3RD PARTY EVALUATION REPORT

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drizzleX

DRIZZLEX MICROMETER MONITORING SYSTEM

WATER SAVINGS ACHIEVED BY CALIFORNIA-BASED MULTI-UNIT RESIDENTIAL APARTMENT BUILDINGS AFTER INSTALLATION

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Table of Contents

Executive Summary

As utility bills continue to increase, there is growing interest in evaluating products and processes that might contribute to verifiable water efficiency. Water conservation experts generally recommend that manufacturers and service companies retain third-party evaluators to assess the savings that can be achieved using their products.

Dickinson Associates and Gauley Associates Ltd. were retained by a company called DrizzleX to provide a third-party evaluation of the water savings achieved by a number of multi-family apartment buildings after they installed DrizzleX micrometers (sub-meters) on all toilets, faucets, showers, and baths in each apartment unit (suite).

DrizzleX provided the review team water billing data for 252 buildings equipped with their system. After reviewing the billing data, buildings that opted to sub-meter only a portion of in-suite fixtures were eliminated from the analysis, as were buildings with fewer than 5 PRE and 5 POST water bills. The results of this review, therefore, are based on analysing PRE and POST water demands of the 112 multi-residential apartment buildings (2,062 suites and approximately 5,901 tenants), all located in California, that met the following two criteria:

- Billing data included a minimum of 5 PRE and 5 POST water bills
- All water-using fixtures in each apartment unit are sub-metered[1]

There are three primary options available to multi-residential property managers wishing to reduce water demands and utility costs in the buildings they manage:

1. Help tenants improve water using behaviors, e.g., taking shorter showers, only washing full loads of dishes and clothes, turning faucets off when not needed, choosing the lowest faucet flow rate acceptable to fit the task, etc.;
2. Install more efficient water-using fixtures and appliances; and/or
3. Find and repair leakage.

The first option may be difficult to achieve, since there is often no financial incentive for the multi-residential tenants to use water more efficiently or to notify property management when they observe minor leakage. The second option is readily achievable but, because of the cost, may take considerable time to implement (installing new fixtures, regardless of the efficiency, can also help reduce leakage). The third option – find and repair leakage – can be difficult and time-consuming to achieve unless (1) the apartment units are individually metered and (2) the leak(s) are significant.

The technology developed by DrizzleX involves installing sub-meters (DrizzleX uses the term "micrometers") on the water supply lines of in-suite water-using fixtures and appliances. The micrometers transmit water flow data for each fixture to a SIM-enabled gateway located in the

[1] Some buildings choose to micrometer only toilets and/or faucets.

building, which then relays the data to the DrizzleX cloud. DrizzleX sends customers real-time alerts and periodic customizable reports, pinpointing leaks in nearly real time as well as providing analytics. Figures 1, 2, and 3 show DrizzleX micrometers installed below a sink, behind a toilet, and on a shower arm.

Figure 1

Figure 2

Figure 3

DrizzleX currently charges $225 for a typical package of 7-8 micrometers needed to outfit the fixtures in a one-bath apartment. The cost of installation, if needed, is additional (many customers choose to self-install). DrizzleX charges a monthly subscription fee of approximately $6 per apartment suite, regardless of how many micrometers are installed.

Using the DrizzleX data, property managers can identify individual high-demand suites, non-code-compliant fixtures, as well as leaks. Because each fixture is monitored, property managers are notified not only of the specific suite in question but also precisely which fixture in the suite is suspected of leaking or of being out of compliance.

It is important to note that meters, sub-meters, and micrometers, by themselves, do not reduce water demands[2]. It is the remedial actions taken in response to the data provided by the meters that result in water savings. The level of water savings will vary from building to building depending on many factors, including: 1) the magnitude of PRE demands; 2) the level of PRE leakage; 3) the willingness of tenants to support more efficient behaviors; and, most importantly, 4) the actions taken in response to the sub-metering data to reduce demands.

