9.8%	$13,500	$283,500	9.6%
High User WS Labeled Irrigation Controller	$21,700	$455,700	56.8%	$21,700	$455,700	15.5%
Average User WS Labeled Irrigation Controller	$3,000	$63,000	7.9%	$12,300	$258,300	8.8%
SFR Irrigation Nozzle Replacement	-	-	-	$15,300	$321,300	10.9%
Rain Sensor Replacement	$1,250	$26,250	3.3%	$7,650	$160,650	5.5%
SFR Rain Barrel (< 200 gal) Rebate	-	-	-	$300	$6,300	0.2%
SFR Washer Rebate (WF <=4)	-	-	-	$3,900	$81,900	2.8%
Florida Friendly Yard Incentive program	-	-	-	$22,475	$471,975	16.0%
Workshops	$3,500	$73,500	9.2%	$3,500	$73,500	2.5%
PSA	-	-	-	-	-	-
Exhibits	-	-	-	-	-	-
Web page	-	-	-	-	-	-
In-School Education	-	-	-	-	-	-
WaterSense Showerhead	$750	$15,750	2.0%	$750	$15,750	0.5%
WS Labeled Faucet Aerator	$438	$9,188	1.1%	$438	$9,188	0.3%
WS Labeled Kitchen Faucet Aerator	-	-	-	-	-	-
Water Use Audits	-	-	-	-	-	-
SFR HET+ Replacement	-	-	-	$23,000	$483,000	16.4%
Total	$37,988	$802,238	100%	$140,113	$2,946,863	100%

[1] The annual budget column references the 2045 annual budget values. The annual budget for Tier 2 and Tier 3 is the same for every year, except for the SFR HET Replacement Program. For the SFR HET Replacement Program, the 2025 through 2027 expenditures are $2,000, $1,500, and $1,000, respectively for both Tier 2 and Tier 3.

5. Summary and Conclusions

This Water Conservation Plan evaluates the role of conservation in supporting long-term water supply sustainability for Citrus County Utilities through a planning-level assessment of baseline efficiency, remaining conservation potential, and achievable water savings under varying program scenarios.

Baseline projections indicate that absent additional conservation efforts, potable water demand is expected to increase substantially through 2045. Passive efficiency improvements associated with natural replacement of fixtures and appliances (Tier 1) modestly reduce this growth but are insufficient on their own to offset projected increases in demand. As a result, active conservation programs play a critical role in managing future water needs.

The conservation planning scenarios evaluated in this plan demonstrate that meaningful demand reductions can be achieved through targeted, cost-effective measures. Tier 2 represents a moderate level of active conservation focused on high-performing measures, particularly irrigation efficiency technologies. This scenario provides a pragmatic and scalable level of demand reduction achievable under typical programmatic and budgetary conditions, though savings are concentrated in a limited number of measures.

The Tier 3 scenario illustrates the upper range of achievable conservation savings through higher participation and a more diversified program portfolio. While requiring greater overall investment, Tier 3 produces larger and more reliable long-term demand reductions by distributing savings across a broader mix of indoor and outdoor measures, including irrigation controllers, high-efficiency toilet replacements, irrigation nozzle upgrades, and landscape conversions. This diversification reduces reliance on any single measure and enhances the robustness of conservation as a planning resource.

Across scenarios, outdoor measures account for a substantial share of total savings, particularly those targeting high irrigation users and seasonal demand. Indoor measures provide more predictable and consistent savings that complement outdoor programs and contribute to long-term baseline efficiency improvements. Together, these measures form a balanced conservation portfolio capable of addressing both average and peak demand drivers.

From a water supply planning perspective, conservation offers several advantages relative to traditional supply-side options. Conservation savings can be phased over time, scaled to available funding, and adjusted as demand conditions evolve. When evaluated on a cost-per-gallon basis, many conservation measures compare favorably with alternative water supply options and can reduce or defer the need for future capital-intensive supply projects.

In summary, this analysis demonstrates that conservation can offset a substantial portion of Citrus County Utilities' projected demand growth through 2045. Tier 2 represents a reasonable baseline level of conservation achievable through targeted program implementation, while Tier 3 highlights the broader potential available through sustained and diversified investment. Together, these scenarios support the inclusion of conservation as a core component of long-term water supply planning and provide a consistent analytical foundation for coordination with the WRWSA Regional Water Supply Plan.

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City of Ocala Conservation Plan

December 2025

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List of Acronyms

Abbreviation	Definition
AWE	Alliance for Water Efficiency
CII	Commercial, Industrial, and Institutional
CPC	Conservation Planning Committee
EPAct	U.S. Energy Policy Act of 1992
ET	Evapotranspiration
gpd	Gallons per Day
gpf	Gallons per Flush
gpm	Gallons per Minute
HE	High Efficiency
HET	High Efficiency Toilet
HET+	Ultra High Efficiency Toilet
HEU	High Efficiency Urinal
MGD	Million Gallons per Day
MGY	Million Gallons per Year
MF	Multifamily
NR	Nonresidential
PSAR	Public Supply Annual Report
RWSP	Regional Water Supply Plan
SF	Single-Family
SWFWMD	Southwest Florida Water Management District
ULFT	Ultra-Low Flow Toilet
WF	Water Factor
WRWSA	Withlacoochee Regional Water Supply Authority
WS	WaterSense

1. Introduction

This Conservation Plan was developed to identify cost-effective strategies for reducing water demand through 2045, supporting long-term water supply sustainability for the City of Ocala. Conservation is essential for extending existing water sources, reducing peak demand, and deferring or avoiding costly new supply projects. The plan was prepared as part of the Withlacoochee Regional Water Supply Authority (WRWSA) 2025 Regional Water Supply Plan (RWSP), funded through a cooperative funding agreement between WRWSA and the Southwest Florida Water Management District (SWFWMD). While supporting regional planning efforts, this document also serves as a stand-alone plan for the City of Ocala.

The plan was developed collaboratively with the WRWSA Conservation Planning Committee, which included representatives from Citrus, Hernando, and Marion Counties, the City of Ocala, and The Villages. This collaborative approach ensures regional consistency while allowing each utility to tailor programs to local needs and priorities.

A wide range of residential and nonresidential water efficiency measures was evaluated, including fixture and appliance upgrades, irrigation improvements, landscape practices, system evaluations, and education/outreach initiatives. Programs were selected based on local relevance, expected water savings, feasibility, and cost-effectiveness.

Water savings potential was assessed using three scenarios:

- Tier 1 (Low): Passive conservation from natural replacement of fixtures, new construction standards, and market-driven adoption of efficient technologies.
- Tier 2 (Medium): Passive efficiency plus a targeted portfolio of active conservation programs, reflecting a practical and achievable level of effort.
- Tier 3 (High/Regional): Expanded conservation with higher participation and broader regional application, illustrating the upper bound of achievable savings.

These tiered scenarios provide a transparent framework for evaluating conservation potential and integrating savings into demand projections and regional planning. The Alliance for Water Efficiency (AWE) Tracking Tool was used to estimate baseline water use, remaining efficiency potential, program-level savings, and costs, with local data incorporated where available.

Overall, this plan supports the City of Ocala’s long-term water supply planning by identifying feasible, cost-effective conservation strategies. These efforts help defer capital-intensive supply projects, reduce long-term costs, and ensure reliable service for current and future customers, while supporting compliance with regulatory requirements.

2. Baseline Housing, Population, and Water Demand

Establishing baseline housing, population, and water demand conditions provides the foundation for evaluating conservation potential and understanding how future demands are expected to evolve in the absence of additional conservation efforts. These baseline conditions represent the reference case against which conservation savings are measured and are critical for assessing how conservation influences long-term water supply planning. For the City of Ocala, baseline conditions were developed by evaluating population, housing units, service connections, and water demand across primary customer classes. This assessment supports both utility-level conservation planning and integration of conservation results into regional demand projections used in the WRWSA 2025 Regional Water Supply Plan.

2.1 Customer Classes and Demand Composition

Water demand is analyzed across three primary customer classes: Single-Family (SF), Multifamily (MF), and Commercial, Industrial, and Institutional (CII). Each class has distinct water use characteristics, end-use profiles, and conservation opportunities. By disaggregating demand in this way, conservation potential can be evaluated more precisely, supporting the development of targeted and cost-effective programs. Single-family residential customers account for the largest share of total water demand and exhibit the greatest seasonal variability due to outdoor irrigation. In contrast, multifamily demand is primarily driven by indoor water use and is typically less seasonal. CII demand is diverse, reflecting a range of operational drivers and conservation opportunities depending on facility type.

2.2 Baseline Data Sources and Methodology

Baseline demand projections for the City of Ocala were developed using data from the 2021 Public Supply Annual Report (PSAR) for Permit Number 50324 (City of Ocala). These data established the foundation for evaluating conservation potential, with demand across single-family, multifamily, and commercial/industrial/institutional classes assumed to represent total retail sales. Population and housing forecasts align with the WRWSA Regional Water Supply Plan, and baseline projections reflect average annual conditions, incorporating only passive efficiency improvements such as fixture replacement and updated plumbing codes. The Alliance for Water Efficiency (AWE) Tracking Tool was calibrated with utility-specific data to ensure consistency between observed water use and modeled end-use distributions.

2.3 Baseline Growth and Demand Trends

Table 2-1 presents the historical and projected baseline inputs used in the AWE Tracking Tool, including population, dwelling units, service connections, and water demand by customer class over the 2025–2045 planning horizon. As shown, baseline projections indicate no growth across all major planning inputs. The single-family residential sector accounts for approximately 70% of the population and dwelling units. While overall inputs are constant, the concentration within the single-family residential sector has important implications for future water demand due to the associated contribution of outdoor irrigation.

Key observations include:

- Population Growth: Total population is projected to remain nearly the same between 2025 and 2045. Between 2020 and 2025, population is projected to grow by about 11.6% (7,566 people), with majority of this growth occurring in the single family sector (70% of total).
- Housing Growth: Dwelling units are not projected to increase between 2025 and 2045. Between 2020 and 2025, dwelling units are projected to increase by 3,457 (11.6%). Single-family dwelling units account for approximately 70% of all units in the City of Ocala.
- Service Connections: Total connections are not projected to increase between 2025 and 2045. Between 2020 and 2025, service connections are projected to increase by 2,912 (11.6%). Of all service connections, about 82% are single-family, 1% are multifamily, and 17% are CII customers.
- Water Demand: Total water sales are not projected to increase between 2025 and 2045. Between 2020 and 2025, total water sales are projected to increase by 1.55 MGD (13.3%). For this time period, single-family customers account for 55% of this growth, with CII customers contributing the other 45%.

These projections establish the baseline conditions against which conservation savings are measured and highlight the extent to which residential growth, particularly single-family development, drives future demand. Even with embedded passive efficiency improvements, projected demand increases underscore the importance of active conservation programs in moderating long-term water use and reducing the timing and magnitude of future supply needs.

2.4 Seasonal and End-Use Considerations

Baseline water demand shows seasonal variability, with outdoor irrigation in single-family homes driving peak demand during dry periods. Indoor residential use remains steady year-round, influenced by household size, fixture efficiency, and occupancy. Commercial, industrial, and institutional water use varies due to diverse operational needs. Recognizing these patterns is key for conservation planning: indoor measures manage annual demand, while outdoor programs reduce seasonal peaks. Addressing both is vital, as peak demand affects system capacity and future supply investments.

2.5 Role of the Baseline in Conservation Evaluation

The baseline conditions described in this section represent the reference case against which conservation savings are evaluated in subsequent sections of this plan. Conservation scenarios build upon these baseline projections by incorporating both passive and active efficiency improvements to estimate conservation-adjusted demands. By establishing a clear and consistent baseline, this plan ensures that conservation savings reflect true reductions relative to expected future conditions rather than reductions relative to historical use alone. This approach supports transparent evaluation of conservation benefits and facilitates integration of utility-level conservation results into regional water supply planning and avoided-cost analyses.

Table 2-1: Historical and Projected AWE Tracking Tool Inputs

Input	Class	Historical Observations		Projections					2025-2045		
		1990	2020	2025	2030	2035	2040	2045	Change	% Change	% of Change within Utility
Population	SF	31,380	45,585	50,884	50,885	50,885	50,885	50,885	1	0%	100%
	MF	13,425	19,501	21,768	21,768	21,768	21,768	21,768	0	0%	0%
	Total	44,805	65,086	72,652	72,653	72,653	72,653	72,653	1	0%	100%
Dwelling Units	SF	14,205	20,635	23,034	23,034	23,034	23,034	23,034	0	0%	-
	MF	6,267	9,104	10,163	10,163	10,163	10,163	10,163	0	0%	-
	Total	20,473	29,740	33,197	33,197	33,197	33,197	33,197	0	0%	-
Connections	SF	14,217	20,653	23,054	23,054	23,054	23,054	23,054	0	0%	-
	MF	173	251	280	280	280	280	280	0	0%	-
	CII Mixed Meter	2,857	4,151	4,633	4,633	4,633	4,633	4,633	0	0%	-
	Total	17,247	25,055	27,967	27,967	27,967	27,967	27,967	0	0%	-
Water Sales	SF		6.40	7.25	7.25	7.25	7.25	7.25	0	0%	-
	MF		0.08	0.09	0.09	0.09	0.09	0.09	0	0%	-
	CII Mixed Meter		5.21	5.90	5.90	5.90	5.90	5.90	0	0%	-
	UAW		0.00	0.00	0.00	0.00	0.00	0.00	0	0%	-
	Total		11.69	13.24	13.24	13.24	13.24	13.24	0	0%	-

3. Evaluation of Conservation Potential

Conservation potential is assessed by first establishing baseline water efficiency and then identifying opportunities for additional active conservation programs. Water savings result from both passive efficiency improvements, such as natural fixture replacement and regulatory standards and active utility-driven initiatives that further reduce demand. Differentiating these sources is essential for producing accurate and defensible estimates of conservation potential. By evaluating conservation relative to projected future baseline conditions, rather than historical use, the analysis ensures that estimated savings reflect true incremental reductions and avoids overstating the benefits of active programs.

3.1 Passive and Active Conservation Framework

Water efficiency improvements occur through both passive and active mechanisms.

- **Passive conservation** represents efficiency gains that occur without direct programmatic intervention. These gains are driven by plumbing codes and standards, market transformation, and the natural replacement of fixtures and appliances as they reach the end of their useful life. Passive efficiency improvements are most strongly associated with indoor water use, where fixture turnover steadily shifts the installed stock toward higher efficiency over time.
- **Active conservation** represents additional efficiency gains achieved through conservation programs designed to accelerate replacement of inefficient fixtures, influence customer behavior, or address water uses not typically affected by passive replacement. Active programs may include rebates, direct-install programs, irrigation system evaluations, landscape incentives, and education and outreach initiatives.

Separating passive and active conservation is essential for identifying the remaining market available for active water efficiency programs and for ensuring that conservation savings are incremental and not double-counted.

3.2 Establishing Baseline Water Efficiency

The baseline water efficiency assessment determines current and projected levels of technological efficiency before active conservation programs are implemented. This process quantifies passive efficiency improvements already reflected in baseline demand projections and identifies the remaining fixtures, appliances, and practices eligible for active conservation efforts.

The AWE Tracking Tool, a Microsoft Excel–based planning model, serves as the primary instrument for estimating baseline efficiency, passive water savings, and the cost-effectiveness of water-saving measures. The tool incorporates stock models for single-family, multifamily, and commercial, industrial, and institutional customer classes, estimating the distribution of key fixtures and appliances across various efficiency levels over time.

Fixtures and appliances evaluated include toilets, urinals, clothes washers (in-unit and shared), showerheads, faucet aerators, and dishwashers. The tool projects water savings from passive replacement as older, less efficient models are replaced with products that meet or exceed current standards.

The remaining inventory of conventional and standard efficiency fixtures after passive replacement establishes the starting point for estimating active conservation potential. This potential is defined by the portion of the remaining stock that could reasonably be replaced through utility-sponsored programs, considering usage intensity. The estimation of active program savings is addressed in subsequent sections of the plan.

3.3 End-Use Technology Efficiency Levels

End-use technologies evaluated in the baseline assessment are grouped into three general efficiency levels:

- **Non-conserving (conventional):** Typically the least efficient fixtures and appliances, most commonly found in homes and businesses constructed prior to 1994.
- **Conserving (standard):** Fixtures and appliances that meet minimum plumbing code or appliance efficiency standards.
- **Ultra-conserving (high-efficiency):** Fixtures and appliances that exceed minimum efficiency standards, often carrying the U.S. Environmental Protection Agency (EPA) WaterSense label.

The U.S. Energy Policy Act of 1992 (EPAct) was a pivotal milestone in advancing water efficiency, introducing maximum flow standards for toilets, faucets, and showerheads, as well as efficiency requirements for nonresidential plumbing fixtures. EPAct also set energy efficiency standards for appliances such as water heaters and air conditioners, which helped reduce water use in energy-intensive systems like cooling towers. Since its enactment, manufacturers have consistently developed products that meet or exceed these federal standards. The EPA WaterSense program has further accelerated market transformation by certifying ultra-efficient fixtures that maintain performance while using less water. Consequently, the market has steadily shifted toward higher-efficiency technologies for both fixtures and appliances.

3.4 Passive Replacement and Useful Life Assumptions

As fixtures and appliances reach the end of their useful life, they are assumed to be replaced with products that meet prevailing efficiency standards. This process drives passive efficiency improvements embedded in baseline demand projections.

Each fixture and appliance type is assigned an expected useful life, which is used to estimate an annual natural replacement rate (NRR) according to Equation 3-1:

Equation 3-1:

$$nrr = \frac{1}{Expected\ Life\ in\ Years}$$

Fixtures subject to natural replacement assumptions include toilets, urinals, clothes washers, and dishwashers. In contrast, outdoor irrigation measures and many CII technologies (e.g., cooling towers) are not typically subject to natural replacement and therefore do not exhibit significant passive efficiency improvements over time. Accounting for passive replacement is essential for avoiding overestimation of conservation potential and for isolating the remaining market that can be addressed through active conservation programs.

3.5 Data Sources and Local Calibration

Baseline efficiency estimates were developed using utility-reported data from the 2022 Public Supply Annual Report (PSAR), including service connections, population, and water demand by customer class. These data were integrated with AWE Tracking Tool stock distributions and useful-life parameters, with local information incorporated where available to accurately reflect service-area conditions. For historical demand estimates dating back to 1990, a parcel-level dataset from SWFWMD, containing year-built and land use classification, was used to assign historical population to single-family and multifamily customer classes. This approach ensured consistency between historical housing stock, population estimates, and the reporting categories used in both the PSAR and the AWE Tracking Tool. By aligning historical development patterns with modeled efficiency trends, the baseline assessment provides a robust foundation for identifying remaining conservation potential and guiding program development.

3.6 Residential Indoor Water Efficiency Baseline Assessment

Residential water use and efficiency are influenced by location-specific factors such as housing age, number of occupants, household income, and outdoor features like pools or automated irrigation systems. Housing age is especially significant, as older homes tend to have less efficient fixtures and appliances, while newer homes typically incorporate higher-efficiency technologies. The presence of automated irrigation systems also correlates with housing age and can substantially impact outdoor water use.

For multifamily properties, water use patterns are more complex due to variations in building size, occupancy, management practices, and the presence of shared facilities. Factors such as sub-metering and responsibility for outdoor maintenance contribute to greater variability in efficiency potential compared to single-family homes.

To estimate the remaining market potential for residential indoor efficiency measures, projected housing unit counts for both single-family and multifamily sectors are used. These projections help identify the number of non-conserving toilets, showerheads, clothes washers, and dishwashers available for replacement with higher-efficiency products over the planning horizon. Faucet aerators are excluded, as most are already operating at high efficiency levels. A summary of common residential end uses and location characteristics affecting water demand is provided in Table 3-1.

Table 3-1: Common End Use and Location Characteristics Affecting Residential Water Use

End Uses	Location Characteristics
• Irrigation • Pools • Clothes/dish washing • Bathing • Toilet flushing • Eating/drinking • Leaks	• Number of occupants • Home value • Age of house and/or plumbing • Building/irrigable area • Number/ages/types of toilets, fixtures, and appliances • Price of water and income level of occupants • Alternative water sources (e.g. reclaimed water, shallow wells)

3.6.1 Residential Fixtures and Appliances

Residential water efficiency opportunities are evaluated collectively for major fixtures and appliances, including toilets, clothes washers, showerheads, faucet aerators, and dishwashers. The AWE Tracking Tool stock model simulates the gradual replacement of conventional units with higher-efficiency products, estimating both passive and active conservation potential.

- **Toilets**: Stock estimates support calculation of passive efficiency improvements and identification of remaining units eligible for replacement. With an expected useful life of 25 years (natural replacement rate of 4% per year), the share of single-family toilets exceeding 1.6 gallons per flush (gpf) is projected to decline from 5.4% in 2025 to 2.0% by 2045. Table 3-2 presents the estimated number of toilets by efficiency class for single-family and multifamily housing.
- **Clothes Washers:** High-efficiency ENERGY STAR washers use 4 gallons per cubic foot of laundry or less, compared to up to 15 gallons per cubic foot for conventional models. Approximately 50% of clothes washers in both single-family and multifamily housing are expected to remain conventional through 2045 under baseline conditions. Table 3-2 summarizes the projected distribution of clothes washers by efficiency class.

Table 3-2 provides a comprehensive breakdown of fixture and appliance stock, efficiency levels, and projected changes over the planning horizon. This table is essential for illustrating the remaining market potential for indoor water efficiency measures and guiding targeted conservation programs.

3.7 Nonresidential Indoor Water Efficiency Baseline Assessment

The CII sector encompasses a diverse range of customer types, each with unique water use characteristics. For this baseline assessment, NR service connections reported in the PSAR were used to estimate CII water demand and the remaining potential for indoor efficiency improvements.

The AWE Tracking Tool uses a statistical model to estimate nonresidential fixture counts based on the number of accounts and population served. While this provides a reasonable baseline for fixture distribution and passive efficiency trends, it does not capture the full variability across different facility types. Therefore, these estimates reflect overall baseline conditions and remaining potential for efficiency upgrades, rather than site-specific savings.

Table 3-2: Residential End Uses by Technological Efficiency Level

Class	End Use Technology	Mechanical Efficiency	Projections					2025-2045	
			2025	2030	2035	2040	2045	Change	% Change
SF	Toilets	Pre-ULFT	3,124	2,397	1,872	1,458	1,130	-1,994	-63.8%
		ULFT/HET	54,436	55,078	55,578	55,968	56,271	1,834	3.4%
		% Pre-ULFT	5.4%	4.2%	3.3%	2.5%	2.0%	-	-
SF	Showerheads	>2.5 gpm	390	230	136	80	47	-343	-87.8%
		(1.8, 2.5)	45,678	45,838	45,933	45,988	46,021	343	0.8%
		<=1.8 gpm	-	-	-	-	-	0	0.0%
		% >2.5 gpm	0.8%	0.5%	0.3%	0.2%	0.1%	-	-
SF	Clotheswashers	Conventional	17,931	17,839	17,782	17,747	17,725	-206	-1.1%
		High-Efficiency	17,446	17,538	17,595	17,631	17,653	206	1.2%
		% Conventional	50.7%	50.4%	50.3%	50.2%	50.1%	-	-
SF	Dishwashers	Conventional	6,937	5,476	4,504	3,895	3,526	-3,411	-49.2%
		High-Efficiency	26,579	28,040	29,012	29,621	29,990	3,411	12.8%
		% Conventional	20.7%	16.3%	13.4%	11.6%	10.5%	-	-
MF	Toilets	Pre-ULFT	1,000	790	624	493	390	-610	-61.0%
		ULFT	17,293	17,503	17,669	17,800	17,903	610	3.5%
		% Pre-ULFT	5.5%	4.3%	3.4%	2.7%	2.1%	-	-
MF	Showerheads	>2.5 gpm	151	89	53	31	18	-132	-87.8%
		(1.8, 2.5)	17,634	17,696	17,732	17,754	17,767	133	0.8%
		<=1.8 gpm	-	-	-	-	-	0	0.0%
		% >2.5 gpm	0.8%	0.5%	0.3%	0.2%	0.1%	-	-
MF	In-Unit Clotheswashers	Conventional	4,164	4,142	4,129	4,121	4,116	-48	-1.1%
		High-Efficiency	4,051	4,073	4,086	4,094	4,099	48	1.2%
		% Conventional	50.7%	50.4%	50.3%	50.2%	50.1%	-	-
MF	Shared Clotheswashers	Conventional	1,025	1,026	1,026	1,027	1,027	2	0.2%
		High-Efficiency	1,029	1,028	1,027	1,027	1,027	-2	-0.2%
		% Conventional	49.9%	50.0%	50.0%	50.0%	50.0%	-	-
MF	Dishwashers	Conventional	2,380	1,879	1,546	1,337	1,210	-1,170	-49.2%
		High-Efficiency	9,121	9,622	9,956	10,165	10,291	1,171	12.8%
		% Conventional	20.7%	16.3%	13.4%	11.6%	10.5%	-	-

3.7.1 Nonresidential Toilets and Urinals

Restroom fixtures, specifically toilets and urinals, are the most consistent and broadly applicable targets for indoor water efficiency improvements within the commercial, industrial, and institutional (CII) sector. These fixtures are present in nearly all nonresidential facility types, making them a central focus for baseline efficiency assessments. The AWE Tracking Tool estimates the distribution of nonresidential toilets and urinals by efficiency class, using assumptions about useful life and natural replacement rates. This allows for calculation of passive efficiency improvements and identification of the remaining stock of fixtures that do not meet current high-efficiency standards.

Table 3-3 presents the projected stock of CII toilets by efficiency class from 2025 through 2045. All nonresidential toilets are projected to be ultra-low flow toilets (ULFT) across the planning horizon.

Urinals show a different efficiency profile. The majority are assumed to operate at flow rates of 1.0 gpf or greater, with only a small share represented by ultra-low-flow or waterless models. Because urinals are less frequently replaced through passive turnover and often remain in service for extended periods, a substantial stock of higher-volume urinals remains across the CII sector. Identifying these remaining inventories of toilets and urinals establishes the foundation for evaluating nonresidential indoor conservation measures in subsequent sections of this plan.

Table 3-3: CII End Uses by Technological Efficiency Level

Class	End Use Technology	Mechanical Efficiency	Projections					2025-2045	
			2025	2030	2035	2040	2045	Change	% Change
CII	Toilets	Pre- ULFT	-	-	-	-	-	0	0.0%
		ULFT	11,820	11,820	11,820	11,820	11,820	0	0.0%
		% Pre-ULFT	0.0%	0.0%	0.0%	0.0%	0.0%	-	-
CII	Urinals	>=1 gpf	2,806	2,800	2,794	2,789	2,786	-21	-0.7%
		0.5 gpf	-	-	-	-	-	0	0.0%
		0.25 gpf	-	-	-	-	-	0	0.0%
		0.125 gpf	-	-	-	-	-	0	0.0%
		0 gpf	140	147	152	157	160	21	14.8%
		% >=1 gpf	95.3%	95.0%	94.8%	94.7%	94.6%	-	-

3.8 Landscape Irrigation Water Efficiency Baseline Assessment

Outdoor water use remains one of the largest opportunities for efficiency improvements in the single-family residential sector. Unlike indoor fixtures, landscape irrigation efficiency does not improve significantly through passive replacement, making outdoor use a critical focus for assessing remaining conservation potential.

Efficiency potential was evaluated by identifying single-family customers with irrigation systems and classifying them based on observed irrigation behavior relative to theoretical landscape water requirements. Customers were grouped as either average irrigators—those whose water use is at or below estimated landscape needs, or high irrigators, those who exceed these requirements. This distinction enables a more accurate assessment of where efficiency improvements are most needed.

Research by the WRWSA found that approximately 40% of single-family customers irrigate seasonally, while about 20% exhibit over-irrigation behaviors. These findings informed the assumptions used in this baseline assessment. The distribution of irrigator types is summarized in Table 3-4, and the estimated number of irrigators by category is presented in Table 3-5.

Potential improvements in landscape irrigation efficiency stem from practices and technologies such as irrigation system evaluations, smart controllers, high-efficiency nozzles, and rain or soil moisture sensors. While these measures are described in detail in Section 4, they are referenced here to define the achievable efficiency potential within the outdoor sector.

The baseline assessment indicates that the greatest remaining efficiency potential lies with high irrigators, where targeted measures can substantially reduce water use without risk of rebound. For average irrigators, program design must be carefully tailored to avoid unintended increases in water use, such as when automated controllers are provided to customers already irrigating below theoretical need.

