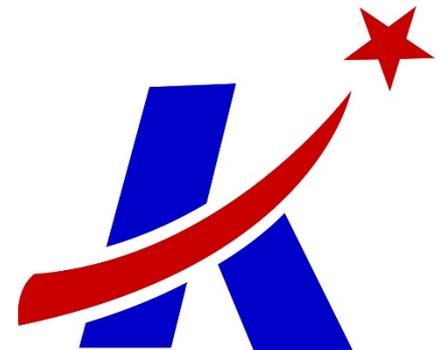


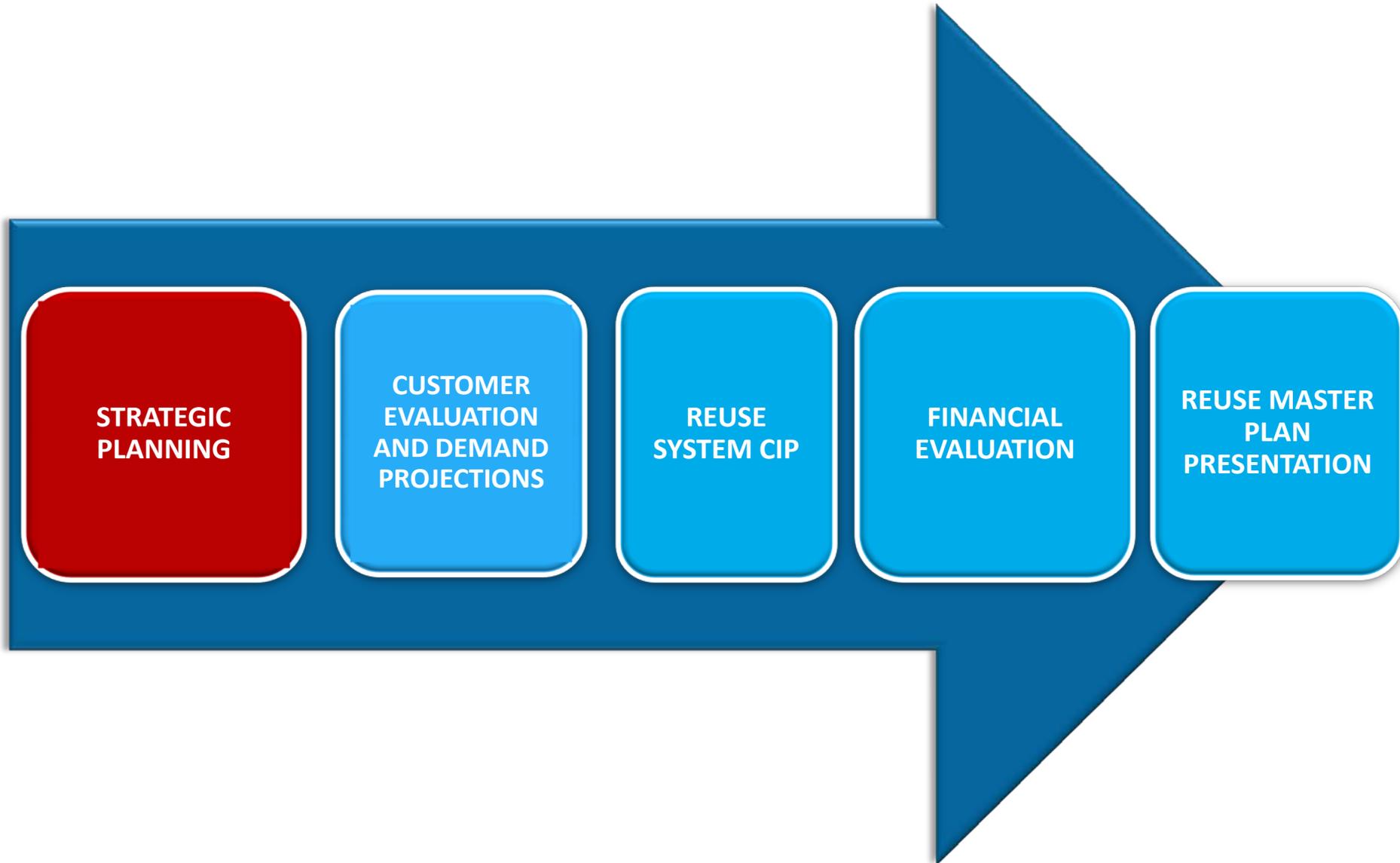


Reuse Master Plan City of Killeen

November 1, 2016



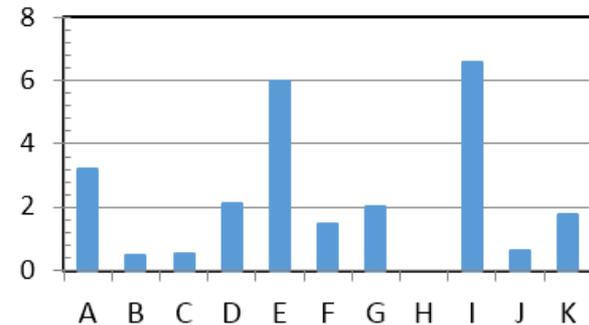
Reuse Master Plan Process



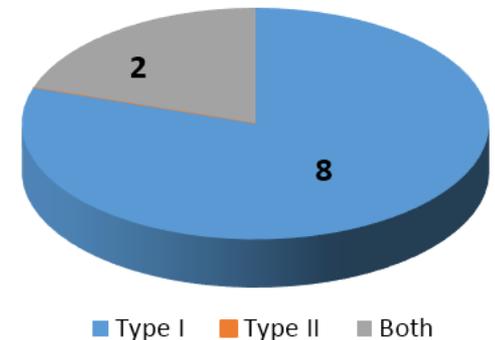


- Identify Implementation Challenges & Solutions
- Document Regulations for Reuse
- Recommended Revisions to City Standards
- Coordination with Bell County WCID #1
- Benchmarking with 11 Local & National Utilities

