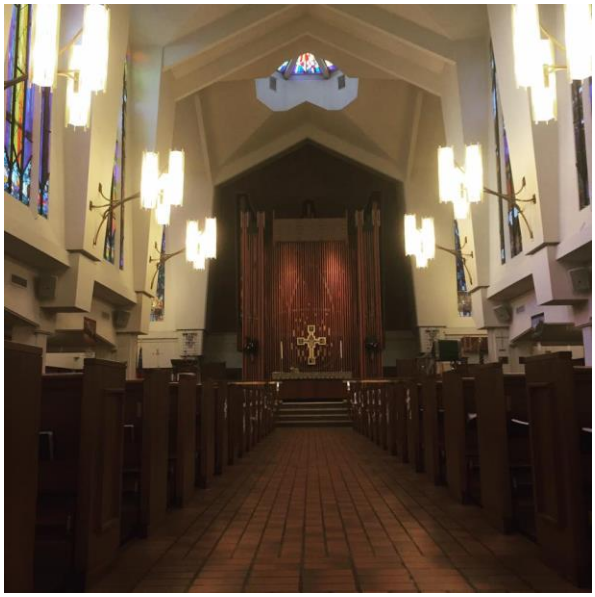
Water Audit Report



Saint Anne's Episcopal Church and Day School

March 2019

Introduction

This water audit was created for St. Anne's Episcopal Church and Day School to identify water saving measures that can lower the water consumption and costs at the church. The report presents water saving measures (WSMs) that include replacement or retrofit of multiple plumbing fixtures.

Saint Anne's has excellent opportunities for increased water efficiency. If all water saving measures are implemented, the church can reduce their water use by 44%. The total savings potential is shown in the following table.

Annual Water Savings	Annual Cost Savings	Estimated Project Cost	Simple Payback (Years)
259 kGal	$7,400	$4,300	0.6 years

This report looks at the current water use and costs at Saint Anne's, then provides water saving measures with estimated project costs and savings.

Building Information

Saint Anne's Church and Day School is located in northern Atlanta. It has a sanctuary, Parish Hall, church office, and day school. The following table describes additional relevant details about the church.

Property Background		
Congregation	Saint Anne's Episcopal Church and Day School 3098 Saint Anne's Lane NW Atlanta, GA 30327-1557	
Major Building Uses	Church, Day School	
Building Area	50,000 SF (estimated)	
Irrigated Area	3,000 SF (Day School farm beds, not included, are irrigated with on-site well water)	
Congregation Contact	Patrick Cobb, Facilities Manager pcobb@saintannes.com	
Auditor	Jamie Kono, Associate Engineer, Servidyne, LLC jamie.kono@servidyne.com	
Church Details	Sunday visitors	325 per week
	Monday – Saturday visitors/staff	160 per week
	Other visitors	1500 per year
Day School Details	Students	222
	Teachers	39

Water-Using Fixtures

This section briefly describes the main water-using fixtures at Saint Anne's.

Restrooms and Sinks

Restrooms and sinks account for the most of the building's water use. Most restroom and faucet fixtures are high flow, with the exception of about half of the toilets, which are moderately low flow.

The following table shows the restroom and sink fixtures, the flow rating of the installed fixtures, and whether the installed fixture is a high or low flow fixture.

Fixture	Installed Rating at Saint Anne's	Recommended Ratings
Restroom Sinks	2.0 gpm (gallons per minute)	0.5 gpm
Urinals	1.0 gpf (gallons per flush)	0.125 gpf
Toilets	1.6 and 3.5 gpf	1.28 gpf
Breakroom/Classroom Sinks	2.0 gpf	1.0 gpm

Irrigation

A small amount of irrigation serves the planter beds in front of the sanctuary. The outdoor classroom's farm beds are irrigated with well water. The memorial garden fountain receives makeup water from the building water supply.