Table 3-4: Percent Breakdown of Irrigator Types

Irrigator Type	% of Irrigators
% Total Irrigators	40%
% Total Non-Irrigators	60%
% Total High Irrigators	20%
% Total Low Irrigators	80%

Table 3-5: Distribution of Irrigators

Variable	2020	Projections					2025 - 2045	
		2025	2030	2035	2040	2045	Change	% Change
Total SF Homes	20,635	23,034	23,034	23,034	23,034	23,034	0	0.0%
Total SF Non-Irrigators	12,381	13,820	13,821	13,821	13,821	13,821	0	0.0%
Total SF Irrigators	8,254	9,214	9,214	9,214	9,214	9,214	0	0.0%
Total SF High Irrigators	1,651	1,843	1,843	1,843	1,843	1,843	0	0.0%
Total SF Low Irrigators	6,603	7,371	7,371	7,371	7,371	7,371	0	0.0%
New SF Irrigators	81	1,041	1,041	1,041	1,041	1,041	0	0.0%
New SF High Irrigators	16	208	208	208	208	208	0	0.0%
New SF Low Irrigators	65	833	833	833	833	833	0	0.0%
Existing SF Irrigators	8,173	8,173	8,173	8,173	8,173	8,173	0	0.0%
Existing SF High Irrigators	1,635	1,635	1,635	1,635	1,635	1,635	0	0.0%
Existing SF Low Irrigators	6,538	6,538	6,538	6,538	6,538	6,538	0	0.0%

4. Water Conservation Program Development

Water conservation program development is based on the baseline efficiency assessment and remaining market characterization presented in Section 3. The goal is to identify and evaluate a portfolio of technically feasible, locally relevant conservation measures for inclusion in planning scenarios. Measures are selected through a review of eligible fixtures, appliances, and irrigation practices, and are screened for technical applicability and cost-effectiveness. The AWE Tracking Tool is used to estimate water savings, costs, and program effectiveness, supporting prioritization and comparison with alternative supply options. Selected measures are then assembled into planning scenarios, with estimated savings and budget impacts evaluated for long-term implementation.

Water conservation program development is guided by a structured evaluation process. First, a baseline assessment identifies remaining opportunities for efficiency improvements. Potential measures, such as fixture and appliance upgrades, irrigation enhancements, and outreach, are reviewed for technical feasibility and cost-effectiveness. These measures are then assembled into program portfolios, which are evaluated using the AWE Tracking Tool to estimate water savings, costs, and overall effectiveness. This portfolio-based approach allows the utility to prioritize and implement a balanced mix of conservation strategies, ensuring both immediate and long-term demand reductions that can be compared with other alternative supply options.

The sections that follow describe the conservation measures considered (Section 4.1), followed by the assembly of those measures into planning scenarios and the resulting water savings and budget implications (Sections 4.2 through 4.4).

4.1 Water Conservation Measures

The conservation measures evaluated in this plan include a suite of indoor and outdoor water efficiency technologies and practices applicable primarily to the single-family residential sector. Measures were selected based on technical feasibility, documented performance, and alignment with the remaining efficiency potential identified in Section 3.

Table 4-1 summarizes the conservation measures evaluated, along with estimated unit costs, unit savings, and cost-effectiveness metrics. Although the AWE Tracking Tool includes 21 single-family program options, 18 measures were selected based on their applicability and potential to achieve meaningful savings.

Estimated water savings reflect the full useful life of each measure, with measure life and unit savings varying by technology and implementation approach. Cost-effectiveness metrics were developed to support program prioritization and comparison with alternative water supply options.

Each measure targets either indoor (e.g., toilets, clothes washers, showerheads, and aerators) or outdoor (e.g., irrigation evaluations, smart controllers, rain sensors, and landscape conversions) water use. Only a subset of measures was incorporated into the Tier 2 and Tier 3 planning scenarios, which are evaluated in subsequent sections.

Table 4-1: Portfolio of Conservation Programs and Unit Cost

Program Name & Category			Program Cost and Water Saving Parameters						
Program ID	Program Name	Units	Utility ($/unit)	Expected Savings (gpd/unit)	Life of Savings (Years)	Cost Effectiveness ($/1000 gal)	Utility Unit Cost ($/MG)	Utility Unit Benefit ($/MG)	Utility BCR
1	SFR HET Replacement	Toilet	$ 100	27.8	25	$ 0.39	$ 226.90	$ 2,289	$ 10.09
2	High User Irrigation Evaluation	Irrigation	$ 400	170.0	5	$ 1.29	$ 1,289.28	$ 2,289	$ 1.78
3	High User Irrigation Evaluation w/Enhancement	Irrigation	$ 450	197.0	5	$ 1.25	$ 1,251.65	$ 2,289	$ 1.83
4	High User Irrigation Evaluation w/WS Controller	Controller	$ 750	355.0	10	$ 0.58	$ 578.82	$ 2,289	$ 3.95
5	High User WS Labeled Irrigation Controller	Controller	$ 350	297.0	10	$ 0.32	$ 322.86	$ 2,289	$ 7.09
6	Average User WS Labeled Irrigation Controller	Controller	$ 100	121.0	10	$ 0.23	$ 226.46	$ 2,289	$ 10.11
7	SFR Irrigation Nozzle Replacement	Sprinkler Head	$ 100	32.0	10	$ 0.86	$ 856.16	$ 2,289	$ 2.67
8	Rain Sensor Replacement	Controller	$ 50	35.0	3	$ 1.30	$ 1,304.63	$ 2,289	$ 1.75
9	SFR Rain Barrel (< 200 gal) Rebate	Household	$ 50	1.7	5	$ 16.12	$ 16,116.04	$ 2,289	$ 0.14
10	SFR Washer Rebate (WF <=4)	Washer	$ 100	13.7	12	$ 1.67	$ 1,666.50	$ 2,289	$ 1.37
11	Florida Friendly Yard Incentive program	Landscapes	$ 725	133.0	25	$ 0.60	$ 597.38	$ 2,289	$ 3.83
12	Workshops	10 Households	$ 140	70.0	1	$ 5.48	$ 5,479.45	$ 2,289	$ 0.42
13	Public Service Announcements (PSAs)	Times Played	$ -	0.0	1	$ -		$ -	$ -
14	Exhibits	# Exhibits	$ -	0.0	1	$ -		$ -	$ -
15	Web page	#Hits	$ -	0.0	1	$ -		$ -	$ -
16	In-School Education	Students	$ -	0.0	1	$ -		$ -	$ -
17	WS Showerhead	Home	$ 10	2.4	10	$ 1.14	$ 1,141.55	$ 2,289	$ 2.00
18	WS Labeled Faucet Aerator	Household	$ 4	1.7	5	$ 1.13	$ 1,128.12	$ 2,289	$ 2.03
19	WS Labeled Kitchen Faucet Aerator	Household	$ 4	0.0	0	$ -		$ -	$ -
20	SFR Water Use Audit	Household	$ 125	33.9	5	$ 2.02	$ 3,005.31	$ 2,289	$ 0.76
21	SFR HET+ Replacement	Toilet	$ 50	8.0	25	$ 0.68	$ 171.23	$ 2,289	$ 13.37

4.1.1 SFR HET Replacement

Replaces existing low-efficiency toilets with high-efficiency toilets (HETs) rated at 1.28 gallons per flush (gpf) or less. Most commonly implemented through rebates, though vouchers, give-away, or direct installation approaches may also be used.

4.1.2 High User Irrigation Evaluation

Provides in-depth evaluations of high-use irrigation systems, including zone-by-zone inspection, adjustment of run cycles, and customer-specific recommendations. Participants also receive Florida-Friendly Landscaping guidance and educational materials to sustain savings.

4.1.3 High User Irrigation Evaluation with Enhancement

Expands the basic irrigation evaluation with on-site system upgrades such as installing ET sensors, replacing broken or mismatched sprinkler heads, capping unnecessary heads, and correcting alignment or pressure issues.

4.1.4 High User Irrigation Evaluation with WaterSense Controller

Adds installation of a WaterSense labeled ET controller to the irrigation evaluation, enabling irrigation schedules to automatically adjust to weather and evapotranspiration data.

4.1.5 High User WaterSense Labeled Irrigation Controller

Provides direct installation of a WaterSense labeled ET controller at targeted high-use locations, independent of a full irrigation evaluation.

4.1.6 Average User WaterSense Labeled Irrigation Controller

Offers WaterSense labeled ET controller installation to average-use households, broadening access to smart irrigation technology.

4.1.7 SFR Irrigation Nozzle Replacement

Replaces standard sprinkler nozzles with high-efficiency nozzles designed to reduce overspray, improve distribution uniformity, and lower wind drift. Programs typically provide ~20 nozzles per household via rebate, distribution, or direct install.

4.1.8 Rain Sensor Replacement

Provides new or replacement rain sensors that automatically shut off irrigation systems during rainfall events, preventing unnecessary outdoor water use.

4.1.9 SFR Rain Barrel (<200 gal) Rebate

Offers a rebate (typically $50) toward the purchase of a rain barrel (<200 gallons) or a small cistern (200–500 gallons) to capture rainwater for outdoor use and reduce potable irrigation demand.

4.1.10 SFR Washer Rebate (WF ≤4)

Replaces conventional washers (8–15 gallons/cubic foot of laundry) with high-efficiency Energy Star models using ≤4 gallons/cubic foot. Most effective for common-area washers in multifamily housing, which have higher daily use rates. Rebate levels vary by utility (e.g., $75 in Hernando County).

4.1.11 Florida Friendly Yard Incentive Program

Supports landscape conversions to Florida-Friendly or Florida Water Star standards, reducing long-term irrigation demand. Incentives are offered to all customers with potable irrigation. Savings vary by site but have been documented at ~130–140 gpd in regional studies.

4.1.12 Workshops

Provides customer education workshops on water-efficient practices, technologies, and outdoor savings techniques. Savings are modest but measurable; estimates assume ~10 households per workshop with ~3 gpd reduction per household.

4.1.13 Public Service Announcements (PSAs)

PSAs use media channels such as radio, television, social media, and digital advertising to inform and motivate customers about water conservation. These messages raise awareness of efficient practices, promote participation in rebate and retrofit programs, and reinforce conservation as a community value.

4.1.14 Exhibits

Exhibits consist of visual or interactive displays presented at community events, utility offices, libraries, or other public venues. They are designed to engage residents of all ages, demonstrate efficient technologies (e.g., WaterSense fixtures, smart irrigation controllers), and showcase the benefits of water conservation in a tangible, hands-on format.

4.1.15 Web Page

Utility conservation web pages provide customers with a centralized, accessible source of information. These sites typically include program descriptions, rebate forms, instructional videos, and efficiency calculators. Web resources extend outreach beyond in-person events and ensure customers have year-round access to tools that support efficient water use.

4.1.16 In-School Education

In-school programs bring water conservation concepts directly to students through classroom presentations, interactive activities, and curriculum support. Educating students not only builds long-term conservation awareness, but also extends influence into households as children share what they learn with their families.

4.1.17 WaterSense Showerhead

Replaces inefficient showerheads with WaterSense-labeled models rated at ≤1.8 gallons per minute (gpm). Typically implemented through direct installation or give-away kits, often bundled with other devices such as faucet aerators or leak detection tablets.

4.1.18 WaterSense Labeled Faucet Aerator

Adds or replaces aerators on bathroom faucets to achieve flows of ≤1.5 gpm. Commonly distributed as part of give-away kits or bundled with other low-cost water-saving devices.

4.1.19 WaterSense Labeled Kitchen Faucet Aerator

Installs kitchen faucet aerators to reduce flow to ≤2.2 gpm. Often distributed in efficiency kits alongside showerheads and bathroom aerators.

4.1.20 SFR Water Use Audit

Provides on-site residential water use surveys. Trained staff assess indoor and outdoor practices, recommend efficiency upgrades, and may install devices directly. Outdoor audits can include turf analysis, catch-can testing, and irrigation scheduling recommendations.

4.1.21 SFR HET+ Replacement

Enhances the traditional toilet rebate program by replacing 1.6 gpf ultra-low flush toilets (ULFTs) with high-efficiency toilets (HET+) rated at ≤1.1 gpf. Targeted once the stock of higher-flush toilets has been largely retired.

4.1.22 Education and Outreach Programs

While outreach and educational initiatives do not have directly quantified savings rates in the AWE Tracking Tool, they are included in the portfolio because they play an important supporting role. These efforts increase public awareness, encourage participation in rebate and retrofit programs, and help sustain water-saving behaviors over time. Recognizing their influence, these measures are presented below as complementary strategies, even though no standalone water savings are assigned to them in this analysis.

4.2 Conservation Planning Scenarios

To evaluate the role of conservation as part of the long-term water supply strategy, the conservation measures described in Section 4.1 were assembled into a set of planning scenarios representing increasing levels of program intensity and investment. These scenarios are not intended to prescribe implementation schedules or funding commitments; rather, they are designed to bound the range of achievable water savings and associated costs under different programmatic approaches.

Each scenario builds upon the baseline efficiency conditions and remaining eligible fixtures, appliances, and irrigation practices identified in Section 3. Measures were selected based on technical feasibility, alignment with remaining efficiency potential, and relative cost-effectiveness as estimated using the AWE Tracking Tool.

The conservation scenarios are structured to:

- Distinguish between passive efficiency gains and active program-driven savings
- Reflect differing levels of program effort and participation
- Support comparison of conservation outcomes with alternative water supply options

The three conservation planning scenarios evaluated are described below.

- **Tier 1 – Passive Efficiency (Low):** Tier 1 reflects only passive conservation achieved through the natural replacement of fixtures and appliances as they reach the end of their useful life. No active conservation programs are assumed under this scenario. Savings result from ongoing market-driven adoption of more efficient technologies and provide a baseline reference for evaluating the incremental benefits of active conservation.

- **Tier 2 – Targeted Active Conservation (Medium):** Tier 2 builds upon passive efficiency by incorporating a focused portfolio of active conservation programs. Measures included in this scenario reflect technologies and practices judged to be locally applicable, cost-effective, and feasible to implement at moderate participation levels. Tier 2 represents a pragmatic level of conservation that could reasonably be achieved through sustained program implementation under typical utility staffing and budget conditions.

- **Tier 3 – Expanded Conservation (High / Regional):** Tier 3 expands upon Tier 2 by applying a broader mix of conservation measures at higher participation rates. This scenario illustrates the upper range of water savings that could be achieved through more aggressive and coordinated conservation efforts. Tier 3 emphasizes diversification across both indoor and outdoor measures to reduce reliance on any single program and improve long-term resilience of conservation savings.

Together, these scenarios provide a structured framework for evaluating conservation as a planning resource, illustrating how varying levels of program investment and participation influence long-term water demand outcomes. The resulting water savings and associated costs are presented in the following sections and are used to assess conservation as a flexible and cost-effective strategy for managing long-term demand.

4.3 Scenario Assumptions and Program Penetration

Active conservation scenarios were developed by applying planning-level participation rates to the remaining eligible fixtures, appliances, and irrigation systems identified in Section 3. Participation rates were selected to reflect realistic implementation levels consistent with cost-effectiveness thresholds and anticipated program capacity over the 2025–2045 planning horizon.

Table 4-2 summarizes the eligible measures and assumed penetration rates for Tier 2 and Tier 3 scenarios. Penetration rates were intentionally set below the total remaining market potential to reflect conservative planning assumptions rather than maximum achievable uptake.

To estimate annual program activity, the total number of assumed program participants was evenly distributed across the planning horizon. Table 4-3 presents the resulting average annual interventions by measure for Tier 2 and Tier 3. This approach avoids front-loading savings and provides a stable representation of long-term program implementation.

4.4 Water Demand and Conservation Savings Results

Projected water savings and demand under each conservation scenario is summarized in Table 4-4. Under baseline conditions, potable water demand is projected to remain constant at 13.2 MGD from 2025 to 2045.

- Under Tier 1, which reflects passive efficiency only, projected demand reaches 12.8 MGD by 2045, reducing demand growth by approximately 0.5 MGD relative to baseline.
- Under Tier 2, which incorporates passive efficiency plus a moderate level of active conservation, projected demand is reduced to 12.6 MGD by 2045, or 0.7 MGD below baseline.
- Under Tier 3, which assumes higher participation across selected conservation measures, projected demand declines further to 12.3 MGD by 2045, representing a 0.9 MGD reduction relative to baseline.

These results demonstrate that progressively higher levels of conservation investment yield increasing reductions in long-term demand.

4.5 Distribution of Savings Across Measures

Across all active conservation scenarios, outdoor measures account for a substantial share of total water savings, particularly in scenarios that emphasize irrigation efficiency for high-use customers. Indoor savings are driven primarily by toilet and clothes washer replacements, with additional contributions from showerheads, aerators, and audits. Indoor conservation measures tend to produce savings that are more predictable, less sensitive to behavioral variability, and more uniformly realized across customer classes. Outdoor measures, while inherently more variable, provide larger per-participant savings, greater opportunity to address seasonal and peak demand, and meaningful reductions in discretionary water use. Together, these characteristics underscore the importance of maintaining a balanced portfolio of indoor and outdoor conservation measures.

Table 4-2: Conservation Program Eligible Measures and Penetration Rates

Program Name	Units	Eligible Measures (2045)	Tier 2 Penetration Rate	Tier 3 Penetration Rate
SFR HET Replacement	Toilet	8,374	12%	15%
High User Irrigation Evaluation	Irrigation	1,843	68%	68%
High User Irrigation Evaluation w/Enhancement	Irrigation	1,843	15%	15%
High User Irrigation Evaluation w/WS Controller	Controller	1,843	15%	15%
High User WS Labeled Irrigation Controller	Controller	1,843	40%	40%
Average User WS Labeled Irrigation Controller	Controller	7,371	25%	25%
SFR Irrigation Nozzle Replacement	Sprinkler Head	8,289	25%	25%
Rain Sensor Replacement	Controller	8,289	25%	25%
SFR Rain Barrel (< 200 gal) Rebate	Household	8,289	1%	1%
SFR Washer Rebate (WF <=4)	Washer	8,374	5%	5%
Florida Friendly Yard Incentive program	Landscapes	8,374	1%	1%
Workshops	10 Households	8,289	1%	1%
PSA	Times Played	23,034	1%	1%
Exhibits	# Exhibits	23,034	2%	2%
Web page	# Hits	23,034	0%	0%
In-School Education	Students	23,034	3%	3%
WaterSense Showerhead	Home	23,034	0%	3%
WS Labeled Faucet Aerator	Household	44,867	1%	9%
WS Labeled Kitchen Faucet Aerator	Household	44,867	0%	0%
SFR Water Use Audit	Household	23,034	0%	0%
SFR HET+ Replacement	Toilet	23,034	0%	15%

Table 4-3: Tier 2 and Tier 3 Annual Planned Measures

Program Name	Tier 2					Tier 3				
	2025	2030	2035	2040	2045	2025	2030	2035	2040	2045
SFR HET Replacement	25	5	5	5	5	25	25	25	25	25
High User Irrigation Evaluation	24	60	60	60	60	24	60	60	60	60
High User Irrigation Evaluation w/Enhancement	-	-	-	-	-	13	13	13	13	13
High User Irrigation Evaluation w/WS Controller	5	5	5	5	5	5	13	13	13	13
High User WS Labeled Irrigation Controller	25	35	35	35	35	25	35	35	35	35
Average User WS Labeled Irrigation Controller	-	-	-	-	-	88	88	88	88	88
SFR Irrigation Nozzle Replacement	-	-	-	-	-	99	99	99	99	99
Rain Sensor Replacement	20	40	40	40	40	20	40	99	99	99
SFR Rain Barrel (< 200 gal) Rebate	-	-	-	-	-	4	4	4	4	4
SFR Washer Rebate (WF <=4)	-	-	-	-	-	10	10	10	10	10
Florida Friendly Yard Incentive program	-	-	-	-	-	4	4	4	4	4
Workshops	12	15	15	15	15	12	15	15	15	15
PSA	8	8	8	8	8	8	8	8	8	8
Exhibits	18	18	18	18	18	18	18	18	18	18
Web page	5	5	5	5	5	5	5	5	5	5
In-School Education	25	35	35	35	35	25	35	35	35	35
WaterSense Showerhead	-	-	-	-	-	-	-	-	-	-
WS Labeled Faucet Aerator	30	30	30	30	30	30	30	30	30	30
WS Labeled Kitchen Faucet Aerator	-	-	-	-	-	-	-	-	-	-
Water Use Audits	-	-	-	-	-	-	-	-	-	-
SFR HET+ Replacement	-	-	-	-	-	328	328	328	328	328

Table 4-4: Annual Water Demand Projections

Unit	Variable	2020	2025	2030	2035	2040	2045	2025-2045	
								Change	% Change
Water Demand (MGD)	Baseline	11.7	13.2	13.2	13.2	13.2	13.2	0.0	0.0%
	Tier 1	11.7	12.9	12.9	12.8	12.8	12.8	-0.2	-1.3%
	Tier 2	11.7	12.9	12.7	12.6	12.6	12.6	-0.3	-2.6%
	Tier 3	11.7	12.9	12.6	12.4	12.3	12.3	-0.6	-4.5%
Demand Reduction (MGD)	Baseline	-	-	-	-	-	-	-	-
	Tier 1	-	0.3	0.4	0.4	0.4	0.5	0.2	56%
	Tier 2	-	0.3	0.5	0.6	0.6	0.7	0.3	106%
	Tier 3	-	0.3	0.6	0.8	0.9	0.9	0.6	170%
% Reduction	Baseline	-	-	-	-	-	-	-	-
	Tier 1	-	2.3%	2.8%	3.1%	3.4%	3.6%	1.3%	56%
	Tier 2	-	2.4%	3.7%	4.5%	4.8%	4.9%	2.5%	106%
	Tier 3	-	2.6%	4.8%	6.3%	6.6%	6.9%	4.4%	170%
GPCD	Baseline	179	182	182	182	182	182	0	0.0%
	Tier 1	179	178	177	176	176	176	-2	-1.3%
	Tier 2	179	178	175	174	173	173	-5	-2.6%
	Tier 3	179	178	174	171	170	170	-8	-4.5%
GPCD Reduction	Baseline	-	-	-	-	-	-	-	-
	Tier 1	-	4.2	5.1	5.7	6.2	6.5	2.3	56%
	Tier 2	-	4.4	6.8	8.2	8.7	9.0	4.6	106%
	Tier 3	-	4.7	8.7	11.4	12.1	12.6	7.9	170%

The distribution of savings differs notably between conservation scenarios. In Tier 2, irrigation controller programs dominate, accounting for more than 55 percent of total savings. While this reflects the strong performance of smart irrigation technologies, it also indicates a portfolio that is heavily reliant on a single measure type. In Tier 3, conservation savings are distributed more evenly across a broader range of measures. Irrigation controllers remain an important contributor; however, substantial additional savings are achieved through high-efficiency (HET+) toilet replacements and irrigation nozzle upgrades. This broader distribution reduces reliance on any single technology and improves the robustness of the conservation portfolio if participation in individual programs falls short of expectations.

Table 4-5 summarizes cumulative water savings by program for Tier 2 and Tier 3 and illustrates how expanded participation and a more diverse measure mix contribute to higher overall savings and a more balanced distribution of conservation benefits.

4.6 Annual Budget Estimates

Estimated annual program costs for Tier 2 and Tier 3 are summarized in Table 4-6. For most measures, unit costs are assumed to remain constant over the planning horizon. Tier 2 achieves moderate demand reductions at relatively low annual cost but concentrates expenditures in a small number of measures. Tier 3 requires higher annual investment but produces over twice the cumulative savings while distributing costs across a broader suite of programs.

Table 4-5: Tier 2 and Tier 3 Cumulative Program Water Savings Estimates (MGY)

Program Name	Tier 2							Tier 3						
	2025	2030	2035	2040	2045	Million Gallons Saved (2025-2045)	Total Distribution	2025	2030	2035	2040	2045	Million Gallons Saved (2025-2045)	Total Distribution
SFR HET Replacement	0.25	1.01	1.12	1.21	1.30	22	2.0%	0.25	1.41	2.42	3.30	4.07	49	1.9%
High User Irrigation Evaluation	1.49	16.38	18.62	18.62	18.62	331	29.7%	1.49	16.38	18.62	18.62	18.62	331	13.1%
High User Irrigation Evaluation w/Enhancement	-	-	-	-	-	-	-	0.93	4.67	4.67	4.67	4.67	89	3.5%
High User Irrigation Evaluation w/WS Controller	0.65	3.89	6.48	6.48	6.48	107	9.6%	0.65	9.07	16.84	16.84	16.84	268	10.6%
High User WS Labeled Irrigation Controller	2.71	21.68	37.94	37.94	37.94	615	55.2%	2.71	21.68	37.94	37.94	37.94	615	24.3%
Average User WS Labeled Irrigation Controller	-	-	-	-	-	-	-	3.89	23.32	38.86	38.86	38.86	641	25.3%
SFR Irrigation Nozzle Replacement	-	-	-	-	-	-	-	1.16	6.94	11.56	11.56	11.56	191	7.5%
Rain Sensor Replacement	0.26	1.53	1.53	1.53	1.53	29	2.6%	0.26	1.53	3.79	3.79	3.79	61	2.4%
SFR Rain Barrel (< 200 gal) Rebate	-	-	-	-	-	-	-	0.00	0.01	0.01	0.01	0.01	0	0.0%
SFR Washer Rebate (WF <=4)	-	-	-	-	-	-	-	0.05	0.30	0.55	0.60	0.60	9	0.4%
Florida Friendly Yard Incentive program	-	-	-	-	-	-	-	0.19	1.17	2.14	3.11	4.08	45	1.8%
Workshops	0.31	0.38	0.38	0.38	0.38	8	0.7%	0.31	0.38	0.38	0.38	0.38	8	0.3%
PSA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exhibits	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Web page	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In-School Education	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WaterSense Showerhead	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WS Labeled Faucet Aerator	0.02	0.09	0.09	0.09	0.09	2	0.2%	0.02	0.09	0.09	0.09	0.09	2	0.1%
WS Labeled Kitchen Faucet Aerator	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Use Audits	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SFR HET+ Replacement	-	-	-	-	-	-	-	0.96	5.75	10.54	15.32	20.11	221	8.7%
Total	5.7	45.0	66.2	66.3	66.3	1114	100%	12.9	92.7	148.4	155.1	161.6	2530	100%

Table 4-6: Tier 2 and Tier 3 Conservation Plan Estimated Annual Budget

Program Name	Tier 2			Tier 3		
	Annual Budget[1]	Total Expenditures (2025-2045)	Distribution Within Utility (2025-2045)	Annual Budget Error! Bookmark not defined.	Total Expenditures (2025-2045)	Distribution Within Utility (2025-2045)
SFR HET Replacement	$500	$18,500	2.0%	$2,500	$52,500	2.6%
High User Irrigation Evaluation	$24,000	$475,200	52.1%	$24,000	$475,200	23.1%
High User Irrigation Evaluation w/Enhancement	-	-	-	$5,850	$122,850	6.0%
High User Irrigation Evaluation w/WS Controller	$3,750	$78,750	8.6%	$9,750	$198,750	9.7%
High User WS Labeled Irrigation Controller	$12,250	$253,750	27.8%	$12,250	$253,750	12.3%
Average User WS Labeled Irrigation Controller	-	-	-	$8,800	$184,800	9.0%
SFR Irrigation Nozzle Replacement	-	-	-	$9,900	$207,900	10.1%
Rain Sensor Replacement	$2,000	$40,000	4.4%	$4,950	$84,250	4.1%
SFR Rain Barrel (< 200 gal) Rebate	-	-	-	$200	$4,200	0.2%
SFR Washer Rebate (WF <=4)	-	-	-	$1,000	$21,000	1.0%
Florida Friendly Yard Incentive program	-	-	-	$2,900	$60,900	3.0%
Workshops	$2,100	$43,260	4.7%	$2,100	$43,260	2.1%
PSA	-	-	-	-	-	-
Exhibits	-	-	-	-	-	-
Web page	-	-	-	-	-	-
In-School Education	-	-	-	-	-	-
WaterSense Showerhead	-	-	-	-	-	-
WS Labeled Faucet Aerator	$105	$2,205	0.2%	$105	$2,205	0.1%
WS Labeled Kitchen Faucet Aerator	-	-	-	-	-	-
Water Use Audits	-	-	-	-	-	-
SFR HET+ Replacement	-	-	-	$16,400	$344,400	16.8%
Total	$44,705	$911,665	100%	$100,705	$2,055,965	100%

[1] The annual budget column references the 2045 annual budget values. The annual budget for Tier 2 and Tier 3 is the same for every year, with some exceptions between 2025 and 2028. The programs and the costs that differ from the 2045 annual budget are listed below:

- SFR HET Replacement: Tier 2: $2,500 in 2025-2028.
- High User Irrigation Evaluation: Tier 2: $9,600 in 2025, $14,400 in 2026, $19,200 in 2027. Tier 3: $9,600 in 2025, $14,400 in 2026, $19,200 in 2027.
- High User Irrigation Evaluation w/WS Controller: Tier 3: $3,750 in 2025.
- High User WS Labeled Irrigation Controller: Tier 3: $8,750 in 2025.
- Rain Sensor Replacement: Tier 2: $1,000 in 2025, $1,500 in 2026-2027. Tier 3: $1,000 in 2025, $1,500 in 2026-2027.
- Workshops: Tier 2: $1,680 in 2025-2026. Tier 3: $1,680 in 2025-2026.

5. Summary and Conclusions

This Water Conservation Plan evaluates the role of conservation in supporting long-term water supply sustainability for the City of Ocala through a planning-level assessment of baseline efficiency, remaining conservation potential, and achievable water savings under varying program scenarios.