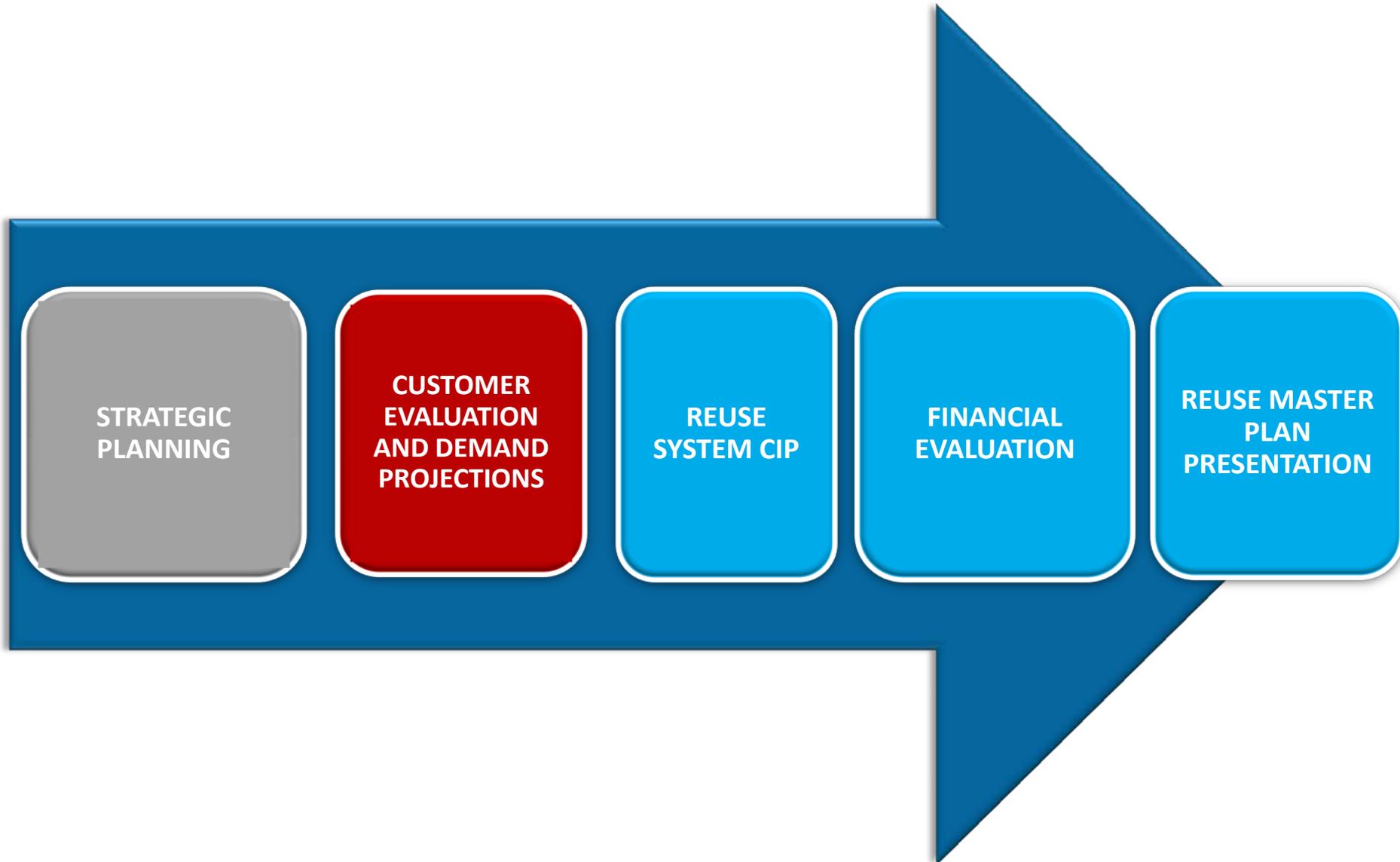
20.) What is your utility's average day reuse water demand (MGD)?



18.) What water quality type is your reuse water treated to?