Based on the results of this analysis, it seems that most property managers were able to utilize the DrizzleX data to reduce water demands. Dickinson/Gauley calculated an average savings of 56 gallons per suite per day – equating to a savings of 28.6% of PRE demands. The median savings rate was slightly lower at 47 gallons per suite per day (26.7% of PRE demands). These savings rates are presented in Table 1.

Table 1

Measurement	Avg. PRE Demand, gallons per suite per day	Avg. POST Demand, gallons per suite per day	Avg. Savings, gallons per suite per day	Avg. Savings, percent
Average	196	140	56	28.6%
Median	174	128	47	26.7%

[2] Meters that can independently shut off the water supply to a suspected leaking fixture are an exception.

1.0 Introduction

There is great interest in evaluating products and processes for their contribution to a more sustainable future, particularly regarding how they might contribute to overall documentable water efficiency. To assist in this evaluation process and to provide evidence of replicable savings, water conservation experts generally recommend that manufacturers and service companies retain third-party evaluators to assess the verified savings that can be achieved using their products.

This third-party analysis review was prepared by Dickinson Associates and Gauley Associates Ltd for DrizzleX (https://www.drizzlex.com). The report outlines the results of a review of the water savings achieved by multi-family apartment buildings after they have installed DrizzleX micrometers on all toilets, faucets, showers, and baths in each apartment unit (suite).

Note that meters, sub-meters, and micrometers, by themselves, do not reduce water demands. The savings, if any, are realized only if suitable actions are taken by homeowners or property managers in response to the information provided by the meters. Suitable actions include: repairing any identified leakage; replacing inefficient fixtures/appliances with more efficient models; and/or educating family members or building tenants to improve their water-using behavior (e.g., taking shorter showers or turning faucets off when not in immediate use).

To ensure a fully independent process, DrizzleX paid the total cost of this review in advance and agreed to allow the results to be made public regardless of the outcome. DrizzleX also agreed to provide the review team unedited water billing data for buildings that had installed the DrizzleX system.

DrizzleX originally provided the review team water billing data for 252 buildings, but not all buildings had micrometers installed on all in-suite fixtures and not every building had a minimum of 5 PRE and 5 POST water bills. The results of this review are based on analysing PRE and POST water demands of the 112 multi-residential apartment buildings (including of 2,062 apartment suites and approximately 5,901 tenants), all located in California, that met the following two criteria:

- billing data included a minimum of 5 PRE and 5 POST water bills
- all water-using fixtures in each apartment unit are micro-metered[1]

[1] Some buildings choose to micrometer only toilets and/or showers.

2.0 Overview of the DrizzleX Technology

In simple terms, the technology developed by DrizzleX could be described as sub-meters (DrizzleX uses the term "micrometers") designed to be installed on the water supply lines of all in-suite water-using fixtures and appliances in multi-residential apartment buildings[2]. The micrometers record water flow data of each fixture, including the separate hot and cold water supply of faucets, and transmit the data on a dedicated frequency to a SIM-enabled gateway located in the building, which relays the collected data to the DrizzleX cloud. The DrizzleX cloud platform sends customers real-time alerts and periodic customizable reports, pinpointing leaks in nearly real time as well as providing analytics and AI-powered insights. DrizzleX charges $225 for a typical package of 7-8 micrometers that are needed to fully outfit all fixtures in a one-bath apartment. The cost of installation is additional, but many DrizzleX customers choose to self-install (no plumber is needed). Building maintenance personnel can typically install a one-bath apartment in about 15 minutes. DrizzleX charges a monthly subscription fee of approximately $6 per apartment suite, regardless of how many micrometers are installed, for the cloud platform, real-time alerts, and reports. The monthly subscription fee can differ somewhat from building to building based on site-specific details. All 112 buildings included in this analysis pay the monthly subscription fee.

3.0 Benefits of Sub-Metering

Most buildings in the USA have at least one utility-owned water meter ("master meter") that records the volume of water used by the building during each billing cycle (typically ranging from one to three months). The information provided on a customer's water bill is generally not very granular, often just showing the total volume of water used in the building over the billing period and perhaps the average day water demand over the same period. Some bills also provide historical demand rates over the previous 12 months to allow the customer to determine if their water demands are increasing, decreasing, or remaining fairly constant over time. It is important to note that these "master meter" water bills are often sent to property management companies and may not even be seen by onsite building personnel or even the building owner (it is the building owner that ultimately benefits if utility bills are reduced).