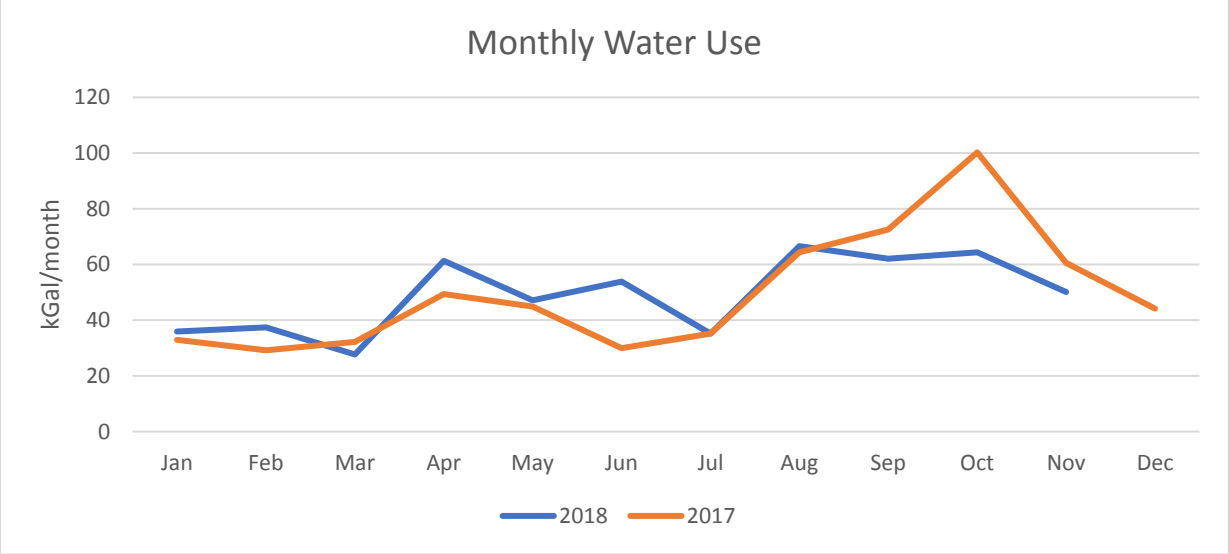
Other

The church's commercial kitchen, which is used infrequently, has a dishwasher, washer and dryer, and ice machine. The day school has an ENERGY STAR washing machine and dishwasher that are used daily.

Water Use History

Saint Anne's receives water from the City of Atlanta, which has an exceptionally high water and sewer rate. The following table and chart show the past water use and costs at Saint Anne's. Water use is expressed as kGal, which is equal to 1,000 gallons. The utility rate can also be understood as about 3 cents per gallon.

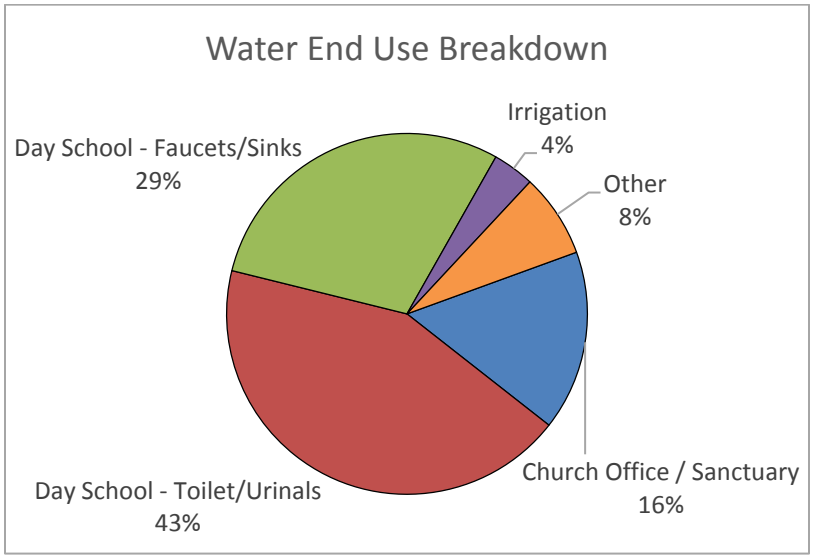
Annual Water Use (2018)	Annual Water Cost (2018)	Water Utility Rate
586 kGal	$16,820	$29.29 / kGal



2017 use is higher due to several significant leaks that occurred during the year.

Water End-Use Breakdown

This report estimates how the property's water is used. The chart below shows the breakdown.



The largest water use is at the day school, which accounts for 72% of the property's water use. The "Other" category includes miscellaneous usage, much of which is likely leaks that have been identified and fixed at the property throughout the year.

Water Metrics

Saint Anne's uses approximately 12 gallons per square foot of floor area per year. Based on the end-use breakdown estimates, the Church uses 9.5 gallons per congregant per week, and the Day School uses 36.8 gallons per student per week.

Annual Gallons per Square Foot	**Weekly Gallons per Congregant** (Church Use Only)	**Weekly Gallons per Student** (School Use Only)
12 gal/SF/yr	9.5 gal/person/week	36.8 gal/student/week

Water Saving Measures

Multiple plumbing retrofits or replacements are recommended at Saint Anne's. These retrofits are presented as Water Savings Measures (WSMs) which include estimated water use and cost savings and estimated project cost. Water savings are presented as kGal, where one kGal equals 1,000 gallons.

Measure	Location	Efficiency Measure	Annual Water Savings (kGal)	Annual Cost Savings	Estimated Project Cost	Simple Payback (Years)
WSM 1	School	Aerator Replacement	76	$2,170	$140	0.1
WSM 2	School	Urinal Replacement	45	$1,280	$550	0.4
WSM 3	School	Toilet Replacement	105	$3,000	$3,000	1.0
WSM 4	Church	Aerator Replacement	24	$690	$70	0.1
WSM 5	Church	Urinal Diaphragm Replacement	10	$280	$550	2.0
Total			**259**	**$7,420**	**$4,310**	**0.6**

WSM 1: School Aerator Replacement

Replace the school sink aerators with low-flow aerators, 0.5 gpm for restrooms and 1.0 for classroom and breakroom sinks.