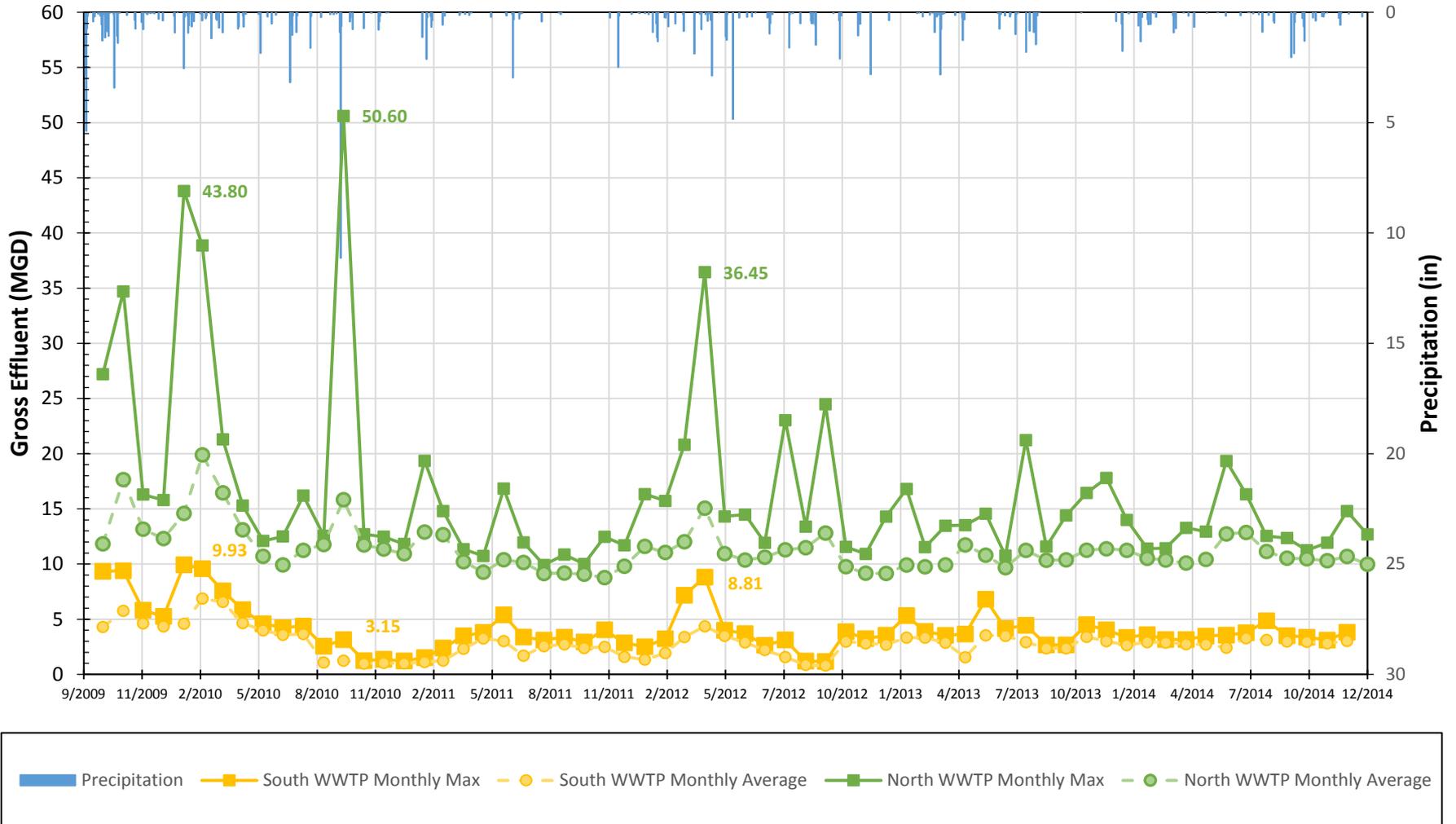
Reuse Master Plan Process



Customer Evaluation



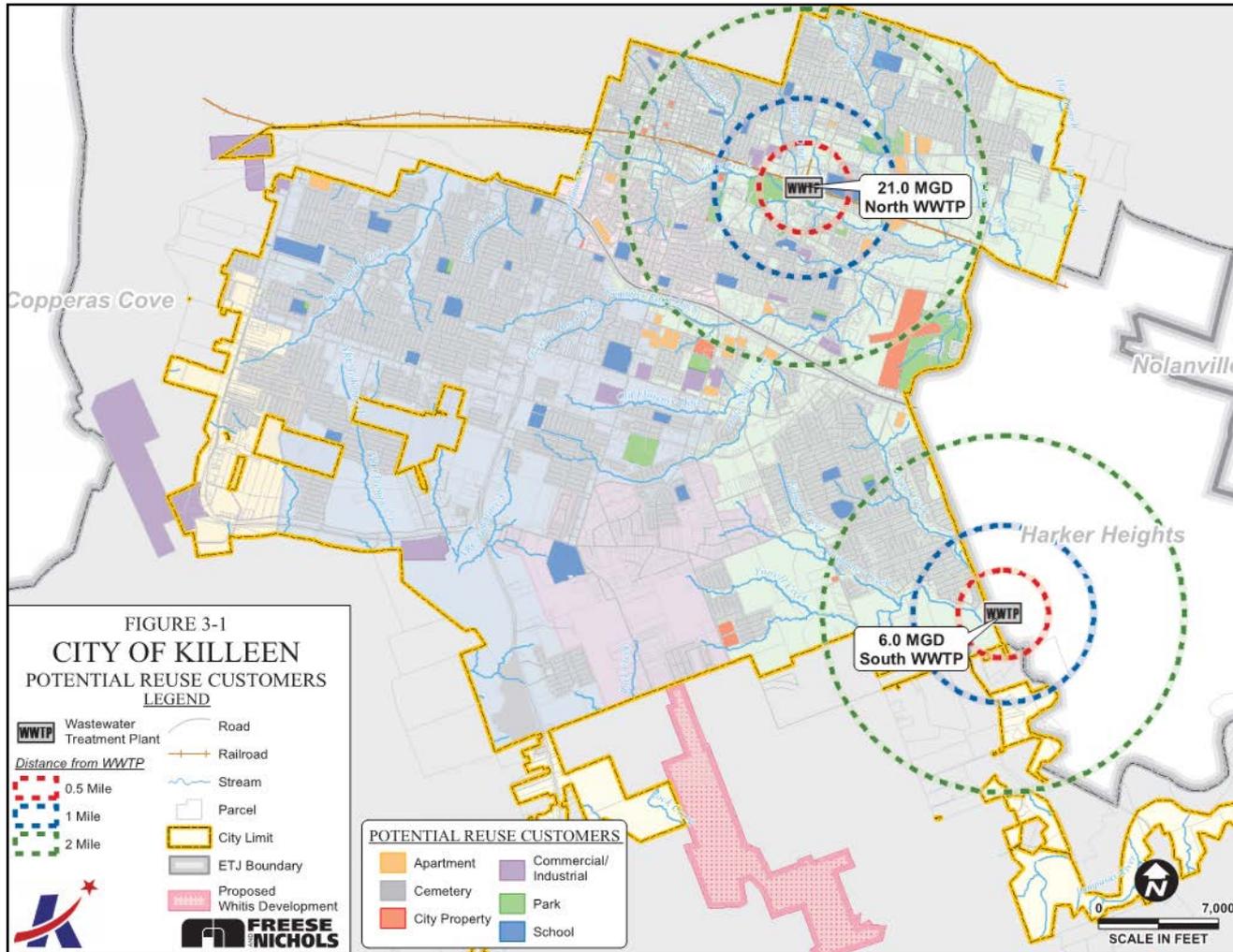
- Review historical wastewater plant flows for available supply



Customer Evaluation

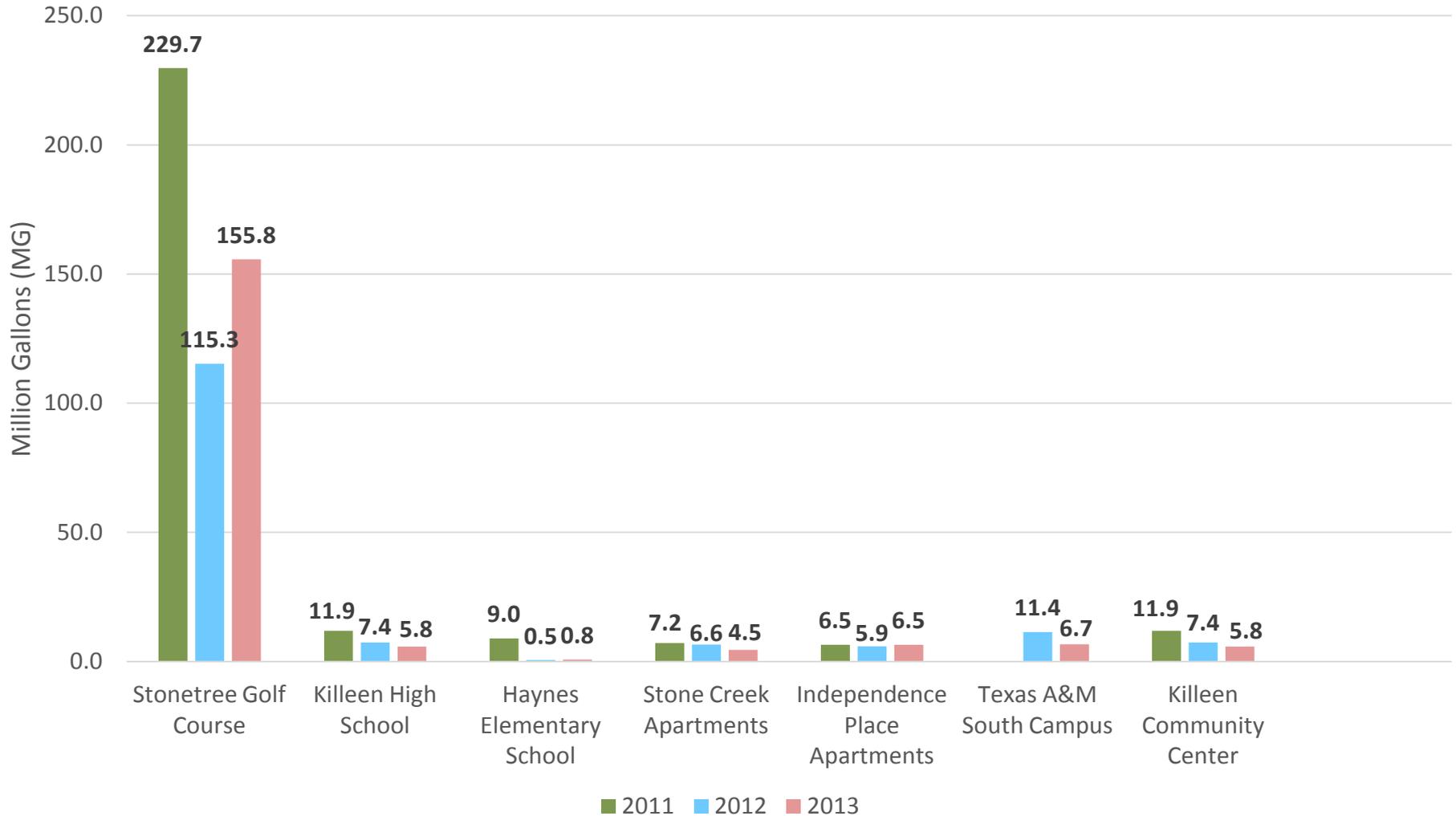


- Identify potential reuse customers
 - Schools, Parks, Golf Courses, Commercial, Industrial





