

Facility Water Analysis and Recommended Efficiency Measures

for

Park Place

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LBA Realty



business minded sustainability



healthybuildings.com

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**Water
Efficiency
Technologies**

A Water Efficiency Program Administered by the
Energy & Resource Group of Healthy Buildings

Audits | Tuning | Automation | WETrofit™ | Turn-Key Solutions



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PARK PLACE – CAMPUS OVERVIEW

Park Place is a Premier Mixed-Use Office Campus situated on 105 acres of lushly landscaped grounds. In addition to 2.5 million sf of Class A office space, an on-site Market Café and full service conference facilities, Park Place boasts its very own destination retail center. Featuring more than 125,000 square feet of retail space, Park Place provides tenants direct access to shopping, an on-site fitness center, restaurants and specialty services unmatched at any corporate address in Southern California. The Campus is extremely well maintained and energy efficient, with the majority of the buildings being LEED Certified. While energy and carbon footprint reduction have been the main focus for the past 25 years, water is finally making its way into the forefront. It is obvious that the owners and managers of Park Place were on the cutting edge of water efficiency from initial design phase, through their continuous campus improvement efforts. Working with the Park Place team has been a wonderful experience and the results of our study are directly attributed to the support we were given.

SCOPE OF WORK

Prior to meeting with Tim Bryan for the on-site audits, we were able to collect enough initial data from the LBA staff, to plan our strategy. This property is very unique for many reasons, but most interesting to our team was the existence of an extensive Recycled Water Distribution network, that provides approximately 50% of the water used on the campus. IRWD is extremely advanced when compared to other water municipalities, which enables Park Place to maintain an extremely water efficient campus.

A list of our primary objectives for this Water Efficiency Study were:

- To understand the existing distribution and both the Domestic and Process water demand (end use) on campus, for both the Potable and Recycled (Purple Pipe) networks.
- Isolate Domestic (Sanitary) water use per building based on full time tenants and the overall demographics, looking for any anomalies as we compared the usage to our benchmark data.
- Create water balances for each building, showing where the water was being used, and looking for opportunities and any signs of unallocated use.
- Catalog each Potable and Recycled water meter, and identify the areas they served, while quantifying and graphically presenting, the overall yearly and monthly demand.
- Inventory all of the sanitary fixtures, looking for opportunities to reduce consumption while remain in the constantly changing compliance requirements.
- Identify all water using Process equipment and catalog the monthly and yearly consumption, while looking for ideas for improvement.

- Focus on being extremely creative in identifying was to capture effluent and move it to areas that are high water consumer.
- Investigate the Kitchen and discuss daily processes with the Management (Todd), in order to uncover any potential areas of improvement, while not paying attention to sanitary and health implication.

There are a few items that were not extensively researched, and are worth mentioning:

- The scope did not include an in-depth study to locate leaks in buried pipes, although anything major would be apparent during the creation of our water balances. The Fire meters were also excluded from this SOW.
- The Irrigation controllers are 'Top of the Line', so we did not pursue system improvements. We did have discussions with the Landscape contractor and they are on top of things. We spoke about new sprinkler heads and overspray, but we felt they had it handled. Kudos to using Recycled water on the majority of the areas that are being irrigated.
- The demographic information for the 6 Clustered Buildings (3345 – 3355 Michelson) was given to Healthy Buildings in aggregate, and the staff was not able to separate them by address. Domestic (sanitary) water use calculations are based on people and not square footage, and we all agreed to treat it as one complex.
- The retail spaces were not included in this report for multiple reasons. Of those, the domestic water which is fed into the retail center is divided among 4 meters, which further split off without being sub-metered. Our onsite team was unable to obtain water bills or access to each facility, as some of the utility bills are paid by the tenant and the facility team did not want to disturb private businesses. That said, we did include a section on water efficiency measures for indoor pools, assuming that LA Fitness could benefit from that information

WATER DISTRIBUTION SYSTEM

The Irvine Ranch Water District (IRWD) supplies both Potable and Recycled (Purple Pipe) water to the Park Place Campus. The majority of water used for irrigation comes from the Recycled water supply, except for Plaza Deck. This area is Irrigated using **Potable water**, because the Central Plant and other buildings are directly beneath the turf. Using Recycled water could present a health hazard, should it leak into the occupied offices and Physical Plant. The different rate schedules are based on allocation, and will be covered under the Water Rate section in this report.

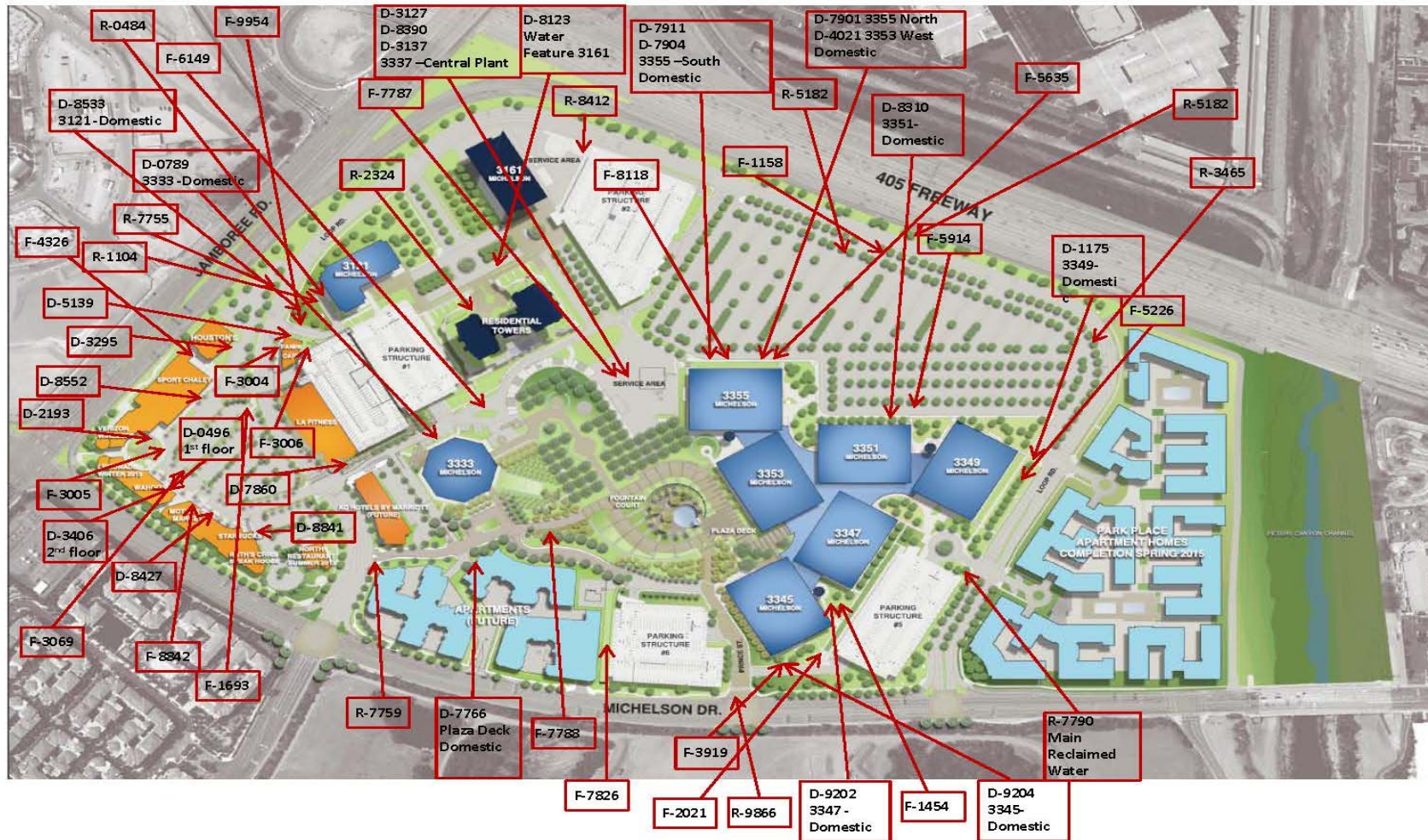
Master Map includes all Potable, Recycled and Fire Meter locations

MASTER MAP – PARK PLACE WATER METERS



Park Place Water Meter Locations

D- Domestic
R- Reclaimed Water
F- Fire Line

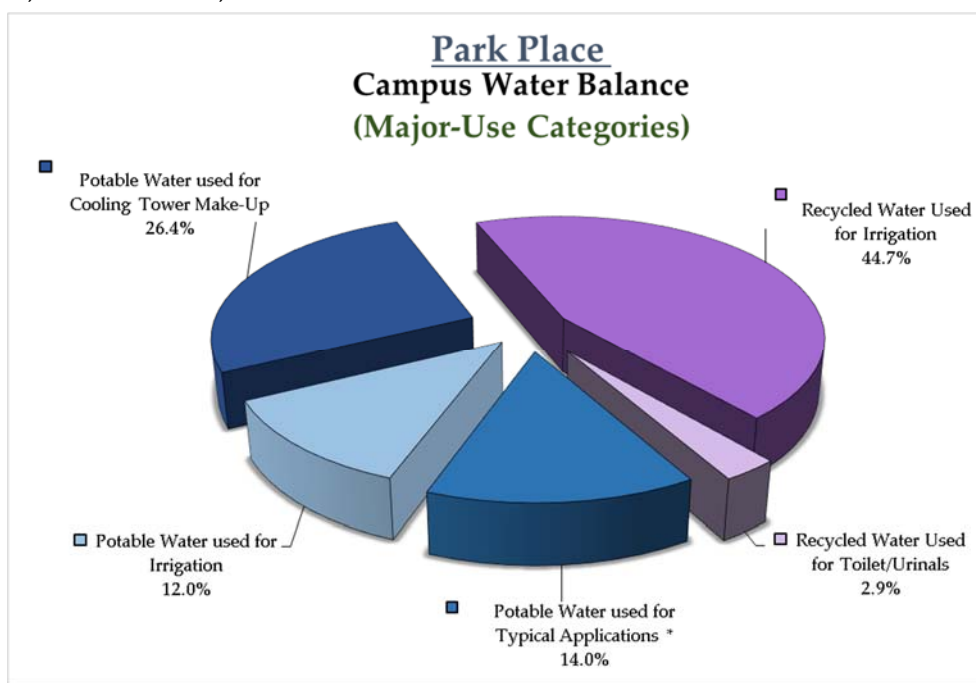


PARK PLACE – TOTAL WATER USE

The Park Place Campus used approximately **64,330,514 gallons** of water in the last 12 months. This total includes all of the Potable and Non-Potable water meters defined in the Scope of Work, and does not include the Retail section or the Fire meters. That said, there may be a small quantity of Recycled Water (Irrigation) included in our totals, because there was some cross usage. The charts below represents the breakout of the major water-use categories for the entire campus; individual buildings, areas and processes are broken out in subsequent sections of this report.

PARK PLACE – TOP LEVEL WATER BALANCE

There is a category in the breakdown that specifies the term '*Typical Applications*', that is defined as usage in Restrooms, Janitorial Sinks, Hose Bibs, Indoor Drinking Fountains, Kitchenettes, etc.



Water Balance	Park Place Campus	
	Percentage of Total	Consumption (Gals)
Potable Water used for Typical Applications *	14.0%	8,981,993
Potable Water used for Irrigation	12.0%	7,732,076
Potable Water used for Cooling Tower Make-Up	26.4%	16,960,909
Recycled Water Used for Irrigation	44.7%	28,766,088
Recycled Water Used for Toilet/Urinals	2.9%	1,889,448
TOTAL	100.0%	64,330,514
Restrooms/Kitchenettes/Janitorial/Hose Bibs/Drinking Fountains *		

RECYCLED WATER METERS & AREAS SERVED

There are a total of nine (9) Recycled water meters that are shown on the Master Meter Map, that are included in this study. One (1) of the Recycled water meters (#60550484) does not supply water for Irrigation; it is providing water for flushing Toilets and Urinals in the 3121 Michelson building. The details are displayed in the tables below and the monthly usage is attached as an **appendix**.