Baseline projections indicate that absent additional conservation efforts, potable water demand is expected to increase substantially through 2045. Passive efficiency improvements associated with natural replacement of fixtures and appliances (Tier 1) modestly reduce this growth but are insufficient on their own to offset projected increases in demand. As a result, active conservation programs play a critical role in managing future water needs.

The conservation planning scenarios evaluated in this plan demonstrate that meaningful demand reductions can be achieved through targeted, cost-effective measures. Tier 2 represents a moderate level of active conservation focused on high-performing measures, particularly irrigation efficiency technologies. This scenario provides a pragmatic and scalable level of demand reduction achievable under typical programmatic and budgetary conditions, though savings are concentrated in a limited number of measures.

The Tier 3 scenario illustrates the upper range of achievable conservation savings through higher participation and a more diversified program portfolio. While requiring greater overall investment, Tier 3 produces larger and more reliable long-term demand reductions by distributing savings across a broader mix of indoor and outdoor measures, including irrigation controllers, high-efficiency toilet replacements, irrigation nozzle upgrades, and landscape conversions. This diversification reduces reliance on any single measure and enhances the robustness of conservation as a planning resource.

Across scenarios, outdoor measures account for a substantial share of total savings, particularly those targeting high irrigation users and seasonal demand. Indoor measures provide more predictable and consistent savings that complement outdoor programs and contribute to long-term baseline efficiency improvements. Together, these measures form a balanced conservation portfolio capable of addressing both average and peak demand drivers.

From a water supply planning perspective, conservation offers several advantages relative to traditional supply-side options. Conservation savings can be phased over time, scaled to available funding, and adjusted as demand conditions evolve. When evaluated on a cost-per-gallon basis, many conservation measures compare favorably with alternative water supply options and can reduce or defer the need for future capital-intensive supply projects.

In summary, this analysis demonstrates that conservation can offset a substantial portion of the City of Ocala's projected demand growth through 2045. Tier 2 represents a reasonable baseline level of conservation achievable through targeted program implementation, while Tier 3 highlights the broader potential available through sustained and diversified investment. Together, these scenarios support the inclusion of conservation as a core component of long-term water supply planning and provide a consistent analytical foundation for coordination with the WRWSA Regional Water Supply Plan.

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Hernando County Utilities Conservation Plan

December 2025

Table of Contents

List of Tables

List of Acronyms

Abbreviation	Definition
AWE	Alliance for Water Efficiency
CII	Commercial, Industrial, and Institutional
CPC	Conservation Planning Committee
EPAct	U.S. Energy Policy Act of 1992
ET	Evapotranspiration
gpd	Gallons per Day
gpf	Gallons per Flush
gpm	Gallons per Minute
HE	High Efficiency
HET	High Efficiency Toilet
HET+	Ultra High Efficiency Toilet
HEU	High Efficiency Urinal
MGD	Million Gallons per Day
MGY	Million Gallons per Year
MF	Multifamily
NR	Nonresidential
PSAR	Public Supply Annual Report
RWSP	Regional Water Supply Plan
SF	Single-Family
SWFWMD	Southwest Florida Water Management District
ULFT	Ultra-Low Flow Toilet
WF	Water Factor
WRWSA	Withlacoochee Regional Water Supply Authority
WS	WaterSense

1. Introduction

This Conservation Plan was developed to identify cost-effective strategies for reducing water demand through 2045, supporting long-term water supply sustainability for Hernando County Utilities. Conservation is essential for extending existing water sources, reducing peak demand, and deferring or avoiding costly new supply projects. The plan was prepared as part of the Withlacoochee Regional Water Supply Authority (WRWSA) 2025 Regional Water Supply Plan (RWSP), funded through a cooperative funding agreement between WRWSA and the Southwest Florida Water Management District (SWFWMD). While supporting regional planning efforts, this document also serves as a stand-alone plan for Hernando County Utilities.

The plan was developed collaboratively with the WRWSA Conservation Planning Committee, which included representatives from Citrus, Hernando, and Marion Counties, the City of Ocala, and The Villages. This collaborative approach ensures regional consistency while allowing each utility to tailor programs to local needs and priorities.

A wide range of residential and nonresidential water efficiency measures was evaluated, including fixture and appliance upgrades, irrigation improvements, landscape practices, system evaluations, and education/outreach initiatives. Programs were selected based on local relevance, expected water savings, feasibility, and cost-effectiveness.

Water savings potential was assessed using three scenarios:

- Tier 1 (Low): Passive conservation from natural replacement of fixtures, new construction standards, and market-driven adoption of efficient technologies.
- Tier 2 (Medium): Passive efficiency plus a targeted portfolio of active conservation programs, reflecting a practical and achievable level of effort.
- Tier 3 (High/Regional): Expanded conservation with higher participation and broader regional application, illustrating the upper bound of achievable savings.

These tiered scenarios provide a transparent framework for evaluating conservation potential and integrating savings into demand projections and regional planning. The Alliance for Water Efficiency (AWE) Tracking Tool was used to estimate baseline water use, remaining efficiency potential, program-level savings, and costs, with local data incorporated where available.

Overall, this plan supports Hernando County Utilities' long-term water supply planning by identifying feasible, cost-effective conservation strategies. These efforts help defer capital-intensive supply projects, reduce long-term costs, and ensure reliable service for current and future customers, while supporting compliance with regulatory requirements.

2. Baseline Housing, Population, and Water Demand

Establishing baseline housing, population, and water demand conditions provides the foundation for evaluating conservation potential and understanding how future demands are expected to evolve in the absence of additional conservation efforts. These baseline conditions represent the reference case against which conservation savings are measured and are critical for assessing how conservation influences long-term water supply planning. For Hernando County Utilities, baseline conditions were developed by evaluating population, housing units, service connections, and water demand across primary customer classes. This assessment supports both utility-level conservation planning and integration of conservation results into regional demand projections used in the WRWSA 2025 Regional Water Supply Plan.

2.1 Customer Classes and Demand Composition

Water demand is analyzed across three primary customer classes: Single-Family (SF), Multifamily (MF), and Commercial, Industrial, and Institutional (CII). Each class has distinct water use characteristics, end-use profiles, and conservation opportunities. By disaggregating demand in this way, conservation potential can be evaluated more precisely, supporting the development of targeted and cost-effective programs. Single-family residential customers account for the largest share of total water demand and exhibit the greatest seasonal variability due to outdoor irrigation. In contrast, multifamily demand is primarily driven by indoor water use and is typically less seasonal. CII demand is diverse, reflecting a range of operational drivers and conservation opportunities depending on facility type.

2.2 Baseline Data Sources and Methodology

Baseline demand projections for Hernando County Utilities were developed using data from the 2022 Public Supply Annual Report (PSAR) for Permit Number 5789 (Hernando County Water System). These data established the foundation for evaluating conservation potential, with demand across single-family, multifamily, and commercial/industrial/institutional classes assumed to represent total retail sales. Population and housing forecasts align with the WRWSA Regional Water Supply Plan, and baseline projections reflect average annual conditions, incorporating only passive efficiency improvements such as fixture replacement and updated plumbing codes. The Alliance for Water Efficiency (AWE) Tracking Tool was calibrated with utility-specific data to ensure consistency between observed water use and modeled end-use distributions.

2.3 Baseline Growth and Demand Trends

Table 2-1 presents the historical and projected baseline inputs used in the AWE Tracking Tool, including population, dwelling units, service connections, and water demand by customer class over the 2025–2045 planning horizon. As shown, baseline projections indicate continued growth across all major planning inputs, with the most significant increases occurring in the single-family residential sector. The concentration of growth within single-family development has important implications for future water demand due to the associated contribution of outdoor irrigation.

Key observations include:

- Population Growth: Total population served is projected to grow by about 49.7% (83,517 people) between 2025 and 2045, with nearly all of this growth occurring in the single-family sector (94% of total).
- Housing Growth: Dwelling units are projected to increase by 33,789 (49.7%) over the same period, again dominated by single-family development.
- Service Connections: Total connections increase by about 33,952 (49.7%), with SF customers comprising nearly 96% of the growth.
- Water Demand: Total water sales are projected to increase from 20.77 MGD in 2025 to 31.68 MGD in 2045, an increase of 10.91 MGD (52.5%). Single-family customers account for 73.7% of this growth, with CII customers contributing another 16.4%.

These projections establish the baseline conditions against which conservation savings are measured and highlight the extent to which residential growth, particularly single-family development, drives future demand. Even with embedded passive efficiency improvements, projected demand increases underscore the importance of active conservation programs in moderating long-term water use and reducing the timing and magnitude of future supply needs.

2.4 Seasonal and End-Use Considerations

Baseline water demand shows seasonal variability, with outdoor irrigation in single-family homes driving peak demand during dry periods. Indoor residential use remains steady year-round, influenced by household size, fixture efficiency, and occupancy. Commercial, industrial, and institutional water use varies due to diverse operational needs. Recognizing these patterns is key for conservation planning: indoor measures manage annual demand, while outdoor programs reduce seasonal peaks. Addressing both is vital, as peak demand affects system capacity and future supply investments.

2.5 Role of the Baseline in Conservation Evaluation

The baseline conditions described in this section represent the reference case against which conservation savings are evaluated in subsequent sections of this plan. Conservation scenarios build upon these baseline projections by incorporating both passive and active efficiency improvements to estimate conservation-adjusted demands. By establishing a clear and consistent baseline, this plan ensures that conservation savings reflect true reductions relative to expected future conditions rather than reductions relative to historical use alone. This approach supports transparent evaluation of conservation benefits and facilitates integration of utility-level conservation results into regional water supply planning and avoided-cost analyses.

Table 2-1: Historical and Projected AWE Tracking Tool Inputs

Input	Class	Historical Observations		Projections					2025-2045		
		1990	2020	2025	2030	2035	2040	2045	Change	% Change	% of Change within Utility
Population	SF	75,137	141,219	157,726	177,512	199,067	218,485	236,177	78,451	49.7%	93.9%
	MF	4,558	9,119	10,185	11,463	12,854	14,108	15,251	5,066	49.7%	6.1%
	Total	79,989	150,338	167,911	188,975	211,921	232,593	251,428	83,517	49.7%	100.0%
Dwelling Units	SF	30,417	57,169	63,851	71,861	80,587	88,448	95,610	31,759	49.7%	94.0%
	MF	1,827	3,655	4,082	4,594	5,152	5,654	6,112	2,030	49.7%	6.0%
	Total	32,244	60,824	67,933	76,455	85,739	94,102	101,722	33,789	49.7%	100.0%
Connections	SF	31,198	58,636	65,490	73,705	82,655	90,717	98,063	32,574	49.7%	95.9%
	MF	48	97	108	121	136	149	161	54	49.7%	0.2%
	CII Mixed Meter	1,268	2,384	2,662	2,996	3,360	3,688	3,986	1,324	49.7%	3.9%
	Total	32,514	61,116	68,260	76,823	86,151	94,554	102,211	33,952	49.7%	100.0%
Water Sales	SF		14.55	15.31	17.81	19.86	21.69	23.35	8.04	52.5%	73.7%
	MF		0.02	0.03	0.03	0.03	0.04	0.04	0.01	52.5%	0.1%
	CII Mixed Meter		3.25	3.42	3.97	4.43	4.84	5.21	1.79	52.5%	16.4%
	UAW		1.92	2.02	2.35	2.62	2.86	3.08	1.06	52.5%	9.7%
	Total		19.74	20.77	24.16	26.94	29.43	31.68	10.91	52.5%	100%

3. Evaluation of Conservation Potential

Conservation potential is assessed by first establishing baseline water efficiency and then identifying opportunities for additional active conservation programs. Water savings result from both passive efficiency improvements, such as natural fixture replacement and regulatory standards and active utility-driven initiatives that further reduce demand. Differentiating these sources is essential for producing accurate and defensible estimates of conservation potential. By evaluating conservation relative to projected future baseline conditions, rather than historical use, the analysis ensures that estimated savings reflect true incremental reductions and avoids overstating the benefits of active programs.

3.1 Passive and Active Conservation Framework

Water efficiency improvements occur through both passive and active mechanisms.

- **Passive conservation** represents efficiency gains that occur without direct programmatic intervention. These gains are driven by plumbing codes and standards, market transformation, and the natural replacement of fixtures and appliances as they reach the end of their useful life. Passive efficiency improvements are most strongly associated with indoor water use, where fixture turnover steadily shifts the installed stock toward higher efficiency over time.

- **Active conservation** represents additional efficiency gains achieved through conservation programs designed to accelerate replacement of inefficient fixtures, influence customer behavior, or address water uses not typically affected by passive replacement. Active programs may include rebates, direct-install programs, irrigation system evaluations, landscape incentives, and education and outreach initiatives.

Separating passive and active conservation is essential for identifying the remaining market available for active water efficiency programs and for ensuring that conservation savings are incremental and not double-counted.

3.2 Establishing Baseline Water Efficiency

The baseline water efficiency assessment determines current and projected levels of technological efficiency before active conservation programs are implemented. This process quantifies passive efficiency improvements already reflected in baseline demand projections and identifies the remaining fixtures, appliances, and practices eligible for active conservation efforts.

The AWE Tracking Tool, a Microsoft Excel–based planning model, serves as the primary instrument for estimating baseline efficiency, passive water savings, and the cost-effectiveness of water-saving measures. The tool incorporates stock models for single-family, multifamily, and commercial, industrial, and institutional customer classes, estimating the distribution of key fixtures and appliances across various efficiency levels over time.

Fixtures and appliances evaluated include toilets, urinals, clothes washers (in-unit and shared), showerheads, faucet aerators, and dishwashers. The tool projects water savings from passive replacement as older, less efficient models are replaced with products that meet or exceed current standards.

The remaining inventory of conventional and standard efficiency fixtures after passive replacement establishes the starting point for estimating active conservation potential. This potential is defined by the portion of the remaining stock that could reasonably be replaced through utility-sponsored programs, considering usage intensity. The estimation of active program savings is addressed in subsequent sections of the plan.

3.3 End-Use Technology Efficiency Levels

End-use technologies evaluated in the baseline assessment are grouped into three general efficiency levels:

- **Non-conserving (conventional):** Typically the least efficient fixtures and appliances, most commonly found in homes and businesses constructed prior to 1994.
- **Conserving (standard):** Fixtures and appliances that meet minimum plumbing code or appliance efficiency standards.
- **Ultra-conserving (high-efficiency):** Fixtures and appliances that exceed minimum efficiency standards, often carrying the U.S. Environmental Protection Agency (EPA) WaterSense label.

The U.S. Energy Policy Act of 1992 (EPAct) was a pivotal milestone in advancing water efficiency, introducing maximum flow standards for toilets, faucets, and showerheads, as well as efficiency requirements for nonresidential plumbing fixtures. EPAct also set energy efficiency standards for appliances such as water heaters and air conditioners, which helped reduce water use in energy-intensive systems like cooling towers. Since its enactment, manufacturers have consistently developed products that meet or exceed these federal standards. The EPA WaterSense program has further accelerated market transformation by certifying ultra-efficient fixtures that maintain performance while using less water. Consequently, the market has steadily shifted toward higher-efficiency technologies for both fixtures and appliances.

3.4 Passive Replacement and Useful Life Assumptions

As fixtures and appliances reach the end of their useful life, they are assumed to be replaced with products that meet prevailing efficiency standards. This process drives passive efficiency improvements embedded in baseline demand projections.

Each fixture and appliance type is assigned an expected useful life, which is used to estimate an annual natural replacement rate (NRR) according to Equation 3-1:

Equation 3-1:

$$nrr = \frac{1}{Expected\ Life\ in\ Years}$$

Fixtures subject to natural replacement assumptions include toilets, urinals, clothes washers, and dishwashers. In contrast, outdoor irrigation measures and many CII technologies (e.g., cooling towers) are not typically subject to natural replacement and therefore do not exhibit significant passive efficiency improvements over time. Accounting for passive replacement is essential for avoiding overestimation of conservation potential and for isolating the remaining market that can be addressed through active conservation programs.

3.5 Data Sources and Local Calibration

Baseline efficiency estimates were developed using utility-reported data from the 2022 Public Supply Annual Report (PSAR), including service connections, population, and water demand by customer class. These data were integrated with AWE Tracking Tool stock distributions and useful-life parameters, with local information incorporated where available to accurately reflect service-area conditions. For historical demand estimates dating back to 1990, a parcel-level dataset from SWFWMD, containing year-built and land use classification, was used to assign historical population to single-family and multifamily customer classes. This approach ensured consistency between historical housing stock, population estimates, and the reporting categories used in both the PSAR and the AWE Tracking Tool. By aligning historical development patterns with modeled efficiency trends, the baseline assessment provides a robust foundation for identifying remaining conservation potential and guiding program development.

3.6 Residential Indoor Water Efficiency Baseline Assessment

Residential water use and efficiency are influenced by location-specific factors such as housing age, number of occupants, household income, and outdoor features like pools or automated irrigation systems. Housing age is especially significant, as older homes tend to have less efficient fixtures and appliances, while newer homes typically incorporate higher-efficiency technologies. The presence of automated irrigation systems also correlates with housing age and can substantially impact outdoor water use.

For multifamily properties, water use patterns are more complex due to variations in building size, occupancy, management practices, and the presence of shared facilities. Factors such as sub-metering and responsibility for outdoor maintenance contribute to greater variability in efficiency potential compared to single-family homes.

To estimate the remaining market potential for residential indoor efficiency measures, projected housing unit counts for both single-family and multifamily sectors are used. These projections help identify the number of non-conserving toilets, showerheads, clothes washers, and dishwashers available for replacement with higher-efficiency products over the planning horizon. Faucet aerators are excluded, as most are already operating at high efficiency levels. A summary of common residential end uses and location characteristics affecting water demand is provided in Table 3-1.

Table 3-1: Common End Use and Location Characteristics Affecting Residential Water Use

End Uses	Location Characteristics
• Irrigation • Pools • Clothes/dish washing • Bathing • Toilet flushing • Eating/drinking • Leaks	• Number of occupants • Home value • Age of house and/or plumbing • Building/irrigable area • Number/ages/types of toilets, fixtures, and appliances • Price of water and income level of occupants • Alternative water sources (e.g. reclaimed water, shallow wells)

3.6.1 Residential Fixtures and Appliances

Residential water efficiency opportunities are evaluated collectively for major fixtures and appliances, including toilets, clothes washers, showerheads, faucet aerators, and dishwashers. The AWE Tracking Tool stock model simulates the gradual replacement of conventional units with higher-efficiency products, estimating both passive and active conservation potential.

- **Toilets**: Stock estimates support calculation of passive efficiency improvements and identification of remaining units eligible for replacement. With an expected useful life of 25 years (natural replacement rate of 4% per year), the share of single-family toilets exceeding 1.6 gallons per flush (gpf) is projected to decline from 4.1% in 2025 to 0.3% by 2045. Table 3-2 presents the estimated number of toilets by efficiency class for single-family and multifamily housing.
- **Clothes Washers:** High-efficiency ENERGY STAR washers use 4 gallons per cubic foot of laundry or less, compared to up to 15 gallons per cubic foot for conventional models. Approximately 50% of clothes washers in both single-family and multifamily housing are expected to remain conventional through 2045 under baseline conditions. Table 3-2 summarizes the projected distribution of clothes washers by efficiency class.

Table 3-2 provides a comprehensive breakdown of fixture and appliance stock, efficiency levels, and projected changes over the planning horizon. This table is essential for illustrating the remaining market potential for indoor water efficiency measures and guiding targeted conservation programs.

3.7 Nonresidential Indoor Water Efficiency Baseline Assessment

The CII sector encompasses a diverse range of customer types, each with unique water use characteristics. For this baseline assessment, NR service connections reported in the PSAR were used to estimate CII water demand and the remaining potential for indoor efficiency improvements.

The AWE Tracking Tool uses a statistical model to estimate nonresidential fixture counts based on the number of accounts and population served. While this provides a reasonable baseline for fixture distribution and passive efficiency trends, it does not capture the full variability across different facility types. Therefore, these estimates reflect overall baseline conditions and remaining potential for efficiency upgrades, rather than site-specific savings.

Table 3-2: Residential End Uses by Technological Efficiency Level

Class	End Use Technology	Mechanical Efficiency	Projections					2025-2045	
			2025	2030	2035	2040	2045	Change	% Change
SF	Toilets	Pre-ULFT	6,637	4,592	2,976	1,699	690	-5,947	-89.6%
		ULFT/HET	153,287	154,582	197,404	217,638	235,853	82,566	53.9%
		% Pre-ULFT	4.1%	2.9%	1.5%	0.8%	0.3%	-	-
SF	Showerheads	>2.5 gpm	840	496	293	173	102	-738	-87.8%
		(1.8, 2.5)	127,219	127,563	161,331	177,217	191,652	64,433	50.6%
		<=1.8 gpm	-	-	-	-	-	0	0.0%
		% >2.5 gpm	0.7%	0.4%	0.2%	0.1%	0.1%	-	-
SF	Clotheswashers	Conventional	43,755	44,096	52,278	56,154	59,647	15,891	36.3%
		High-Efficiency	46,050	45,710	53,470	57,083	60,414	14,364	31.2%
		% Conventional	48.7%	49.1%	49.4%	49.6%	49.7%	-	-
SF	Dishwashers	Conventional	17,807	14,001	13,048	12,117	11,711	-6,095	-34.2%
		High-Efficiency	67,272	71,078	87,134	95,160	102,030	34,758	51.7%
		% Conventional	20.9%	16.5%	13.0%	11.3%	10.3%	-	-
MF	Toilets	Pre-ULFT	257	203	161	127	100	-157	-61.0%
		ULFT	7,111	8,089	9,138	10,079	10,932	3,822	53.7%
		% Pre-ULFT	3.5%	2.5%	1.7%	1.2%	0.9%	-	-
MF	Showerheads	>2.5 gpm	39	23	14	8	5	-34	-87.8%
		(1.8, 2.5)	7,124	8,039	9,027	9,915	10,721	3,597	50.5%
		<=1.8 gpm	-	-	-	-	-	0	0.0%
		% >2.5 gpm	0.5%	0.3%	0.1%	0.1%	0.0%	-	-
MF	In-Unit Clotheswashers	Conventional	1,578	1,685	1,812	1,930	2,039	461	29.2%
		High-Efficiency	1,466	1,616	1,769	1,903	2,023	557	38.0%
		% Conventional	51.8%	51.1%	50.6%	50.3%	50.2%	-	-
MF	Shared Clotheswashers	Conventional	387	416	449	480	508	122	31.5%
		High-Efficiency	375	410	446	478	507	133	35.5%
		% Conventional	50.8%	50.4%	50.2%	50.1%	50.0%	-	-
MF	Dishwashers	Conventional	828	711	639	599	582	-247	-29.8%
		High-Efficiency	3,433	3,911	4,374	4,767	5,105	1,672	48.7%
		% Conventional	19.4%	15.4%	12.7%	11.2%	10.2%	-	-

3.7.1 Nonresidential Toilets and Urinals

Restroom fixtures, specifically toilets and urinals, are the most consistent and broadly applicable targets for indoor water efficiency improvements within the commercial, industrial, and institutional (CII) sector. These fixtures are present in nearly all nonresidential facility types, making them a central focus for baseline efficiency assessments. The AWE Tracking Tool estimates the distribution of nonresidential toilets and urinals by efficiency class, using assumptions about useful life and natural replacement rates. This allows for calculation of passive efficiency improvements and identification of the remaining stock of fixtures that do not meet current high-efficiency standards.

Table 3-3 presents the projected stock of CII toilets by efficiency class from 2025 through 2045. In 2025, about 15.4% of nonresidential toilets are expected to remain rebate-eligible (with flush volumes exceeding 1.6 gallons per flush), declining to 4.8% by 2045 as older fixtures are replaced. While natural replacement reduces inefficient toilets over time, a measurable inventory of higher-volume fixtures persists throughout the planning horizon, forming the baseline pool eligible for active conservation programs.

Urinals show a different efficiency profile. The majority are assumed to operate at flow rates of 1.0 gpf or greater, with only a small share represented by ultra-low-flow or waterless models. Because urinals are less frequently replaced through passive turnover and often remain in service for extended periods, a substantial stock of higher-volume urinals remains across the CII sector. Identifying these remaining inventories of toilets and urinals establishes the foundation for evaluating nonresidential indoor conservation measures in subsequent sections of this plan.

Table 3-3: CII End Uses by Technological Efficiency Level

Class	End Use Technology	Mechanical Efficiency	Projections					2025-2045	
			2025	2030	2035	2040	2045	Change	% Change
CII	Toilets	Pre- ULFT	3,741	3,050	2,487	2,028	1,654	-2,088	-55.8%
		ULFT	20,495	23,775	27,115	30,041	32,637	12,143	59.2%
		% Pre-ULFT	15.4%	11.4%	8.4%	6.3%	4.8%	-	-
CII	Urinals	>=1 gpf	3,507	3,856	4,234	4,571	4,875	1,367	39.0%
		0.5 gpf	-	-	-	-	-	0	0.0%
		0.25 gpf	-	-	-	-	-	0	0.0%
		0.125 gpf	-	-	-	-	-	0	0.0%
		0 gpf	128	168	206	240	269	141	110.1%
		% >=1 gpf	95.6%	95.3%	95.0%	94.8%	94.6%	-	-

3.8 Landscape Irrigation Water Efficiency Baseline Assessment

Outdoor water use remains one of the largest opportunities for efficiency improvements in the single-family residential sector. Unlike indoor fixtures, landscape irrigation efficiency does not improve significantly through passive replacement, making outdoor use a critical focus for assessing remaining conservation potential.

Efficiency potential was evaluated by identifying single-family customers with irrigation systems and classifying them based on observed irrigation behavior relative to theoretical landscape water requirements. Customers were grouped as either average irrigators—those whose water use is at or below estimated landscape needs—or high irrigators—those who exceed these requirements. This distinction enables a more accurate assessment of where efficiency improvements are most needed.

Research by the WRWSA found that approximately 40% of single-family customers irrigate seasonally, while about 20% exhibit over-irrigation behaviors. These findings informed the assumptions used in this baseline assessment. The distribution of irrigator types is summarized in Table 3-4, and the estimated number of irrigators by category is presented in Table 3-5.

Potential improvements in landscape irrigation efficiency stem from practices and technologies such as irrigation system evaluations, smart controllers, high-efficiency nozzles, and rain or soil moisture sensors. While these measures are described in detail in Section 4, they are referenced here to define the achievable efficiency potential within the outdoor sector.

The baseline assessment indicates that the greatest remaining efficiency potential lies with high irrigators, where targeted measures can substantially reduce water use without risk of rebound. For average irrigators, program design must be carefully tailored to avoid unintended increases in water use, such as when automated controllers are provided to customers already irrigating below theoretical need.

Table 3-4: Percent Breakdown of Irrigator Types

Irrigator Type	% of Irrigators
% Total Irrigators	40%
% Total Non-Irrigators	60%
% Total High Irrigators	20%
% Total Low Irrigators	80%

Table 3-5: Distribution of Irrigators

Variable	2020	Projections					2025 - 2045	
		2025	2030	2035	2040	2045	Change	% Change
Total SF Homes	57,169	63,851	71,861	80,587	88,448	95,610	31,759	49.7%
Total SF Non-Irrigators	34,301	38,311	43,117	48,352	53,069	57,366	19,055	49.7%
Total SF Irrigators	22,868	25,540	28,744	32,235	35,379	38,244	12,704	49.7%
Total SF High Irrigators	4,574	5,108	5,749	6,447	7,076	7,649	2,541	49.7%
Total SF Low Irrigators	18,294	20,432	22,996	25,788	28,303	30,595	10,163	49.7%
New SF Irrigators	320	2,993	6,197	9,687	12,831	15,696	12,704	424.5%
New SF High Irrigators	64	599	1,239	1,937	2,566	3,139	2,541	424.5%
New SF Low Irrigators	256	2,394	4,957	7,749	10,265	12,557	10,163	424.5%
Existing SF Irrigators	22,548	22,548	22,548	22,548	22,548	22,548	0	0.0%
Existing SF High Irrigators	4,510	4,510	4,510	4,510	4,510	4,510	0	0.0%
Existing SF Low Irrigators	18,038	18,038	18,038	18,038	18,038	18,038	0	0.0%

4. Water Conservation Program Development

Water conservation program development is based on the baseline efficiency assessment and remaining market characterization presented in Section 3. The goal is to identify and evaluate a portfolio of technically feasible, locally relevant conservation measures for inclusion in planning scenarios. Measures are selected through a review of eligible fixtures, appliances, and irrigation practices, and are screened for technical applicability and cost-effectiveness. The AWE Tracking Tool is used to estimate water savings, costs, and program effectiveness, supporting prioritization and comparison with alternative supply options. Selected measures are then assembled into planning scenarios, with estimated savings and budget impacts evaluated for long-term implementation.