Large Irrigation Users

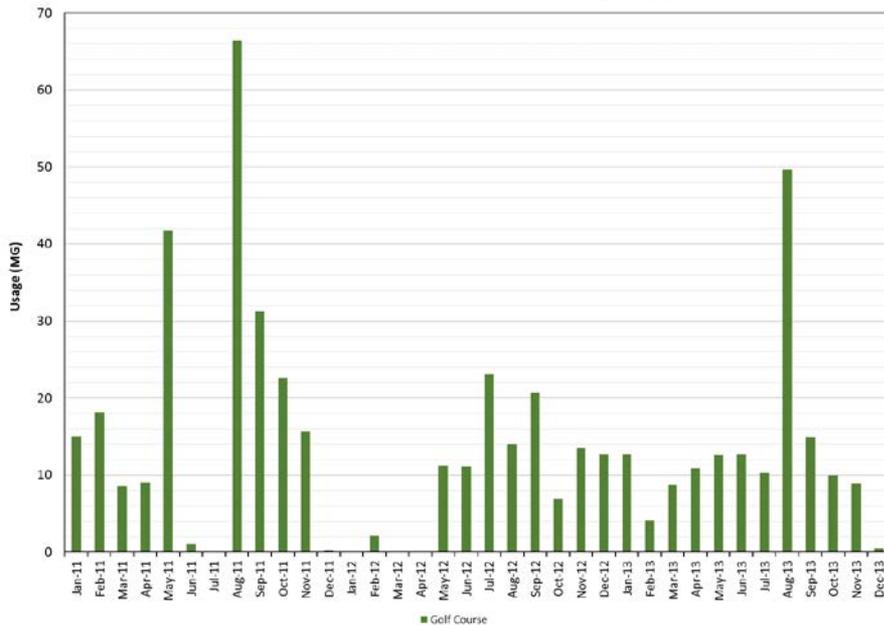


Customer Evaluation

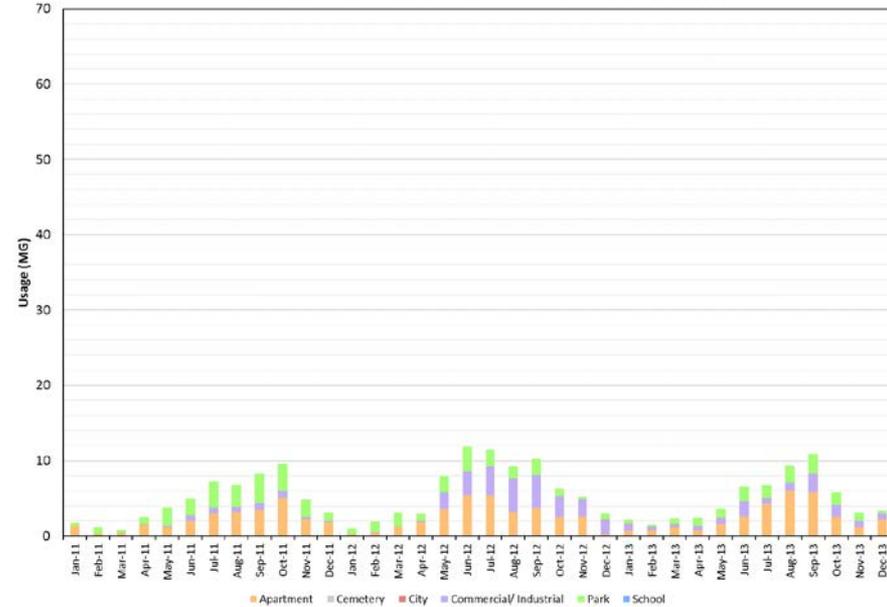


- Demands are highly cyclical, resulting in a small window each year for generating revenue.
- Most utilities with successful reuse systems have a year-round base usage.

Stonetree Golf Course - Historical Monthly Usage



Potential Reuse Customers - Historical Monthly Usage

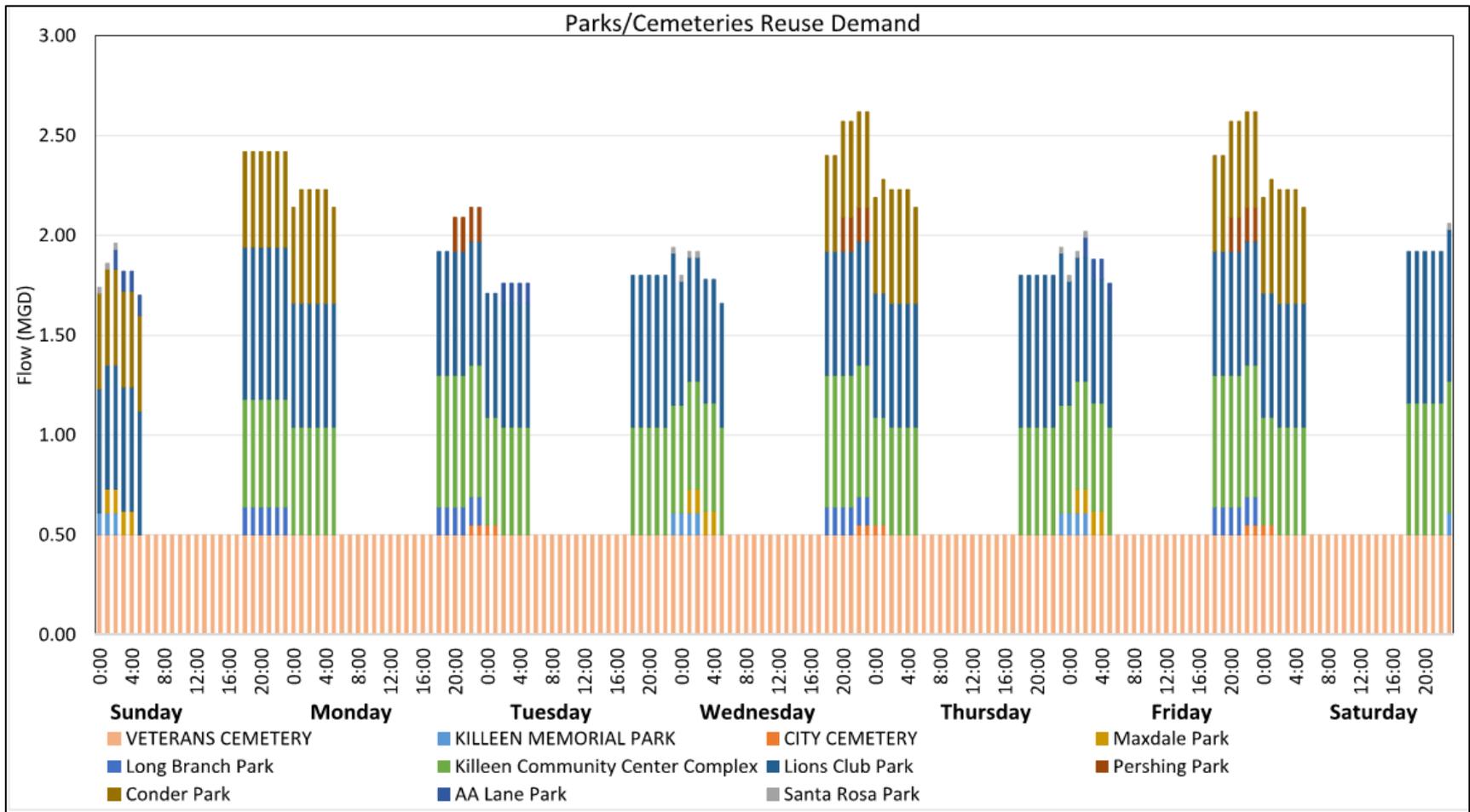


- Usage for Stonetree Golf Course (current reuse customer) is over **6 times** larger than **all** potential customers **combined**.