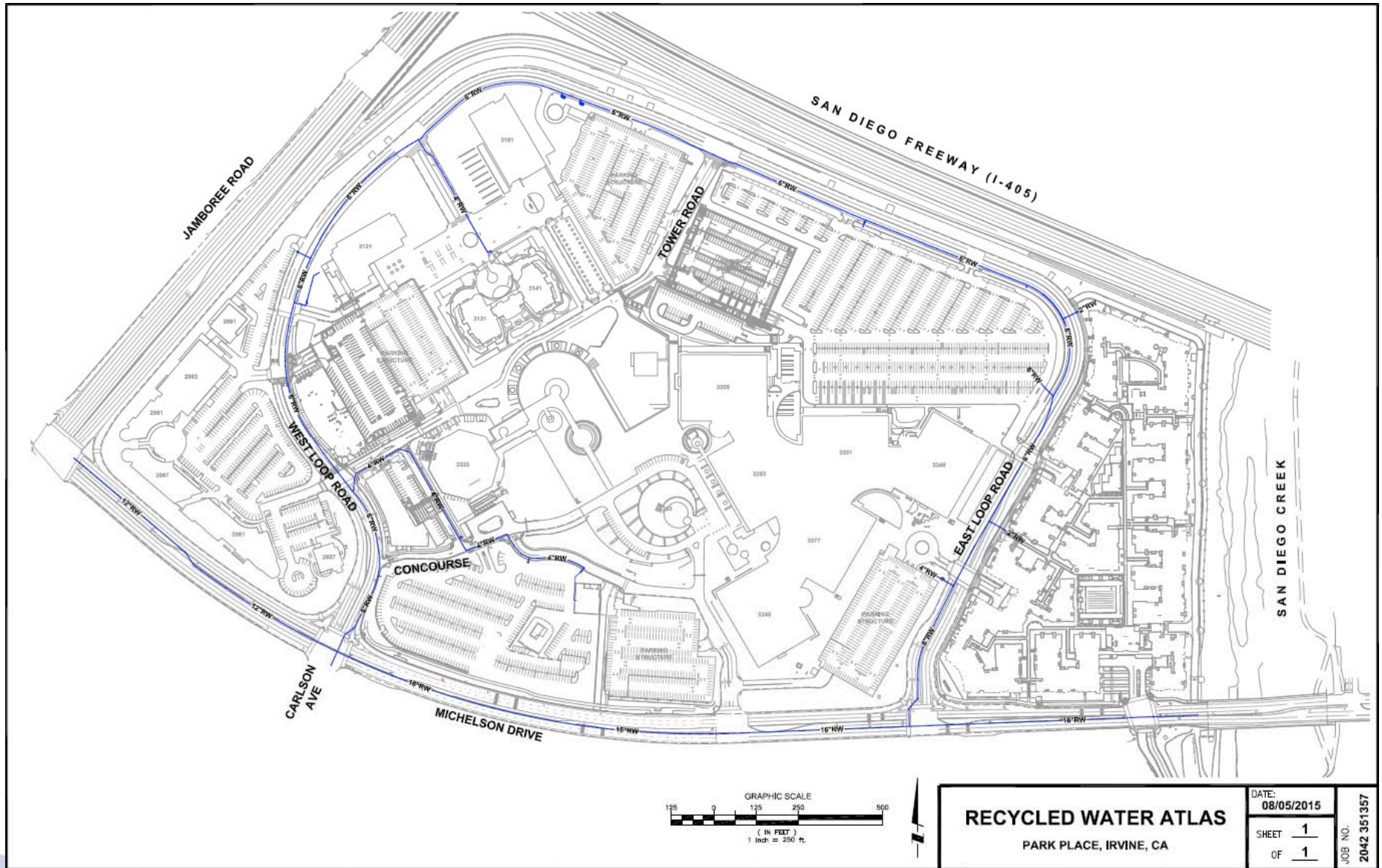
RECYCLED WATER - TOTAL USE – ALL METERS (MAY 2014 – MAY 2015)

Total Volume of Reclaimed Water Usage		
May 2014 - May 2015		
End Use	ccf	Gals
Irrigation	38,457	28,766,088
Toilet / Urinals in 3121	2,526	1,889,448
Total Recycled Water	40,983	30,655,536

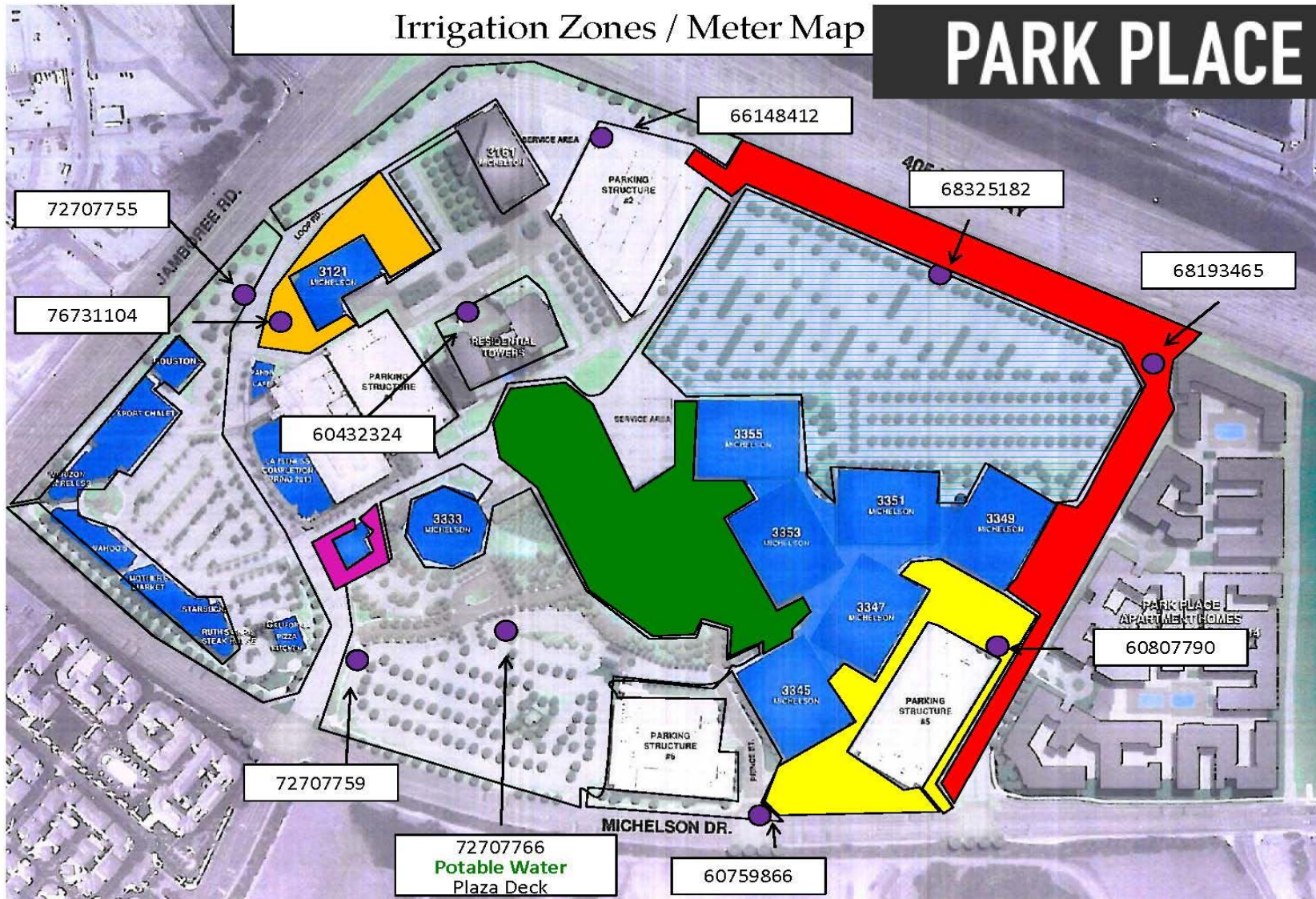
RECYCLED WATER - METER NUMBERS / VOLUMES / AREAS SERVED

Account Number	Meter #	Volume - Gals (5/14 - 5/15)	End Use	Location of Use
8129810000	72707755	5,607,756	Irrigation	Serves all Retail plus Taleo and the PS1 side of 3333. (Replaced Meter #60530151)
5316610000	60550484	1,889,448	Toilet / Urinal Flushing	3121 Michelson - Toilets & Urinals
8362310000	76731104	1,909,270	Irrigation	3121 Surrounding Irrigation (Replaced Meter # 60742190)
3163810000	66148412	7,420,160	Irrigation	Serves area around 3161, PS2, Marquee
6217010000	72707759	3,619,572	Irrigation	Serves area around Surface Lot L and 3333 (Replaced Meter #49243867)
823910000	68325182	1,823,624	Irrigation	Serves irrigation surround of Surface Lots E & F.
860910000	68193465	3,787,750	Irrigation	Serves area around Future Bosa Dev, Surface Lot B, Helipad, down Loop Rd to PS2.
9129810000	60807790	3,422,100	Irrigation	Serves irrigation from Prince & Michelson, around PS5, up against 3345-51 (Replaced Meter #60723255)
4934300000	60759866	1,175,856	Irrigation	Serves irrigation PS6 to Tower along Prince St., mostly Atrium/Concourse side.

RECYCLED WATER – CAMPUS DISTRIBUTION MAP



IRRIGATION ZONE MAP – RECYCLED AND POTABLE WATER USED



POTABLE WATER METERS & AREAS SERVED

There are a total of fifteen (15) Potable water meters that are shown on the Master Meter Map. One (1) of the Potable water meters is feeding the Irrigation zone(s) on the Plaza Deck area. The details are displayed in the tables below and the monthly usage is **attached in the Appendix**.

POTABLE WATER - TOTAL USE – ALL METER (MAY 2014 – MAY 2015)

Total Volume of Potable Water Usage May 2014 - May 2015		
End Use	ccf	Gals
Irrigation / Fountain	10,337	7,732,076
All Buildings / Kitchen / Ct Make-Up / Hose / etc	34,683	25,942,902
Total Potable Water	45,020	33,674,978

POTABLE WATER - METER NUMBERS / VOLUMES / AREAS SERVED

Building Address	Meter #	Volume - Gals (5/14 - 5/15)	End Use	Location of Use
3121	60298533	139,128	Domestic	3121 Sinks & Kitchens
3161	67428123	364,276	Fountain	Serves 3161 Water Feature.
3333	1550789	799,612	Domestic	Serves 3333 All
	72707766	7,367,800	Irrigation	Potable water used to Irrigate Plaza Deck
3345	65869204	992,596	Domestic	Serves 3345 All
3347	65869202	569,246	Domestic	Serves 3347 All
3349	76331175	539,308	Domestic	Serves 3349 ALL.
3351	68828310	1,080,112	Domestic	Serves 3351 All. Replaced Meter #24197905.
3355 / 3353	23554021	1,062,908	Domestic	Serves 3355 East, 3355 East Concourse Level, 3353 ALL, 3353 Concourse Level.
3355 / 3353	24197901	973,148	Domestic	
3355	24197904	451,792	Domestic	Serves 3355 West, 3355 West Concourse Level.
3355	24197911	510,136	Domestic	
3337	1138390	6,688,616	Domestic / Process Water / Cooling Towers / Kitchen / Hose Bibs	Combination with 1138390 and 24053127, serves Cooling Towers and +/- 75% of Concourse including Kitchen. Also feeds hose bib and eyewash station on Plaza Deck in big, black enclosure.
3337	24053127	6,113,404		
3337	24053137	6,022,896		

The (above) 3 meters highlighted in **Green**, all split off from 1 water main, and then merge back into 1 Water Line (**Loop & Pool**)

WATER RATE STRUCTURE (IRWD)

IRWD allocates a pre-determined quantity of water for each meter, based on number of residents, landscape square footage and actual daily weather and evapotranspiration (ET) data for your area. ET is the amount of water required for drought tolerant landscaping to be healthy and attractive. Turfgrass is the highest water-using plant in a landscape. Trees and shrubs use far less water than turfgrass. IRWD's allocation system assumes that your entire landscape is covered in drought tolerant landscaping irrigated with a water efficient system such as drip irrigation.