3.1 Water Use Monitoring in Single-Family Homes

Large increases in water demand from one billing cycle to the next can generally be an indication of a change in household dynamics, such as an increase in the number of persons living in the home, the filling of a hot-tub or pool, or perhaps the development of a leak. Unfortunately, because of the natural variation in household water demands from billing period to billing period, it can be difficult for homeowners to easily identify the presence of small leaks

[2] DrizzleX also offers equipment able to sub-meter the water demands of entire apartment suites, regardless of whether or not the individual fixtures are micro-metered.

or small increases in legitimate water demands based solely on water bills. And, since many utilities bill every 60 days or even every quarter, the leak can be running an extensively long period of time before the homeowner becomes aware.

In most single-family homes, except where water and sewer services are billed on a flat rate, there is a financial incentive for homeowners to reduce their water demands[3]. For example, homeowners receiving an unexpectedly high water bill might decide to conduct a home inspection looking for leaking fixtures and/or appliances. In another example, homeowners wishing to reduce their water bill might decide to replace their inefficient water-using fixtures and appliances with more efficient models and/or to improve their water-using behavior by taking shorter showers, by only washing full loads of dishes and clothes, by turning faucets off when not needed, or by choosing the lowest faucet flow rate acceptable to fit the task. In any case, the home owner can use the information provided by the utility water bill to determine if their current water demand is:

- greater than their demand the previous month, possibly indicating the development of a leak; or
- greater than the demand of similar homes in their neighborhood, indicating that they may have inefficient fixtures/appliances and/or inefficient behaviors; or
- equal to or less than the demand of similar homes, indicating that their fixtures/appliances and/or behaviors are relatively efficient.

Unfortunately, the non-granular nature of quarterly or monthly water billing data tends to "smooth" the normal day to day or week to week variations of demands, making it much more difficult to identify opportunities for savings. Even if the increase in water demands is significant enough to alert the homeowner, the cause of the higher demands may have been operating for several weeks.

The more granular the water demand data, the better the opportunity to identify savings opportunities. Many water utilities are switching from taking physical meter reads on a quarterly or monthly basis to using advanced metering infrastructure (AMI) systems that use two-way communication to digitally record and report nearly real-time customer demands. AMI can be used to collect water demand data for individual properties on a daily or hourly basis, and can therefore notify customers in a timely manner if a leak is suspected or if any unexpected water demands are identified. The advantages of using AMI systems to identify leaks are more applicable to single-family homes and small businesses where overall water demands are relatively small. For example, while a 10 gallon per day leak might be easily noticed in a home or business using 100 gallons per day, it may well go unnoticed in a building using 1000 gallons per day or more. While an AMI system should be able to identify the development of a large leak in an apartment building or large business, it would be unable to provide any information regarding where the leak is located in the building.

[3] Because flat rate customers are billed a pre-determined cost for their water regardless of how much water they use, there is no incentive to reduce demands.

In areas without AMI it is possible to install a whole-home monitoring device either directly on the utility water meter or the water supply piping servicing the building. These devices can record flow rates and flow durations and, because they have an internal clock, they can record the time of day when each water draw occurred. These data can be analyzed using algorithms to estimate:

- how much water is used by each type of water-using fixture and appliance in the home;
- the flow rates and flush volumes of fixtures and appliances in the home; and
- the development of potential leaks.

These types of devices have proven to be very effective in the single-family housing sector. The software and programming used by these devices can quickly notify homeowners of suspected leaks or unusual water demands. Some devices will also automatically shut-off the water supply to the home if a large leak is suspected. Unfortunately, because these devices delineate fixture water demands based on flow rate and flow duration data (and possibly time of day) collected at a single point usually at or near the home's utility water meter, they cannot identify with certainty if a specific demand is from a kitchen or lavatory faucet, or whether a leak is on the hot or cold water supply, or which fixture is suspected of leaking, or which fixture is out of compliance with the relevant code requirements.