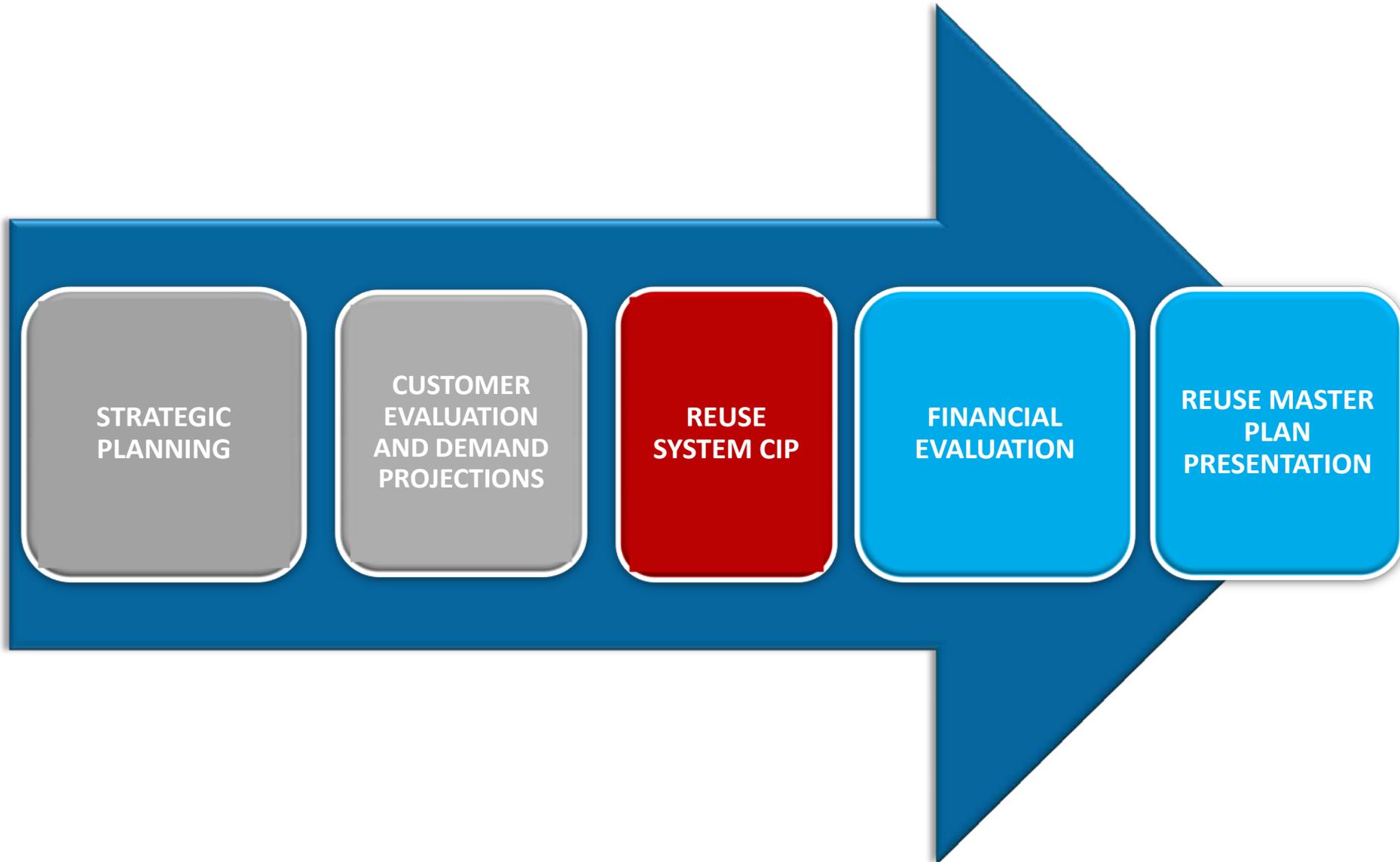
Customer Demand Projections



- Customer demands developed on a weekly basis (example below)



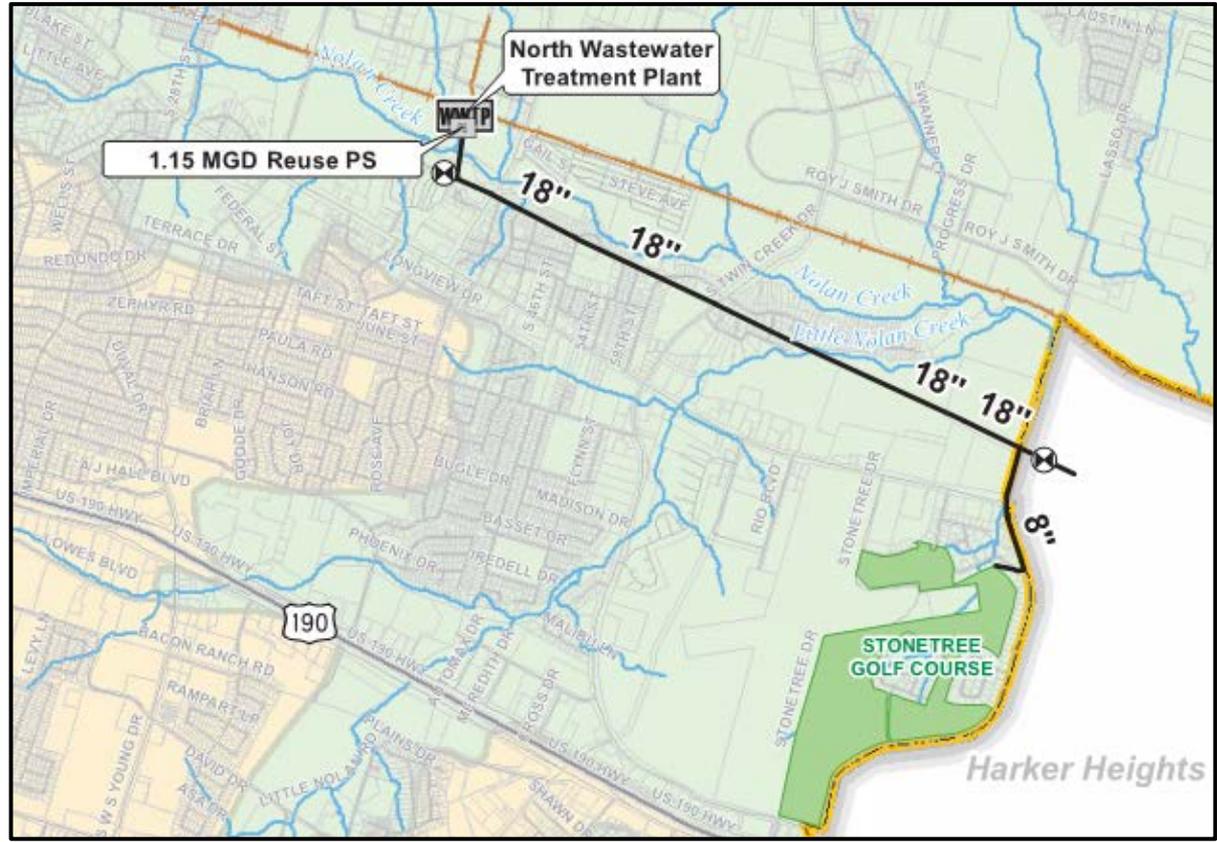
Reuse Master Plan Process



Existing Reuse System



- Repurposed existing water line sliplined to 18" diameter line
- Pump Station at North WWTP
- Currently supplies irrigation for the Stonetree Golf Course to a pond (non-pressurized)
- Not included in the financial analysis