Water conservation program development is guided by a structured evaluation process. First, a baseline assessment identifies remaining opportunities for efficiency improvements. Potential measures, such as fixture and appliance upgrades, irrigation enhancements, and outreach, are reviewed for technical feasibility and cost-effectiveness. These measures are then assembled into program portfolios, which are evaluated using the AWE Tracking Tool to estimate water savings, costs, and overall effectiveness. This portfolio-based approach allows the utility to prioritize and implement a balanced mix of conservation strategies, ensuring both immediate and long-term demand reductions that can be compared with other alternative supply options.

The sections that follow describe the conservation measures considered (Section 4.1), followed by the assembly of those measures into planning scenarios and the resulting water savings and budget implications (Sections 4.2 through 4.4).

4.1 Water Conservation Measures

The conservation measures evaluated in this plan include a suite of indoor and outdoor water efficiency technologies and practices applicable primarily to the single-family residential sector. Measures were selected based on technical feasibility, documented performance, and alignment with the remaining efficiency potential identified in Section 3.

Table 4-1 summarizes the conservation measures evaluated, along with estimated unit costs, unit savings, and cost-effectiveness metrics. Although the AWE Tracking Tool includes 21 single-family program options, 17 measures were selected based on their applicability and potential to achieve meaningful savings.

Estimated water savings reflect the full useful life of each measure, with measure life and unit savings varying by technology and implementation approach. Cost-effectiveness metrics were developed to support program prioritization and comparison with alternative water supply options.

Each measure targets either indoor (e.g., toilets, clothes washers, showerheads, and aerators) or outdoor (e.g., irrigation evaluations, smart controllers, rain sensors, and landscape conversions) water use. Only a subset of measures was incorporated into the Tier 2 and Tier 3 planning scenarios, which are evaluated in subsequent sections.

Table 4-1: Portfolio of Conservation Programs and Unit Cost

Program Name & Category			Program Cost and Water Saving Parameters						
Program ID	Program Name	Units	Utility ($/unit)	Expected Savings (gpd/unit)	Life of Savings (Years)	Cost Effectiveness ($/1000 gal)	Utility Unit Cost ($/MG)	Utility Unit Benefit ($/MG)	Utility BCR
1	SFR HET Replacement	Toilet	$ 100	27.8	25	$ 0.39	$ 226.90	$ 2,289	$ 10.09
2	High User Irrigation Evaluation	Irrigation	$ 400	170.0	5	$ 1.29	$ 1,289.28	$ 2,289	$ 1.78
3	High User Irrigation Evaluation w/Enhancement	Irrigation	$ 450	197.0	5	$ 1.25	$ 1,251.65	$ 2,289	$ 1.83
4	High User Irrigation Evaluation w/WS Controller	Controller	$ 750	355.0	10	$ 0.58	$ 578.82	$ 2,289	$ 3.95
5	High User WS Labeled Irrigation Controller	Controller	$ 350	297.0	10	$ 0.32	$ 322.86	$ 2,289	$ 7.09
6	Average User WS Labeled Irrigation Controller	Controller	$ 100	121.0	10	$ 0.23	$ 226.46	$ 2,289	$ 10.11
7	SFR Irrigation Nozzle Replacement	Sprinkler Head	$ 100	32.0	10	$ 0.86	$ 856.16	$ 2,289	$ 2.67
8	Rain Sensor Replacement	Controller	$ 50	35.0	3	$ 1.30	$ 1,304.63	$ 2,289	$ 1.75
9	SFR Rain Barrel (< 200 gal) Rebate	Household	$ 50	1.7	5	$ 16.12	$ 16,116.04	$ 2,289	$ 0.14
10	SFR Washer Rebate (WF <=4)	Washer	$ 100	13.7	12	$ 1.67	$ 1,666.50	$ 2,289	$ 1.37
11	Florida Friendly Yard Incentive program	Landscapes	$ 725	133.0	25	$ 0.60	$ 597.38	$ 2,289	$ 3.83
12	Workshops	10 Households	$ 140	70.0	1	$ 5.48	$ 5,479.45	$ 2,289	$ 0.42
13	Public Service Announcements (PSAs)	Times Played	$ -	0.0	1	$ -		$ -	$ -
14	Exhibits	# Exhibits	$ -	0.0	1	$ -		$ -	$ -
15	Web page	#Hits	$ -	0.0	1	$ -		$ -	$ -
16	In-School Education	Students	$ -	0.0	1	$ -		$ -	$ -
17	WS Showerhead	Home	$ 10	2.4	10	$ 1.14	$ 1,141.55	$ 2,289	$ 2.00
18	WS Labeled Faucet Aerator	Household	$ 4	1.7	5	$ 1.13	$ 1,128.12	$ 2,289	$ 2.03
19	WS Labeled Kitchen Faucet Aerator	Household	$ 4	0.0	0	$ -		$ -	$ -
20	SFR Water Use Audit	Household	$ 125	33.9	5	$ 2.02	$ 3,005.31	$ 2,289	$ 0.76
21	SFR HET+ Replacement	Toilet	$ 50	8.0	25	$ 0.68	$ 171.23	$ 2,289	$ 13.37

4.1.1 SFR HET Replacement

Replaces existing low-efficiency toilets with high-efficiency toilets (HETs) rated at 1.28 gallons per flush (gpf) or less. Most commonly implemented through rebates, though vouchers, give-away, or direct installation approaches may also be used.

4.1.2 High User Irrigation Evaluation

Provides in-depth evaluations of high-use irrigation systems, including zone-by-zone inspection, adjustment of run cycles, and customer-specific recommendations. Participants also receive Florida-Friendly Landscaping guidance and educational materials to sustain savings.

4.1.3 High User Irrigation Evaluation with Enhancement

Expands the basic irrigation evaluation with on-site system upgrades such as installing ET sensors, replacing broken or mismatched sprinkler heads, capping unnecessary heads, and correcting alignment or pressure issues.

4.1.4 High User Irrigation Evaluation with WaterSense Controller

Adds installation of a WaterSense labeled ET controller to the irrigation evaluation, enabling irrigation schedules to automatically adjust to weather and evapotranspiration data.

4.1.5 High User WaterSense Labeled Irrigation Controller

Provides direct installation of a WaterSense labeled ET controller at targeted high-use locations, independent of a full irrigation evaluation.

4.1.6 Average User WaterSense Labeled Irrigation Controller

Offers WaterSense labeled ET controller installation to average-use households, broadening access to smart irrigation technology.

4.1.7 SFR Irrigation Nozzle Replacement

Replaces standard sprinkler nozzles with high-efficiency nozzles designed to reduce overspray, improve distribution uniformity, and lower wind drift. Programs typically provide ~20 nozzles per household via rebate, distribution, or direct install.

4.1.8 Rain Sensor Replacement

Provides new or replacement rain sensors that automatically shut off irrigation systems during rainfall events, preventing unnecessary outdoor water use.

4.1.9 SFR Rain Barrel (<200 gal) Rebate

Offers a rebate (typically $50) toward the purchase of a rain barrel (<200 gallons) or a small cistern (200–500 gallons) to capture rainwater for outdoor use and reduce potable irrigation demand.

4.1.10 SFR Washer Rebate (WF ≤4)

Replaces conventional washers (8–15 gallons/cubic foot of laundry) with high-efficiency Energy Star models using ≤4 gallons/cubic foot. Most effective for common-area washers in multifamily housing, which have higher daily use rates. Rebate levels vary by utility (e.g., $75 in Hernando County).

4.1.11 Florida Friendly Yard Incentive Program

Supports landscape conversions to Florida-Friendly or Florida Water Star standards, reducing long-term irrigation demand. Incentives are offered to all customers with potable irrigation. Savings vary by site but have been documented at ~130–140 gpd in regional studies.

4.1.12 Workshops

Provides customer education workshops on water-efficient practices, technologies, and outdoor savings techniques. Savings are modest but measurable; estimates assume ~10 households per workshop with ~3 gpd reduction per household.

4.1.13 Public Service Announcements (PSAs)

PSAs use media channels such as radio, television, social media, and digital advertising to inform and motivate customers about water conservation. These messages raise awareness of efficient practices, promote participation in rebate and retrofit programs, and reinforce conservation as a community value.

4.1.14 Exhibits

Exhibits consist of visual or interactive displays presented at community events, utility offices, libraries, or other public venues. They are designed to engage residents of all ages, demonstrate efficient technologies (e.g., WaterSense fixtures, smart irrigation controllers), and showcase the benefits of water conservation in a tangible, hands-on format.

4.1.15 Web Page

Utility conservation web pages provide customers with a centralized, accessible source of information. These sites typically include program descriptions, rebate forms, instructional videos, and efficiency calculators. Web resources extend outreach beyond in-person events and ensure customers have year-round access to tools that support efficient water use.

4.1.16 In-School Education

In-school programs bring water conservation concepts directly to students through classroom presentations, interactive activities, and curriculum support. Educating students not only builds long-term conservation awareness, but also extends influence into households as children share what they learn with their families.

4.1.17 WaterSense Showerhead

Replaces inefficient showerheads with WaterSense-labeled models rated at ≤1.8 gallons per minute (gpm). Typically implemented through direct installation or give-away kits, often bundled with other devices such as faucet aerators or leak detection tablets.

4.1.18 WaterSense Labeled Faucet Aerator

Adds or replaces aerators on bathroom faucets to achieve flows of ≤1.5 gpm. Commonly distributed as part of give-away kits or bundled with other low-cost water-saving devices.

4.1.19 WaterSense Labeled Kitchen Faucet Aerator

Installs kitchen faucet aerators to reduce flow to ≤2.2 gpm. Often distributed in efficiency kits alongside showerheads and bathroom aerators.

4.1.20 SFR Water Use Audit

Provides on-site residential water use surveys. Trained staff assess indoor and outdoor practices, recommend efficiency upgrades, and may install devices directly. Outdoor audits can include turf analysis, catch-can testing, and irrigation scheduling recommendations.

4.1.21 SFR HET+ Replacement

Enhances the traditional toilet rebate program by replacing 1.6 gpf ultra-low flush toilets (ULFTs) with high-efficiency toilets (HET+) rated at ≤1.1 gpf. Targeted once the stock of higher-flush toilets has been largely retired.

4.1.22 Education and Outreach Programs

While outreach and educational initiatives do not have directly quantified savings rates in the AWE Tracking Tool, they are included in the portfolio because they play an important supporting role. These efforts increase public awareness, encourage participation in rebate and retrofit programs, and help sustain water-saving behaviors over time. Recognizing their influence, these measures are presented below as complementary strategies, even though no standalone water savings are assigned to them in this analysis.

4.2 Conservation Planning Scenarios

To evaluate the role of conservation as part of the long-term water supply strategy, the conservation measures described in Section 4.1 were assembled into a set of planning scenarios representing increasing levels of program intensity and investment. These scenarios are not intended to prescribe implementation schedules or funding commitments; rather, they are designed to bound the range of achievable water savings and associated costs under different programmatic approaches.

Each scenario builds upon the baseline efficiency conditions and remaining eligible fixtures, appliances, and irrigation practices identified in Section 3. Measures were selected based on technical feasibility, alignment with remaining efficiency potential, and relative cost-effectiveness as estimated using the AWE Tracking Tool.

The conservation scenarios are structured to:

- Distinguish between passive efficiency gains and active program-driven savings
- Reflect differing levels of program effort and participation
- Support comparison of conservation outcomes with alternative water supply options

The three conservation planning scenarios evaluated are described below.

- **Tier 1 – Passive Efficiency (Low):** Tier 1 reflects only passive conservation achieved through the natural replacement of fixtures and appliances as they reach the end of their useful life. No active conservation programs are assumed under this scenario. Savings result from ongoing market-driven adoption of more efficient technologies and provide a baseline reference for evaluating the incremental benefits of active conservation.

- **Tier 2 – Targeted Active Conservation (Medium):** Tier 2 builds upon passive efficiency by incorporating a focused portfolio of active conservation programs. Measures included in this scenario reflect technologies and practices judged to be locally applicable, cost-effective, and feasible to implement at moderate participation levels. Tier 2 represents a pragmatic level of conservation that could reasonably be achieved through sustained program implementation under typical utility staffing and budget conditions.

- **Tier 3 – Expanded Conservation (High / Regional):** Tier 3 expands upon Tier 2 by applying a broader mix of conservation measures at higher participation rates. This scenario illustrates the upper range of water savings that could be achieved through more aggressive and coordinated conservation efforts. Tier 3 emphasizes diversification across both indoor and outdoor measures to reduce reliance on any single program and improve long-term resilience of conservation savings.

Together, these scenarios provide a structured framework for evaluating conservation as a planning resource, illustrating how varying levels of program investment and participation influence long-term water demand outcomes. The resulting water savings and associated costs are presented in the following sections and are used to assess conservation as a flexible and cost-effective strategy for managing long-term demand.

4.3 Scenario Assumptions and Program Penetration

Active conservation scenarios were developed by applying planning-level participation rates to the remaining eligible fixtures, appliances, and irrigation systems identified in Section 3. Participation rates were selected to reflect realistic implementation levels consistent with cost-effectiveness thresholds and anticipated program capacity over the 2025–2045 planning horizon.

Table 4-2 summarizes the eligible measures and assumed penetration rates for Tier 2 and Tier 3 scenarios. Penetration rates were intentionally set below the total remaining market potential to reflect conservative planning assumptions rather than maximum achievable uptake.

To estimate annual program activity, the total number of assumed program participants was evenly distributed across the planning horizon. Table 4-3 presents the resulting average annual interventions by measure for Tier 2 and Tier 3. This approach avoids front-loading savings and provides a stable representation of long-term program implementation.

4.4 Water Demand and Conservation Savings Results

Projected water savings and demand under each conservation scenario is summarized in Table 4-4. Under baseline conditions, potable water demand is projected to increase from 20.8 MGD in 2025 to 31.7 MGD by 2045, representing a 52.5 percent increase over the planning horizon.

- Under Tier 1, which reflects passive efficiency only, projected demand reaches 28.5 MGD by 2045, reducing demand growth by approximately 3.2 MGD relative to baseline.
- Under Tier 2, which incorporates passive efficiency plus a moderate level of active conservation, projected demand is reduced to 28.3 MGD by 2045, or 3.4 MGD below baseline.
- Under Tier 3, which assumes higher participation across selected conservation measures, projected demand declines further to 26.9 MGD by 2045, representing a 4.7 MGD reduction relative to baseline.

These results demonstrate that progressively higher levels of conservation investment yield increasing reductions in long-term demand.

4.5 Distribution of Savings Across Measures

Across all active conservation scenarios, outdoor measures account for a substantial share of total water savings, particularly in scenarios that emphasize irrigation efficiency for high-use customers. Indoor savings are driven primarily by toilet and clothes washer replacements, with additional contributions from showerheads, aerators, and audits. Indoor conservation measures tend to produce savings that are more predictable, less sensitive to behavioral variability, and more uniformly realized across customer classes. Outdoor measures, while inherently more variable, provide larger per-participant savings, greater opportunity to address seasonal and peak demand, and meaningful reductions in discretionary water use. Together, these characteristics underscore the importance of maintaining a balanced portfolio of indoor and outdoor conservation measures.

Table 4-2: Conservation Program Eligible Measures and Penetration Rates

Program Name	Units	Eligible Measures (2045)	Tier 2 Penetration Rate	Tier 3 Penetration Rate
SFR HET Replacement	Toilet	16,742	36%	36%
High User Irrigation Evaluation	Irrigation	4,927	15%	15%
High User Irrigation Evaluation w/Enhancement	Irrigation	4,927	15%	15%
High User Irrigation Evaluation w/WS Controller	Controller	4,927	15%	15%
High User WS Labeled Irrigation Controller	Controller	4,927	25%	25%
Average User WS Labeled Irrigation Controller	Controller	19,710	25%	25%
SFR Irrigation Nozzle Replacement	Sprinkler Head	24,637	25%	25%
Rain Sensor Replacement	Controller	24,637	25%	25%
SFR Rain Barrel (< 200 gal) Rebate	Household	24,637	1%	1%
SFR Washer Rebate (WF <=4)	Washer	35,160	5%	5%
Florida Friendly Yard Incentive program	Landscapes	24,637	1%	1%
Workshops	10 Households	61,593	2%	2%
PSA	Times Played	61,593	1%	1%
Exhibits	# Exhibits	61,593	0%	0%
Web page	# Hits	61,593	0%	0%
In-School Education	Students	61,593	0%	0%
WaterSense Showerhead	Home	1,463	3%	3%
WS Labeled Faucet Aerator	Household	1,463	9%	9%
WS Labeled Kitchen Faucet Aerator	Household	61,593	0%	0%
SFR Water Use Audit	Household	61,593	0%	0%
SFR HET+ Replacement	Toilet	153,621	0%	15%

Table 4-3: Tier 2 and Tier 3 Annual Planned Measures

Program Name	Tier 2					Tier 3				
	2025	2030	2035	2040	2045	2025	2030	2035	2040	2045
SFR HET Replacement	150	150	150	150	150	150	150	150	150	150
High User Irrigation Evaluation	60	60	60	60	60	45	45	45	45	45
High User Irrigation Evaluation w/Enhancement	60	60	60	60	60	45	45	45	45	45
High User Irrigation Evaluation w/WS Controller	-	-	-	-	-	45	45	45	45	45
High User WS Labeled Irrigation Controller	-	-	-	-	-	75	75	75	75	75
Average User WS Labeled Irrigation Controller	-	-	-	-	-	301	301	301	301	301
SFR Irrigation Nozzle Replacement	-	-	-	-	-	376	376	376	376	376
Rain Sensor Replacement	50	50	50	50	50	376	376	376	376	376
SFR Rain Barrel (< 200 gal) Rebate	50	50	50	50	50	15	15	15	15	15
SFR Washer Rebate (WF <=4)	25	25	25	25	25	95	95	95	95	95
Florida Friendly Yard Incentive program	16	16	16	16	16	15	15	15	15	15
Workshops	70	70	70	70	70	62	62	62	62	62
PSA	-	-	-	-	-	56	56	56	56	56
Exhibits	-	-	-	-	-	19	19	19	19	19
Web page	-	-	-	-	-	-	-	-	-	-
In-School Education	-	-	-	-	-	-	-	-	-	-
WaterSense Showerhead	-	-	-	-	-	225	225	225	225	225
WS Labeled Faucet Aerator	50	50	50	50	50	729	729	729	729	729
WS Labeled Kitchen Faucet Aerator	-	-	-	-	-	-	-	-	-	-
Water Use Audits	-	-	-	-	-	-	-	-	-	-
SFR HET+ Replacement	-	-	-	-	-	1097	1097	1097	1097	1097

Table 4-4: Annual Water Demand Projections

Unit	Variable	2020	2025	2030	2035	2040	2045	2025-2045	
								Change	% Change
Water Demand (MGD)	Baseline	19.7	20.8	24.2	26.9	29.3	31.7	10.9	52.5%
	Tier 1	19.7	20.1	22.8	24.9	26.7	28.5	8.4	41.9%
	Tier 2	19.7	20.1	22.6	24.7	26.5	28.3	8.2	40.9%
	Tier 3	19.7	19.9	21.9	23.5	25.2	26.9	7.0	35.2%
Demand Reduction (MGD)	Baseline	-	-	-	-	-	-	-	-
	Tier 1	-	0.7	1.4	2.0	2.6	3.2	2.5	370%
	Tier 2	-	0.7	1.5	2.2	2.9	3.4	2.7	380%
	Tier 3	-	0.8	2.3	3.5	4.1	4.7	3.9	460%
% Reduction	Baseline	-	-	-	-	-	-	-	-
	Tier 1	-	3.3%	5.6%	7.6%	9.0%	10.0%	6.8%	208%
	Tier 2	-	3.4%	6.3%	8.3%	9.7%	10.8%	7.4%	215%
	Tier 3	-	4.1%	9.5%	12.9%	14.1%	15.0%	10.9%	267%
GPCD	Baseline	131	124	128	127	126	126	2	1.9%
	Tier 1	131	120	121	117	115	113	-6	-5.3%
	Tier 2	131	119	120	117	114	112	-7	-5.9%
	Tier 3	131	119	116	111	108	107	-12	-9.7%
GPCD Reduction	Baseline	-	-	-	-	-	-	-	-
	Tier 1	-	4.0	7.2	9.7	11.4	12.6	8.6	214%
	Tier 2	-	4.2	8.0	10.6	12.3	13.6	9.3	221%
	Tier 3	-	5.0	12.1	16.4	17.8	18.9	13.8	274%

The distribution of savings differs notably between conservation scenarios. In Tier 2, irrigation evaluation programs dominate, accounting for more than 50 percent of total savings. While this reflects the strong performance of irrigation evaluations, it also indicates a portfolio that is heavily reliant on a single measure type. In Tier 3, conservation savings are distributed more evenly across a broader range of measures. Irrigation evaluations still contribute; however, substantial additional savings are achieved through irrigation controllers, high-efficiency (HET+) toilet replacements, and irrigation nozzle upgrades. This broader distribution reduces reliance on any single technology and improves the robustness of the conservation portfolio if participation in individual programs falls short of expectations.

Table 4-5 summarizes cumulative water savings by program for Tier 2 and Tier 3 and illustrates how expanded participation and a more diverse measure mix contribute to higher overall savings and a more balanced distribution of conservation benefits.

4.6 Annual Budget Estimates

Estimated annual program costs for Tier 2 and Tier 3 are summarized in Table 4-6. For most measures, unit costs are assumed to remain constant over the planning horizon. Tier 2 achieves moderate demand reductions at relatively low annual cost but concentrates expenditures in a small number of measures. Tier 3 requires higher annual investment but produces over five times the cumulative savings while distributing costs across a broader suite of programs.

Table 4-5: Tier 2 and Tier 3 Cumulative Program Water Savings Estimates (MGY)

Program Name	Tier 2							Tier 3						
	2025	2030	2035	2040	2045	Million Gallons Saved (2025-2045)	Total Distribution	2025	2030	2035	2040	2045	Million Gallons Saved (2025-2045)	Total Distribution
SFR HET Replacement	1.52	8.48	14.51	19.78	24.42	293	21.8%	1.52	8.48	14.51	19.78	24.42	293	3.9%
High User Irrigation Evaluation	3.72	18.62	18.62	18.62	18.62	354	26.4%	2.79	13.96	13.96	13.96	13.96	265	3.5%
High User Irrigation Evaluation w/Enhancement	4.31	21.57	21.57	21.57	21.57	410	30.6%	3.24	16.18	16.18	16.18	16.18	307	4.1%
High User Irrigation Evaluation w/WS Controller	-	-	-	-	-	-	-	5.83	34.99	58.31	58.31	58.31	962	12.9%
High User WS Labeled Irrigation Controller	-	-	-	-	-	-	-	8.13	48.78	81.30	81.30	81.30	1342	17.9%
Average User WS Labeled Irrigation Controller	-	-	-	-	-	-	-	13.29	79.75	132.92	132.92	132.92	2193	29.3%
SFR Irrigation Nozzle Replacement	-	-	-	-	-	-	-	4.39	26.35	43.92	43.92	43.92	725	9.7%
Rain Sensor Replacement	0.64	1.92	1.92	1.92	1.92	38	2.9%	4.80	14.41	14.41	14.41	14.41	288	3.9%
SFR Rain Barrel (< 200 gal) Rebate	0.03	0.16	0.16	0.16	0.16	3	0.2%	0.01	0.05	0.05	0.05	0.05	1	0.0%
SFR Washer Rebate (WF <=4)	0.13	0.75	1.38	1.50	1.50	23	1.7%	0.48	2.85	5.23	5.70	5.70	88	1.2%
Florida Friendly Yard Incentive program	0.78	4.66	8.54	12.43	16.31	179	13.4%	0.73	4.37	8.01	11.65	15.29	168	2.2%
Workshops	1.79	1.79	1.79	1.79	1.79	38	2.8%	1.58	1.58	1.58	1.58	1.58	33	0.4%
PSA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exhibits	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Web page	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In-School Education	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WaterSense Showerhead	-	-	-	-	-	-	-	0.20	1.18	1.97	1.97	1.97	33	0.4%
WS Labeled Faucet Aerator	0.03	0.16	0.16	0.16	0.16	3	0.2%	0.45	2.26	2.26	2.26	2.26	43	0.6%
WS Labeled Kitchen Faucet Aerator	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Use Audits	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SFR HET+ Replacement	-	-	-	-	-	-	-	3.20	19.22	35.24	51.25	67.27	740	9.9%
Total	13.0	58.1	68.6	77.9	86.4	1341	100%	50.6	274.4	429.8	455.2	479.5	7481	100%

Table 4-6: Tier 2 and Tier 3 Conservation Plan Estimated Annual Budget

Program Name	Tier 2			Tier 3		
	Annual Budget[1]	Total Expenditures (2025-2045)	Distribution Within Utility (2025-2045)	Annual Budget[1]	Total Expenditures (2025-2045)	Distribution Within Utility (2025-2045)
SFR HET Replacement	$15,000	$315,000	15.8%	$15,000	$315,000	5.2%
High User Irrigation Evaluation	$24,000	$504,000	25.2%	$18,000	$378,000	6.2%
High User Irrigation Evaluation w/Enhancement	$27,000	$567,000	28.4%	$20,250	$425,250	7.0%
High User Irrigation Evaluation w/WS Controller	-	-	-	$33,750	$708,750	11.7%
High User WS Labeled Irrigation Controller	-	-	-	$26,250	$551,250	9.1%
Average User WS Labeled Irrigation Controller	-	-	-	$30,100	$632,100	10.4%
SFR Irrigation Nozzle Replacement	-	-	-	$37,600	$789,600	13.0%
Rain Sensor Replacement	$2,500	$52,500	2.6%	$18,800	$394,800	6.5%
SFR Rain Barrel (< 200 gal) Rebate	$2,500	$52,500	2.6%	$750	$15,750	0.3%
SFR Washer Rebate (WF <=4)	$2,500	$52,500	2.6%	$9,500	$199,500	3.3%
Florida Friendly Yard Incentive program	$11,600	$243,600	12.2%	$10,875	$228,375	3.8%
Workshops	$9,800	$205,800	10.3%	$8,680	$182,280	3.0%
PSA	-	-	-	-	-	-
Exhibits	-	-	-	-	-	-
Web page	-	-	-	-	-	-
In-School Education	-	-	-	-	-	-
WaterSense Showerhead	-	-	-	$2,250	$47,250	0.8%
WS Labeled Faucet Aerator	$175	$3,675	0.2%	$2,552	$53,582	0.9%
WS Labeled Kitchen Faucet Aerator	-	-	-	-	-	-
Water Use Audits	-	-	-	-	-	-
SFR HET+ Replacement	-	-	-	$54,850	$1,151,850	19.0%
Total	$95,075	$1,996,575	100%	$289,207	$6,073,337	100%

[1] The annual budget column references the 2045 annual budget values. The annual budget for Tier 2 and Tier 3 is the same for every year.

5. Summary and Conclusions

This Water Conservation Plan evaluates the role of conservation in supporting long-term water supply sustainability for Hernando County Utilities through a planning-level assessment of baseline efficiency, remaining conservation potential, and achievable water savings under varying program scenarios.

Baseline projections indicate that absent additional conservation efforts, potable water demand is expected to increase substantially through 2045. Passive efficiency improvements associated with natural replacement of fixtures and appliances (Tier 1) modestly reduce this growth but are insufficient on their own to offset projected increases in demand. As a result, active conservation programs play a critical role in managing future water needs.

The conservation planning scenarios evaluated in this plan demonstrate that meaningful demand reductions can be achieved through targeted, cost-effective measures. Tier 2 represents a moderate level of active conservation focused on high-performing measures, particularly irrigation efficiency technologies. This scenario provides a pragmatic and scalable level of demand reduction achievable under typical programmatic and budgetary conditions, though savings are concentrated in a limited number of measures.

The Tier 3 scenario illustrates the upper range of achievable conservation savings through higher participation and a more diversified program portfolio. While requiring greater overall investment, Tier 3 produces larger and more reliable long-term demand reductions by distributing savings across a broader mix of indoor and outdoor measures, including irrigation controllers, high-efficiency toilet replacements, irrigation nozzle upgrades, and landscape conversions. This diversification reduces reliance on any single measure and enhances the robustness of conservation as a planning resource.

Across scenarios, outdoor measures account for a substantial share of total savings, particularly those targeting high irrigation users and seasonal demand. Indoor measures provide more predictable and consistent savings that complement outdoor programs and contribute to long-term baseline efficiency improvements. Together, these measures form a balanced conservation portfolio capable of addressing both average and peak demand drivers.

From a water supply planning perspective, conservation offers several advantages relative to traditional supply-side options. Conservation savings can be phased over time, scaled to available funding, and adjusted as demand conditions evolve. When evaluated on a cost-per-gallon basis, many conservation measures compare favorably with alternative water supply options and can reduce or defer the need for future capital-intensive supply projects.

In summary, this analysis demonstrates that conservation can offset a substantial portion of Hernando County Utilities' projected demand growth through 2045. Tier 2 represents a reasonable baseline level of conservation achievable through targeted program implementation, while Tier 3 highlights the broader potential available through sustained and diversified investment. Together, these scenarios support the inclusion of conservation as a core component of long-term water supply planning and provide a consistent analytical foundation for coordination with the WRWSA Regional Water Supply Plan.