Commercial/Industrial Water Allocations

- IRWD's rate structure is site specific, taking into consideration production needs, number of employees, water use efficiency practices and irrigation needs.
- Many commercial businesses have separate water meters for indoor use and outdoor landscaping – in these cases, the allocations are handled separately.
- Commercial, Industrial and Institutional water allocations are referred to as a Base Index.
- The Base Index is determined from actual historical water usage for each individual customer.
- The monthly water bill is calculated by comparing actual usage with the base index.
- When a business grows, adds more employees, increases manufacturing output or serves more customers, customers may request a base index evaluation for possible adjustment of the base index.

RECYCLED COMMERCIAL WATER (NON - IRRIGATION USE) - RATES

Recycled Commercial Water (Toilets & CT's)			
Irvine Ranch Water District (Effective July 1, 2013)			
Conservation Tiered Rate Structure		Water	Sewer
Base Water Rate	Per kgal (Thousand Gallons)	\$1.02	\$2.88
Inefficient Rate	Per kgal (Thousand Gallons)	\$2.23	\$2.88
Excessive Rate	Per kgal (Thousand Gallons)	\$3.77	\$2.88
Wasteful Rate	Per kgal (Thousand Gallons)	\$7.90	\$2.88
Irvine Ranch Water District (Effective July 1, 2014)			
Conservation Tiered Rate Structure		Water	Sewer
Base Water Rate	Per kgal (Thousand Gallons)	\$1.07	\$3.14
Inefficient Rate	Per kgal (Thousand Gallons)	\$3.14	\$3.14
Excessive Rate	Per kgal (Thousand Gallons)	\$4.99	\$3.14
Wasteful Rate	Per kgal (Thousand Gallons)	\$10.11	\$3.14
Irvine Ranch Water District (Effective July 1, 2015)			
Conservation Tiered Rate Structure		Water	Sewer
Base Water Rate	Per kgal (Thousand Gallons)	\$1.30	\$3.42
Wasteful Rate	Per kgal (Thousand Gallons)	\$7.74	\$3.42

RECYCLED WATER (IRRIGATION USE) - RATES

Recycled Irrigation Water			
Irvine Ranch Water District (Effective July 1, 2013)			
Conservation Tiered Rate Structure		Water	Sewer *
Low Volume	Per kgal (Thousand Gallons)	\$1.10	n/a
Base Rate	Per kgal (Thousand Gallons)	\$1.48	n/a
Inefficient	Per kgal (Thousand Gallons)	\$3.32	n/a
Excessive	Per kgal (Thousand Gallons)	\$5.66	n/a
Wasteful	Per kgal (Thousand Gallons)	\$11.83	n/a
Irvine Ranch Water District (Effective July 1, 2014)			
Conservation Tiered Rate Structure		Water	Sewer*
Low Volume	Per kgal (Thousand Gallons)	\$1.06	n/a
Base Rate	Per kgal (Thousand Gallons)	\$1.59	n/a
Inefficient	Per kgal (Thousand Gallons)	\$3.42	n/a
Excessive	Per kgal (Thousand Gallons)	\$6.91	n/a
Wasteful	Per kgal (Thousand Gallons)	\$15.33	n/a
Irvine Ranch Water District (Effective July 1, 2015)			
Conservation Tiered Rate Structure		Water	Sewer*
Low Volume	Per kgal (Thousand Gallons)	\$1.44	n/a
Base Rate	Per kgal (Thousand Gallons)	\$1.83	n/a
Inefficient	Per kgal (Thousand Gallons)	\$2.03	n/a
Wasteful	Per kgal (Thousand Gallons)	\$7.74	n/a

* Evaporation Credit - No Sewer Charge

POTABLE COMMERCIAL WATER - RATES

Potable Commercial Water			
Irvine Ranch Water District (Effective July 1, 2013)			
Conservation Tiered Rate Structure		Water	Sewer
Base Water Rate	Per kgal (Thousand Gallons)	\$1.70	\$2.88
Inefficient Rate	Per kgal (Thousand Gallons)	\$3.82	\$2.88
Excessive Rate	Per kgal (Thousand Gallons)	\$6.42	\$2.88
Wasteful Rate	Per kgal (Thousand Gallons)	\$13.16	\$2.88
Irvine Ranch Water District (Effective July 1, 2014)			
Conservation Tiered Rate Structure		Water	Sewer
Base Water Rate	Per kgal (Thousand Gallons)	\$1.79	\$3.14
Inefficient Rate	Per kgal (Thousand Gallons)	\$5.23	\$3.14
Excessive Rate	Per kgal (Thousand Gallons)	\$8.32	\$3.14
Wasteful Rate	Per kgal (Thousand Gallons)	\$16.84	\$3.14
Irvine Ranch Water District (Effective July 1, 2015)			
Conservation Tiered Rate Structure		Water	Sewer
Base Water Rate	Per kgal (Thousand Gallons)	\$2.17	\$3.42
Wasteful Rate	Per kgal (Thousand Gallons)	\$19.43	\$3.42

POTABLE COMMERCIAL (IRRIGATION) WATER - RATES

Potable Commercial Water (Irrigation)			
Irvine Ranch Water District (Effective July 1, 2013)			
Conservation Tiered Rate Structure		Water	Sewer
Low Volume	Per kgal (Thousand Gallons)	\$1.22	n/a
Base Rate	Per kgal (Thousand Gallons)	\$1.70	n/a
Inefficient	Per kgal (Thousand Gallons)	\$3.82	n/a
Excessive	Per kgal (Thousand Gallons)	\$6.42	n/a
Wasteful	Per kgal (Thousand Gallons)	\$13.16	n/a
Irvine Ranch Water District (Effective July 1, 2014)			
Conservation Tiered Rate Structure		Water	Sewer*
Low Volume	Per kgal (Thousand Gallons)	\$1.18	n/a
Base Rate	Per kgal (Thousand Gallons)	\$1.79	n/a
Inefficient	Per kgal (Thousand Gallons)	\$5.23	n/a
Excessive	Per kgal (Thousand Gallons)	\$8.32	n/a
Wasteful	Per kgal (Thousand Gallons)	\$16.84	n/a
Irvine Ranch Water District (Effective July 1, 2015)			
Conservation Tiered Rate Structure		Water	Sewer*
Low Volume	Per kgal (Thousand Gallons)	\$1.48	n/a
Base Rate	Per kgal (Thousand Gallons)	\$2.17	n/a
Inefficient	Per kgal (Thousand Gallons)	\$5.24	n/a
Wasteful	Per kgal (Thousand Gallons)	\$19.43	n/a

POTABLE WATER USE – BY BUILDING

The majority of the Potable (Safe for drinking and food preparation) water that serves Park Place is used for all of the restrooms, kitchens, janitorial, boiler make-up, cooling tower make-up and a few zones in the Irrigation System. The exception to this scenario is the building located at 3121 Michelson.

3121 MICHELSON DRIVE

The Class A building located at 3121 Michelson is 6 floor building with 150,000 square feet of office space, and is centrally located in the heart of Park Place; Orange County's premier mixed use office campus. It achieved LEED Gold in 2014, and is occupied by approximately 520 FTE's during business hours. It is the only building on the Campus that uses Recycled water inside of the building, for flushing sanitary fixtures in all of the restrooms.

3121 - WATER METER(S)

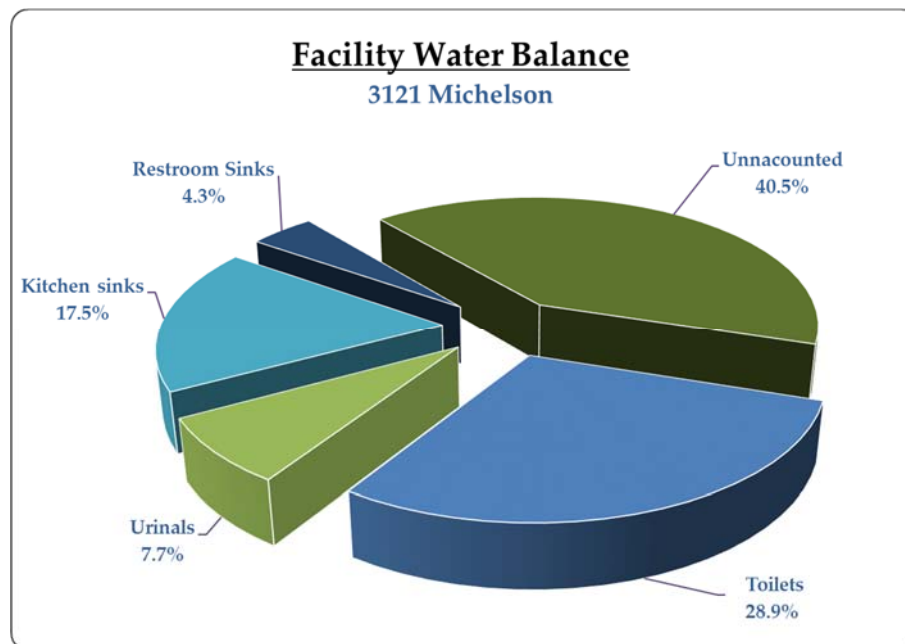
There are two meters serving the building; one is **Reclaimed Water** (Purple Pipe), and the other is Potable Water. The Reclaimed Meter (Purple Highlight) is used to flush the Toilets and Urinals, throughout the buildings. The other meter serves the sinks in the restrooms and kitchenettes and mop sinks. The chart below, represents a full year of water usage for the interior of this building, separated by meter. We have included a table showing the monthly usage 'per meter' in the **Appendix** of this report.

Total Water Usage - 3121 Michelson			
May 2014 - May 2015			
Meter #	End Use	ccf	Gals
60298533	Sinks / Kitchens	186	139,128
60550484	Toilets / Urinals	2,549	1,889,448
	Total Water Use	2,735	2,028,576

3121 - WATER BALANCE

An integral part of any comprehensive water conservation program is the development of an accurate water balance. Without a water balance, which quantifies and illustrates where a facility's water is actually being used, it is much more difficult to prescribe potential solution sets for reducing water usage. Using the information collected during the audit, along with details gathered through interviews with site staff, Healthy Buildings has quantified and calculated the water use at 3121 Michelson, for several different water end-use categories.

The specific results are illustrated in the charts below:



Facility Water Balance	3121 Michelson	
	Percentage of Total	Consumption (Gals)
Toilets	28.9%	585,312
Urinals	7.7%	156,780
Kitchen sinks	17.5%	354,640
Restroom Sinks	4.3%	87,100
Unaccounted	40.5%	821,131
TOTAL	98.8%	2,004,963

Actual Metered Consumption (gal)	2,028,576
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3121 – Unaccounted Water Use

In creating a Water Balance for each building, we run the demographics against benchmarks and industry standard metrics, to calculate water use in the restrooms. The models are over 95% accurate in most instances but we ran into a challenge with 3121 Michelson. If you look at the charts on the previous page, you will notice that the largest section is not allocated to a specific end use. We had a few discussions with IRWD and the LBA staff and are assured that the Recycled water meter that is used to flush the restroom fixtures, is not used for any other purposes.

If I run the usage model using high flow fixtures (3.5 gpf for toilets and 1.5 gpf for urinals, then the water balance works and accounts for almost 97% of the metered use. (See chart below)

3121 Michelson

Water / Sewer - Savings Calculations
(Uses Reclaimed Commercial Water to flush Toilets / Urinals)

# of Tenants FTE's =	620	# of Toilets =	0
# of Facility Support Employees =	5	# of Urinals =	0
# Tenant Days	161,200	# of Showers =	0
# Facility Support Employee Days* =	1,300	# of Kitchen Sinks =	0
# of Visitors/Day =	100	# of Common Area Sinks =	0
# of Visitors Using Restrooms =	45%	# of FTE Days =	260
Percent Male Occupants =	45%	# of Facility Days =	260
Fuel Rate per MMBtu =	\$21.00	W/S Rate per 1000 gallons =	
% of Total Water that is Domestic =	96.5%	Metered Total Facility Gallons =	2,028,576
		Cooling Tower Makeup Gallons =	0

3333 MICHELSON DRIVE

Park Place's 3333 Michelson is a 10 story tower that hosts 240,000 square feet of Class-A office space, floor to ceiling glass, a new lobby and common area, 24 hour security, a state of the art auditorium, amazing views and is one of Orange County's most distinctive properties. This property is also Energy Star Rated and LEED Gold Certified.