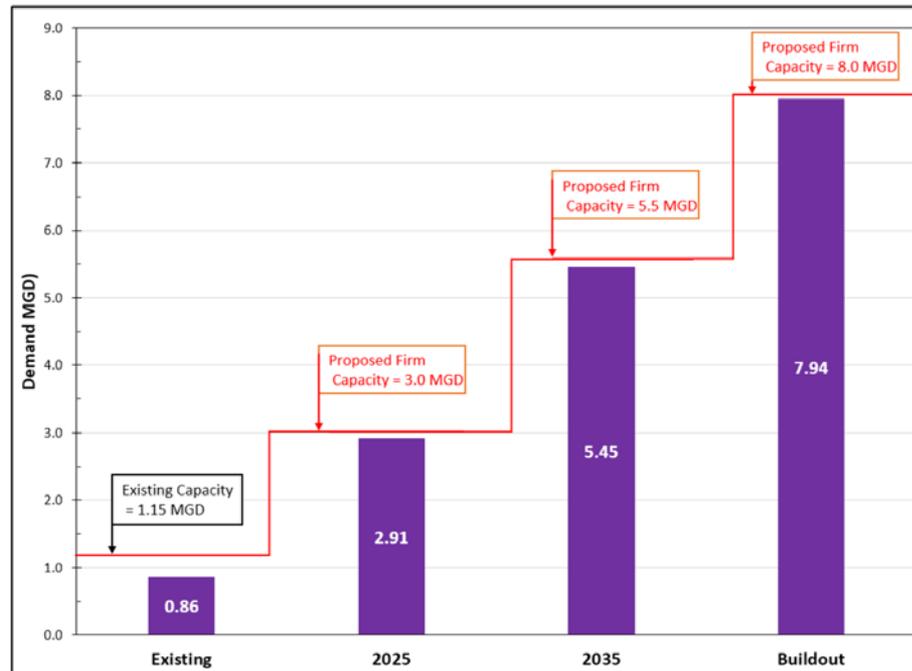


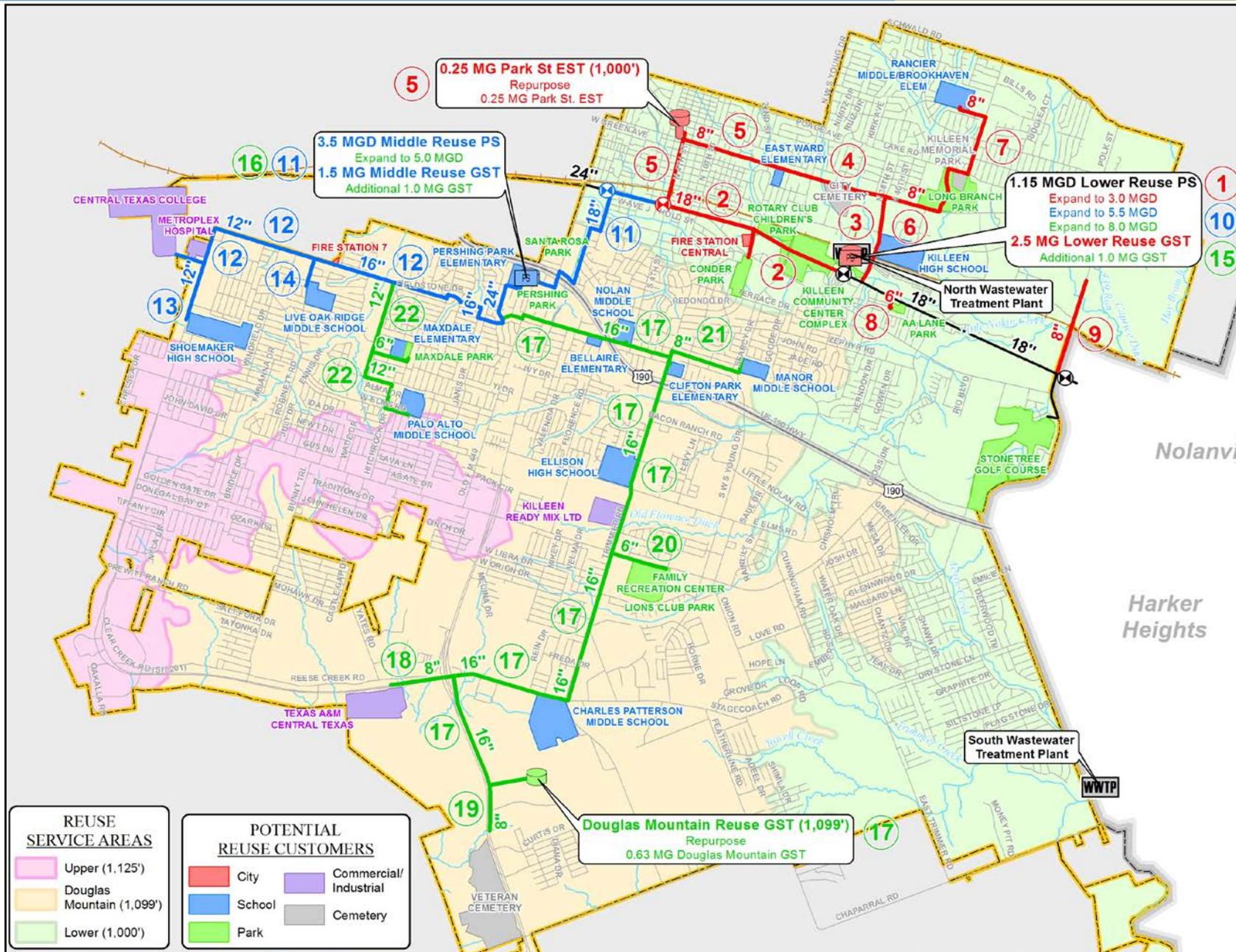
Reuse Capital Improvement Plan Development Process



- Delineate Service Areas based on ground elevations
- Determine reuse pumping, storage and water line requirements
- Evaluate sizing and phasing with reuse hydraulic model
- Eliminate potential projects with a high cost per million gallons (\$/MG)