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Marion County Utilities Conservation Plan

December 2025

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List of Acronyms

Abbreviation	Definition
AWE	Alliance for Water Efficiency
CII	Commercial, Industrial, and Institutional
CPC	Conservation Planning Committee
EPAct	U.S. Energy Policy Act of 1992
ET	Evapotranspiration
gpd	Gallons per Day
gpf	Gallons per Flush
gpm	Gallons per Minute
HE	High Efficiency
HET	High Efficiency Toilet
HET+	Ultra High Efficiency Toilet
HEU	High Efficiency Urinal
MGD	Million Gallons per Day
MGY	Million Gallons per Year
MF	Multifamily
NR	Nonresidential
PSAR	Public Supply Annual Report
RWSP	Regional Water Supply Plan
SF	Single-Family
SWFWMD	Southwest Florida Water Management District
ULFT	Ultra-Low Flow Toilet
WF	Water Factor
WRWSA	Withlacoochee Regional Water Supply Authority
WS	WaterSense

1. Introduction

This Conservation Plan was developed to identify cost-effective strategies for reducing water demand through 2045, supporting long-term water supply sustainability for Marion County Utilities. Conservation is essential for extending existing water sources, reducing peak demand, and deferring or avoiding costly new supply projects. The plan was prepared as part of the Withlacoochee Regional Water Supply Authority (WRWSA) 2025 Regional Water Supply Plan (RWSP), funded through a cooperative funding agreement between WRWSA and the Southwest Florida Water Management District (SWFWMD). While supporting regional planning efforts, this document also serves as a stand-alone plan for Marion County Utilities.

The plan was developed collaboratively with the WRWSA Conservation Planning Committee, which included representatives from Citrus, Hernando, and Marion Counties, the City of Ocala, and The Villages. This collaborative approach ensures regional consistency while allowing each utility to tailor programs to local needs and priorities.

A wide range of residential and nonresidential water efficiency measures was evaluated, including fixture and appliance upgrades, irrigation improvements, landscape practices, system evaluations, and education/outreach initiatives. Programs were selected based on local relevance, expected water savings, feasibility, and cost-effectiveness.

Water savings potential was assessed using three scenarios:

- Tier 1 (Low): Passive conservation from natural replacement of fixtures, new construction standards, and market-driven adoption of efficient technologies.
- Tier 2 (Medium): Passive efficiency plus a targeted portfolio of active conservation programs, reflecting a practical and achievable level of effort.
- Tier 3 (High/Regional): Expanded conservation with higher participation and broader regional application, illustrating the upper bound of achievable savings.

These tiered scenarios provide a transparent framework for evaluating conservation potential and integrating savings into demand projections and regional planning. The Alliance for Water Efficiency (AWE) Tracking Tool was used to estimate baseline water use, remaining efficiency potential, program-level savings, and costs, with local data incorporated where available.

Overall, this plan supports Marion County Utilities' long-term water supply planning by identifying feasible, cost-effective conservation strategies. These efforts help defer capital-intensive supply projects, reduce long-term costs, and ensure reliable service for current and future customers, while supporting compliance with regulatory requirements.

2. Baseline Housing, Population, and Water Demand

Establishing baseline housing, population, and water demand conditions provides the foundation for evaluating conservation potential and understanding how future demands are expected to evolve in the absence of additional conservation efforts. These baseline conditions represent the reference case against which conservation savings are measured and are critical for assessing how conservation influences long-term water supply planning. For Marion County Utilities, baseline conditions were developed by evaluating population, housing units, service connections, and water demand across primary customer classes. This assessment supports both utility-level conservation planning and integration of conservation results into regional demand projections used in the WRWSA 2025 Regional Water Supply Plan.

2.1 Customer Classes and Demand Composition

Water demand is analyzed across three primary customer classes: Single-Family (SF), Multifamily (MF), and Commercial, Industrial, and Institutional (CII). Each class has distinct water use characteristics, end-use profiles, and conservation opportunities. By disaggregating demand in this way, conservation potential can be evaluated more precisely, supporting the development of targeted and cost-effective programs. Single-family residential customers account for the largest share of total water demand and exhibit the greatest seasonal variability due to outdoor irrigation. In contrast, multifamily demand is primarily driven by indoor water use and is typically less seasonal. CII demand is diverse, reflecting a range of operational drivers and conservation opportunities depending on facility type.

2.2 Baseline Data Sources and Methodology

Baseline demand projections for Marion County Utilities were developed using data from the 2021 Public Supply Annual Report (PSAR) for Permit Number 6151 (Marion County Utilities Consolidated WUP). These data established the foundation for evaluating conservation potential, with demand across single-family, multifamily, and commercial/industrial/institutional classes assumed to represent total retail sales. Population and housing forecasts align with the WRWSA Regional Water Supply Plan, and baseline projections reflect average annual conditions, incorporating only passive efficiency improvements such as fixture replacement and updated plumbing codes. The Alliance for Water Efficiency (AWE) Tracking Tool was calibrated with utility-specific data to ensure consistency between observed water use and modeled end-use distributions.

2.3 Baseline Growth and Demand Trends

Table 2-1 presents the historical and projected baseline inputs used in the AWE Tracking Tool, including population, dwelling units, service connections, and water demand by customer class over the 2025–2045 planning horizon. As shown, baseline projections indicate continued growth across all major planning inputs, with the most significant increases occurring in the single-family residential sector. While overall growth rates are moderate, the concentration of growth within single-family development has important implications for future water demand due to the associated contribution of outdoor irrigation.

Key observations include:

- Population Growth: Total population served is projected to grow by about 16.7% (19,882 people) between 2025 and 2045, with nearly all of this growth occurring in the single-family sector (99% of total).
- Housing Growth: Dwelling units are projected to increase by 7,725 (16.7%) over the same period, again dominated by single-family development.
- Service Connections: Total connections increase by 7,940 (16.7%), with SF customers comprising about 97% of the growth.
- Water Demand: Total water sales are projected to increase from 12.55 MGD in 2025 to 14.70 MGD in 2045, an increase of 2.15 MGD (17.1%). Single-family customers account for 79.6% of this growth, with CII customers contributing another 10.1%.

These projections establish the baseline conditions against which conservation savings are measured and highlight the extent to which residential growth, particularly single-family development, drives future demand. Even with embedded passive efficiency improvements, projected demand increases underscore the importance of active conservation programs in moderating long-term water use and reducing the timing and magnitude of future supply needs.

2.4 Seasonal and End-Use Considerations

Baseline water demand shows seasonal variability, with outdoor irrigation in single-family homes driving peak demand during dry periods. Indoor residential use remains steady year-round, influenced by household size, fixture efficiency, and occupancy. Commercial, industrial, and institutional water use varies due to diverse operational needs. Recognizing these patterns is key for conservation planning: indoor measures manage annual demand, while outdoor programs reduce seasonal peaks. Addressing both is vital, as peak demand affects system capacity and future supply investments.

2.5 Role of the Baseline in Conservation Evaluation

The baseline conditions described in this section represent the reference case against which conservation savings are evaluated in subsequent sections of this plan. Conservation scenarios build upon these baseline projections by incorporating both passive and active efficiency improvements to estimate conservation-adjusted demands. By establishing a clear and consistent baseline, this plan ensures that conservation savings reflect true reductions relative to expected future conditions rather than reductions relative to historical use alone. This approach supports transparent evaluation of conservation benefits and facilitates integration of utility-level conservation results into regional water supply planning and avoided-cost analyses.

Table 2-1: Historical and Projected AWE Tracking Tool Inputs

Input	Class	Historical Observations		Projections					2025-2045		
		1990	2020	2025	2030	2035	2040	2045	Change	% Change	% of Change within Utility
Population	SF	49,163	97,916	117,849	122,786	127,725	132,663	137,479	19,630	16.7%	98.7%
	MF	623	1,257	1,512	1,576	1,639	1,703	1,764	252	16.7%	1.3%
	Total	49,793	99,172	119,361	124,362	129,364	134,366	139,243	19,882	16.7%	100.0%
Dwelling Units	SF	19,152	38,144	45,909	47,833	49,757	51,681	53,556	7,647	16.7%	99.0%
	MF	193	389	468	488	507	527	546	78	16.7%	1.0%
	Total	19,345	38,533	46,377	48,320	50,264	52,208	54,102	7,725	16.7%	100.0%
Connections	SF	19,347	38,533	46,377	48,320	50,264	52,208	54,102	7,725	16.7%	97.3%
	MF	122	247	297	310	322	335	347	50	16.7%	0.6%
	CII Mixed Meter	415	826	995	1,036	1,078	1,120	1,160	166	16.7%	2.1%
	Total	19,884	39,606	47,669	49,666	51,664	53,662	55,609	7,940	16.7%	100.0%
Water Sales	SF		10.41	12.55	13.09	13.63	14.17	14.70	2.15	17.1%	79.6%
	MF		0.01	0.01	0.01	0.01	0.01	0.01	0.00	17.1%	0.1%
	CII Mixed Meter		1.32	1.59	1.66	1.73	1.80	1.87	0.27	17.1%	10.1%
	UAW		1.33	1.60	1.67	1.74	1.81	1.88	0.27	17.1%	10.2%
	Total		13.07	15.75	16.43	17.11	17.79	18.45	2.70	17.1%	100.0%

3. Evaluation of Conservation Potential

Conservation potential is assessed by first establishing baseline water efficiency and then identifying opportunities for additional active conservation programs. Water savings result from both passive efficiency improvements, such as natural fixture replacement and regulatory standards and active utility-driven initiatives that further reduce demand. Differentiating these sources is essential for producing accurate and defensible estimates of conservation potential. By evaluating conservation relative to projected future baseline conditions, rather than historical use, the analysis ensures that estimated savings reflect true incremental reductions and avoids overstating the benefits of active programs.

3.1 Passive and Active Conservation Framework

Water efficiency improvements occur through both passive and active mechanisms.

- **Passive conservation** represents efficiency gains that occur without direct programmatic intervention. These gains are driven by plumbing codes and standards, market transformation, and the natural replacement of fixtures and appliances as they reach the end of their useful life. Passive efficiency improvements are most strongly associated with indoor water use, where fixture turnover steadily shifts the installed stock toward higher efficiency over time.
- **Active conservation** represents additional efficiency gains achieved through conservation programs designed to accelerate replacement of inefficient fixtures, influence customer behavior, or address water uses not typically affected by passive replacement. Active programs may include rebates, direct-install programs, irrigation system evaluations, landscape incentives, and education and outreach initiatives.

Separating passive and active conservation is essential for identifying the remaining market available for active water efficiency programs and for ensuring that conservation savings are incremental and not double-counted.

3.2 Establishing Baseline Water Efficiency

The baseline water efficiency assessment determines current and projected levels of technological efficiency before active conservation programs are implemented. This process quantifies passive efficiency improvements already reflected in baseline demand projections and identifies the remaining fixtures, appliances, and practices eligible for active conservation efforts.

The AWE Tracking Tool, a Microsoft Excel–based planning model, serves as the primary instrument for estimating baseline efficiency, passive water savings, and the cost-effectiveness of water-saving measures. The tool incorporates stock models for single-family, multifamily, and commercial, industrial, and institutional customer classes, estimating the distribution of key fixtures and appliances across various efficiency levels over time.

Fixtures and appliances evaluated include toilets, urinals, clothes washers (in-unit and shared), showerheads, faucet aerators, and dishwashers. The tool projects water savings from passive replacement as older, less efficient models are replaced with products that meet or exceed current standards.

The remaining inventory of conventional and standard efficiency fixtures after passive replacement establishes the starting point for estimating active conservation potential. This potential is defined by the portion of the remaining stock that could reasonably be replaced through utility-sponsored programs, considering usage intensity. The estimation of active program savings is addressed in subsequent sections of the plan.

3.3 End-Use Technology Efficiency Levels

End-use technologies evaluated in the baseline assessment are grouped into three general efficiency levels:

- **Non-conserving (conventional):** Typically the least efficient fixtures and appliances, most commonly found in homes and businesses constructed prior to 1994.
- **Conserving (standard):** Fixtures and appliances that meet minimum plumbing code or appliance efficiency standards.
- **Ultra-conserving (high-efficiency):** Fixtures and appliances that exceed minimum efficiency standards, often carrying the U.S. Environmental Protection Agency (EPA) WaterSense label.

The U.S. Energy Policy Act of 1992 (EPAct) was a pivotal milestone in advancing water efficiency, introducing maximum flow standards for toilets, faucets, and showerheads, as well as efficiency requirements for nonresidential plumbing fixtures. EPAct also set energy efficiency standards for appliances such as water heaters and air conditioners, which helped reduce water use in energy-intensive systems like cooling towers. Since its enactment, manufacturers have consistently developed products that meet or exceed these federal standards. The EPA WaterSense program has further accelerated market transformation by certifying ultra-efficient fixtures that maintain performance while using less water. Consequently, the market has steadily shifted toward higher-efficiency technologies for both fixtures and appliances.

3.4 Passive Replacement and Useful Life Assumptions

As fixtures and appliances reach the end of their useful life, they are assumed to be replaced with products that meet prevailing efficiency standards. This process drives passive efficiency improvements embedded in baseline demand projections.

Each fixture and appliance type is assigned an expected useful life, which is used to estimate an annual natural replacement rate (NRR) according to Equation 3-1:

Equation 3-1:

$$nrr = \frac{1}{Expected\ Life\ in\ Years}$$

Fixtures subject to natural replacement assumptions include toilets, urinals, clothes washers, and dishwashers. In contrast, outdoor irrigation measures and many CII technologies (e.g., cooling towers) are not typically subject to natural replacement and therefore do not exhibit significant passive efficiency improvements over time. Accounting for passive replacement is essential for avoiding overestimation of conservation potential and for isolating the remaining market that can be addressed through active conservation programs.

3.5 Data Sources and Local Calibration

Baseline efficiency estimates were developed using utility-reported data from the 2022 Public Supply Annual Report (PSAR), including service connections, population, and water demand by customer class. These data were integrated with AWE Tracking Tool stock distributions and useful-life parameters, with local information incorporated where available to accurately reflect service-area conditions. For historical demand estimates dating back to 1990, a parcel-level dataset from SWFWMD, containing year-built and land use classification, was used to assign historical population to single-family and multifamily customer classes. This approach ensured consistency between historical housing stock, population estimates, and the reporting categories used in both the PSAR and the AWE Tracking Tool. By aligning historical development patterns with modeled efficiency trends, the baseline assessment provides a robust foundation for identifying remaining conservation potential and guiding program development.

3.6 Residential Indoor Water Efficiency Baseline Assessment

Residential water use and efficiency are influenced by location-specific factors such as housing age, number of occupants, household income, and outdoor features like pools or automated irrigation systems. Housing age is especially significant, as older homes tend to have less efficient fixtures and appliances, while newer homes typically incorporate higher-efficiency technologies. The presence of automated irrigation systems also correlates with housing age and can substantially impact outdoor water use.

For multifamily properties, water use patterns are more complex due to variations in building size, occupancy, management practices, and the presence of shared facilities. Factors such as sub-metering and responsibility for outdoor maintenance contribute to greater variability in efficiency potential compared to single-family homes.

To estimate the remaining market potential for residential indoor efficiency measures, projected housing unit counts for both single-family and multifamily sectors are used. These projections help identify the number of non-conserving toilets, showerheads, clothes washers, and dishwashers available for replacement with higher-efficiency products over the planning horizon. Faucet aerators are excluded, as most are already operating at high efficiency levels. A summary of common residential end uses and location characteristics affecting water demand is provided in Table 3-1.

Table 3-1: Common End Use and Location Characteristics Affecting Residential Water Use

End Uses	Location Characteristics
• Irrigation • Pools • Clothes/dish washing • Bathing • Toilet flushing • Eating/drinking • Leaks	• Number of occupants • Home value • Age of house and/or plumbing • Building/irrigable area • Number/ages/types of toilets, fixtures, and appliances • Price of water and income level of occupants • Alternative water sources (e.g. reclaimed water, shallow wells)

3.6.1 Residential Fixtures and Appliances

Residential water efficiency opportunities are evaluated collectively for major fixtures and appliances, including toilets, clothes washers, showerheads, faucet aerators, and dishwashers. The AWE Tracking Tool stock model simulates the gradual replacement of conventional units with higher-efficiency products, estimating both passive and active conservation potential.

- **Toilets**: Stock estimates support calculation of passive efficiency improvements and identification of remaining units eligible for replacement. With an expected useful life of 25 years (natural replacement rate of 4% per year), the share of single-family toilets exceeding 1.6 gallons per flush (gpf) is projected to decline from 10.1% in 2025 to 2.7% by 2045. Table 3-2 presents the estimated number of toilets by efficiency class for single-family and multifamily housing.
- **Clothes Washers:** High-efficiency ENERGY STAR washers use 4 gallons per cubic foot of laundry or less, compared to up to 15 gallons per cubic foot for conventional models. Approximately 50% of clothes washers in both single-family and multifamily housing are expected to remain conventional through 2045 under baseline conditions. Table 3-2 summarizes the projected distribution of clothes washers by efficiency class.

Table 3-2 provides a comprehensive breakdown of fixture and appliance stock, efficiency levels, and projected changes over the planning horizon. This table is essential for illustrating the remaining market potential for indoor water efficiency measures and guiding targeted conservation programs.

3.7 Nonresidential Indoor Water Efficiency Baseline Assessment

The CII sector encompasses a diverse range of customer types, each with unique water use characteristics. For this baseline assessment, NR service connections reported in the PSAR were used to estimate CII water demand and the remaining potential for indoor efficiency improvements.

The AWE Tracking Tool uses a statistical model to estimate nonresidential fixture counts based on the number of accounts and population served. While this provides a reasonable baseline for fixture distribution and passive efficiency trends, it does not capture the full variability across different facility types. Therefore, these estimates reflect overall baseline conditions and remaining potential for efficiency upgrades, rather than site-specific savings.

Table 3-2: Residential End Uses by Technological Efficiency Level

Class	End Use Technology	Mechanical Efficiency	Projections					2025-2045	
			2025	2030	2035	2040	2045	Change	% Change
SF	Toilets	Pre-ULFT	11,583	8,848	6,687	4,980	3,631	-7,952	-68.7%
		ULFT/HET	103,120	105,505	116,934	123,102	128,790	25,670	24.9%
		% Pre-ULFT	10.1%	7.7%	5.4%	3.9%	2.7%	-	-
SF	Showerheads	>2.5 gpm	1,444	853	504	297	176	-1,269	-87.8%
		(1.8, 2.5)	90,374	90,966	99,010	103,064	106,937	16,563	18.3%
		<=1.8 gpm	-	-	-	-	-	0	0.0%
		% >2.5 gpm	1.6%	0.9%	0.5%	0.3%	0.2%	-	-
SF	Clotheswashers	Conventional	22,640	22,324	23,956	24,748	25,563	2,923	12.9%
		High-Efficiency	20,974	21,290	23,313	24,349	25,316	4,341	20.7%
		% Conventional	51.9%	51.2%	50.7%	50.4%	50.2%	-	-
SF	Dishwashers	Conventional	9,018	6,990	6,034	5,380	5,038	-3,980	-44.1%
		High-Efficiency	32,300	34,329	38,748	41,133	43,163	10,862	33.6%
		% Conventional	21.8%	16.9%	13.5%	11.6%	10.5%	-	-
MF	Toilets	Pre-ULFT	173	137	108	85	67	-105	-61.0%
		ULFT	1,547	1,656	1,757	1,851	1,940	392	25.3%
		% Pre-ULFT	10.0%	7.6%	5.8%	4.4%	3.4%	-	-
MF	Showerheads	>2.5 gpm	26	15	9	5	3	-23	-87.8%
		(1.8, 2.5)	1,647	1,727	1,804	1,877	1,948	301	18.3%
		<=1.8 gpm	-	-	-	-	-	0	0.0%
		% >2.5 gpm	1.6%	0.9%	0.5%	0.3%	0.2%	-	-
MF	In-Unit Clotheswashers	Conventional	248	255	262	271	280	32	12.9%
		High-Efficiency	230	243	255	267	277	48	20.7%
		% Conventional	51.9%	51.1%	50.7%	50.4%	50.2%	-	-
MF	Shared Clotheswashers	Conventional	60	62	65	67	70	10	15.8%
		High-Efficiency	59	62	65	67	70	10	17.5%
		% Conventional	50.4%	50.2%	50.1%	50.0%	50.0%	-	-
MF	Dishwashers	Conventional	146	116	98	87	82	-64	-44.1%
		High-Efficiency	523	581	627	666	699	176	33.6%
		% Conventional	21.8%	16.7%	13.5%	11.6%	10.5%	-	-

3.7.1 Nonresidential Toilets and Urinals

Restroom fixtures, specifically toilets and urinals, are the most consistent and broadly applicable targets for indoor water efficiency improvements within the commercial, industrial, and institutional (CII) sector. These fixtures are present in nearly all nonresidential facility types, making them a central focus for baseline efficiency assessments. The AWE Tracking Tool estimates the distribution of nonresidential toilets and urinals by efficiency class, using assumptions about useful life and natural replacement rates. This allows for calculation of passive efficiency improvements and identification of the remaining stock of fixtures that do not meet current high-efficiency standards.

Table 3-3 presents the projected stock of CII toilets by efficiency class from 2025 through 2045. In 2025, about 13.9% of nonresidential toilets are expected to remain rebate-eligible (with flush volumes exceeding 1.6 gallons per flush), declining to 5.4% by 2045 as older fixtures are replaced. While natural replacement reduces inefficient toilets over time, a measurable inventory of higher-volume fixtures persists throughout the planning horizon, forming the baseline pool eligible for active conservation programs.

Urinals show a different efficiency profile. The majority are assumed to operate at flow rates of 1.0 gpf or greater, with only a small share represented by ultra-low-flow or waterless models. Because urinals are less frequently replaced through passive turnover and often remain in service for extended periods, a substantial stock of higher-volume urinals remains across the CII sector. Identifying these remaining inventories of toilets and urinals establishes the foundation for evaluating nonresidential indoor conservation measures in subsequent sections of this plan.

Table 3-3: CII End Uses by Technological Efficiency Level

Class	End Use Technology	Mechanical Efficiency	Projections					2025-2045	
			2025	2030	2035	2040	2045	Change	% Change
CII	Toilets	Pre- ULFT	2,510	2,047	1,669	1,361	1,110	-1,401	-55.8%
		ULFT	15,573	16,684	17,706	18,655	19,528	3,955	25.4%
		% Pre-ULFT	13.9%	10.9%	8.6%	6.8%	5.4%	-	-
CII	Urinals	>=1 gpf	2,609	2,689	2,771	2,854	2,936	327	12.5%
		0.5 gpf	-	-	-	-	-	0	0.0%
		0.25 gpf	-	-	-	-	-	0	0.0%
		0.125 gpf	-	-	-	-	-	0	0.0%
		0 gpf	104	120	135	148	160	56	54.1%
		% >=1 gpf	96.2%	95.7%	95.4%	95.1%	94.8%	-	-

3.8 Landscape Irrigation Water Efficiency Baseline Assessment

Outdoor water use remains one of the largest opportunities for efficiency improvements in the single-family residential sector. Unlike indoor fixtures, landscape irrigation efficiency does not improve significantly through passive replacement, making outdoor use a critical focus for assessing remaining conservation potential.

Efficiency potential was evaluated by identifying single-family customers with irrigation systems and classifying them based on observed irrigation behavior relative to theoretical landscape water requirements. Customers were grouped as either average irrigators, those whose water use is at or below estimated landscape needs, or high irrigators, those who exceed these requirements. This distinction enables a more accurate assessment of where efficiency improvements are most needed.

Research by the WRWSA found that approximately 40% of single-family customers irrigate seasonally, while about 20% exhibit over-irrigation behaviors. These findings informed the assumptions used in this baseline assessment. The distribution of irrigator types is summarized in Table 3-4, and the estimated number of irrigators by category is presented in Table 3-5.

Potential improvements in landscape irrigation efficiency stem from practices and technologies such as irrigation system evaluations, smart controllers, high-efficiency nozzles, and rain or soil moisture sensors. While these measures are described in detail in Section 4, they are referenced here to define the achievable efficiency potential within the outdoor sector.

The baseline assessment indicates that the greatest remaining efficiency potential lies with high irrigators, where targeted measures can substantially reduce water use without risk of rebound. For average irrigators, program design must be carefully tailored to avoid unintended increases in water use, such as when automated controllers are provided to customers already irrigating below theoretical need.

Table 3-4: Percent Breakdown of Irrigator Types

Irrigator Type	% of Irrigators
% Total Irrigators	40%
% Total Non-Irrigators	60%
% Total High Irrigators	20%
% Total Low Irrigators	80%

Table 3-5: Distribution of Irrigators

Variable	2020	Projections					2025 - 2045	
		2025	2030	2035	2040	2045	Change	% Change
Total SF Homes	38,144	45,909	47,833	49,757	51,681	53,556	7,647	16.7%
Total SF Non-Irrigators	22,887	27,546	28,700	29,854	31,008	32,134	4,588	16.7%
Total SF Irrigators	15,258	18,364	19,133	19,903	20,672	21,423	3,059	16.7%
Total SF High Irrigators	3,052	3,673	3,827	3,981	4,134	4,285	612	16.7%
Total SF Low Irrigators	12,206	14,691	15,307	15,922	16,538	17,138	2,447	16.7%
New SF Irrigators	295	3,401	4,170	4,940	5,709	6,459	3,059	90.0%
New SF High Irrigators	59	680	834	988	1,142	1,292	612	90.0%
New SF Low Irrigators	236	2,720	3,336	3,952	4,567	5,168	2,447	90.0%
Existing SF Irrigators	14,963	14,963	14,963	14,963	14,963	14,963	0	0.0%
Existing SF High Irrigators	2,993	2,993	2,993	2,993	2,993	2,993	0	0.0%
Existing SF Low Irrigators	11,971	11,971	11,971	11,971	11,971	11,971	0	0.0%

4. Water Conservation Program Development

Water conservation program development is based on the baseline efficiency assessment and remaining market characterization presented in Section 3. The goal is to identify and evaluate a portfolio of technically feasible, locally relevant conservation measures for inclusion in planning scenarios. Measures are selected through a review of eligible fixtures, appliances, and irrigation practices, and are screened for technical applicability and cost-effectiveness. The AWE Tracking Tool is used to estimate water savings, costs, and program effectiveness, supporting prioritization and comparison with alternative supply options. Selected measures are then assembled into planning scenarios, with estimated savings and budget impacts evaluated for long-term implementation.

Water conservation program development is guided by a structured evaluation process. First, a baseline assessment identifies remaining opportunities for efficiency improvements. Potential measures, such as fixture and appliance upgrades, irrigation enhancements, and outreach, are reviewed for technical feasibility and cost-effectiveness. These measures are then assembled into program portfolios, which are evaluated using the AWE Tracking Tool to estimate water savings, costs, and overall effectiveness. This portfolio-based approach allows the utility to prioritize and implement a balanced mix of conservation strategies, ensuring both immediate and long-term demand reductions that can be compared with other alternative supply options.

The sections that follow describe the conservation measures considered (Section 4.1), followed by the assembly of those measures into planning scenarios and the resulting water savings and budget implications (Sections 4.2 through 4.4).

4.1 Water Conservation Measures

The conservation measures evaluated in this plan include a suite of indoor and outdoor water efficiency technologies and practices applicable primarily to the single-family residential sector. Measures were selected based on technical feasibility, documented performance, and alignment with the remaining efficiency potential identified in Section 3.

Table 4-1 summarizes the conservation measures evaluated, along with estimated unit costs, unit savings, and cost-effectiveness metrics. Although the AWE Tracking Tool includes 21 single-family program options, 17 measures were selected based on their applicability and potential to achieve meaningful savings.

Estimated water savings reflect the full useful life of each measure, with measure life and unit savings varying by technology and implementation approach. Cost-effectiveness metrics were developed to support program prioritization and comparison with alternative water supply options.

Each measure targets either indoor (e.g., toilets, clothes washers, showerheads, and aerators) or outdoor (e.g., irrigation evaluations, smart controllers, rain sensors, and landscape conversions) water use. Only a subset of measures was incorporated into the Tier 2 and Tier 3 planning scenarios, which are evaluated in subsequent sections.