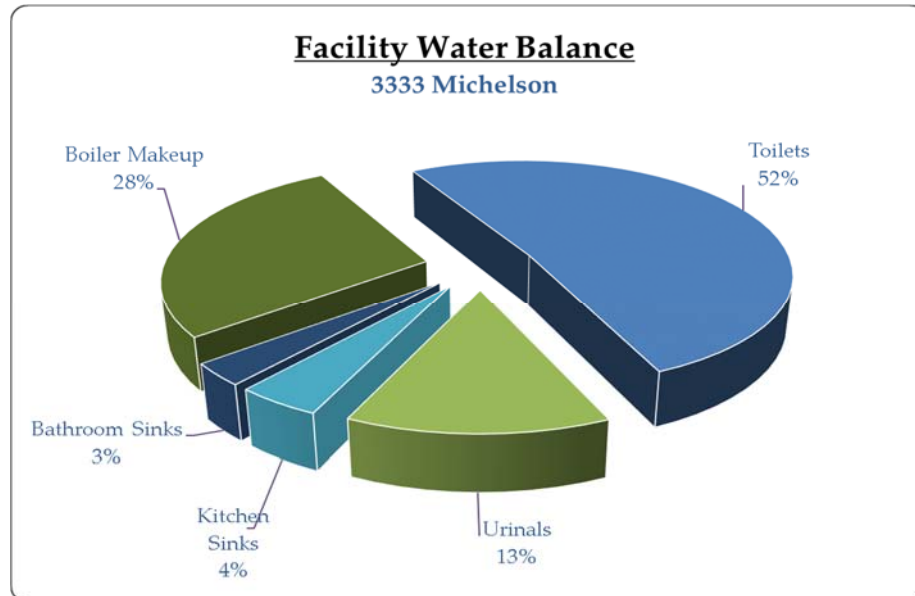
3333 - WATER METER(S)

There is one main Potable Commercial meter serving the 3333 Michelson Building. The chart below, represents a full year of water usage for the interior of this building, separated by meter. We have included a table showing the monthly usage 'per meter' in the **Appendix** of this report.

Total Water Usage - 3333 Michelson			
May 2014 - May 2015			
Meter #	End Use	ccf	Gals
1550789	Interior / All Bldg	1,040	777,920
	Total Water Use	1,040	777,920

3333 - WATER BALANCE

Using the information collected during the audit, along with details gathered through interviews with site staff, Healthy Buildings has quantified and calculated the water use at 3333 Michelson, for several different water end-use categories.



Facility Water Balance	3333 Michelson	
	Percentage of Total	Consumption (gals)
Toilets	55%	424,719
Urinals	14%	110,604
Kitchen Sinks	5%	36,400
Bathroom Sinks	3%	27,651
Boiler Makeup	29%	248,982
TOTAL	106%	848,356
Actual Metered Consumption (gal)		777,920

THE ATRIUM - 3345, 3347, 3349, 3351, 3353, 3355 BUILDINGS

The Atrium is Orange County's only world-class mixed-use office complex specifically designed for large space users, has a Comprehensive sustainability program proven by its LEED Gold Status. Since the Demographic data was not provided on a 'per building' basis, we combined the water meter data for all 6 buildings, and ran it through our Benchmarking model.

THE ATRIUM - WATER METER(S)

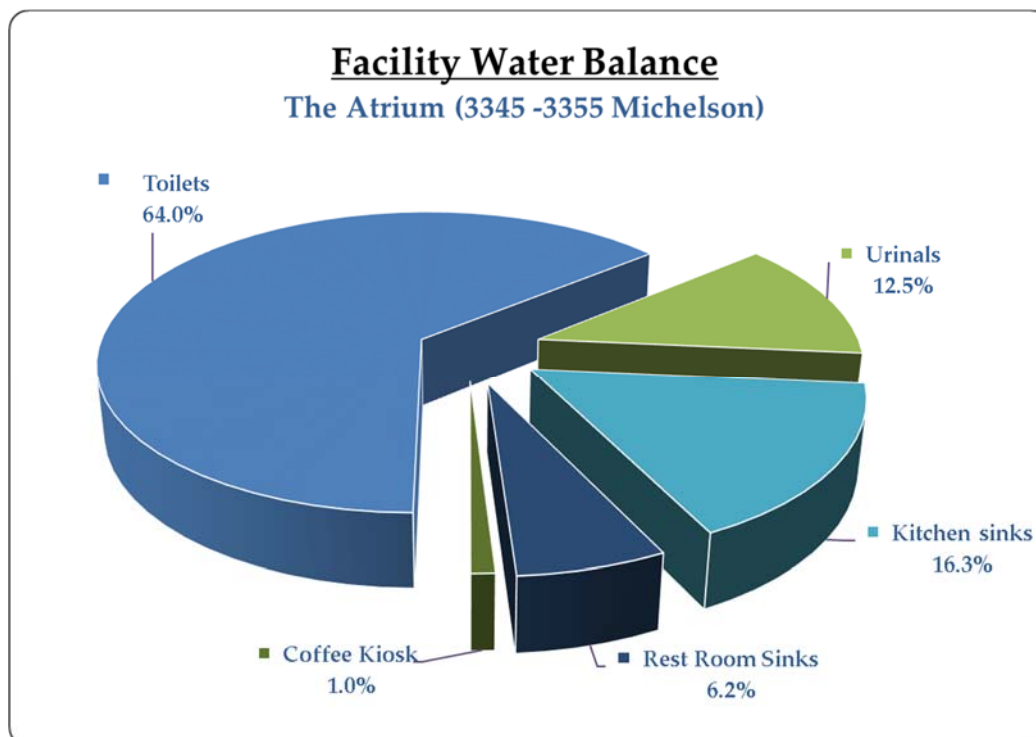
There are eight (8) Potable Commercial meters serving the Atrium Buildings. The chart below represents a full year of combined water use for all six buildings, separated by meter. We have also included a table showing the monthly usage 'per meter' in the **Appendix** of this report.

Total Water Usage - The Atrium (3345 - 3355 Michelson)			
May 2014 - May 2015			
Meter #	End Use	ccf	Gals
65869204	All Atrium Buildings (3345 - 3355)	1,327	992,596
65869202		761	569,228
76331175		721	539,308
21497901		1,301	973,148
23554021		1,421	1,062,908
24197904		604	451,792
24197911		682	510,136
68828310		1,444	1,080,112
	Total Water Use	8,261	6,179,228

THE ATRIUM – WATER BALANCE

Using the information collected during the audit, along with details gathered through interviews with site staff, Healthy Buildings has quantified and calculated the water use in The Atrium buildings, for several different water end-use categories.

The specific results are illustrated in the charts below:



Facility Water Balance	Park Place - The Atrium	
	Percentage of Total	Consumption (gals)
Toilets	64.0%	3,952,640
Urinals	12.5%	772,000
Kitchen sinks	16.3%	1,006,500
Rest Room Sinks	6.2%	386,000
Coffee Kiosk	1.0%	62,107
TOTAL	100.0%	6,179,247
Actual Metered Consumption (gal)		6,179,246

3337 MICHELSON DRIVE – CENTRAL PLANT / MARKET CAFÉ / COOLING TOWERS / ETC

The Concourse provides tenants with the most convenient access and a central location at Park Place. Situated directly adjacent to the newly renovated Atrium buildings and below the new valet parking and common areas, the Concourse is the heart of Park Place. It offers unique and efficient work spaces that can accommodate a variety of uses along with a full service Market Café dining center, Wi-Fi and multiple conference rooms for small and large corporate meetings.

3337 - WATER METER(S)

There is **one (1)** main Potable water line that feeds this area of campus, and is one of the more challenging aspects of the overall water distribution. This main water line splits into three parallel lines, each of them having sub-meters installed. The flow through these meters is not controlled by a flow-control valve, but there is no reason to install one. These three sub-metered water lines immediately combine back into one main line, and head to the areas requiring potable water service. Evaporation credit for the cooling towers is handled by manually reading make-up and blow-down sub-meters, and reporting those values to IRWD. Detailed information on this is presented the Process Water section of this report

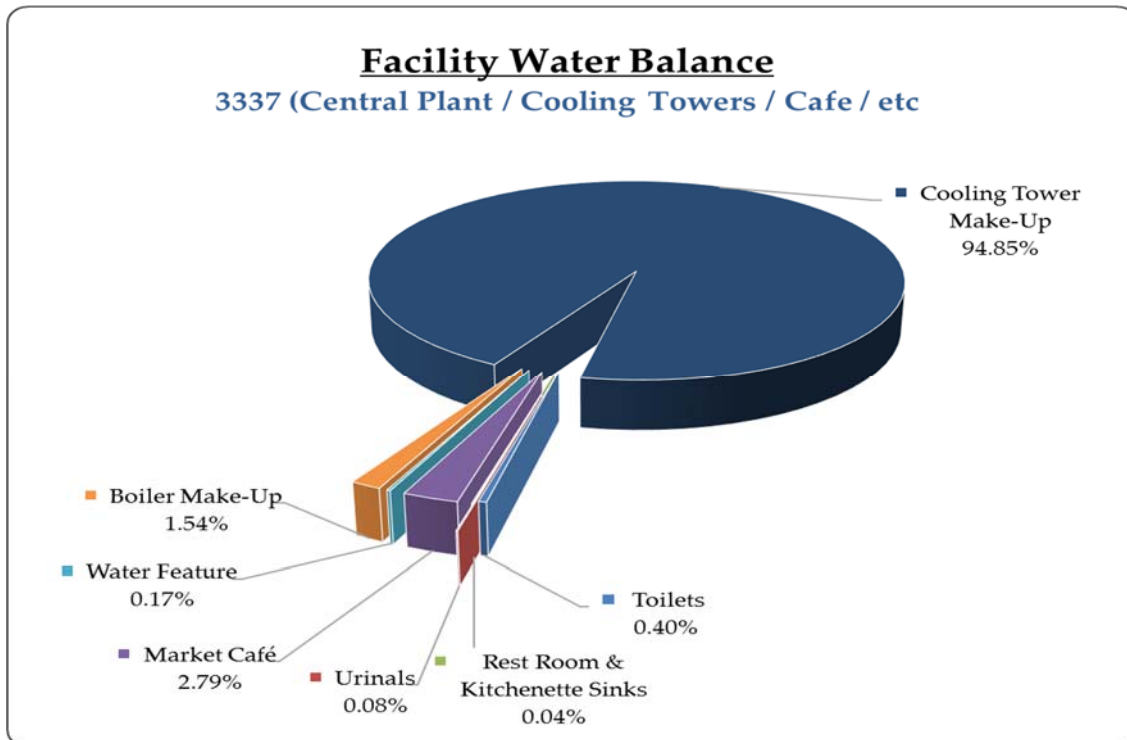
The chart below, represents a full year of water usage for the area served, separated by meter. We have included a table showing the **monthly usage 'per meter' in the Appendix.**

Total Water Usage - 3337 and additional areas Served			
Multiple Use - Loop & Pool / 3 Parallel Meters			
May 2014 - May 2015			
Meter #	End Use	ccf	Gals
1138390	Central Plant / Market Café / Cooling Towers / Rest Rooms / Kitchenette / Boiler Feed / etc	8,942	6,688,616
24053127		8,173	6,113,404
24053137		7,326	6,022,896
	Total Water Use	24,441	18,824,916
** These three meter values are combined, and billed under Meter # 24053137. We separated them out to show how volume acts in parallel pipes with no control --> the volume varies as expected. There is no reason to control the flow rate in this situation; we were just including this to illustrate the dynamics of the system ***			

3337 - WATER BALANCE

Using the information collected during the audit, along with details gathered through interviews with site staff, Healthy Buildings has quantified and calculated the water use at 3337 Michelson, for several different water end-use categories.