Figure 7.1: North Plant Reuse PS Firm Pumping Capacity





Buildout Reuse CIP

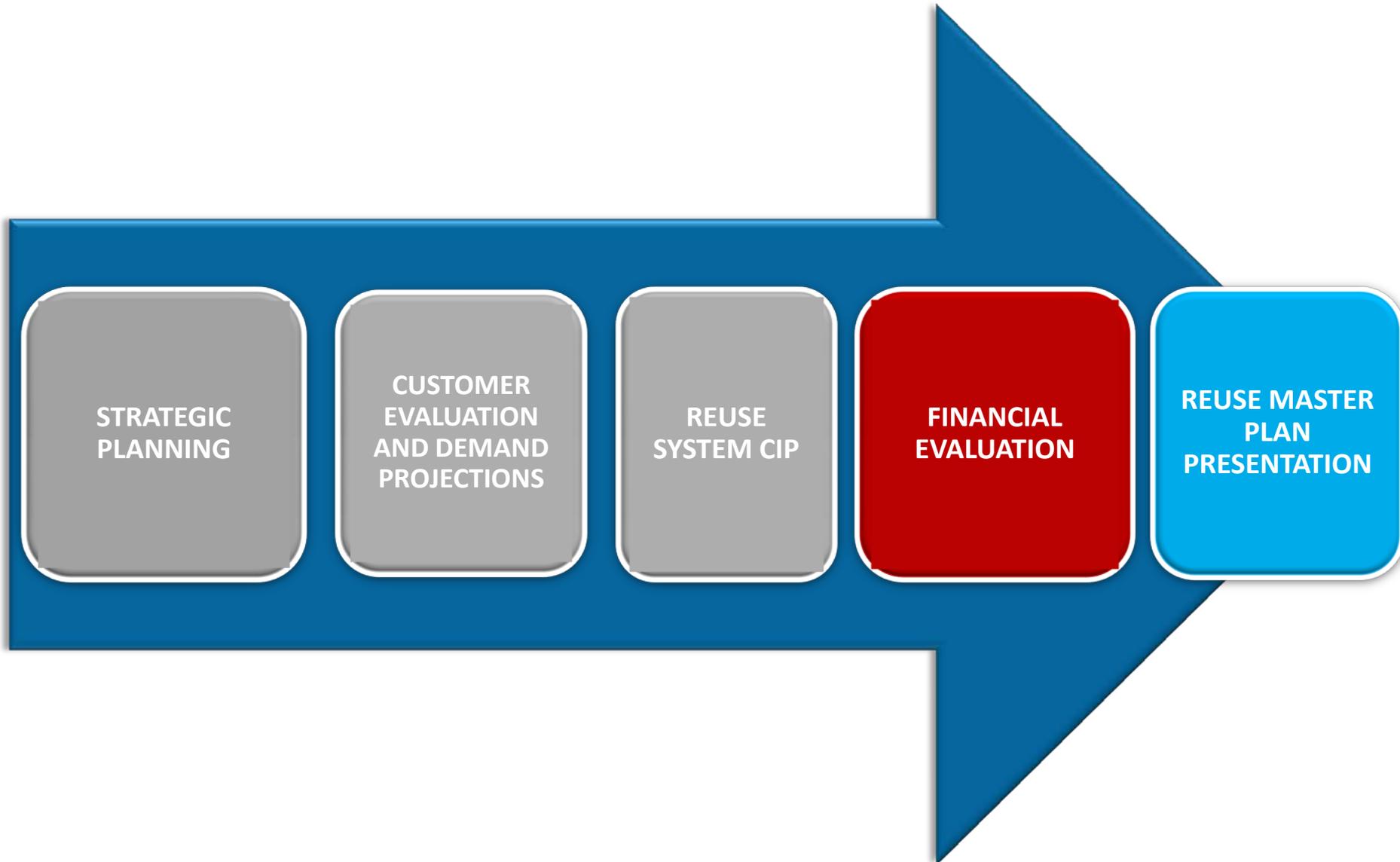
Reuse Capital Improvement Plan

Costs



Phase	#	Reuse Water System Capital Improvement Plan	Cost
10 Year	1	New Lower Service Area 3.0 MGD Pump Station and a 2.5 MG Ground Storage Tank	\$ 10,166,000
	2	8" and Slip Lined 18" Reuse Water Lines along 28th St. and Veterans Memorial Blvd.	\$ 3,154,540
	3	8" and 12" Reuse Water Line along 38th Street	\$ 684,830
	4	8" Reuse Water Line along Rancier Avenue	\$ 753,830
	5	8" & 16" Reuse Water Lines and Repurposing 0.25 MG Park St. EST	\$ 2,013,870
	6	8" Reuse Water Line along East Rancier Avenue	\$ 602,890
	7	8" Reuse Water Line along 60th Street	\$ 712,430
	8	6" Reuse Water Line along 48th Street	\$ 56,930
	9	8" Reuse Water Line along Roy Reynolds Drive	\$ 587,410
10 Year Total:			\$ 18,732,730
10 - 20 Year	10	Lower Service Area 2.50 MGD Pump Station Expansion to 5.50 MGD at the North WWTP	\$ 747,500
	11	New Douglas Mtn Service Area 3.50 MGD Pump Station, 1.5 MG Ground Storage Tank and 18" Reuse Water Transmission Line	\$ 9,792,550
	12	12", 16" and 24" Reuse Water Lines along Watercrest Road	\$ 4,271,970
	13	12" Reuse Water Line along Clear Creek Road	\$ 453,680
	14	8" Reuse Water Line along Robinett Road	\$ 243,230
10 - 20 Year Total:			\$ 15,508,930
20 Year - Buildout	15	Lower Service Area 2.5 MGD Pump Station Expansion to 8.0 MGD and 1.0 MG Ground Storage Tank	\$ 1,868,750
	16	Douglas Mtn Service Area 1.5 MGD Pump Station Expansion to 5.0 MGD and 1.0 MG Ground Storage Tank	\$ 1,569,750
	17	16" Reuse Water Line and Repurposing Douglas Mountain 0.66 MG GST	\$ 7,748,210
	18	8" Reuse Water Line along Clear Creek Road	\$ 543,380
	19	8" Reuse Water Line along SH 195	\$ 376,050
	20	6" Reuse Water Line along Stan Schlueter Loop	\$ 256,170
	21	8" Reuse Water Line along Illinois Avenue	\$ 568,390
22	6" and 12" Reuse Water Lines along Cody Poe Road	\$ 1,411,920	
20 Year - Buildout Total:			\$ 14,342,620
Grand Total:			\$ 48,584,280

Reuse Master Plan Process

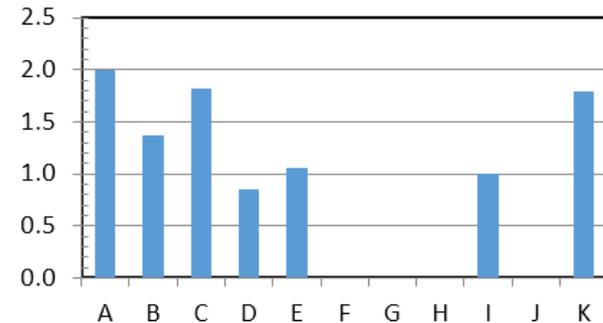


Financial Evaluation



- Developed Reuse Rate Structure
 - Break even analysis
 - Impact to Water and Wastewater CIPs
 - Potable Water Rate Structure
 - Local Reuse Rates (Typically Between \$0.50 and \$2.00/1,000 gal)
- Developed Revenue & Cost Comparison
- Developed Cost & Rate Model
- Reviewed Two Financial Scenarios
 - Complete Buildout of Reuse CIP
 - Construction of 10 year CIP

28.) What does your utility charge for reuse water per 1,000 gallons?