Most faucet aerators in the hallway student and teacher restrooms and the classroom restrooms are rated at 1.5 to 2.0 gpm, which should be changed to the current plumbing standard of 0.5 gpm for handwashing sinks.

All classroom and breakroom sinks currently have high-flow aerators. These 16 aerators should be replaced with 1.0 gpm rated aerators.

The estimated project cost is based on replacing 12 restroom and 16 classroom/breakroom aerators.

Annual Water Savings	Annual Cost Savings	Estimated Project Cost	Simple Payback (Years)
76 kGal	$2,170	$140	0.1 years

If a specific classroom/breakroom sink is mainly used to fill containers or has other high flow requirements, a 1.5 gpm aerator can be used instead. This will drop the annual water savings for each sink from 1.0 kGal per year to 0.6 kGal per fixture per year.

WSM 2: School Urinal Replacement

Replace the boy's room urinal with a low-flow urinal rated at 0.125 gallons per flush.

The urinal in the boy's restroom is a high-flow fixture. This fixture can be replaced with a pint-flush model that uses a fraction of the current fixture's water per flush.

The estimated project cost is based on replacing one urinal.

Annual Water Savings	Annual Cost Savings	Estimated Project Cost	Simple Payback (Years)
45 kGal	$1,280	$550	0.4 years

WSM 3: School Toilet Replacement

Replace the school toilets with low-flush toilets rated at 1.28 gallons per flush.

Six of the toilets in the day school appear to be high-flow fixtures, estimated at 3.5 gallons per flush. These toilets can be replaced or retrofitted with 1.28 gallon per flush models.

The estimated project cost is based on replacing six toilets.

Annual Water Savings	Annual Cost Savings	Estimated Project Cost	Simple Payback (Years)
105 kGal	$3,000	$3,000	1.0 years

Before replacing, each existing toilet should be inspected to see if it can be retrofitted to 1.28 or 1.6 gallon per flush by replacing the flush diaphragm. A diaphragm replacement will cost around $50 per fixture compared to $500 per fixture for toilet replacement.

If the toilets can be retrofitted to 1.28 gpf, savings will be the same as listed, with a payback of 0.1 years. If all toilets are retrofitted to 1.6 gpf, savings will be 90 kGal/yr and $2,600/yr, with a payback of 0.1 years.

WSM 4: Church Aerator Replacement

Replace the church sink aerators with low-flow aerators, 0.5 gpm for the restrooms and 1.0 gpm for the break room and sacristy.

The sanctuary and church restroom faucets are rated at 2.0 gpm. They can be fitted with low-flow aerators rated at 0.5 gpm. Additionally, the church office breakroom sink and the sacristy sinks can be fitted with 1.0 gpm fixtures.

The estimated project cost is based on replacing 10 restroom aerators and 3 breakroom/Sacristy sink aerators.

Annual Water Savings	Annual Cost Savings	Estimated Project Cost	Simple Payback (Years)
24 kGal	$690	$70	0.1 years

WSM 5: Church Urinal Retrofit

Replace the Sanctuary restroom urinal with a low-flow urinal, rated at 0.125 gpf.

The urinal in the main Sanctuary men's room is a high flow fixture. The urinal can be replaced with a pint-flush model.

The estimated project cost is based on replacing one urinal.

Annual Water Savings	Annual Cost Savings	Estimated Project Cost	Simple Payback (Years)
10 kGal	$280	$550	2.0 years

If the cost and payback are too high, the fixture can also be retrofit to 0.5 gallon per flush model for a smaller cost, estimated at $50. Annual savings would be 5.5 kGal/yr and $160/yr, for a payback of 0.3 years.

Additional Issues

The following items were observed during the site visit that did not result in a water saving measure.

- A domestic hot water heater intake line in a custodial closet in the day school was leaking during the visit and was fixed shortly afterwards. Even small leaks add up to a large waste in water and money. For example, fixing this leak saved 21,600 gallons per month of water, or $633 per month.
- While not affecting water use, the condensing boiler efficiency can be further optimized. Currently, the condensing boiler operates at 180 °F. During periods of low load (i.e. when the outside air is warmer), the boiler should lower its operating temperature to improve its efficiency. Consider discussing a hot water temperature reset schedule with your vendor.
- Installing low-flow sink aerators are easy water-saving actions for your members to take at home. Replacing old toilets can also result in large water savings. The EPA Watersense website provides more information and fact sheets on increasing water efficiency: https://www.epa.gov/watersense/watersense-products