The specific results are illustrated in the charts below:



Facility Water Balance	Central Plant / Market Café / Cooling Towers / etc.	
	Percentage of Total	Consumption (gals)
Toilets	0.40%	74,880
Urinals	0.08%	14,625
Rest Room & Kitchenette Sinks	0.04%	7,313
Market Café	2.8%	525,566
Water Feature	0.17%	32,200
Boiler Make-Up	1.5%	289,972
Cooling Tower Make-Up	94.9%	17,855,443
TOTAL	99.9%	18,799,999

Actual Metered Consumption (gal)	18,824,916
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DOMESTIC WATER – POTENTIAL OPPORTUNITIES

When we speak about Domestic Water Efficiency, the main focus is on improving the efficiency of plumbing fixtures and faucets in the restrooms. This category does expand into areas like Laundry and Kitchens, and any opportunities related to those categories will be covered in this section

PUBLIC RESTROOMS – WATER CONSERVATION OPPORTUNITY

To date, all of the buildings in the scope of this water audit have achieved LEED Gold status. As part of that process, all of the restroom fixtures were replaced and are currently low flow, and in compliance with the local California plumbing code. In addition, building 3121 is flushing fixtures with Recycled water.

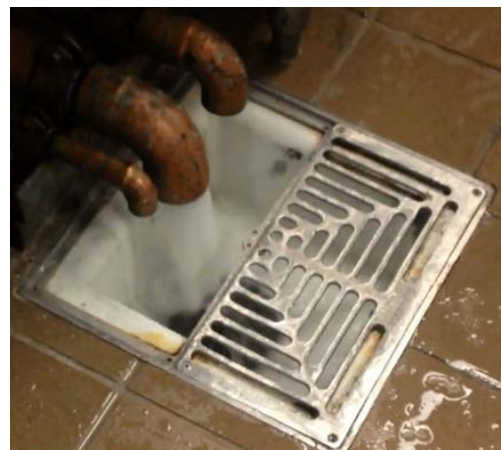
- Buildings 3333, 3337, 3345, 3347, 3349, 3351, 3353, and 3355 Michelson achieved LEED Gold in 2012, and is currently undergoing recertification.
- Building 3121 Michelson achieved LEED Gold in 2014.

MAIN DINING CENTER (MARKET CAFÉ) – WATER CONSERVATION OPPORTUNITY

The Market Café by Patina is located on the Concourse level and draws an impressive number of diners from the area, including a large portion of the 8,000 people that work on Campus. Approximately 50% of the orders are ‘take-out’, but the kitchen is still using a large amount of water, throughout the day. The water used in the Café comes from the same triple meter configuration that feeds that Cooling Towers and the Central Plant. Estimating ‘accurate’ water consumption will take additional effort but there are opportunities for savings.

Dish Washer / Food Scraper

During our audit of the main kitchen for the Market Cafe, we observed the dishwashing process that is dumping all of the water, directly to drain. The operator runs the machine from 7 am – 10:30 and, and then from 1 pm until 3:30 pm. The volume of water that is sent to drain during each cycle was eye opening, and easily exceeded 5 gpm. This water is approximately 90 F° and provides an incredible opportunity for both energy and water savings.



The installation of a Food Scrapper will save at least 50% of the water by recirculation it through the integrated filtration and reuse system. The operator's hands are freed from using the overhead nozzle, because the integrated high pressure spray head is built into the system, and is powered with the recirculated water.



IRRIGATION SYSTEM

There is an extensive irrigation system that uses the 'ETwater' control system that utilizes rain sensor, a cellular connection to the latest weather forecast, cycle and soak sequences, and mobile access. Utilizing Recycled water in conjunction with this hardware does not offer any opportunities for improvement. We spoke with Valley Crest and part of their contract involves looking for distribution leaks, replacing faulty spray heads and adjusting overspray.

PROCESS WATER

Process water is a common name for water which can't be classified as drinking (potable) water and is used in connection with technical plants and processes in production companies, heat and power plants, and institutions. There are many opportunities for saving water through reducing consumption or reusing the effluent. Healthy Buildings specialized in custom designed Water Conservation Measures that address this broad category of water use.

COOLING TOWERS

The Central Plant has new Cooling Towers and an outstanding treatment company (EAI Water), and claim that the system operates as high as 6 Cycles of Concentration. That's an incredibly efficient level of operation, as long as it is not offset by high chemical costs or the liability of storing highly toxic acid on the property. The main Potable line that provides make-up water to the towers, splits into three smaller diameter (metered) pipes, and then they merge back together as one pipe again. That **single** pipe now feeds the Central Plant, the Cooling Towers, the Main Kitchen, and many other areas on the Concourse level. That configuration that some call a 'Loop and Pool', does not function as a sub meter for any of the major water using Processes downstream, so the Water Balance becomes extremely tricky.

The table below shows the three meter numbers, along with a year's worth of readings, and an approximation of the areas that it serves. The water use from all three meters is combined and billed under meter # 24053137. If the Chief Engineer wants

evaporation credit (sewer credit), he/she has to read their own set of sub-meters and report the Tower make-up and blowdown values to IRWD.

** There is a possibility that many California water municipalities will have to force large Commercial customers to use Recycled water for Cooling Tower make-up, if the drought conditions continue. While the commodity rate is lower than Potable, the water quality and consistency vary weekly, and increased treatment costs along with equipment degradation will be two of the undesired consequences. Burbank has already begun the implementation process. **

Building Address	Meter #	Volume - Gals (5/14 - 5/15)	End Use	Location of Use
3337	1138390	6,688,616	Domestic / Process Water / Cooling Towers / Kitchen / Hose Bibs	Combination with 1138390 and 24053127, serves Cooling Towers and +/- 75% of Concourse including Kitchen. Also feeds hose bib and eyewash station on Plaza Deck in big, black enclosure.
	24053127	6,113,404		
	24053137	6,022,896		
The (above) 3 meters highlighted in Green , all split off from 1 water main, and then merge back into 1 Water Line (Loop & Pool)				

The table below summarizes the Cooling Tower make-up and blowdown data for the past four year. Using industry standard calculations for Cycles of Concentration and ignoring Drift, I was only able to come up with an average of 5 Cycles. That is something that most Chief Engineers dream about, in other locations!

Cooling Tower Water Usage - Past 4 Years							
Year	Days	Date Range	Make-Up Water (Gals)		Blowdown Water Gals)		Cycles (COC)
			Meter Readings	Total Make-Up	Meter Readings	Total Blowdown	Cycles of Concentration
2012	366	6/28/2011	4,756,737	14,562,915	9,144,965	2,966,566	4.91
		6/28/2012	19,319,652		12,111,531		
2013	364	6/28/2012	19,319,652	15,871,553	12,111,531	3,523,899	4.50
		6/27/2013	35,191,205		15,635,430		
2014	365	6/27/2013	35,191,205	16,222,445	15,635,430	3,037,000	5.34
		6/26/2014	51,413,650		18,672,430		
2015	315	6/27/2014	51,469,740	15,240,735	18,682,465	2,874,867	5.30
		5/8/2015	66,710,475		21,557,332		
			New Meter				
2015	30	6/8/2015	1,439,065	1,720,174	21,659,545	463,089	3.71
		7/8/2015	3,159,239		22,122,634		
2015	31	7/8/2015	3,159,239	1,890,608	22,122,634	342,705	5.52
		8/8/2015	5,049,847		22,465,339		
					Average COC (4 Year)		5.01

COOLING TOWER - WATER CONSERVATION OPPORTUNITY

As stated earlier, the Central Plant is one of the cleanest and well run that we have seen in many years. Tim is very proactive and constantly tests the quality of the incoming city water, as well as the Condenser water. We had similar concerns about the proximity of the Cooling Towers to the 405 Freeway, and the new Parking Structure construction. In an effort to assist with future efficiency plans related to the Cooling Towers at Park Place, we have identified a list of strategies and equipment for your consideration.

Side-Stream Filtration

Since the Cooling Towers are in close proximity to the 405 Freeway and the new Parking construction project, they are collecting an enormous amount of dirt from the air and are basically acting like large scrubbers. Filtration can be a very effective method of cleaning up cooling water and eliminating suspended solids problems. However, with most cooling water particles being extremely fine (0.5 to 5 microns), the ability of the filter to cost effectively remove these tiny contaminants is the key to successful side-stream filtration.



Based on our observations, installing a 0.5 micron side stream filtration system will reduce the suspended solids and bacteria in the cooling tower condenser loop. The system will constantly filter approximately 10% of the total circulation water, thereby increasing the existing cycles of concentration and keeping the chiller tubes clean and ensuring efficient heat transfer. The photo at the right shows the ideal location for this system and it appears that there is an existing 'large particle' filter (red cap), but Tim knows this is a bandage and is exploring our recommendation.

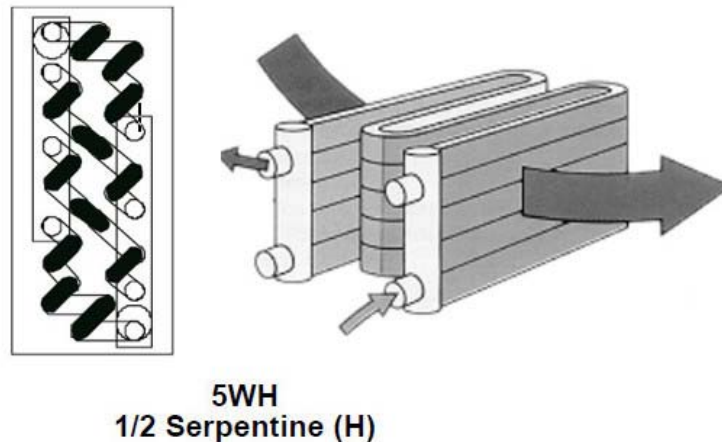


Dolphin System / Silver Bullet / Pulse~Pure / Make-up Pre-Conditioning

There are a multitude of products on the market to increase cycles, prevent corrosion, control scale, eliminate dirt and bacterial down to 0.5 micron, increase heat transfer efficiency at the chiller, and even to eliminate blowdown. Healthy Buildings can consult with you on all of these technologies, and recommend the best solution for your current configuration and long term goals. With your chemical treatment company doing such a spectacular job, we think that Side-Stream filtration is the most important investment you can make at this time.

FAN TOWERS - HVAC

The three massive Silver Fan Towers contain the Chilled Water coils and multiple, massive Axial supply and exhaust fans to bring conditioned air to all six of the buildings in the Atrium. These fans will move air (on average) at volumes of 56,000 cubic feet per minute (cfm). The Towers have McQuay serpentine chilled water coils (Model 5WH1010B) that are ten rows deep, providing an incredible amount of surface area for condensate collection.



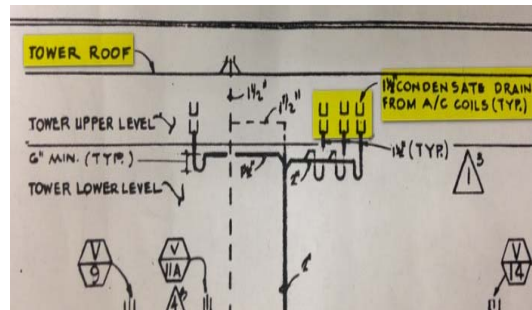
FAN TOWERS - WATER CONSERVATION OPPORTUNITY

The most effective use of condensate water collected from commercial or industrial buildings is for makeup water in cooling towers. This is because the pure and cool condensate water dilutes the sediment buildup in cooling towers (the sediment is left behind during the evaporative cooling process), increases the efficiency of the cooling towers by virtue of its relatively cool temperature, provides the most water in hot and humid conditions when makeup water for the cooling towers is most needed, and requires no additional storage or treatment. We understand that the general public thinks there is no humidity in California, but that is not true. This potential Water Conservation Measure would require further investigation, and we would be happy to assist you.