Table 4-1: Portfolio of Conservation Programs and Unit Cost

Program Name & Category			Program Cost and Water Saving Parameters						
Program ID	Program Name	Units	Utility ($/unit)	Expected Savings (gpd/unit)	Life of Savings (Years)	Cost Effectiveness ($/1000 gal)	Utility Unit Cost ($/MG)	Utility Unit Benefit ($/MG)	Utility BCR
1	SFR HET Replacement	Toilet	$ 100	27.8	25	$ 0.39	$ 226.90	$ 2,289	$ 10.09
2	High User Irrigation Evaluation	Irrigation	$ 400	170.0	5	$ 1.29	$ 1,289.28	$ 2,289	$ 1.78
3	High User Irrigation Evaluation w/Enhancement	Irrigation	$ 450	197.0	5	$ 1.25	$ 1,251.65	$ 2,289	$ 1.83
4	High User Irrigation Evaluation w/WS Controller	Controller	$ 750	355.0	10	$ 0.58	$ 578.82	$ 2,289	$ 3.95
5	High User WS Labeled Irrigation Controller	Controller	$ 350	297.0	10	$ 0.32	$ 322.86	$ 2,289	$ 7.09
6	Average User WS Labeled Irrigation Controller	Controller	$ 100	121.0	10	$ 0.23	$ 226.46	$ 2,289	$ 10.11
7	SFR Irrigation Nozzle Replacement	Sprinkler Head	$ 100	32.0	10	$ 0.86	$ 856.16	$ 2,289	$ 2.67
8	Rain Sensor Replacement	Controller	$ 50	35.0	3	$ 1.30	$ 1,304.63	$ 2,289	$ 1.75
9	SFR Rain Barrel (< 200 gal) Rebate	Household	$ 50	1.7	5	$ 16.12	$ 16,116.04	$ 2,289	$ 0.14
10	SFR Washer Rebate (WF <=4)	Washer	$ 100	13.7	12	$ 1.67	$ 1,666.50	$ 2,289	$ 1.37
11	Florida Friendly Yard Incentive program	Landscapes	$ 725	133.0	25	$ 0.60	$ 597.38	$ 2,289	$ 3.83
12	Workshops	10 Households	$ 140	70.0	1	$ 5.48	$ 5,479.45	$ 2,289	$ 0.42
13	Public Service Announcements (PSAs)	Times Played	$ -	0.0	1	$ -		$ -	$ -
14	Exhibits	# Exhibits	$ -	0.0	1	$ -		$ -	$ -
15	Web page	#Hits	$ -	0.0	1	$ -		$ -	$ -
16	In-School Education	Students	$ -	0.0	1	$ -		$ -	$ -
17	WS Showerhead	Home	$ 10	2.4	10	$ 1.14	$ 1,141.55	$ 2,289	$ 2.00
18	WS Labeled Faucet Aerator	Household	$ 4	1.7	5	$ 1.13	$ 1,128.12	$ 2,289	$ 2.03
19	WS Labeled Kitchen Faucet Aerator	Household	$ 4	0.0	0	$ -		$ -	$ -
20	SFR Water Use Audit	Household	$ 125	33.9	5	$ 2.02	$ 3,005.31	$ 2,289	$ 0.76
21	SFR HET+ Replacement	Toilet	$ 50	8.0	25	$ 0.68	$ 171.23	$ 2,289	$ 13.37

4.1.1 SFR HET Replacement

Replaces existing low-efficiency toilets with high-efficiency toilets (HETs) rated at 1.28 gallons per flush (gpf) or less. Most commonly implemented through rebates, though vouchers, give-away, or direct installation approaches may also be used.

4.1.2 High User Irrigation Evaluation

Provides in-depth evaluations of high-use irrigation systems, including zone-by-zone inspection, adjustment of run cycles, and customer-specific recommendations. Participants also receive Florida-Friendly Landscaping guidance and educational materials to sustain savings.

4.1.3 High User Irrigation Evaluation with Enhancement

Expands the basic irrigation evaluation with on-site system upgrades such as installing ET sensors, replacing broken or mismatched sprinkler heads, capping unnecessary heads, and correcting alignment or pressure issues.

4.1.4 High User Irrigation Evaluation with WaterSense Controller

Adds installation of a WaterSense labeled ET controller to the irrigation evaluation, enabling irrigation schedules to automatically adjust to weather and evapotranspiration data.

4.1.5 High User WaterSense Labeled Irrigation Controller

Provides direct installation of a WaterSense labeled ET controller at targeted high-use locations, independent of a full irrigation evaluation.

4.1.6 Average User WaterSense Labeled Irrigation Controller

Offers WaterSense labeled ET controller installation to average-use households, broadening access to smart irrigation technology.

4.1.7 SFR Irrigation Nozzle Replacement

Replaces standard sprinkler nozzles with high-efficiency nozzles designed to reduce overspray, improve distribution uniformity, and lower wind drift. Programs typically provide ~20 nozzles per household via rebate, distribution, or direct install.

4.1.8 Rain Sensor Replacement

Provides new or replacement rain sensors that automatically shut off irrigation systems during rainfall events, preventing unnecessary outdoor water use.

4.1.9 SFR Rain Barrel (<200 gal) Rebate

Offers a rebate (typically $50) toward the purchase of a rain barrel (<200 gallons) or a small cistern (200–500 gallons) to capture rainwater for outdoor use and reduce potable irrigation demand.

4.1.10 SFR Washer Rebate (WF ≤4)

Replaces conventional washers (8–15 gallons/cubic foot of laundry) with high-efficiency Energy Star models using ≤4 gallons/cubic foot. Most effective for common-area washers in multifamily housing, which have higher daily use rates. Rebate levels vary by utility (e.g., $75 in Hernando County).

4.1.11 Florida Friendly Yard Incentive Program

Supports landscape conversions to Florida-Friendly or Florida Water Star standards, reducing long-term irrigation demand. Incentives are offered to all customers with potable irrigation. Savings vary by site but have been documented at ~130–140 gpd in regional studies.

4.1.12 Workshops

Provides customer education workshops on water-efficient practices, technologies, and outdoor savings techniques. Savings are modest but measurable; estimates assume ~10 households per workshop with ~3 gpd reduction per household.

4.1.13 Public Service Announcements (PSAs)

PSAs use media channels such as radio, television, social media, and digital advertising to inform and motivate customers about water conservation. These messages raise awareness of efficient practices, promote participation in rebate and retrofit programs, and reinforce conservation as a community value.

4.1.14 Exhibits

Exhibits consist of visual or interactive displays presented at community events, utility offices, libraries, or other public venues. They are designed to engage residents of all ages, demonstrate efficient technologies (e.g., WaterSense fixtures, smart irrigation controllers), and showcase the benefits of water conservation in a tangible, hands-on format.

4.1.15 Web Page

Utility conservation web pages provide customers with a centralized, accessible source of information. These sites typically include program descriptions, rebate forms, instructional videos, and efficiency calculators. Web resources extend outreach beyond in-person events and ensure customers have year-round access to tools that support efficient water use.

4.1.16 In-School Education

In-school programs bring water conservation concepts directly to students through classroom presentations, interactive activities, and curriculum support. Educating students not only builds long-term conservation awareness, but also extends influence into households as children share what they learn with their families.

4.1.17 WaterSense Showerhead

Replaces inefficient showerheads with WaterSense-labeled models rated at ≤1.8 gallons per minute (gpm). Typically implemented through direct installation or give-away kits, often bundled with other devices such as faucet aerators or leak detection tablets.

4.1.18 WaterSense Labeled Faucet Aerator

Adds or replaces aerators on bathroom faucets to achieve flows of ≤1.5 gpm. Commonly distributed as part of give-away kits or bundled with other low-cost water-saving devices.

4.1.19 WaterSense Labeled Kitchen Faucet Aerator

Installs kitchen faucet aerators to reduce flow to ≤2.2 gpm. Often distributed in efficiency kits alongside showerheads and bathroom aerators.

4.1.20 SFR Water Use Audit

Provides on-site residential water use surveys. Trained staff assess indoor and outdoor practices, recommend efficiency upgrades, and may install devices directly. Outdoor audits can include turf analysis, catch-can testing, and irrigation scheduling recommendations.

4.1.21 SFR HET+ Replacement

Enhances the traditional toilet rebate program by replacing 1.6 gpf ultra-low flush toilets (ULFTs) with high-efficiency toilets (HET+) rated at ≤1.1 gpf. Targeted once the stock of higher-flush toilets has been largely retired.

4.1.22 Education and Outreach Programs

While outreach and educational initiatives do not have directly quantified savings rates in the AWE Tracking Tool, they are included in the portfolio because they play an important supporting role. These efforts increase public awareness, encourage participation in rebate and retrofit programs, and help sustain water-saving behaviors over time. Recognizing their influence, these measures are presented below as complementary strategies, even though no standalone water savings are assigned to them in this analysis.

4.2 Conservation Planning Scenarios

To evaluate the role of conservation as part of the long-term water supply strategy, the conservation measures described in Section 4.1 were assembled into a set of planning scenarios representing increasing levels of program intensity and investment. These scenarios are not intended to prescribe implementation schedules or funding commitments; rather, they are designed to bound the range of achievable water savings and associated costs under different programmatic approaches.

Each scenario builds upon the baseline efficiency conditions and remaining eligible fixtures, appliances, and irrigation practices identified in Section 3. Measures were selected based on technical feasibility, alignment with remaining efficiency potential, and relative cost-effectiveness as estimated using the AWE Tracking Tool.

The conservation scenarios are structured to:

- Distinguish between passive efficiency gains and active program-driven savings
- Reflect differing levels of program effort and participation
- Support comparison of conservation outcomes with alternative water supply options

The three conservation planning scenarios evaluated are described below.

- **Tier 1 – Passive Efficiency (Low):** Tier 1 reflects only passive conservation achieved through the natural replacement of fixtures and appliances as they reach the end of their useful life. No active conservation programs are assumed under this scenario. Savings result from ongoing market-driven adoption of more efficient technologies and provide a baseline reference for evaluating the incremental benefits of active conservation.

- **Tier 2 – Targeted Active Conservation (Medium):** Tier 2 builds upon passive efficiency by incorporating a focused portfolio of active conservation programs. Measures included in this scenario reflect technologies and practices judged to be locally applicable, cost-effective, and feasible to implement at moderate participation levels. Tier 2 represents a pragmatic level of conservation that could reasonably be achieved through sustained program implementation under typical utility staffing and budget conditions.

- **Tier 3 – Expanded Conservation (High / Regional):** Tier 3 expands upon Tier 2 by applying a broader mix of conservation measures at higher participation rates. This scenario illustrates the upper range of water savings that could be achieved through more aggressive and coordinated conservation efforts. Tier 3 emphasizes diversification across both indoor and outdoor measures to reduce reliance on any single program and improve long-term resilience of conservation savings.

Together, these scenarios provide a structured framework for evaluating conservation as a planning resource, illustrating how varying levels of program investment and participation influence long-term water demand outcomes. The resulting water savings and associated costs are presented in the following sections and are used to assess conservation as a flexible and cost-effective strategy for managing long-term demand.

4.3 Scenario Assumptions and Program Penetration

Active conservation scenarios were developed by applying planning-level participation rates to the remaining eligible fixtures, appliances, and irrigation systems identified in Section 3. Participation rates were selected to reflect realistic implementation levels consistent with cost-effectiveness thresholds and anticipated program capacity over the 2025–2045 planning horizon.

Table 4-2 summarizes the eligible measures and assumed penetration rates for Tier 2 and Tier 3 scenarios. Penetration rates were intentionally set below the total remaining market potential to reflect conservative planning assumptions rather than maximum achievable uptake.

To estimate annual program activity, the total number of assumed program participants was evenly distributed across the planning horizon. Table 4-3 presents the resulting average annual interventions by measure for Tier 2 and Tier 3. This approach avoids front-loading savings and provides a stable representation of long-term program implementation.

4.4 Water Demand and Conservation Savings Results

Projected water savings and demand under each conservation scenario is summarized in Table 4-4. Under baseline conditions, potable water demand is projected to increase from 15.8 MGD in 2025 to 18.5 MGD by 2045, representing a 17.1 percent increase over the planning horizon.

- Under Tier 1, which reflects passive efficiency only, projected demand reaches 17.1 MGD by 2045, reducing demand growth by approximately 1.4 MGD relative to baseline.
- Under Tier 2, which incorporates passive efficiency plus a moderate level of active conservation, projected demand is reduced to 17.0 MGD by 2045, or 1.5 MGD below baseline.
- Under Tier 3, which assumes higher participation across selected conservation measures, projected demand declines further to 16.1 MGD by 2045, representing a 2.3 MGD reduction relative to baseline.

These results demonstrate that progressively higher levels of conservation investment yield increasing reductions in long-term demand.

4.5 Distribution of Savings Across Measures

Across all active conservation scenarios, outdoor measures account for a substantial share of total water savings, particularly in scenarios that emphasize irrigation efficiency for high-use customers. Indoor savings are driven primarily by toilet and clothes washer replacements, with additional contributions from showerheads, aerators, and audits. Indoor conservation measures tend to produce savings that are more predictable, less sensitive to behavioral variability, and more uniformly realized across customer classes. Outdoor measures, while inherently more variable, provide larger per-participant savings, greater opportunity to address seasonal and peak demand, and meaningful reductions in discretionary water use. Together, these characteristics underscore the importance of maintaining a balanced portfolio of indoor and outdoor conservation measures.

Table 4-2: Conservation Program Eligible Measures and Penetration Rates

Program Name	Units	Eligible Measures (2045)	Tier 2 Penetration Rate	Tier 3 Penetration Rate
SFR HET Replacement	Toilet	8,659	17%	15%
High User Irrigation Evaluation	Irrigation	4,134	15%	15%
High User Irrigation Evaluation w/Enhancement	Irrigation	4,134	15%	15%
High User Irrigation Evaluation w/WS Controller	Controller	4,134	15%	15%
High User WS Labeled Irrigation Controller	Controller	4,134	25%	25%
Average User WS Labeled Irrigation Controller	Controller	16,538	25%	25%
SFR Irrigation Nozzle Replacement	Sprinkler Head	14,867	25%	25%
Rain Sensor Replacement	Controller	14,867	25%	25%
SFR Rain Barrel (< 200 gal) Rebate	Household	14,867	1%	1%
SFR Washer Rebate (WF <=4)	Washer	40,107	0%	5%
Florida Friendly Yard Incentive program	Landscapes	14,867	1%	1%
Workshops	10 Households	51,681	1%	1%
PSA	Times Played	51,681	1%	1%
Exhibits	# Exhibits	51,681	0%	0%
Web page	# Hits	51,681	0%	0%
In-School Education	Students	0	0%	0%
WaterSense Showerhead	Home	167,431	3%	3%
WS Labeled Faucet Aerator	Household	167,431	9%	9%
WS Labeled Kitchen Faucet Aerator	Household	51,681	0%	0%
SFR Water Use Audit	Household	51,681	0%	0%
SFR HET+ Replacement	Toilet	153,621	17%	15%

Table 4-3: Tier 2 and Tier 3 Annual Planned Measures

Program Name	Tier 2					Tier 3				
	2025	2030	2035	2040	2045	2025	2030	2035	2040	2045
SFR HET Replacement	70	70	70	70	70	70	70	70	70	70
High User Irrigation Evaluation	-	-	-	-	-	30	30	30	30	30
High User Irrigation Evaluation w/Enhancement	20	20	20	20	20	30	30	30	30	30
High User Irrigation Evaluation w/WS Controller	-	-	-	-	-	30	30	30	30	30
High User WS Labeled Irrigation Controller	10	10	10	10	10	49	49	49	49	49
Average User WS Labeled Irrigation Controller	-	-	-	-	-	197	197	197	197	197
SFR Irrigation Nozzle Replacement	-	-	-	-	-	177	177	177	177	177
Rain Sensor Replacement	-	-	-	-	-	177	177	177	177	177
SFR Rain Barrel (< 200 gal) Rebate	-	-	-	-	-	7	7	7	7	7
SFR Washer Rebate (WF <=4)	-	-	-	-	-	-	-	-	-	-
Florida Friendly Yard Incentive program	-	-	-	-	-	7	7	7	7	7
Workshops	4	4	4	4	4	25	25	25	25	25
PSA	-	-	-	-	-	37	37	37	37	37
Exhibits	-	-	-	-	-	12	12	12	12	12
Web page	-	-	-	-	-	-	-	-	-	-
In-School Education	-	-	-	-	-	-	-	-	-	-
WaterSense Showerhead	225	225	225	225	225	225	225	225	225	225
WS Labeled Faucet Aerator	225	225	225	225	225	225	225	225	225	225
WS Labeled Kitchen Faucet Aerator	-	-	-	-	-	-	-	-	-	-
Water Use Audits	35	150	150	150	150	-	-	-	-	-
SFR HET+ Replacement	-	-	-	-	-	1242	1242	1242	1242	1242

Table 4-4: Annual Water Demand Projections

Unit	Variable	2020	2025	2030	2035	2040	2045	2025-2045	
								Change	% Change
Water Demand (MGD)	Baseline	13.0	15.8	16.4	17.1	17.7	18.5	2.7	17.1%
	Tier 1	13.0	15.1	15.6	16.1	16.5	17.1	2.0	13.0%
	Tier 2	13.0	15.1	15.5	16.0	16.4	17.0	1.9	12.4%
	Tier 3	13.0	15.0	15.0	15.2	15.6	16.1	1.1	7.4%
Demand Reduction (MGD)	Baseline	-	-	-	-	-	-	-	-
	Tier 1	-	0.7	0.9	1.1	1.2	1.4	0.7	112%
	Tier 2	-	0.7	0.9	1.2	1.3	1.5	0.8	124%
	Tier 3	-	0.8	1.4	1.9	2.1	2.3	1.6	211%
% Reduction	Baseline	-	-	-	-	-	-	-	-
	Tier 1	-	4.2%	5.3%	6.2%	6.9%	7.5%	3.4%	81%
	Tier 2	-	4.2%	5.7%	6.7%	7.5%	8.1%	3.9%	91%
	Tier 3	-	4.8%	8.5%	11.0%	11.9%	12.7%	7.9%	166%
GPCD	Baseline	131	132	132	132	132	133	1	0.4%
	Tier 1	131	127	125	124	123	123	-4	-3.1%
	Tier 2	131	126	125	123	122	122	-5	-3.7%
	Tier 3	131	126	121	118	116	116	-10	-8.0%
GPCD Reduction	Baseline	-	-	-	-	-	-	-	-
	Tier 1	-	5.5	7.0	8.2	9.1	10.0	4.5	82%
	Tier 2	-	5.6	7.6	8.9	9.9	10.7	5.1	92%
	Tier 3	-	6.3	11.2	14.6	15.8	16.8	10.6	168%

The distribution of savings differs notably between conservation scenarios. In Tier 2, the irrigation controller program has the highest savings, accounting for 29 percent of total savings. The SFR HET replacement and irrigation evaluation programs represent the second highest water savings, accounting for 22.2 percent of total savings each. While this reflects the strong performance of smart irrigation and efficient toilet technologies, it also indicates a portfolio that is heavily reliant on a few measure types. In Tier 3, conservation savings are distributed more evenly across a broader range of measures. Irrigation controllers, irrigation evaluations, and HET replacements remain important contributors; however, substantial additional savings are achieved through high-efficiency (HET+) toilet replacements, irrigation nozzle upgrades, and rain sensor replacements. This broader distribution reduces reliance on any single technology and improves the robustness of the conservation portfolio if participation in individual programs falls short of expectations.

Table 4-5 summarizes cumulative water savings by program for Tier 2 and Tier 3 and illustrates how expanded participation and a more diverse measure mix contribute to higher overall savings and a more balanced distribution of conservation benefits.

4.6 Annual Budget Estimates

Estimated annual program costs for Tier 2 and Tier 3 are summarized in Table 4-6. For most measures, unit costs are assumed to remain constant over the planning horizon. Tier 2 achieves moderate demand reductions at relatively low annual cost but concentrates expenditures in a small number of measures. Tier 3 requires higher annual investment but produces nearly eight times the cumulative savings while distributing costs across a broader suite of programs.

Table 4-5: Tier 2 and Tier 3 Cumulative Program Water Savings Estimates (MGY)

Program Name	Tier 2							Tier 3						
	2025	2030	2035	2040	2045	Million Gallons Saved (2025-2045)	Total Distribution	2025	2030	2035	2040	2045	Million Gallons Saved (2025-2045)	Total Distribution
SFR HET Replacement	0.71	3.96	6.77	9.23	11.40	137	22.2%	0.71	3.96	6.77	9.23	11.40	137	2.8%
High User Irrigation Evaluation	-	-	-	-	-	-	-	1.86	9.31	9.31	9.31	9.31	177	3.6%
High User Irrigation Evaluation w/Enhancement	1.44	7.19	7.19	7.19	7.19	137	22.2%	2.16	10.79	10.79	10.79	10.79	205	4.2%
High User Irrigation Evaluation w/WS Controller	-	-	-	-	-	-	-	3.89	23.32	38.87	38.87	38.87	641	13.0%
High User WS Labeled Irrigation Controller	1.08	6.50	10.84	10.84	10.84	179	29.0%	5.31	31.87	53.12	53.12	53.12	876	17.8%
Average User WS Labeled Irrigation Controller	-	-	-	-	-	-	-	8.70	52.20	86.99	86.99	86.99	1435	29.1%
SFR Irrigation Nozzle Replacement	-	-	-	-	-	-	-	2.07	12.40	20.67	20.67	20.67	341	6.9%
Rain Sensor Replacement	-	-	-	-	-	-	-	2.26	6.78	6.78	6.78	6.78	136	2.8%
SFR Rain Barrel (< 200 gal) Rebate	-	-	-	-	-	-	-	0.00	0.02	0.02	0.02	0.02	0	0.0%
SFR Washer Rebate (WF <=4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Florida Friendly Yard Incentive program	-	-	-	-	-	-	-	0.34	2.04	3.74	5.44	7.14	78	1.6%
Workshops	0.10	0.10	0.10	0.10	0.10	2	0.3%	0.64	0.64	0.64	0.64	0.64	13	0.3%
PSA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exhibits	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Web page	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In-School Education	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WaterSense Showerhead	0.20	1.18	1.97	1.97	1.97	33	5.3%	0.20	1.18	1.97	1.97	1.97	33	0.7%
WS Labeled Faucet Aerator	0.14	0.70	0.70	0.70	0.70	13	2.2%	0.14	0.70	0.70	0.70	0.70	13	0.3%
WS Labeled Kitchen Faucet Aerator	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Use Audits	0.43	6.24	6.24	6.24	6.24	116	18.9%	-	-	-	-	-	-	-
SFR HET+ Replacement	-	-	-	-	-	-	-	3.63	21.76	39.89	58.03	76.16	838	17.0%
Total	4.1	25.9	33.8	36.3	38.4	617	100%	31.9	177.0	280.3	302.6	324.6	4924	100%

Table 4-6: Tier 2 and Tier 3 Conservation Plan Estimated Annual Budget

Program Name	Tier 2			Tier 3		
	Annual Budget[1]	Total Expenditures (2025-2045)	Distribution Within Utility (2025-2045)	Annual Budget[1]	Total Expenditures (2025-2045)	Distribution Within Utility (2025-2045)
SFR HET Replacement	$7,000	$147,000	17.0%	$7,000	$147,000	3.6%
High User Irrigation Evaluation	-	-	-	$12,000	$252,000	6.2%
High User Irrigation Evaluation w/Enhancement	$9,000	$189,000	21.9%	$13,500	$283,500	7.0%
High User Irrigation Evaluation w/WS Controller	-	-	-	$22,500	$472,500	11.7%
High User WS Labeled Irrigation Controller	$3,500	$73,500	8.5%	$17,150	$360,150	8.9%
Average User WS Labeled Irrigation Controller	-	-	-	$19,700	$413,700	10.2%
SFR Irrigation Nozzle Replacement	-	-	-	$17,700	$371,700	9.2%
Rain Sensor Replacement	-	-	-	$8,850	$185,850	4.6%
SFR Rain Barrel (< 200 gal) Rebate	-	-	-	$350	$7,350	0.2%
SFR Washer Rebate (WF <=4)	-	-	-	-	-	-
Florida Friendly Yard Incentive program	-	-	-	$5,075	$106,575	2.6%
Workshops	$560	$11,760	1.4%	$3,500	$73,500	1.8%
PSA	-	-	-	-	-	-
Exhibits	-	-	-	-	-	-
Web page	-	-	-	-	-	-
In-School Education	-	-	-	-	-	-
WaterSense Showerhead	$2,250	$47,250	5.5%	$2,250	$47,250	1.2%
WS Labeled Faucet Aerator	$788	$16,538	1.9%	$788	$16,538	0.4%
WS Labeled Kitchen Faucet Aerator	-	-	-	-	-	-
Water Use Audits	$18,750	$379,375	43.9%	-	-	-
SFR HET+ Replacement	-	-	-	$62,100	$1,304,100	32.3%
Total	$41,848	$864,423	100%	$192,463	$4,041,713	100%

[1] The annual budget column references the 2045 annual budget values. The annual budget for Tier 2 and Tier 3 is the same for every year, except for the Tier 2 Water Use Audits program. The annual budget for the Tier 2 Water Use Audits program in 2025 is $4,375.

5. Summary and Conclusions

This Water Conservation Plan evaluates the role of conservation in supporting long-term water supply sustainability for Marion County Utilities through a planning-level assessment of baseline efficiency, remaining conservation potential, and achievable water savings under varying program scenarios.

Baseline projections indicate that absent additional conservation efforts, potable water demand is expected to increase substantially through 2045. Passive efficiency improvements associated with natural replacement of fixtures and appliances (Tier 1) modestly reduce this growth but are insufficient on their own to offset projected increases in demand. As a result, active conservation programs play a critical role in managing future water needs.

The conservation planning scenarios evaluated in this plan demonstrate that meaningful demand reductions can be achieved through targeted, cost-effective measures. Tier 2 represents a moderate level of active conservation focused on high-performing measures, particularly irrigation efficiency technologies. This scenario provides a pragmatic and scalable level of demand reduction achievable under typical programmatic and budgetary conditions, though savings are concentrated in a limited number of measures.

The Tier 3 scenario illustrates the upper range of achievable conservation savings through higher participation and a more diversified program portfolio. While requiring greater overall investment, Tier 3 produces larger and more reliable long-term demand reductions by distributing savings across a broader mix of indoor and outdoor measures, including irrigation controllers, high-efficiency toilet replacements, irrigation nozzle upgrades, and landscape conversions. This diversification reduces reliance on any single measure and enhances the robustness of conservation as a planning resource.

Across scenarios, outdoor measures account for a substantial share of total savings, particularly those targeting high irrigation users and seasonal demand. Indoor measures provide more predictable and consistent savings that complement outdoor programs and contribute to long-term baseline efficiency improvements. Together, these measures form a balanced conservation portfolio capable of addressing both average and peak demand drivers.

From a water supply planning perspective, conservation offers several advantages relative to traditional supply-side options. Conservation savings can be phased over time, scaled to available funding, and adjusted as demand conditions evolve. When evaluated on a cost-per-gallon basis, many conservation measures compare favorably with alternative water supply options and can reduce or defer the need for future capital-intensive supply projects.

In summary, this analysis demonstrates that conservation can offset a substantial portion of Marion County Utilities' projected demand growth through 2045. Tier 2 represents a reasonable baseline level of conservation achievable through targeted program implementation, while Tier 3 highlights the broader potential available through sustained and diversified investment. Together, these scenarios support the inclusion of conservation as a core component of long-term water supply planning and provide a consistent analytical foundation for coordination with the WRWSA Regional Water Supply Plan.

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The Villages Community Development District Conservation Plan

December 2025

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List of Acronyms

Abbreviation	Definition
AWE	Alliance for Water Efficiency
CII	Commercial, Industrial, and Institutional
CPC	Conservation Planning Committee
EPAct	U.S. Energy Policy Act of 1992
ET	Evapotranspiration
gpd	Gallons per Day
gpf	Gallons per Flush
gpm	Gallons per Minute
HE	High Efficiency
HET	High Efficiency Toilet
HET+	Ultra High Efficiency Toilet
HEU	High Efficiency Urinal
MGD	Million Gallons per Day
MGY	Million Gallons per Year
MF	Multifamily
NR	Nonresidential
PSAR	Public Supply Annual Report
RWSP	Regional Water Supply Plan
SF	Single-Family
SWFWMD	Southwest Florida Water Management District
ULFT	Ultra-Low Flow Toilet
WF	Water Factor
WRWSA	Withlacoochee Regional Water Supply Authority
WS	WaterSense

1. Introduction

This Conservation Plan was developed to identify cost-effective strategies for reducing water demand through 2045, supporting long-term water supply sustainability for The Villages. Conservation is essential for extending existing water sources, reducing peak demand, and deferring or avoiding costly new supply projects. The plan was prepared as part of the Withlacoochee Regional Water Supply Authority (WRWSA) 2025 Regional Water Supply Plan (RWSP), funded through a cooperative funding agreement between WRWSA and the Southwest Florida Water Management District (SWFWMD). While supporting regional planning efforts, this document also serves as a stand-alone plan for The Villages.

The plan was developed collaboratively with the WRWSA Conservation Planning Committee, which included representatives from Citrus, Hernando, and Marion Counties, the City of Ocala, and The Villages. This collaborative approach ensures regional consistency while allowing each utility to tailor programs to local needs and priorities.

A wide range of residential and nonresidential water efficiency measures was evaluated, including fixture and appliance upgrades, irrigation improvements, landscape practices, system evaluations, and education/outreach initiatives. Programs were selected based on local relevance, expected water savings, feasibility, and cost-effectiveness.

Water savings potential was assessed using three scenarios:

- Tier 1 (Low): Passive conservation from natural replacement of fixtures, new construction standards, and market-driven adoption of efficient technologies.
- Tier 2 (Medium): Passive efficiency plus a targeted portfolio of active conservation programs, reflecting a practical and achievable level of effort.
- Tier 3 (High/Regional): Expanded conservation with higher participation and broader regional application, illustrating the upper bound of achievable savings.