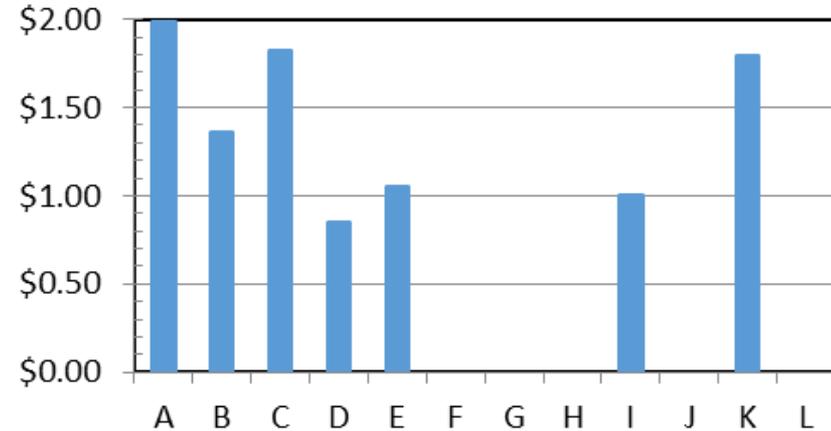


Financial Evaluation: Scenario 1 (Full CIP)



- Funding of entire Reuse CIP over 50 years
- Reuse Rate = \$2.46/1,000 gal
 - High rate compared to other utilities
 - Study showed rates are typically \$0.50-\$2.00.
- Positive Cash Flow first 5 years
 - \$100,000 prior to bond issuance
 - Result of reduced cost of water to serve Stonetree Golf Course
- Deficit in Reuse Fund
 - **Average \$3.5 million per year for over 50 years**
 - Approximately 3.1% of current Water/Sewer Fund

27.) What does your utility charge for reuse water per 1,000 gallons?

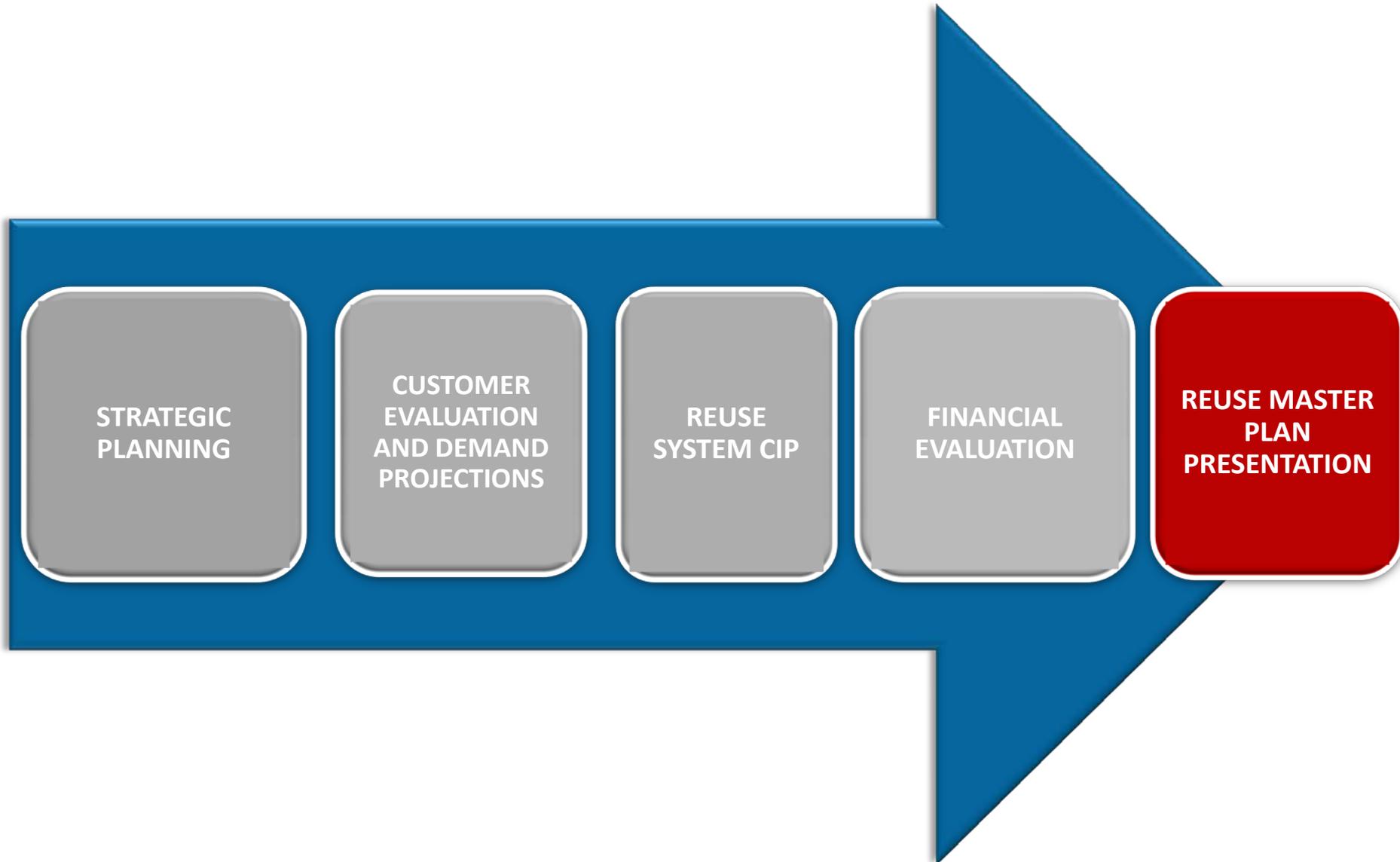


Financial Evaluation: Scenario 2 (10-year CIP)



- Funding of 10 year Reuse CIP over 40 years
- Reuse Rate = \$2.46/1,000 gallons
- Positive Cash Flow first 5 years
 - \$100,000 prior to bond issuance
 - Result of reduced cost of water to serve Stonetree Golf Course
- **Deficit in Reuse Fund next 35 years**
 - *Average \$1.5 million per year*
 - Approximately 1.8% of current Water/Sewer Fund
- **Small positive Cash Flow after 40 years**

Reuse Master Plan Process



Reuse Master Plan Conclusions & Recommendations



- A direct nonpotable reuse system would be dependent on transfers from the Water/Sewer Fund, \$1.5 – 3.5 million/year.
- Providing reuse water to the Stonetree Golf Course results in a positive cash flow and should be continued.
- Analysis shows that full development of a reuse water system will not result in cost savings to the city until after 35 years.
- Reuse may become more financially attractive over time as alternative sources of supply become more expensive.
- **At this time, it is recommended that the City not pursue additional reuse customers, but reuse should be reevaluated in the future for customers with large nonpotable water demands.**