Condensate Harvesting – CW Coils

During our audits, we observed condensate flow rates as high as 3 gpm to drain, from one of the Fan Towers. We also located the drawings for the existing condensate drains and piping that bring the condensate to the lower levels for use. The logistics of moving that pure water to the cooling towers is not complicated, and we actually discussed a few different ways to route the piping during our audits.



3333 MICHELSON TOWER

The Air Handler units on each floor of the 3333 Tower, except the 9th and 10th floors, have dedicated pipes that route the condensate to the ground level, simplifying the collection and conveyance process.

Condensate Harvesting – CW Coils

As with the available condensate from the Fan Towers, further investigation is required to calculate the potential volume and possible end use. Whether it is cooling tower make-up or make-up water for the multiple water features on campus, the collection and conveyance require additional work. We would be thrilled to take a deeper dive into the feasibility of this reuse opportunities.

RETAIL AREA

As mentioned in the SOW section, we did not have access to water meter data for any tenants in the Retail section. We are also aware that many tenants share meters and there was not enough information available to proceed with our investigation.

LA FITNESS

While we did not have access to the interior of LA Fitness, we were told that there was a large swimming pool. The majority of the pools in US fitness clubs do not utilize any methods to prevent heat and water loss, through evaporation. In addition to water and energy loss from the pool, the constant heat and moisture load, and corrosion on the HVAC system serving that space is extremely damaging.

Liquid Pool Cover

Liquid pool covers are composed of a transparent liquid that spreads itself out over the surface of a body of water. When it is added to your pool, it creates a liquid barrier between the water and the air, which helps to reduce the rate of evaporation. The active ingredients in liquid pool covers are biodegradable organic compounds. Extensive testing proves that the active ingredients we have chosen do the best possible job at reducing evaporation, saving water and energy in every pool. Healthy Buildings can assist your tenant with this technology, if they are interested.

IRVINE RANCH WATER DISTRICT

Commercial Rebate Programs

Credits, Rebates & Incentives

Site Evaluation & Efficiency
Recommendations

Irrigation Landscape Tools



Credits, Rebates & Incentives



\$\$ Rebates: Your business may qualify for a rebate on many items ranging from high efficiency toilets, turf removal, irrigation controllers, ice machines and more!

\$\$\$ Recycled Water in Cooling Towers can help you save water and money. To convert your cooling tower to recycled water use, call IRWD's Recycled Water Department at 949-453-5300.

\$\$ Performance Based Savings: Your special water-efficient projects or upgrades for your business may qualify for the Commercial and Industrial Water Use Efficiency Incentive Program. Incentives can be as much as \$3 for every 1,000 gallons of water saved in a year! For details, contact the [Conservation Department](#).

\$\$ Evaporation Credits: Cooling towers that are metered with make-up meters and blow-down meters are eligible for evaporation credits. Please submit one year of completed meter log sheets for both meters. For details, contact the [Conservation Department](#).

Commercial Customers must [apply for a rebate](#) before making the purchase.



Find those Leaks: You may also have leaks or other unintended water use such as over irrigation or an increase in production. For details, contact the [Conservation Department](#).

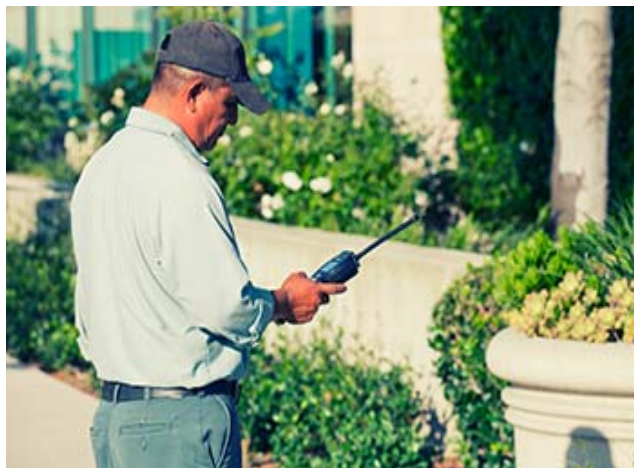


Free Water Use Evaluations:

Property managers experiencing water usage in the Inefficient, Excessive or Wasteful tiers are eligible for a free evaluation of your company's base index (water allocation).

For details, contact the [Conservation Department](#) **EPA Water Sense at Work:** check out water efficiency best management practices for commercial and institutional facilities. Designed to help you understand and better manage your water use, help you establish an effective water management program and identify projects and practices that can reduce facility water use. [read more](#)

Irrigation Water Management Tools



Tips for Property Managers: Check out cost-saving irrigation tips for property managers. [click here to view the slide show](#)



Free Mixed-use Meters Log-Sheet:

Help keep track of your weekly water usage. Commercial property meters measure both outdoor water usage such as outdoor spigots, indoor water usage, bathroom and kitchen fixtures, and production processes requiring water, etc. For assistance using this log sheet and to determine your current indoor and outdoor allocations, please contact Amy McNulty at (949) 453-5634 or mcnulty@irwd.com.

Free Suggested Weekly Irrigation Schedule: Download the free suggested weekly irrigation schedule, available in English and Spanish. [Download the schedule](#) **ET Weather & Data Center:** Download weekly allocation data, CIMIS information and more. ET Hotline: 949-453-5351. [read more](#)

Commercial Rebates

Eligible Fixture	Total Rebate Amount
<u>High Efficiency Toilet (Tank and Bowl)</u>	\$150
<u>Multi-Family High Efficiency Toilet (HET)</u>	\$150
<u>High Efficiency Toilet (HET) - Flushometer</u>	\$150
<u>Zero and Ultra Low Water Urinal</u>	\$300
<u>Weather-Based Irrigation Controller</u>	\$35 per station plus \$120 installation
<u>Central Computer Irrigation Controller</u>	\$35 per station
<u>Turf Removal Rebate (IRWD Program)</u>	\$2 per sq. foot of grass removed
<u>Rotating Nozzles for Pop-Up Spray Heads</u>	\$4 per nozzle, 15 piece minimum
<u>High Efficiency Nozzles for Large Sprinklers</u>	\$13 per set, 8 set minimum
<u>In-Stem Flow Regulator</u>	\$1 per regulator, 25 piece minimum
<u>Cooling Tower Conductivity Controller</u>	\$625 per controller
<u>pH Conductivity Controller</u>	\$1750 per controller
<u>Dry Vacuum Pumps</u>	\$125 per 0.5 hp
<u>Air Cooled Ice Machines</u>	\$1,250 per ice machine
<u>Connectionless Food Steamers</u>	\$970 per steam compartment
<u>Laminar Flow Restrictors</u>	\$10 per restrictor
<u>Fitness Center HET Tank Type or Flushometer</u>	\$350
<u>Fitness Center Urinals ZWU and ULWU</u>	\$600 per urinal

Note*: Rebate amounts may fluctuate and are subject to funding availability. Although rebate funding comes from IRWD and other regional water agencies, to receive the combined total rebate amount only one rebate application is required.

Commercial Customers

- Commercial Customers must apply for a rebate **before** making the purchase. Applications and specific information on each rebate available at www.socalwatersmart.com
- There is an indoor device rebate limit of \$50,000 per address.

APPENDIX

- Domestic Water Use – Separated by Meter (Usage By Month)
- Domestic Water Calculations for The Atrium (6 Buildings)
- Side Stream Filtration System

Monthly Potable Water Usage – By Meter

Domestic Commercial Water		3121 Building except Toilets and Urinals			Rates / kGal		Avg Gals per Day
Meter Number	Date Range	# days	Usage (ccf)	Usage (Gals)	Water	Sewer	
60298533							
	5/9/14 - 6/9/14	31	15	11,220	\$1.70	\$2.88	362
	6/9/14 - 7/10/14	31	17	12,716	\$1.70	\$2.88	410
	7/10/14 - 8/8/14	29	16	11,968	\$1.79	\$3.14	413
	8/8/14 - 9/9/14	32	15	11,220	\$1.79	\$3.14	351
	9/9/15 - 10/9/14	30	16	11,968	\$1.79	\$3.14	399
	10/9/14 - 11/10/14	30	18	13,464	\$1.79	\$3.14	449
	11/10/14 - 12/9/14	31	15	11,220	\$1.79	\$3.14	362
	12/9/14 - 1/12/15	34	15	11,220	\$1.79	\$3.14	330
	1/12/15 - 2/9/15	28	17	12,716	\$1.79	\$3.14	454
	2/9/15 - 3/9/15	25	14	10,472	\$1.79	\$3.14	419
	3/9/15 - 4/9/15	34	15	11,220	\$1.79	\$3.14	330
	4/9/15 - 5/9/15	30	13	9,724	\$1.79	\$3.14	324
		365	186	139,128			384

Domestic Commercial Water		3333 Building			Rates / kGal		Avg Gals per Day
Meter Number	Date Range	# days	Usage (ccf)	Usage (Gals)	Water	Sewer	
1550789							
	5/9/14 - 6/9/14	31	77	57,596	\$1.70	\$2.88	1,858
	6/9/14 - 7/10/14	31	88	65,824	\$1.70	\$2.88	2,123
	7/10/14 - 8/8/14	29	86	64,328	\$1.79	\$3.14	2,218
	8/8/14 - 9/9/14	32	82	61,336	\$1.79	\$3.14	1,917
	9/9/15 - 10/9/14	30	83	62,084	\$1.79	\$3.14	2,069
	10/9/14 - 11/8/14	30	89	66,572	\$1.79	\$3.14	2,219
	11/8/14 - 12/9/14	31	79	59,092	\$1.79	\$3.14	1,906
	12/9/14 - 1/12/15	34	88	65,824	\$1.79	\$3.14	1,936
	1/12/15 - 2/9/15	28	94	70,312	\$1.79	\$3.14	2,511
	2/9/15 - 3/6/15	25	85	63,580	\$1.79	\$3.14	2,543
	3/6/15 - 4/9/15	34	111	83,028	\$1.79	\$3.14	2,442
	4/9/15 - 5/9/15	30	107	80,036	\$1.79	\$3.14	2,668
		365	1,069	799,612			2,201