These tiered scenarios provide a transparent framework for evaluating conservation potential and integrating savings into demand projections and regional planning. The Alliance for Water Efficiency (AWE) Tracking Tool was used to estimate baseline water use, remaining efficiency potential, program-level savings, and costs, with local data incorporated where available.

Overall, this plan supports The Villages' long-term water supply planning by identifying feasible, cost-effective conservation strategies. These efforts help defer capital-intensive supply projects, reduce long-term costs, and ensure reliable service for current and future customers, while supporting compliance with regulatory requirements.

2. Baseline Housing, Population, and Water Demand

Establishing baseline housing, population, and water demand conditions provides the foundation for evaluating conservation potential and understanding how future demands are expected to evolve in the absence of additional conservation efforts. These baseline conditions represent the reference case against which conservation savings are measured and are critical for assessing how conservation influences long-term water supply planning. For The Villages, baseline conditions were developed by evaluating population, housing units, service connections, and water demand across primary customer classes. This assessment supports both utility-level conservation planning and integration of conservation results into regional demand projections used in the WRWSA 2025 Regional Water Supply Plan.

2.1 Customer Classes and Demand Composition

Water demand is analyzed across three primary customer classes: Single-Family (SF), Multifamily (MF), and Commercial, Industrial, and Institutional (CII). Each class has distinct water use characteristics, end-use profiles, and conservation opportunities. By disaggregating demand in this way, conservation potential can be evaluated more precisely, supporting the development of targeted and cost-effective programs. Single-family residential customers account for the largest share of total water demand and exhibit the greatest seasonal variability due to outdoor irrigation. In contrast, multifamily demand is primarily driven by indoor water use and is typically less seasonal. CII demand is diverse, reflecting a range of operational drivers and conservation opportunities depending on facility type.

2.2 Baseline Data Sources and Methodology

Baseline demand projections for The Villages were developed using data from the 2021 Public Supply Annual Report (PSAR) for Permit Number 13005 (The Villages Combined Water Use Permit). These data established the foundation for evaluating conservation potential, with demand across single-family, multifamily, and commercial/industrial/institutional classes assumed to represent total retail sales. Population and housing forecasts align with the WRWSA Regional Water Supply Plan, and baseline projections reflect average annual conditions, incorporating only passive efficiency improvements such as fixture replacement and updated plumbing codes. The Alliance for Water Efficiency (AWE) Tracking Tool was calibrated with utility-specific data to ensure consistency between observed water use and modeled end-use distributions.

2.3 Baseline Growth and Demand Trends

Table 2-1 presents the historical and projected baseline inputs used in the AWE Tracking Tool, including population, dwelling units, service connections, and water demand by customer class over the 2025–2045 planning horizon. As shown, baseline projections indicate minimal growth across all major planning inputs, with almost all increases occurring in the single-family residential sector. While overall growth rates are minimal, the concentration of growth within single-family development has important implications for future water demand due to the associated contribution of outdoor irrigation.

Key observations include:

- Population Growth: Population Growth: Total population served is projected to grow by about 1% (694 people) between 2025 and 2045, with all growth occurring in the single-family sector.
- Housing Growth: Dwelling units are projected to increase by 386 (1%) over the same period, again only from single-family development.
- Service Connections: Total connections increase by about 395 (1%), with SF customers comprising nearly 98% of the growth.
- Water Demand: Total water sales are projected to remain at 19.35 MGD between 2025 and 2045.

These projections establish the baseline conditions against which conservation savings are measured and highlight the extent to which residential growth, particularly single-family development, drives future demand. Even with embedded passive efficiency improvements, projected demand increases underscore the importance of active conservation programs in moderating long-term water use and reducing the timing and magnitude of future supply needs.

2.4 Seasonal and End-Use Considerations

Baseline water demand shows seasonal variability, with outdoor irrigation in single-family homes driving peak demand during dry periods. Indoor residential use remains steady year-round, influenced by household size, fixture efficiency, and occupancy. Commercial, industrial, and institutional water use varies due to diverse operational needs. Recognizing these patterns is key for conservation planning: indoor measures manage annual demand, while outdoor programs reduce seasonal peaks. Addressing both is vital, as peak demand affects system capacity and future supply investments.

2.5 Role of the Baseline in Conservation Evaluation

The baseline conditions described in this section represent the reference case against which conservation savings are evaluated in subsequent sections of this plan. Conservation scenarios build upon these baseline projections by incorporating both passive and active efficiency improvements to estimate conservation-adjusted demands. By establishing a clear and consistent baseline, this plan ensures that conservation savings reflect true reductions relative to expected future conditions rather than reductions relative to historical use alone. This approach supports transparent evaluation of conservation benefits and facilitates integration of utility-level conservation results into regional water supply planning and avoided-cost analyses.

Table 2-1: Historical and Projected AWE Tracking Tool Inputs

Input	Class	Historical Observations		Projections					2025-2045		
		1990	2020	2025	2030	2035	2040	2045	Change	% Change	% of Change within Utility
Population	SF	1,000	91,920	90,389	90,616	90,766	90,919	91,083	694	0.8%	100.0%
	MF	0	0	0	0	0	0	0	0	0.0%	0.0%
	Total	1,000	91,920	90,389	90,616	90,766	90,919	91,083	694	0.8%	100.0%
Dwelling Units	SF	426	51,151	50,299	50,425	50,509	50,594	50,685	386	0.8%	100.0%
	MF	0	0	0	0	0	0	0	0	0.0%	0.0%
	Total	556	51,151	50,299	50,425	50,509	50,594	50,685	386	0.8%	100.0%
Connections	SF	556	51,151	50,299	50,425	50,509	50,594	50,685	386	0.8%	97.8%
	MF	0	0	0	0	0	0	0	0	0.0%	0.0%
	CII Mixed Meter	0	1,143	1,124	1,127	1,129	1,131	1,133	9	0.8%	2.2%
	Total	556	52,294	51,423	51,552	51,638	51,725	51,818	395	0.8%	100.0%
Water Sales	SF		18.40	16.12	16.12	16.12	16.12	16.12	0	0.0%	-
	MF		0.00	0.00	0.00	0.00	0.00	0.00	0	0.0%	-
	CII Mixed Meter		3.38	2.96	2.96	2.96	2.96	2.96	0	0.0%	-
	UAW		0.30	0.26	0.26	0.26	0.26	0.26	0	0.0%	-
	Total		22.08	19.35	19.35	19.35	19.35	19.35	0	0.0%	-

3. Evaluation of Conservation Potential

Conservation potential is assessed by first establishing baseline water efficiency and then identifying opportunities for additional active conservation programs. Water savings result from both passive efficiency improvements, such as natural fixture replacement and regulatory standards and active utility-driven initiatives that further reduce demand. Differentiating these sources is essential for producing accurate and defensible estimates of conservation potential. By evaluating conservation relative to projected future baseline conditions, rather than historical use, the analysis ensures that estimated savings reflect true incremental reductions and avoids overstating the benefits of active programs.

3.1 Passive and Active Conservation Framework

Water efficiency improvements occur through both passive and active mechanisms.

- **Passive conservation** represents efficiency gains that occur without direct programmatic intervention. These gains are driven by plumbing codes and standards, market transformation, and the natural replacement of fixtures and appliances as they reach the end of their useful life. Passive efficiency improvements are most strongly associated with indoor water use, where fixture turnover steadily shifts the installed stock toward higher efficiency over time.
- **Active conservation** represents additional efficiency gains achieved through conservation programs designed to accelerate replacement of inefficient fixtures, influence customer behavior, or address water uses not typically affected by passive replacement. Active programs may include rebates, direct-install programs, irrigation system evaluations, landscape incentives, and education and outreach initiatives.

Separating passive and active conservation is essential for identifying the remaining market available for active water efficiency programs and for ensuring that conservation savings are incremental and not double-counted.

3.2 Establishing Baseline Water Efficiency

The baseline water efficiency assessment determines current and projected levels of technological efficiency before active conservation programs are implemented. This process quantifies passive efficiency improvements already reflected in baseline demand projections and identifies the remaining fixtures, appliances, and practices eligible for active conservation efforts.

The AWE Tracking Tool, a Microsoft Excel–based planning model, serves as the primary instrument for estimating baseline efficiency, passive water savings, and the cost-effectiveness of water-saving measures. The tool incorporates stock models for single-family, multifamily, and commercial, industrial, and institutional customer classes, estimating the distribution of key fixtures and appliances across various efficiency levels over time.

Fixtures and appliances evaluated include toilets, urinals, clothes washers (in-unit and shared), showerheads, faucet aerators, and dishwashers. The tool projects water savings from passive replacement as older, less efficient models are replaced with products that meet or exceed current standards.

The remaining inventory of conventional and standard efficiency fixtures after passive replacement establishes the starting point for estimating active conservation potential. This potential is defined by the portion of the remaining stock that could reasonably be replaced through utility-sponsored programs, considering usage intensity. The estimation of active program savings is addressed in subsequent sections of the plan.

3.3 End-Use Technology Efficiency Levels

End-use technologies evaluated in the baseline assessment are grouped into three general efficiency levels:

- **Non-conserving (conventional):** Typically the least efficient fixtures and appliances, most commonly found in homes and businesses constructed prior to 1994.
- **Conserving (standard):** Fixtures and appliances that meet minimum plumbing code or appliance efficiency standards.
- **Ultra-conserving (high-efficiency):** Fixtures and appliances that exceed minimum efficiency standards, often carrying the U.S. Environmental Protection Agency (EPA) WaterSense label.

The U.S. Energy Policy Act of 1992 (EPAct) was a pivotal milestone in advancing water efficiency, introducing maximum flow standards for toilets, faucets, and showerheads, as well as efficiency requirements for nonresidential plumbing fixtures. EPAct also set energy efficiency standards for appliances such as water heaters and air conditioners, which helped reduce water use in energy-intensive systems like cooling towers. Since its enactment, manufacturers have consistently developed products that meet or exceed these federal standards. The EPA WaterSense program has further accelerated market transformation by certifying ultra-efficient fixtures that maintain performance while using less water. Consequently, the market has steadily shifted toward higher-efficiency technologies for both fixtures and appliances.

3.4 Passive Replacement and Useful Life Assumptions

As fixtures and appliances reach the end of their useful life, they are assumed to be replaced with products that meet prevailing efficiency standards. This process drives passive efficiency improvements embedded in baseline demand projections.

Each fixture and appliance type is assigned an expected useful life, which is used to estimate an annual natural replacement rate (NRR) according to Equation 3-1:

Equation 3-1:

$$nrr = \frac{1}{Expected\ Life\ in\ Years}$$

Fixtures subject to natural replacement assumptions include toilets, urinals, clothes washers, and dishwashers. In contrast, outdoor irrigation measures and many CII technologies (e.g., cooling towers) are not typically subject to natural replacement and therefore do not exhibit significant passive efficiency improvements over time. Accounting for passive replacement is essential for avoiding overestimation of conservation potential and for isolating the remaining market that can be addressed through active conservation programs.

3.5 Data Sources and Local Calibration

Baseline efficiency estimates were developed using utility-reported data from the 2022 Public Supply Annual Report (PSAR), including service connections, population, and water demand by customer class. These data were integrated with AWE Tracking Tool stock distributions and useful-life parameters, with local information incorporated where available to accurately reflect service-area conditions. For historical demand estimates dating back to 1990, a parcel-level dataset from SWFWMD, containing year-built and land use classification, was used to assign historical population to single-family and multifamily customer classes. This approach ensured consistency between historical housing stock, population estimates, and the reporting categories used in both the PSAR and the AWE Tracking Tool. By aligning historical development patterns with modeled efficiency trends, the baseline assessment provides a robust foundation for identifying remaining conservation potential and guiding program development.

3.6 Residential Indoor Water Efficiency Baseline Assessment

Residential water use and efficiency are influenced by location-specific factors such as housing age, number of occupants, household income, and outdoor features like pools or automated irrigation systems. Housing age is especially significant, as older homes tend to have less efficient fixtures and appliances, while newer homes typically incorporate higher-efficiency technologies. The presence of automated irrigation systems also correlates with housing age and can substantially impact outdoor water use.

For multifamily properties, water use patterns are more complex due to variations in building size, occupancy, management practices, and the presence of shared facilities. Factors such as sub-metering and responsibility for outdoor maintenance contribute to greater variability in efficiency potential compared to single-family homes.

To estimate the remaining market potential for residential indoor efficiency measures, projected housing unit counts for both single-family and multifamily sectors are used. These projections help identify the number of non-conserving toilets, showerheads, clothes washers, and dishwashers available for replacement with higher-efficiency products over the planning horizon. Faucet aerators are excluded, as most are already operating at high efficiency levels. A summary of common residential end uses and location characteristics affecting water demand is provided in Table 3-1.

Table 3-1: Common End Use and Location Characteristics Affecting Residential Water Use

End Uses	Location Characteristics
• Irrigation • Pools • Clothes/dish washing • Bathing • Toilet flushing • Eating/drinking • Leaks	• Number of occupants • Home value • Age of house and/or plumbing • Building/irrigable area • Number/ages/types of toilets, fixtures, and appliances • Price of water and income level of occupants • Alternative water sources (e.g. reclaimed water, shallow wells)

3.6.1 Residential Fixtures and Appliances

Residential water efficiency opportunities are evaluated collectively for major fixtures and appliances, including toilets, clothes washers, showerheads, faucet aerators, and dishwashers. The AWE Tracking Tool stock model simulates the gradual replacement of conventional units with higher-efficiency products, estimating both passive and active conservation potential.

- **Toilets**: Stock estimates support calculation of passive efficiency improvements and identification of remaining units eligible for replacement. With an expected useful life of 25 years (natural replacement rate of 4% per year), the share of single-family toilets exceeding 1.6 gallons per flush (gpf) is projected to decline from 2.5% in 2025 to 0.9% by 2045. Table 3-2 presents the estimated number of toilets by efficiency class for single-family and multifamily housing.

- **Clothes Washers:** High-efficiency ENERGY STAR washers use 4 gallons per cubic foot of laundry or less, compared to up to 15 gallons per cubic foot for conventional models. Approximately 50% of clothes washers in single-family housing are expected to remain conventional through 2045 under baseline conditions. Table 3-2 summarizes the projected distribution of clothes washers by efficiency class.

Table 3-2 provides a comprehensive breakdown of fixture and appliance stock, efficiency levels, and projected changes over the planning horizon. This table is essential for illustrating the remaining market potential for indoor water efficiency measures and guiding targeted conservation programs.

3.7 Nonresidential Indoor Water Efficiency Baseline Assessment

The CII sector encompasses a diverse range of customer types, each with unique water use characteristics. For this baseline assessment, NR service connections reported in the PSAR were used to estimate CII water demand and the remaining potential for indoor efficiency improvements.

The AWE Tracking Tool uses a statistical model to estimate nonresidential fixture counts based on the number of accounts and population served. While this provides a reasonable baseline for fixture distribution and passive efficiency trends, it does not capture the full variability across different facility types. Therefore, these estimates reflect overall baseline conditions and remaining potential for efficiency upgrades, rather than site-specific savings.

Table 3-2: Residential End Uses by Technological Efficiency Level

Class	End Use Technology	Mechanical Efficiency	Projections					2025-2045	
			2025	2030	2035	2040	2045	Change	% Change
SF	Toilets	Pre-ULFT	3,142	2,411	1,884	1,467	1,137	-2,005	-63.8%
		ULFT/HET	122,580	123,226	124,253	124,858	125,390	2,810	2.3%
		% Pre-ULFT	2.5%	1.9%	1.5%	1.2%	0.9%	-	-
SF	Showerheads	>2.5 gpm	392	232	137	81	48	-345	-87.8%
		(1.8, 2.5)	100,205	100,366	100,880	101,107	101,322	1,117	1.1%
		<=1.8 gpm	-	-	-	-	-	0	0.0%
		% >2.5 gpm	0.4%	0.2%	0.1%	0.1%	0.0%	-	-
SF	Clotheswashers	Conventional	24,668	24,527	24,539	24,526	24,535	-133	-0.5%
		High-Efficiency	23,925	24,066	24,253	24,348	24,425	500	2.1%
		% Conventional	50.8%	50.5%	50.3%	50.2%	50.1%	-	-
SF	Dishwashers	Conventional	10,295	7,914	6,408	5,480	4,930	-5,366	-52.1%
		High-Efficiency	35,740	38,121	39,817	40,821	41,454	5,713	16.0%
		% Conventional	22.4%	17.2%	13.9%	11.8%	10.6%	-	-
MF	Toilets	Pre-ULFT	-	-	-	-	-	-	-
		ULFT	-	-	-	-	-	-	-
		% Pre-ULFT	-	-	-	-	-	-	-
MF	Showerheads	>2.5 gpm	-	-	-	-	-	-	-
		(1.8, 2.5)	-	-	-	-	-	-	-
		<=1.8 gpm	-	-	-	-	-	-	-
		% >2.5 gpm	-	-	-	-	-	-	-
MF	In-Unit Clotheswashers	Conventional	-	-	-	-	-	-	-
		High-Efficiency	-	-	-	-	-	-	-
		% Conventional	-	-	-	-	-	-	-
MF	Shared Clotheswashers	Conventional	-	-	-	-	-	-	-
		High-Efficiency	-	-	-	-	-	-	-
		% Conventional	-	-	-	-	-	-	-
MF	Dishwashers	Conventional	-	-	-	-	-	-	-
		High-Efficiency	-	-	-	-	-	-	-
		% Conventional	-	-	-	-	-	-	-

3.7.1 Nonresidential Toilets and Urinals

Restroom fixtures, specifically toilets and urinals, are the most consistent and broadly applicable targets for indoor water efficiency improvements within the commercial, industrial, and institutional (CII) sector. These fixtures are present in nearly all nonresidential facility types, making them a central focus for baseline efficiency assessments. The AWE Tracking Tool estimates the distribution of nonresidential toilets and urinals by efficiency class, using assumptions about useful life and natural replacement rates. This allows for calculation of passive efficiency improvements and identification of the remaining stock of fixtures that do not meet current high-efficiency standards.

Table 3-3 presents the projected stock of CII toilets by efficiency class from 2025 through 2045. All nonresidential toilets are projected to be ultra-low flow toilets (ULFT) across the planning horizon.

Urinals show a different efficiency profile. The majority are assumed to operate at flow rates of 1.0 gpf or greater, with only a small share represented by ultra-low-flow or waterless models. Because urinals are less frequently replaced through passive turnover and often remain in service for extended periods, a substantial stock of higher-volume urinals remains across the CII sector. Identifying these remaining inventories of toilets and urinals establishes the foundation for evaluating nonresidential indoor conservation measures in subsequent sections of this plan.

Table 3-3: CII End Uses by Technological Efficiency Level

Class	End Use Technology	Mechanical Efficiency	Projections					2025-2045	
			2025	2030	2035	2040	2045	Change	% Change
CII	Toilets	Pre- ULFT	-	-	-	-	-	0	0.0%
		ULFT	14,250	14,280	14,301	14,321	14,343	94	0.7%
		% Pre-ULFT	0.0%	0.0%	0.0%	0.0%	0.0%	-	-
CII	Urinals	>=1 gpf	2,136	2,134	2,133	2,132	2,132	-3	-0.2%
		0.5 gpf	-	-	-	-	-	0	0.0%
		0.25 gpf	-	-	-	-	-	0	0.0%
		0.125 gpf	-	-	-	-	-	0	0.0%
		0 gpf	105	110	115	119	122	17	16.7%
		% >=1 gpf	95.3%	95.1%	94.9%	94.7%	94.6%	-	-

3.8 Landscape Irrigation Water Efficiency Baseline Assessment

Outdoor water use remains one of the largest opportunities for efficiency improvements in the single-family residential sector. Unlike indoor fixtures, landscape irrigation efficiency does not improve significantly through passive replacement, making outdoor use a critical focus for assessing remaining conservation potential.

Efficiency potential was evaluated by identifying single-family customers with irrigation systems and classifying them based on observed irrigation behavior relative to theoretical landscape water requirements. Customers were grouped as either average irrigators—those whose water use is at or below estimated landscape needs, or high irrigators, those who exceed these requirements. This distinction enables a more accurate assessment of where efficiency improvements are most needed.

Research by the WRWSA found that approximately 40% of single-family customers irrigate seasonally, while about 20% exhibit over-irrigation behaviors. These findings informed the assumptions used in this baseline assessment. The distribution of irrigator types is summarized in Table 3-4, and the estimated number of irrigators by category is presented in Table 3-5.

Potential improvements in landscape irrigation efficiency stem from practices and technologies such as irrigation system evaluations, smart controllers, high-efficiency nozzles, and rain or soil moisture sensors. While these measures are described in detail in Section 4, they are referenced here to define the achievable efficiency potential within the outdoor sector.

The baseline assessment indicates that the greatest remaining efficiency potential lies with high irrigators, where targeted measures can substantially reduce water use without risk of rebound. For average irrigators, program design must be carefully tailored to avoid unintended increases in water use, such as when automated controllers are provided to customers already irrigating below theoretical need.

Table 3-4: Percent Breakdown of Irrigator Types

Irrigator Type	% of Irrigators
% Total Irrigators	40%
% Total Non-Irrigators	60%
% Total High Irrigators	20%
% Total Low Irrigators	80%

Table 3-5: Distribution of Irrigators

Variable	2020	Projections					2025 - 2045	
		2025	2030	2035	2040	2045	Change	% Change
Total SF Homes	51,151	50,299	50,425	50,509	50,594	50,685	386	0.8%
Total SF Non-Irrigators	30,690	29,943	30,046	30,059	30,077	30,095	153	0.5%
Total SF Irrigators	20,460	20,120	20,170	20,203	20,238	20,274	154	0.8%
Total SF High Irrigators	4,092	4,024	4,034	4,041	4,048	4,055	31	0.8%
Total SF Low Irrigators	16,368	16,096	16,136	16,163	16,190	16,219	124	0.8%
New SF Irrigators	509	169	219	252	286	323	154	91.7%
New SF High Irrigators	102	34	44	50	57	65	31	91.7%
New SF Low Irrigators	407	135	175	202	229	258	124	91.7%
Existing SF Irrigators	19,951	20,188	20,160	20,197	20,231	20,267	79	0.4%
Existing SF High Irrigators	3,990	4,038	4,032	4,039	4,046	4,053	16	0.4%
Existing SF Low Irrigators	15,961	16,150	16,128	16,157	16,185	16,213	63	0.4%

4. Water Conservation Program Development

Water conservation program development is based on the baseline efficiency assessment and remaining market characterization presented in Section 3. The goal is to identify and evaluate a portfolio of technically feasible, locally relevant conservation measures for inclusion in planning scenarios. Measures are selected through a review of eligible fixtures, appliances, and irrigation practices, and are screened for technical applicability and cost-effectiveness. The AWE Tracking Tool is used to estimate water savings, costs, and program effectiveness, supporting prioritization and comparison with alternative supply options. Selected measures are then assembled into planning scenarios, with estimated savings and budget impacts evaluated for long-term implementation.

Water conservation program development is guided by a structured evaluation process. First, a baseline assessment identifies remaining opportunities for efficiency improvements. Potential measures, such as fixture and appliance upgrades, irrigation enhancements, and outreach, are reviewed for technical feasibility and cost-effectiveness. These measures are then assembled into program portfolios, which are evaluated using the AWE Tracking Tool to estimate water savings, costs, and overall effectiveness. This portfolio-based approach allows the utility to prioritize and implement a balanced mix of conservation strategies, ensuring both immediate and long-term demand reductions that can be compared with other alternative supply options.

The sections that follow describe the conservation measures considered (Section 4.1), followed by the assembly of those measures into planning scenarios and the resulting water savings and budget implications (Sections 4.2 through 4.4).

4.1 Water Conservation Measures

The conservation measures evaluated in this plan include a suite of indoor and outdoor water efficiency technologies and practices applicable primarily to the single-family residential sector. Measures were selected based on technical feasibility, documented performance, and alignment with the remaining efficiency potential identified in Section 3.

Table 4-1 summarizes the conservation measures evaluated, along with estimated unit costs, unit savings, and cost-effectiveness metrics. Although the AWE Tracking Tool includes 21 single-family program options, 15 measures were selected based on their applicability and potential to achieve meaningful savings.

Estimated water savings reflect the full useful life of each measure, with measure life and unit savings varying by technology and implementation approach. Cost-effectiveness metrics were developed to support program prioritization and comparison with alternative water supply options.

Each measure targets either indoor (e.g., toilets, clothes washers, showerheads, and aerators) or outdoor (e.g., irrigation evaluations, smart controllers, rain sensors, and landscape conversions) water use. Only a subset of measures was incorporated into the Tier 2 and Tier 3 planning scenarios, which are evaluated in subsequent sections.

Table 4-1: Portfolio of Conservation Programs and Unit Cost

Program Name & Category			Program Cost and Water Saving Parameters						
Program ID	Program Name	Units	Utility ($/unit)	Expected Savings (gpd/unit)	Life of Savings (Years)	Cost Effectiveness ($/1000 gal)	Utility Unit Cost ($/MG)	Utility Unit Benefit ($/MG)	Utility BCR
1	SFR HET Replacement	Toilet	$ 50	8.3	25	$ 0.66	$ -184.48	$ 2,289	$100.00
2	High User Irrigation Evaluation	Irrigation	$ 400	170.0	5	$ 1.29	$ 1,289.28	$ 2,289	$ 1.78
3	High User Irrigation Evaluation w/Enhancement	Irrigation	$ 450	197.0	5	$ 1.25	$ 1,251.65	$ 2,289	$ 1.83
4	High User Irrigation Evaluation w/WS Controller	Controller	$ 750	355.0	10	$ 0.58	$ 578.82	$ 2,289	$ 3.95
5	High User WS Labeled Irrigation Controller	Controller	$ 350	297.0	10	$ 0.32	$ 322.86	$ 2,289	$ 7.09
6	Average User WS Labeled Irrigation Controller	Controller	$ 100	121.0	10	$ 0.23	$ 226.46	$ 2,289	$ 10.11
7	SFR Irrigation Nozzle Replacement	Sprinkler Head	$ 100	32.0	10	$ 0.86	$ 856.16	$ 2,289	$ 2.67
8	Rain Sensor Replacement	Controller	$ 50	35.0	3	$ 1.30	$ 1,304.63	$ 2,289	$ 1.75
9	SFR Rain Barrel (< 200 gal) Rebate	Household	$ 50	1.7	5	$ 16.12	$ 16,116.04	$ 2,289	$ 0.14
10	SFR Washer Rebate (WF <=4)	Washer	$ 100	13.7	12	$ 1.67	$ 1,666.50	$ 2,289	$ 1.37
11	Florida Friendly Yard Incentive program	Landscapes	$ 725	133.0	25	$ 0.60	$ 597.38	$ 2,289	$ 3.83
12	Workshops	10 Households	$ 140	70.0	1	$ 5.48	$ 5,479.45	$ 2,289	$ 0.42
13	Public Service Announcements (PSAs)	Times Played	$ -	0.0	1	$ -		$ -	$ -
14	Exhibits	# Exhibits	$ -	0.0	1	$ -		$ -	$ -
15	Web page	#Hits	$ -	0.0	1	$ -		$ -	$ -
16	In-School Education	Students	$ -	0.0	1	$ -		$ -	$ -
17	WS Showerhead	Home	$ 10	2.4	10	$ 1.14	$ 1,141.55	$ 2,289	$ 2.00
18	WS Labeled Faucet Aerator	Household	$ 4	1.7	5	$ 1.13	$ 1,128.12	$ 2,289	$ 2.03
19	WS Labeled Kitchen Faucet Aerator	Household	$ 4	0.0	0	$ -		$ -	$ -
20	SFR Water Use Audit	Household	$ 125	33.9	5	$ 2.02	$ 3,005.31	$ 2,289	$ 0.76
21	SFR HET+ Replacement	Toilet	$ 50	8.0	0	$ -	$ 171.23	$ 2,289	$ 13.37

4.1.1 SFR HET Replacement

Replaces existing low-efficiency toilets with high-efficiency toilets (HETs) rated at 1.28 gallons per flush (gpf) or less. Most commonly implemented through rebates, though vouchers, give-away, or direct installation approaches may also be used.

4.1.2 High User Irrigation Evaluation

Provides in-depth evaluations of high-use irrigation systems, including zone-by-zone inspection, adjustment of run cycles, and customer-specific recommendations. Participants also receive Florida-Friendly Landscaping guidance and educational materials to sustain savings.

4.1.3 High User Irrigation Evaluation with Enhancement

Expands the basic irrigation evaluation with on-site system upgrades such as installing ET sensors, replacing broken or mismatched sprinkler heads, capping unnecessary heads, and correcting alignment or pressure issues.

4.1.4 High User Irrigation Evaluation with WaterSense Controller

Adds installation of a WaterSense labeled ET controller to the irrigation evaluation, enabling irrigation schedules to automatically adjust to weather and evapotranspiration data.

4.1.5 High User WaterSense Labeled Irrigation Controller

Provides direct installation of a WaterSense labeled ET controller at targeted high-use locations, independent of a full irrigation evaluation.