3.2 Water Use Monitoring in Multi-Family Buildings

While AMI and whole-home flow monitoring devices have been shown to be effective in helping single-family home owners take actions to reduce demands, they are not as well suited for multi-residential apartment buildings because they cannot differentiate between the demands occurring in individual apartment suites and, because of the likelihood (especially in larger buildings) of having numerous coincidental demands, they cannot accurately estimate the water usage of individual fixtures or appliances.

In apartment buildings serviced by a single "master meter", the cost of water and sewer servicing is generally shared equally by tenants, thus significantly reducing the incentive for individual tenants to improve their efficiency by reporting leaks or improving their water-use behaviors.

Some muti-residential apartment buildings sub-meter each apartment suite independently, allowing each suite to pay their proportional share of the total cost of the building's water and sewer servicing. Sub-metering individual apartment suites may be more expensive than using one utility "master meter" to service the entire building, but it has the significant benefit of giving tenants a financial incentive to modify their behavior to reduce demands and/or to report leakage. While leaks from faucets, tubs, and showers are generally readily visible and obvious to the tenant, toilet leaks are often much more difficult to detect and can, therefore, continue for months or more. A higher-than-expected water bill can notify tenants of possible leakage but, unfortunately, the leak may have been running for nearly the entire billing cycle before the customer is alerted by the bill.

The DrizzleX technology has been developed specifically for use in multi-unit residential apartment buildings. As stated earlier, DrizzleX micrometers can be installed on the water supply of each water-using fixture and appliance in an apartment suite, including on both the hot water and cold water supplies to kitchen and lavatory sinks. Figures 1, 2, and 3 show DrizzleX micrometers installed below a sink (on both the hot and cold water supply lines), behind a toilet, and on a shower arm.

Figure 1

Figure 2

Figure 3

Because DrizzleX data can be used to determine the volume of water used by each apartment suite, some property owners use DrizzleX data to bill their tenants. DrizzleX data allows property managers to identify high-demand suites which might indicate that the suite has more than the allocated number of tenants, that its tenants are practicing wasteful behaviors, or that its tenants have altered or replaced code-compliant showerheads and/or faucet aerators with high-flow non-compliant models. Because each plumbing fixture has its own micrometer, the property manager can be notified not only of the specific suite or suites in question but also specifically which fixture in the suite is suspected of leaking or of being out of compliance. Even toilet leaks, which may be largely invisible to the tenant, are identified by the DrizzleX system, allowing the property manager to quickly address the situation and repair the leak.

4.0 Water Savings after Installation of DrizzleX System

The results of this review are based on analysing PRE and POST water demands of 112 multi-residential apartment buildings located in California. All buildings included in this review met the following two criteria:

- Billing data included a minimum of 5 PRE and 5 POST water bills
- All water-using fixtures in each apartment unit were micro-metered[4]

Meters, sub-meters, and micrometers, by themselves, do not reduce water demands. Meters are simply a tool that provides water use data to homeowners or property managers. It is actually the actions taken by the homeowner or property manager that result in water savings.

[4] Some buildings choose to micrometer only toilets and/or showers.

If no remedial action is taken to address high water use or suspected leakage, no water is saved. One exception to this statement relates to sub-meters that can independently turn off the water supply to a potentially leaking fixture (or, in some cases, these devices turn off the water supply to the entire home). DrizzleX is currently developing a micrometer with this capability.

As expected, the potential to reduce water demands *increases* as the efficiency of the device or person in question *decreases*. Stated another way, it is easier to reduce the demands of inefficient customers than it is to reduce the demands of efficient customers. Some muti-family residential apartment buildings may appear to be less efficient than they actually are based on their total water use and the number of apartment suites in the building. For instance, buildings with significant non-in-suite water demands, such as automatic irrigation systems, swimming pools, hot tubs, car washes, etc., may appear to be less efficient than they actually are. These non-in-suite demands would not be impacted by fixing in-suite leakage, installing more efficient fixtures/appliances, or by tenants improving their behavior. As such, some apartment buildings may have high overall water demands but not necessarily inefficient in-suite demands.