Domestic Commercial Water		3337 / Plant CT's / Café /etc			Rates / kGal		Avg Gals per Day
Meter Number	Date Range	# days	Usage (ccf)	Usage (Gals)	Water	Sewer	
1138390							
	5/9/14 - 6/9/14	31	800	598,400	\$1.70	\$2.88	19,303
	6/9/14 - 7/10/14	31	813	608,124	\$1.70	\$2.88	19,617
	7/10/14 - 8/8/14	29	875	654,500	\$1.79	\$3.14	22,569
	8/8/14 - 9/9/14	32	975	729,300	\$1.79	\$3.14	22,791
	9/9/15 - 10/9/14	30	977	730,796	\$1.79	\$3.14	24,360
	10/9/14 - 11/11/14	33	802	599,896	\$1.79	\$3.14	18,179
	11/11/14 - 12/9/14	28	543	406,164	\$1.79	\$3.14	14,506
	12/9/14 - 1/12/15	34	436	326,128	\$1.79	\$3.14	9,592
	1/12/15 - 2/9/15	28	521	389,708	\$1.79	\$3.14	13,918
	2/9/15 - 3/9/15	28	531	397,188	\$1.79	\$3.14	14,185
	3/9/15 - 4/9/15	31	774	578,952	\$1.79	\$3.14	18,676
	4/9/15 - 5/9/15	30	895	669,460	\$1.79	\$3.14	22,315
		365	8,942	6,688,616			18,334
Domestic Commercial Water		3337 / Plant CT's / Café /etc			Rates / kGal		Avg Gals per Day
Meter Number	Date Range	# days	Usage (ccf)	Usage (Gals)	Water	Sewer	
24053127							
	5/9/14 - 6/9/14	31	734	549,032	\$1.70	\$2.88	17,711
	6/9/14 - 7/10/14	31	745	557,260	\$1.70	\$2.88	17,976
	7/10/14 - 8/8/14	29	802	599,896	\$1.79	\$3.14	20,686
	8/8/14 - 9/9/14	32	894	668,712	\$1.79	\$3.14	20,897
	9/9/15 - 10/9/14	30	894	668,712	\$1.79	\$3.14	22,290
	10/9/14 - 11/11/14	33	733	548,284	\$1.79	\$3.14	16,615
	11/11/14 - 12/9/14	28	489	365,772	\$1.79	\$3.14	13,063
	12/9/14 - 1/12/15	34	395	295,460	\$1.79	\$3.14	8,690
	1/12/15 - 2/9/15	28	473	353,804	\$1.79	\$3.14	12,636
	2/9/15 - 3/9/15	28	483	361,284	\$1.79	\$3.14	12,903
	3/9/15 - 4/9/15	31	709	530,332	\$1.79	\$3.14	17,107
	4/9/15 - 5/9/15	30	822	614,856	\$1.79	\$3.14	20,495
		365	8,173	6,113,404			16,756
Domestic Commercial Water		3337 / Plant CT's / Café /etc			Rates / kGal		Avg Gals per Day
Meter Number	Date Range	# days	Usage (ccf)	Usage (Gals)	Water	Sewer	
24053137							
	5/9/14 - 6/9/14	31	2,260	1,690,480	\$1.70	\$2.88	54,532
	6/9/14 - 7/10/14	31	2,294	1,715,912	\$1.70	\$2.88	55,352
	7/10/14 - 8/8/14	29	2,470	1,847,560	\$1.79	\$3.14	63,709
	8/8/14 - 9/9/14	32	2,752	2,058,496	\$1.79	\$3.14	64,328
	9/9/15 - 10/9/14	30	2,751	2,057,748	\$1.79	\$3.14	68,592
	10/9/14 - 11/11/14	33	2,256	1,687,488	\$1.79	\$3.14	51,136
	11/11/14 - 12/9/14	28	1,514	1,132,472	\$1.79	\$3.14	40,445
	12/9/14 - 1/12/15	34	1,220	912,560	\$1.79	\$3.14	26,840
	1/12/15 - 2/9/15	28	1,459	1,091,332	\$1.79	\$3.14	38,976
	2/9/15 - 3/9/15	28	1,488	1,113,024	\$1.79	\$3.14	39,751
	3/9/15 - 4/9/15	31	2,179	1,629,892	\$1.79	\$3.14	52,577
	4/9/15 - 5/9/15	30	2,524	1,887,952	\$1.79	\$3.14	62,932
		365	25,167	18,824,916			51,597

Domestic Commercial Water		3345 Building			Rates / kGal		Avg Gals per Day
Meter Number	Date Range	# days	Usage (ccf)	Usage (Gals)	Water	Sewer	
65869204							
	5/9/14 - 6/9/14	31	119	89,012	\$1.70	\$2.88	2,871
	6/9/14 - 7/10/14	31	121	90,508	\$1.70	\$2.88	2,920
	7/10/14 - 8/8/14	29	110	82,280	\$1.79	\$3.14	2,837
	8/8/14 - 9/9/14	32	106	79,288	\$1.79	\$3.14	2,478
	9/9/15 - 10/9/14	30	111	83,028	\$1.79	\$3.14	2,768
	10/9/14 - 11/8/14	30	104	77,792	\$1.79	\$3.14	2,593
	11/8/14 - 12/9/14	31	92	68,816	\$1.79	\$3.14	2,220
	12/9/14 - 1/12/15	34	93	69,564	\$1.79	\$3.14	2,046
	1/12/15 - 2/9/15	28	110	82,280	\$1.79	\$3.14	2,939
	2/9/15 - 3/6/15	25	108	80,784	\$1.79	\$3.14	3,231
	3/6/15 - 4/9/15	34	131	97,988	\$1.79	\$3.14	2,882
	4/9/15 - 5/9/15	30	122	91,256	\$1.79	\$3.14	3,042
		365	1,327	992,596			2736

Domestic Commercial Water		3347 Building			Rates / kGal		Avg Gals per Day
Meter Number	Date Range	# days	Usage (ccf)	Usage (Gals)	Water	Sewer	
65869202							
	5/9/14 - 6/9/14	31	81	60,588	\$1.70	\$2.88	1,954
	6/9/14 - 7/10/14	31	10	7,480	\$1.70	\$2.88	241
	7/10/14 - 8/8/14	29	0	0	\$1.79	\$3.14	0
	8/8/14 - 9/9/14	32	0	0	\$1.79	\$3.14	0
	9/9/15 - 10/9/14	30	75	56,100	\$1.79	\$3.14	1,870
	10/9/14 - 11/11/14	33	94	70,312	\$1.79	\$3.14	2,131
	11/11/14 - 12/9/14	28	75	56,100	\$1.79	\$3.14	2,004
	12/9/14 - 1/12/15	34	83	62,084	\$1.79	\$3.14	1,826
	1/12/15 - 2/9/15	28	86	64,328	\$1.79	\$3.14	2,297
	2/9/15 - 3/9/15	28	83	62,084	\$1.79	\$3.14	2,217
	3/9/15 - 4/9/15	31	91	68,086	\$1.79	\$3.14	2,196
	4/9/15 - 5/9/15	30	83	62,084	\$1.79	\$3.14	2,069
		365	761	569,246			1,567

Domestic Commercial Water		3349 Building			Rates / kGal		Avg Gals per Day
Meter Number	Date Range	# days	Usage (ccf)	Usage (Gals)	Water	Sewer	
76331175							
	5/9/14 - 6/9/14	31	57	42,636	\$1.70	\$2.88	1,375
	6/9/14 - 7/10/14	31	49	36,652	\$1.70	\$2.88	1,182
	7/10/14 - 8/8/14	29	61	45,628	\$1.79	\$3.14	1,573
	8/8/14 - 9/9/14	32	70	52,360	\$1.79	\$3.14	1,636
	9/9/15 - 10/9/14	30	74	55,352	\$1.79	\$3.14	1,845
	10/9/14 - 11/10/14	32	74	55,352	\$1.79	\$3.14	1,730
	11/10/14 - 12/9/14	29	58	43,384	\$1.79	\$3.14	1,496
	12/9/14 - 1/12/15	34	53	39,644	\$1.79	\$3.14	1,166
	1/12/15 - 2/10/15	29	56	41,888	\$1.79	\$3.14	1,444
	2/10/15 - 3/9/15	27	55	41,140	\$1.79	\$3.14	1,524
	3/9/15 - 4/9/15	31	59	44,132	\$1.79	\$3.14	1,424
	4/9/15 - 5/9/15	30	55	41,140	\$1.79	\$3.14	1,371
		365	721	539,308			1,481

Domestic Commercial Water		3351 Building			Rates / kGal		Avg Gals per Day
Meter Number	Date Range	# days	Usage (ccf)	Usage (Gals)	Water	Sewer	
68828310							
	5/9/14 - 6/9/14	31	115	86,020	\$1.70	\$2.88	2,775
	6/9/14 - 7/10/14	31	121	90,508	\$1.70	\$2.88	2,920
	7/10/14 - 8/8/14	29	127	94,996	\$1.79	\$3.14	3,276
	8/8/14 - 9/9/14	32	116	86,768	\$1.79	\$3.14	2,712
	9/9/15 - 10/9/14	30	115	86,020	\$1.79	\$3.14	2,867
	10/9/14 - 11/10/14	32	118	88,264	\$1.79	\$3.14	2,758
	11/10/14 - 12/9/14	29	111	83,028	\$1.79	\$3.14	2,863
	12/9/14 - 1/12/15	34	117	87,516	\$1.79	\$3.14	2,574
	1/12/15 - 2/9/15	28	121	90,508	\$1.79	\$3.14	3,232
	2/9/15 - 3/9/15	28	120	89,760	\$1.79	\$3.14	3,206
	3/9/15 - 4/9/15	31	139	103,972	\$1.79	\$3.14	3,354
	4/9/15 - 5/9/15	30	124	92,752	\$1.79	\$3.14	3,092
		365	1,444	1,080,112			2,969

Domestic Commercial Water		3355 / 3353			Rates / kGal		Avg Gals per Day
Meter Number	Date Range	# days	Usage (ccf)	Usage (Gals)	Water	Sewer	
21497901							
	5/9/14 - 6/9/14	31	106	79,288	\$1.70	\$2.88	2,558
	6/9/14 - 7/10/14	31	102	76,296	\$1.70	\$2.88	2,461
	7/10/14 - 8/8/14	29	107	80,036	\$1.79	\$3.14	2,760
	8/8/14 - 9/9/14	32	104	77,792	\$1.79	\$3.14	2,431
	9/9/15 - 10/9/14	30	108	80,784	\$1.79	\$3.14	2,693
	10/9/14 - 11/10/14	32	109	81,532	\$1.79	\$3.14	2,548
	11/10/14 - 12/9/14	29	118	88,264	\$1.79	\$3.14	3,044
	12/9/14 - 1/12/15	34	89	66,572	\$1.79	\$3.14	1,958
	1/12/15 - 2/9/15	28	111	83,028	\$1.79	\$3.14	2,965
	2/9/15 - 3/9/15	28	107	80,036	\$1.79	\$3.14	2,858
	3/9/15 - 4/9/15	31	125	93,500	\$1.79	\$3.14	3,016
	4/9/15 - 5/9/15	30	115	86,020	\$1.79	\$3.14	2,867
		365	1,301	973,148			2,680

Domestic Commercial Water		3355 / 3353			Rates / kGal		Avg Gals per Day
Meter Number	Date Range	# days	Usage (ccf)	Usage (Gals)	Water	Sewer	
23554021							
	5/9/14 - 6/9/14	31	115	86,020	\$1.70	\$2.88	2,775
	6/9/14 - 7/10/14	31	111	83,028	\$1.70	\$2.88	2,678
	7/10/14 - 8/8/14	29	115	86,020	\$1.79	\$3.14	2,966
	8/8/14 - 9/9/14	32	114	85,272	\$1.79	\$3.14	2,665
	9/9/15 - 10/9/14	30	119	89,012	\$1.79	\$3.14	2,967
	10/9/14 - 11/10/14	32	120	89,760	\$1.79	\$3.14	2,805
	11/10/14 - 12/9/14	29	129	96,492	\$1.79	\$3.14	3,327
	12/9/14 - 1/12/15	34	98	73,304	\$1.79	\$3.14	2,156
	1/12/15 - 2/9/15	28	121	90,508	\$1.79	\$3.14	3,232
	2/9/15 - 3/9/15	28	117	87,516	\$1.79	\$3.14	3,126
	3/9/15 - 4/9/15	31	136	101,728	\$1.79	\$3.14	3,282
	4/9/15 - 5/9/15	30	126	94,248	\$1.79	\$3.14	3,142
		365	1,421	1,062,908			2,927

Domestic Commercial Water		3355			Rates / kGal		Avg Gals per Day
Meter Number	Date Range	# days	Usage (ccf)	Usage (Gals)	Water	Sewer	
24197904							
	5/9/14 - 6/9/14	31	32	23,936	\$1.70	\$2.88	772
	6/9/14 - 7/10/14	31	30	22,440	\$1.70	\$2.88	724
	7/10/14 - 8/8/14	29	35	26,180	\$1.79	\$3.14	903
	8/8/14 - 9/9/14	32	28	20,944	\$1.79	\$3.14	655
	9/9/15 - 10/9/14	30	30	22,440	\$1.79	\$3.14	748
	10/9/14 - 11/10/14	32	30	22,440	\$1.79	\$3.14	701
	11/10/14 - 12/9/14	29	33	24,684	\$1.79	\$3.14	851
	12/9/14 - 1/12/15	34	25	18,700	\$1.79	\$3.14	550
	1/12/15 - 2/9/15	28	27	20,196	\$1.79	\$3.14	721
	2/9/15 - 3/9/15	28	26	19,448	\$1.79	\$3.14	695
	3/9/15 - 4/9/15	31	274	204,952	\$1.79	\$3.14	6,611
	4/9/15 - 5/9/15	30	34	25,432	\$1.79	\$3.14	848
		365	604	451,792			1,232