4.1.6 Average User WaterSense Labeled Irrigation Controller

Offers WaterSense labeled ET controller installation to average-use households, broadening access to smart irrigation technology.

4.1.7 SFR Irrigation Nozzle Replacement

Replaces standard sprinkler nozzles with high-efficiency nozzles designed to reduce overspray, improve distribution uniformity, and lower wind drift. Programs typically provide ~20 nozzles per household via rebate, distribution, or direct install.

4.1.8 Rain Sensor Replacement

Provides new or replacement rain sensors that automatically shut off irrigation systems during rainfall events, preventing unnecessary outdoor water use.

4.1.9 SFR Rain Barrel (<200 gal) Rebate

Offers a rebate (typically $50) toward the purchase of a rain barrel (<200 gallons) or a small cistern (200–500 gallons) to capture rainwater for outdoor use and reduce potable irrigation demand.

4.1.10 SFR Washer Rebate (WF ≤4)

Replaces conventional washers (8–15 gallons/cubic foot of laundry) with high-efficiency Energy Star models using ≤4 gallons/cubic foot. Most effective for common-area washers in multifamily housing, which have higher daily use rates. Rebate levels vary by utility (e.g., $75 in Hernando County).

4.1.11 Florida Friendly Yard Incentive Program

Supports landscape conversions to Florida-Friendly or Florida Water Star standards, reducing long-term irrigation demand. Incentives are offered to all customers with potable irrigation. Savings vary by site but have been documented at ~130–140 gpd in regional studies.

4.1.12 Workshops

Provides customer education workshops on water-efficient practices, technologies, and outdoor savings techniques. Savings are modest but measurable; estimates assume ~10 households per workshop with ~3 gpd reduction per household.

4.1.13 Public Service Announcements (PSAs)

PSAs use media channels such as radio, television, social media, and digital advertising to inform and motivate customers about water conservation. These messages raise awareness of efficient practices, promote participation in rebate and retrofit programs, and reinforce conservation as a community value.

4.1.14 Exhibits

Exhibits consist of visual or interactive displays presented at community events, utility offices, libraries, or other public venues. They are designed to engage residents of all ages, demonstrate efficient technologies (e.g., WaterSense fixtures, smart irrigation controllers), and showcase the benefits of water conservation in a tangible, hands-on format.

4.1.15 Web Page

Utility conservation web pages provide customers with a centralized, accessible source of information. These sites typically include program descriptions, rebate forms, instructional videos, and efficiency calculators. Web resources extend outreach beyond in-person events and ensure customers have year-round access to tools that support efficient water use.

4.1.16 In-School Education

In-school programs bring water conservation concepts directly to students through classroom presentations, interactive activities, and curriculum support. Educating students not only builds long-term conservation awareness, but also extends influence into households as children share what they learn with their families.

4.1.17 WaterSense Showerhead

Replaces inefficient showerheads with WaterSense-labeled models rated at ≤1.8 gallons per minute (gpm). Typically implemented through direct installation or give-away kits, often bundled with other devices such as faucet aerators or leak detection tablets.

4.1.18 WaterSense Labeled Faucet Aerator

Adds or replaces aerators on bathroom faucets to achieve flows of ≤1.5 gpm. Commonly distributed as part of give-away kits or bundled with other low-cost water-saving devices.

4.1.19 WaterSense Labeled Kitchen Faucet Aerator

Installs kitchen faucet aerators to reduce flow to ≤2.2 gpm. Often distributed in efficiency kits alongside showerheads and bathroom aerators.

4.1.20 SFR Water Use Audit

Provides on-site residential water use surveys. Trained staff assess indoor and outdoor practices, recommend efficiency upgrades, and may install devices directly. Outdoor audits can include turf analysis, catch-can testing, and irrigation scheduling recommendations.

4.1.21 SFR HET+ Replacement

Enhances the traditional toilet rebate program by replacing 1.6 gpf ultra-low flush toilets (ULFTs) with high-efficiency toilets (HET+) rated at ≤1.1 gpf. Targeted once the stock of higher-flush toilets has been largely retired.

4.1.22 Education and Outreach Programs

While outreach and educational initiatives do not have directly quantified savings rates in the AWE Tracking Tool, they are included in the portfolio because they play an important supporting role. These efforts increase public awareness, encourage participation in rebate and retrofit programs, and help sustain water-saving behaviors over time. Recognizing their influence, these measures are presented below as complementary strategies, even though no standalone water savings are assigned to them in this analysis.

4.2 Conservation Planning Scenarios

To evaluate the role of conservation as part of the long-term water supply strategy, the conservation measures described in Section 4.1 were assembled into a set of planning scenarios representing increasing levels of program intensity and investment. These scenarios are not intended to prescribe implementation schedules or funding commitments; rather, they are designed to bound the range of achievable water savings and associated costs under different programmatic approaches.

Each scenario builds upon the baseline efficiency conditions and remaining eligible fixtures, appliances, and irrigation practices identified in Section 3. Measures were selected based on technical feasibility, alignment with remaining efficiency potential, and relative cost-effectiveness as estimated using the AWE Tracking Tool.

The conservation scenarios are structured to:

- Distinguish between passive efficiency gains and active program-driven savings
- Reflect differing levels of program effort and participation
- Support comparison of conservation outcomes with alternative water supply options

The three conservation planning scenarios evaluated are described below.

- **Tier 1 – Passive Efficiency (Low):** Tier 1 reflects only passive conservation achieved through the natural replacement of fixtures and appliances as they reach the end of their useful life. No active conservation programs are assumed under this scenario. Savings result from ongoing market-driven adoption of more efficient technologies and provide a baseline reference for evaluating the incremental benefits of active conservation.

- **Tier 2 – Targeted Active Conservation (Medium):** Tier 2 builds upon passive efficiency by incorporating a focused portfolio of active conservation programs. Measures included in this scenario reflect technologies and practices judged to be locally applicable, cost-effective, and feasible to implement at moderate participation levels. Tier 2 represents a pragmatic level of conservation that could reasonably be achieved through sustained program implementation under typical utility staffing and budget conditions.

- **Tier 3 – Expanded Conservation (High / Regional):** Tier 3 expands upon Tier 2 by applying a broader mix of conservation measures at higher participation rates. This scenario illustrates the upper range of water savings that could be achieved through more aggressive and coordinated conservation efforts. Tier 3 emphasizes diversification across both indoor and outdoor measures to reduce reliance on any single program and improve long-term resilience of conservation savings.

Together, these scenarios provide a structured framework for evaluating conservation as a planning resource, illustrating how varying levels of program investment and participation influence long-term water demand outcomes. The resulting water savings and associated costs are presented in the following sections and are used to assess conservation as a flexible and cost-effective strategy for managing long-term demand.

4.3 Scenario Assumptions and Program Penetration

Active conservation scenarios were developed by applying planning-level participation rates to the remaining eligible fixtures, appliances, and irrigation systems identified in Section 3. Participation rates were selected to reflect realistic implementation levels consistent with cost-effectiveness thresholds and anticipated program capacity over the 2025–2045 planning horizon.

Table 4-2 summarizes the eligible measures and assumed penetration rates for Tier 2 and Tier 3 scenarios. Penetration rates were intentionally set below the total remaining market potential to reflect conservative planning assumptions rather than maximum achievable uptake.

To estimate annual program activity, the total number of assumed program participants was evenly distributed across the planning horizon. Table 4-3 presents the resulting average annual interventions by measure for Tier 2 and Tier 3. This approach avoids front-loading savings and provides a stable representation of long-term program implementation.

4.4 Water Demand and Conservation Savings Results

Projected water savings and demand under each conservation scenario is summarized in Table 4-4. Under baseline conditions, potable water demand is projected to remain constant at 19.3 MGD from 2025 to 2045.

- Under Tier 1, which reflects passive efficiency only, the projected demand remains at 19.3 MGD in 2045.
- Under Tier 2, which incorporates passive efficiency plus a moderate level of active conservation, projected demand is reduced to 0.02 MGD below baseline.
- Under Tier 3, which assumes higher participation across selected conservation measures, projected demand declines to 18.7 MGD by 2045, representing a 0.6 MGD reduction relative to baseline.

These results demonstrate that progressively higher levels of conservation investment yield increasing reductions in long-term demand.

4.5 Distribution of Savings Across Measures

Across all active conservation scenarios, outdoor measures account for a substantial share of total water savings, particularly in scenarios that emphasize irrigation efficiency for high-use customers. Indoor savings are driven primarily by toilet and clothes washer replacements, with additional contributions from showerheads, aerators, and audits. Indoor conservation measures tend to produce savings that are more predictable, less sensitive to behavioral variability, and more uniformly realized across customer classes. Outdoor measures, while inherently more variable, provide larger per-participant savings, greater opportunity to address seasonal and peak demand, and meaningful reductions in discretionary water use. Together, these characteristics underscore the importance of maintaining a balanced portfolio of indoor and outdoor conservation measures.

Table 4-2: Conservation Program Eligible Measures and Penetration Rates

Program Name	Units	Eligible Measures (2045)	Tier 2 Penetration Rate	Tier 3 Penetration Rate
SFR HET Replacement	Toilet	0	0%	15%
High User Irrigation Evaluation	Irrigation	4,055	15%	15%
High User Irrigation Evaluation w/Enhancement	Irrigation	4,055	15%	15%
High User Irrigation Evaluation w/WS Controller	Controller	16,219	15%	15%
High User WS Labeled Irrigation Controller	Controller	4,055	25%	25%
Average User WS Labeled Irrigation Controller	Controller	4,055	25%	25%
SFR Irrigation Nozzle Replacement	Sprinkler Head	20,274	25%	25%
Rain Sensor Replacement	Controller	20,274	25%	25%
SFR Rain Barrel (< 200 gal) Rebate	Household	20,274	1%	1%
SFR Washer Rebate (WF <=4)	Washer	24,666	0%	5%
Florida Friendly Yard Incentive program	Landscapes	20,274	1%	1%
Workshops	10 Households	50,685	1%	1%
PSA	Times Played	50,685	1%	1%
Exhibits	# Exhibits	50,685	0%	0%
Web page	# Hits	50,685	0%	0%
In-School Education	Students	50,685	0%	0%
WaterSense Showerhead	Home	101,159	0%	0%
WS Labeled Faucet Aerator	Household	101,159	0%	0%
WS Labeled Kitchen Faucet Aerator	Household	50,685	0%	0%
SFR Water Use Audit	Household	50,685	0%	0%
SFR HET+ Replacement	Toilet	126,676	0%	0%

Table 4-3: Tier 2 and Tier 3 Annual Planned Measures

Program Name	Tier 2					Tier 3				
	2025	2030	2035	2040	2045	2025	2030	2035	2040	2045
SFR HET Replacement	-	-	-	-	-	-	-	-	-	-
High User Irrigation Evaluation	24	24	24	24	24	29	29	29	29	29
High User Irrigation Evaluation w/Enhancement	-	-	-	-	-	29	29	29	29	29
High User Irrigation Evaluation w/WS Controller	-	-	-	-	-	29	29	29	29	29
High User WS Labeled Irrigation Controller	-	-	-	-	-	48	48	48	48	48
Average User WS Labeled Irrigation Controller	-	-	-	-	-	48	48	48	48	48
SFR Irrigation Nozzle Replacement	-	-	-	-	-	241	241	241	241	241
Rain Sensor Replacement	-	-	-	-	-	241	241	241	241	241
SFR Rain Barrel (< 200 gal) Rebate	-	-	-	-	-	10	10	10	10	10
SFR Washer Rebate (WF <=4)	-	-	-	-	-	59	59	59	59	59
Florida Friendly Yard Incentive program	-	-	-	-	-	10	10	10	10	10
Workshops	24	24	24	24	24	24	24	24	24	24
PSA	36	36	36	36	36	36	36	36	36	36
Exhibits	12	12	12	12	12	12	12	12	12	12
Web page	-	-	-	-	-	-	-	-	-	-
In-School Education	-	-	-	-	-	-	-	-	-	-
WaterSense Showerhead	-	-	-	-	-	-	-	-	-	-
WS Labeled Faucet Aerator	-	-	-	-	-	-	-	-	-	-
WS Labeled Kitchen Faucet Aerator	-	-	-	-	-	-	-	-	-	-
Water Use Audits	-	-	-	-	-	-	-	-	-	-
SFR HET+ Replacement	-	-	-	-	-	905	905	905	905	905

Table 4-4: Annual Water Demand Projections

Unit	Variable	2020	2025	2030	2035	2040	2045	2025-2045	
								Change	% Change
Water Demand (MGD)	Baseline	22.0	19.3	19.3	19.3	19.3	19.3	0.00	0.0%
	Tier 1	22.0	19.3	19.3	19.3	19.3	19.3	0.00	0.0%
	Tier 2	22.0	19.3	19.3	19.3	19.3	19.3	-0.02	-0.1%
	Tier 3	22.0	19.3	19.0	18.8	18.7	18.7	-0.6	-3.0%
Demand Reduction (MGD)	Baseline	-	-	-	-	-	-	-	-
	Tier 1	-	-	-	-	-	-	-	-
	Tier 2	-	0.01	0.02	0.02	0.02	0.02	0.02	283%
	Tier 3	-	0.1	0.4	0.6	0.6	0.7	0.6	854%
% Reduction	Baseline	-	-	-	-	-	-	-	-
	Tier 1	-	-	-	-	-	-	-	-
	Tier 2	-	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	283%
	Tier 3	-	0.4%	1.9%	2.9%	3.1%	3.4%	3.0%	854%
GPCD	Baseline	240	214	213	213	212	212	-2	-0.8%
	Tier 1	240	214	213	213	212	212	-2	-0.8%
	Tier 2	240	214	213	213	212	212	-2	-0.8%
	Tier 3	240	213	209	207	206	205	-8	-3.8%
GPCD Reduction	Baseline	-	-	-	-	-	-	-	-
	Tier 1	-	-	-	-	-	-	-	-
	Tier 2	-	0.1	0.2	0.2	0.2	0.2	0.2	280%
	Tier 3	-	0.8	4.0	6.2	6.7	7.1	6.4	846%

The distribution of savings differs notably between conservation scenarios. In Tier 2, irrigation evaluation programs dominate, accounting for more than 90 percent of total savings. While this reflects the strong performance of irrigation evaluations, it also indicates a portfolio that is heavily reliant on a single measure type. In Tier 3, conservation savings are distributed more evenly across a broader range of measures. Irrigation evaluations remain an important contributor; however, substantial additional savings are achieved through irrigation controllers, high-efficiency (HET+) toilet replacements, and irrigation nozzle upgrades. This broader distribution reduces reliance on any single technology and improves the robustness of the conservation portfolio if participation in individual programs falls short of expectations.

Table 4-5 summarizes cumulative water savings by program for Tier 2 and Tier 3 and illustrates how expanded participation and a more diverse measure mix contribute to higher overall savings and a more balanced distribution of conservation benefits.

4.6 Annual Budget Estimates

Estimated annual program costs for Tier 2 and Tier 3 are summarized in Table 4-6. For most measures, unit costs are assumed to remain constant over the planning horizon. Tier 2 achieves low demand reductions at relatively low annual cost but concentrates expenditures in a small number of measures. Tier 3 requires higher annual investment but produces over twenty times the cumulative savings while distributing costs across a broader suite of programs.

Table 4-5: Tier 2 and Tier 3 Cumulative Program Water Savings Estimates (MGY)

Program Name	Tier 2							Tier 3						
	2025	2030	2035	2040	2045	Million Gallons Saved (2025-2045)	Total Distribution	2025	2030	2035	2040	2045	Million Gallons Saved (2025-2045)	Total Distribution
SFR HET Replacement	-	-	-	-	-	-	-	-	-	-	-	-	-	-
High User Irrigation Evaluation	1.49	7.45	7.45	7.45	7.45	141	91.7%	1.80	9.00	9.00	9.00	9.00	171	4.7%
High User Irrigation Evaluation w/Enhancement	-	-	-	-	-	-	-	2.09	10.43	10.43	10.43	10.43	198	5.4%
High User Irrigation Evaluation w/WS Controller	-	-	-	-	-	-	-	3.76	22.55	37.58	37.58	37.58	620	17.0%
High User WS Labeled Irrigation Controller	-	-	-	-	-	-	-	5.20	31.22	52.03	52.03	52.03	859	23.6%
Average User WS Labeled Irrigation Controller	-	-	-	-	-	-	-	2.12	12.72	21.20	21.20	21.20	350	9.6%
SFR Irrigation Nozzle Replacement	-	-	-	-	-	-	-	2.81	16.89	28.15	28.15	28.15	464	12.8%
Rain Sensor Replacement	-	-	-	-	-	-	-	3.08	9.24	9.24	9.24	9.24	185	5.1%
SFR Rain Barrel (< 200 gal) Rebate	-	-	-	-	-	-	-	0.01	0.03	0.03	0.03	0.03	1	0.0%
SFR Washer Rebate (WF <=4)	-	-	-	-	-	-	-	0.30	1.77	3.25	3.54	3.54	55	1.5%
Florida Friendly Yard Incentive program	-	-	-	-	-	-	-	0.49	2.91	5.34	7.77	10.19	112	3.1%
Workshops	0.61	0.61	0.61	0.61	0.61	13	8.3%	0.61	0.61	0.61	0.61	0.61	13	0.4%
PSA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exhibits	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Web page	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In-School Education	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WaterSense Showerhead	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WS Labeled Faucet Aerator	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WS Labeled Kitchen Faucet Aerator	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Use Audits	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SFR HET+ Replacement	-	-	-	-	-	-	-	2.64	15.85	29.06	42.27	55.48	610	16.8%
Total	2.1	8.1	8.1	8.1	8.1	154	100%	24.9	133.2	205.9	221.8	237.5	3637	100%

Table 4-6: Tier 2 and Tier 3 Conservation Plan Estimated Annual Budget

Program Name	Tier 2			Tier 3		
	Annual Budget[1]	Total Expenditures (2025-2045)	Distribution Within Utility (2025-2045)	Annual Budget[1]	Total Expenditures (2025-2045)	Distribution Within Utility (2025-2045)
SFR HET Replacement	-	-	-	-	-	-
High User Irrigation Evaluation	$9,600	$201,600	74.1%	$11,600	$243,600	7.0%
High User Irrigation Evaluation w/Enhancement	-	-	-	$13,050	$274,050	7.8%
High User Irrigation Evaluation w/WS Controller	-	-	-	$21,750	$456,750	13.1%
High User WS Labeled Irrigation Controller	-	-	-	$16,800	$352,800	10.1%
Average User WS Labeled Irrigation Controller	-	-	-	$4,800	$100,800	2.9%
SFR Irrigation Nozzle Replacement	-	-	-	$24,100	$506,100	14.5%
Rain Sensor Replacement	-	-	-	$12,050	$253,050	7.2%
SFR Rain Barrel (< 200 gal) Rebate	-	-	-	$500	$10,500	0.3%
SFR Washer Rebate (WF <=4)	-	-	-	$5,900	$123,900	3.5%
Florida Friendly Yard Incentive program	-	-	-	$7,250	$152,250	4.4%
Workshops	$3,360	$70,560	25.9%	$3,360	$70,560	2.0%
PSA	-	-	-	-	-	-
Exhibits	-	-	-	-	-	-
Web page	-	-	-	-	-	-
In-School Education	-	-	-	-	-	-
WaterSense Showerhead	-	-	-	-	-	-
WS Labeled Faucet Aerator	-	-	-	-	-	-
WS Labeled Kitchen Faucet Aerator	-	-	-	-	-	-
Water Use Audits	-	-	-	-	-	-
SFR HET+ Replacement	-	-	-	$45,242	$950,074	27.2%
Total	$12,960	$272,160	100%	$166,402	$3,494,434	100%

[1] The annual budget column references the 2045 annual budget values. The annual budget for Tier 2 and Tier 3 is the same for every year.

5. Summary and Conclusions

This Water Conservation Plan evaluates the role of conservation in supporting long-term water supply sustainability for The Villages through a planning-level assessment of baseline efficiency, remaining conservation potential, and achievable water savings under varying program scenarios.

Baseline projections indicate that absent additional conservation efforts, potable water demand is expected to increase substantially through 2045. Passive efficiency improvements associated with natural replacement of fixtures and appliances (Tier 1) modestly reduce this growth but are insufficient on their own to offset projected increases in demand. As a result, active conservation programs play a critical role in managing future water needs.

The conservation planning scenarios evaluated in this plan demonstrate that meaningful demand reductions can be achieved through targeted, cost-effective measures. Tier 2 represents a moderate level of active conservation focused on high-performing measures, particularly irrigation efficiency technologies. This scenario provides a pragmatic and scalable level of demand reduction achievable under typical programmatic and budgetary conditions, though savings are concentrated in a limited number of measures.

The Tier 3 scenario illustrates the upper range of achievable conservation savings through higher participation and a more diversified program portfolio. While requiring greater overall investment, Tier 3 produces larger and more reliable long-term demand reductions by distributing savings across a broader mix of indoor and outdoor measures, including irrigation controllers, high-efficiency toilet replacements, irrigation nozzle upgrades, and landscape conversions. This diversification reduces reliance on any single measure and enhances the robustness of conservation as a planning resource.

Across scenarios, outdoor measures account for a substantial share of total savings, particularly those targeting high irrigation users and seasonal demand. Indoor measures provide more predictable and consistent savings that complement outdoor programs and contribute to long-term baseline efficiency improvements. Together, these measures form a balanced conservation portfolio capable of addressing both average and peak demand drivers.

From a water supply planning perspective, conservation offers several advantages relative to traditional supply-side options. Conservation savings can be phased over time, scaled to available funding, and adjusted as demand conditions evolve. When evaluated on a cost-per-gallon basis, many conservation measures compare favorably with alternative water supply options and can reduce or defer the need for future capital-intensive supply projects.

In summary, this analysis demonstrates that conservation can offset a substantial portion of The Villages' projected demand growth through 2045. Tier 2 represents a reasonable baseline level of conservation achievable through targeted program implementation, while Tier 3 highlights the broader potential available through sustained and diversified investment. Together, these scenarios support the inclusion of conservation as a core component of long-term water supply planning and provide a consistent analytical foundation for coordination with the WRWSA Regional Water Supply Plan.

Appendix D: Alternative Water Supply Project Cost Estimation Methodology

Cost estimates were based on the AWS cost model Excel file prepared by the SJRWMD. The SJRWMD's model was reviewed to assess whether the cost estimates would properly reflect the cost of supply project components constructed in the WRWSA region. The SJRWMD's Excel-based AWS cost model is described in its document titled "Special Publication SJ2008-SP10, Engineering Assistance in Updating Information on Water Supply and Reuse System Component Costs." Each worksheet in the Excel file represents a different AWS project component and the worksheet provides the following costs: Capital Cost, Annual Operations and Maintenance (O&M) Cost, and Total Cost per 1,000 gallons.

These costs are determined by cost equations and the values of certain parameters of the AWS project evaluated, including average daily flow in MGD, maximum daily flow (capacity) in MGD, raw water storage in million gallons (MG), capacities of the pump stations in MGD, and feet of transmission pipeline by pipe size. Applicable cost equations were provided in the cost model or derived from "Special Publication SJ2008-SP13, Water Supply Facilities Cost Equations for Application to Alternative Water Supply Projects Investigations and Regional Water Supply Planning."

The Excel AWS cost model was obtained from the SJRWMD and was revised to represent pricing conditions as of 2024. The following changes to the model were made:

- The Construction Cost markup for Mobilization and Demobilization, Contractor OH&P, and Construction Contingency was increased from 35 percent in the SJRWMD model to 60 percent. This includes increasing transmission pipeline markups from 15 percent to 60 percent, which is the only component deviating from the 35 percent markup.
- Non-construction costs are assumed to be 25 percent of construction costs and include facilities planning, engineering design, permitting, services during construction, and administration.
- The discount rate used to calculate the annualized capital cost was increased from 2.875 percent per year to 5.0 percent per year. The 5.0 percent is the median and most common coupon rate paid by municipalities and the State of Florida for water, sewer and power bonds in 2024.
- The $0.09 per kWh power cost used in the SJRWMD AWS cost model was found to still represent the current electricity price paid by Florida's industrial customers based on the data obtained from the US Energy Information Administration.
- The 2020 capital costs provided in the SJRWMD model were updated to 2024 dollars using the Producer Price Index (PPI) for new industrial building construction obtained from the US Bureau of Labor Statistics. The annual O&M costs were adjusted by the PPI for Nonresidential Building Maintenance and Repair obtained from the Economic Research Division of the Federal Reserve Bank of St. Louis.

- Land values were adjusted to 2024 dollars.
- A peaking factor of 1.86515 was used based on regional utility daily operating data for 2023.

The following cost component worksheets of the SJRWMD cost model were used in this planning level evaluation of AWS alternatives. For additional components not initially present in singular worksheets, additional worksheets were developed by following a similar process and using “Construction OPC and Maintenance” costs from “Special Publication SJ2008-SP10.” The nomenclature of the components is stripped directly from “Special Publication SJ2008-SP10.”

The components used include:

- High Service Pumping System
- Transmission Pipelines
- Residual Disinfection for Transmission System
- Conventional Surface Water Treatment Plant
- Storage Ponds and Reservoirs
- Surface Water Intake
- Concrete Storage Tanks
- Lower Floridan Aquifer Wellfield
- Brackish Groundwater Treatment Plant
- Complete Seawater Desalination Treatment Plant <25 MGD
- Membrane Softening (Nanofiltration)
- MF/UF Membrane Filtration System
- Brackish Water Reverse Osmosis Membranes
- UV System[1]
- Injection Well System

The service life of the Conventional Surface Water Treatment, Residual Disinfection for Transmission System, Lower Floridan Aquifer Wellfield, Brackish Groundwater Treatment Plant, and Complete Seawater Desalination Treatment Plant <25 MGD are assumed to be 30 years. The service life for Concrete Storage Tanks is assumed to be 35 years. The remaining components’ service life are assumed to be 40 years.

O&M costs include labor, power, and chemical costs necessary for operation and renewal and replacement costs for equipment maintenance and membrane replacement. These costs are derived from equations provided in the cost model or from “Special Publication SJ2008-SP13.” Unit production cost is a function of the capital costs, debt service, annual O&M costs, and the amount of water produced.

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[1] The UV cost component is used for MAR projects 2A and 2B. According to Fla. Admin. Code R. 62-565.560, advanced treatment of water includes an oxidation treatment process, of which a UV Advanced Oxidation Process was assumed. The SJRWMD cost model only includes a physical UV disinfection system, and not a UV Advanced Oxidation Process. The EPA Work Breakdown Structure Model for Ultraviolet Photolysis/Advanced Oxidation Process Treatment spreadsheet was used for the construction cost and O&M cost for projects 2A and 2B.

Appendix E: Water Conservation Cost Estimates and Expected Savings

Table E-1: Benchmark Utility Conservation Plan Savings (MG)

Utility	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	Cumulative
Citrus	25	50	75	97	120	140	160	179	199	219	222	225	228	231	234	237	239	242	245	248	251	3,867
Hernando	60	118	177	229	281	326	370	415	459	503	509	515	520	525	530	535	540	545	550	555	560	8,821
Marion	33	65	97	127	156	182	207	233	258	283	288	292	297	301	306	310	315	319	324	328	332	5,054
Ocala	13	28	45	62	78	93	107	120	133	145	148	149	151	152	153	155	156	157	159	160	161	2,525
Villages	25	49	73	95	116	133	151	168	185	202	206	209	212	216	219	222	225	228	231	234	237	3,637
WRWSA	**156**	**311**	**466**	**609**	**752**	**873**	**994**	**1,115**	**1,234**	**1,353**	**1,373**	**1,391**	**1,408**	**1,425**	**1,442**	**1,459**	**1,475**	**1,492**	**1,509**	**1,525**	**1,542**	**23,904**

Table E-2: Benchmark Utility Conservation Plan Costs ($ Thousands)

Utility	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	Cumulative
Citrus	$145	$145	$144	$143	$143	$143	$143	$143	$143	$143	$143	$143	$143	$143	$143	$143	$143	$143	$143	$143	$143	$3,014
Hernando	$333	$333	$333	$333	$333	$333	$333	$333	$333	$333	$333	$333	$333	$333	$333	$333	$333	$333	$333	$333	$333	$6,995
Marion	$196	$196	$196	$196	$196	$196	$196	$196	$196	$196	$196	$196	$196	$196	$196	$196	$196	$196	$196	$196	$196	$4,115
Ocala	$72	$87	$92	$98	$98	$98	$101	$101	$101	$101	$101	$101	$101	$101	$101	$101	$101	$101	$101	$101	$101	$2,056
Villages	$166	$166	$166	$166	$166	$166	$166	$166	$166	$166	$166	$166	$166	$166	$166	$166	$166	$166	$166	$166	$166	$3,494
WRWSA	**$913**	**$927**	**$932**	**$937**	**$937**	**$937**	**$939**	**$939**	**$939**	**$939**	**$939**	**$939**	**$939**	**$939**	**$939**	**$939**	**$939**	**$939**	**$939**	**$939**	**$939**	**$19,674**

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