Figure 4 displays the relationship between the average daily per suite water demand before the DrizzleX system was installed (PRE demands) vs. the percentage of savings realized after the DrizzleX system was installed (POST demands) for all 112 buildings analyzed. These 112 buildings included 2,062 apartment suites and approximately 5,901 tenants. While this chart supports the assertion that, in general, a higher percentage of water savings is achieved by properties with higher PRE demands, the correlation is not very strong. For instance, the linear trendline of the data has an R^2 value of only 0.1906, meaning that PRE demands are only a weak indicator of potential savings[5]. As such, the trendline equation in Figure 4 *should not be used* to estimate the percentage savings after installing a DrizzleX system. What's more, some of the buildings included in the analysis had average demands of more than 300 gallons per suite per day or less than 35 gallons per suite per day – demand rates that seem to be outside of what would typically be expected based solely on in-suite water use.

Figure 5 shows the same data but includes only the 100 buildings with average PRE demands of less than 300 gallons per suite per day. These 100 buildings included 1,931 apartment suites and approximately 5,473 tenants. Once again, the trend indicates that buildings with greater PRE demands will generally experience a greater percentage of savings, but once again the R^2 value is very low at only 0.1762. As such, the trendline equation in Figure 5 *should also not be used* to estimate the percentage savings after installing a DrizzleX system.

<u>The most important observation to make is that the magnitude of water savings achieved by an apartment building after installing a DrizzleX system depends almost entirely on the actions taken by property management and/or building tenants</u>. While it might be expected that

[5] The R^2 value is a statistical measure of how close the data are to the fitted regression line - the higher the R^2 value the better the fit, with a value of 1.0 being a perfect fit.

property managers should repair leakage almost immediately once they become aware, budgeting for the replacement of some or all inefficient water-using fixtures/appliances in the building might take months or years, and educating tenants to try improve their water-using behaviors is also likely to be a long-term program. So, it is possible, but not certain, that some of the buildings included in this analysis will experience a greater level of savings over time.

Figures 4 and 5 also illustrate that some buildings experienced zero savings or even slight negative savings. The reason or reasons for these negative results are not known at this time, but may include an increase in non-in-suite building demands, an increase in the number of tenants, the development of unaddressed leaks in the building, tenants purposely using more water as an act of retaliation against being metered, or some other unknown issue. There is no practical reason why installing sub-meters in a multi-unit residential apartment building would cause an increase to the building's water demand.