Domestic Commercial Water		3355			Rates / kGal		Avg Gals per Day
Meter Number	Date Range	# days	Usage (ccf)	Usage (Gals)	Water	Sewer	
	5/9/14 - 6/9/14	31	36	26,928	\$1.70	\$2.88	869
	6/9/14 - 7/10/14	31	35	26,180	\$1.70	\$2.88	845
	7/10/14 - 8/8/14	29	40	29,920	\$1.79	\$3.14	1,032
	8/8/14 - 9/9/14	32	32	23,936	\$1.79	\$3.14	748
	9/9/15 - 10/9/14	30	35	26,180	\$1.79	\$3.14	873
	10/9/14 - 11/10/14	32	35	26,180	\$1.79	\$3.14	818
	11/10/14 - 12/9/14	29	38	28,424	\$1.79	\$3.14	980
	12/9/14 - 1/12/15	34	27	20,196	\$1.79	\$3.14	594
	1/12/15 - 2/9/15	28	32	23,936	\$1.79	\$3.14	855
	2/9/15 - 3/9/15	28	29	21,692	\$1.79	\$3.14	775
	3/9/15 - 4/9/15	31	305	228,140	\$1.79	\$3.14	7,359
	4/9/15 - 5/9/15	30	38	28,424	\$1.79	\$3.14	947
		365	682	510,136			1,391

Domestic Commercial Water		Water Feature - Outside 3161			Rates / kGal		Avg Gals per Day
Meter Number	Date Range	# days	Usage (ccf)	Usage (Gals)	Water	Sewer	
67428123							
	6/9/14 - 7/10/14	31	38	28,424	\$1.70	\$2.88	917
	7/10/14 - 8/8/14	29	30	22,440	\$1.79	\$3.14	774
	8/8/14 - 9/9/14	32	54	40,392	\$1.79	\$3.14	1,262
	9/9/15 - 10/9/14	30	50	37,400	\$1.79	\$3.14	1,247
	10/9/14 - 11/10/14	32	47	35,156	\$1.79	\$3.14	1,099
	11/10/14 - 12/9/14	29	53	39,644	\$1.79	\$3.14	1,367
	12/9/14 - 1/12/15	34	47	35,156	\$1.79	\$3.14	1,034
	1/12/15 - 2/9/15	28	15	11,220	\$1.79	\$3.14	401
	2/9/15 - 3/9/15	28	20	14,960	\$1.79	\$3.14	534
	3/9/15 - 4/9/15	31	26	19,448	\$1.79	\$3.14	627
	4/9/15 - 5/9/15	30	28	20,944	\$1.79	\$3.14	698
	5/9/15 - 6/9/15	31	79	59,092	\$1.79	\$3.14	1,906
		365	487	364,276			989

Park Place - The Atrium

Domestic Water / Sewer - Savings Calculations

# of Tenants / FTE's =	6,100	# of Toilets =	0
# of Facility Support Employees =	16	# of Urinals =	0
# Tenant Days	1,525,000	# of Showers =	0
# Facility Support Employee Days* =	4,000	# of Kitchen Sinks =	0
# of Visitors/Day =	300	# of Common Area Sinks =	0
# of Visitors Using Restrooms =	20%	# of FTE Days =	250
Percent Male Occupants =	50%	# of Facility Days =	250
Fuel Rate per MMBtu =	\$21.00	W/S Rate per 1000 gallons =	\$4.93
% of Total Water that is Domestic =	99.0%	Metered Total Facility Gallons =	6,179,246
		Cooling Tower Makeup Gallons =	

TODAY'S CONSUMPTION

TOILETS

1.28 # gallons per flush
 3.0 # flushes per day women
 1.0 # flushes per day men
 1,544,000 # Tenant/Employee/Visitor days
 988,160 # of Gallons used (Men)
 2,964,480 # of Gallons used (Women)
3,952,640 Total

URINALS

0.50 # gallons per flush
2.0 # flushes per day
 772,000 # Tenant/Employee/Visitor days
772,000 # of Gallons used

SHOWERS

2.50 # gallons per minute
0.0 # minutes per shower
 152,500 # Tenant days (10%)
0 # of Gallons used

KITCHEN SINKS

2.20 # gallons per minute
2.5 # minutes used per day
 183,000 # Tenant days (10%)
1,006,500 # of Gallons used

COMMON AREA BATHROOM SINKS

0.50 # gallons per minute
 0.50 # minutes used per day
 1,544,000 # Tenant/Employee/Visitor days
386,000 # of Gallons used

Total Domestic Gallons Pre-Retrofit =	6,117,140
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CONSUMPTION AFTER RETROFIT

TOILETS

1.28 # gallons per flush
 3.0 # flushes per day women
 1.0 # flushes per day men
 1,544,000 # Tenant/Employee/Visitor days
 988,160 # of Gallons used (Men)
 2,964,480 # of Gallons used (Women)
0 # Gallons Reduced

URINALS

0.50 # gallons per flush
 2.0 # flushes per day
 772,000 # Tenant/Employee/Visitor days
 772,000 # of Gallons used
0 # Gallons Reduced

SHOWERS

2.00 # gallons per minute
 0.0 # minutes per shower
 152,500 # Tenant days (10%)
 0 # of Gallons used
0 # Gallons Reduced

KITCHEN SINKS

2.20 # gallons per minute
 2.5 # minutes used per day
 183,000 # Tenant days (10%)
 1,006,500 # of Gallons used
 0 # Gallons Reduced

COMMON AREA BATHROOM SINKS

0.50 # gallons per minute
 0.50 # minutes used per day
 1,544,000 # Tenant/Employee/Visitor days
 386,000 # of Gallons used
0 # Gallons Reduced

Total Domestic Gallons Post-Retrofit =	6,117,140
Total Domestic Gallons Saved =	0

Total Facility Gallons	6,179,246	Domestic Water Saved as % of Total Facility Use	0.0%
Gallons Water Saved =	0	Annual Water Savings =	\$0
Gallons Heated Water Saved =	0	Annual Fuel Savings =	\$0

* employee days estimates 260 days per year for each employee on average.

Cooling Water Filtration – *at its best!*

HIGH EFFICIENCY SAND FILTERS



How clean is your cooling water?

Particles responsible for fouling of heat transfer surfaces are smaller than 5 microns. AmeriWater high efficiency filters remove these extremely fine particles to provide the true benefits of clean cooling water.

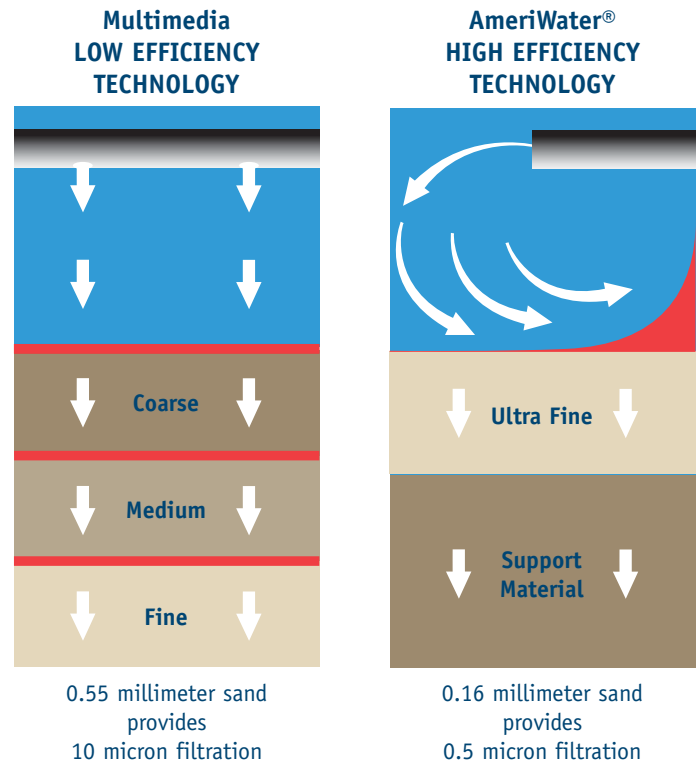
High Efficiency Sand Filters

The development of high efficiency sand filters has revolutionized cooling water filtration. Suspended solids can now be cost effectively removed to $\frac{1}{2}$ micron with an automatic backwashing filter. Older technology multimedia filters only get down to about 10 microns. Since most cooling water particles are in the $\frac{1}{2}$ to 5 micron size range, high efficiency filters are much better at removing these troublesome contaminants. More efficient filtration means greatly improved results with a smaller filter.

AmeriWater high efficiency filters use ultrafine sand to provide this much more effective filtration. The crossflow action of the water across the surface of the finer media prevents rapid plugging by pushing contaminants over to the storage area. Not only do filtration efficiencies improve dramatically, but the filters require up to 10 times less backwash water.

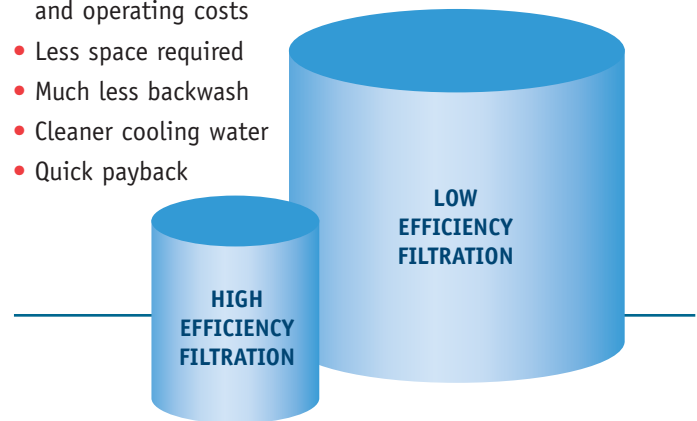
Cost Effective Filtration

AmeriWater high efficiency filters are much more efficient at removing the extremely fine particles that cooling towers scrub from the air. This greatly improved effectiveness allows these filters to be sized 4 to 5 times smaller than multimedia filters while providing much cleaner water. Multimedia filters sidestream 5 to 10% of the recirculation rate, while high efficiency filters only need 1 to 3%. Don't waste money on large inefficient filters utilizing old technology.



HIGH EFFICIENCY BENEFITS

- Lower capital, installation and operating costs
- Less space required
- Much less backwash
- Cleaner cooling water
- Quick payback



FILTRATION RESULTS

Cleaner heat transfer surfaces
Improved microbial treatment effectiveness
Minimized potential for Legionnaires' disease
Reduced corrosion rates
Cleaner sumps, fill and heat exchangers

CLEAN WATER BENEFITS

Energy savings
Healthier workplace
Risk reduction
Longer equipment life
Less maintenance and unscheduled downtime

Filters made to last — with minimal maintenance requirements.



CW330

Cooling Water Filtration — at its best!

AmeriWater produces the most advanced automatic backwashing sand filter systems available.

Standard features include:

- 304 stainless steel vessels
- Type L copper manifold
- Individually motor controlled bronze ball valves with stainless steel internals
- Centrifugal pump with TEFC motor
- PLC control and motor starter package with single point power connection
- Stainless steel support rails and pump skid
- Field switchable backwash source (city or system)
- Improved backwash design
- 1/2 micron filtration for cooling towers
- 1/4 micron filtration for closed loops



CW120

Quality Manufacturing

AmeriWater has been manufacturing quality water treatment equipment for industrial and medical industries since 1977, and has been producing high efficiency sand filters for cooling water since 1991. AmeriWater uses technology that has proven to be superior in the industry for the removal of small micron particulates.

The complete line of AmeriWater water treatment equipment includes: reverse osmosis, deionizers, softeners, filters and FDA approved water treatment systems. All products are manufactured under QS/GMP standards.

Quality Distribution

Over the past 25 years Chemworks has revolutionized the cooling tower filter industry. With thousands of quality references throughout the country, Chemworks is the premier provider of high efficiency filtration for cooling water.

Chemworks is not in the water treatment chemical business, but all sales engineers have previous water treatment experience. This provides them with extensive knowledge of cooling systems and enables them to show how filters can improve the effectiveness of water treatment programs.



CW116 Portable

AmeriWater and Chemworks are proud to be working together to provide the best high efficiency filtration equipment and service available.

Manufacturer



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