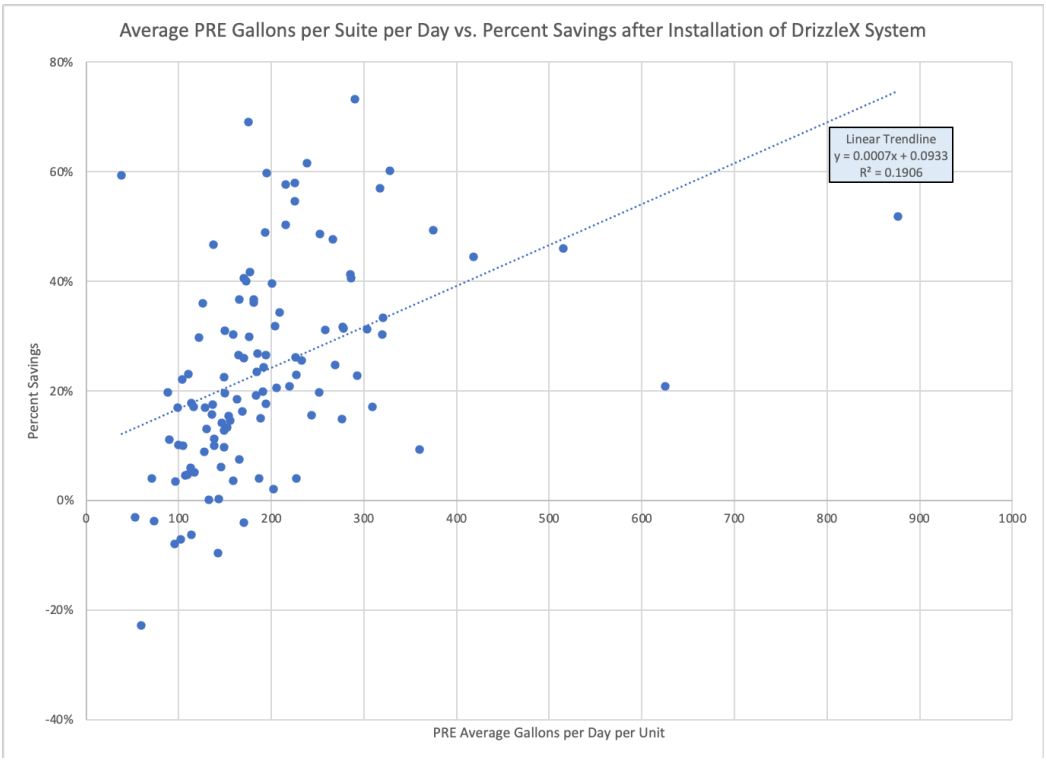

Figure 4

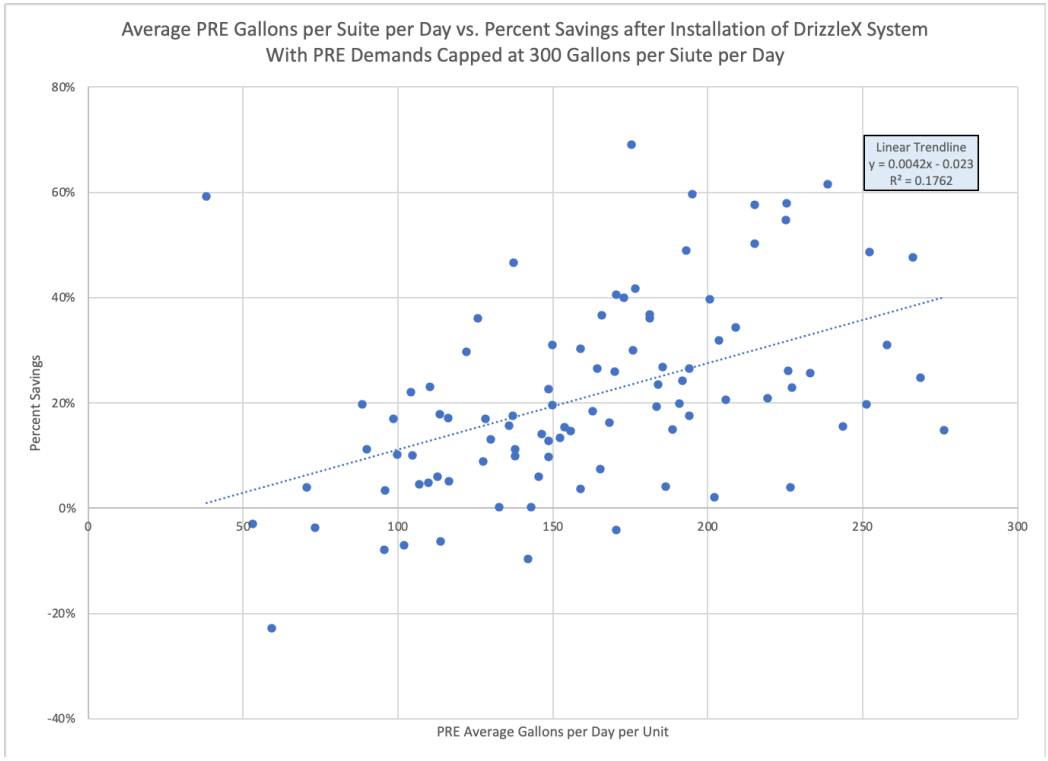

Figure 5

The level of water savings can vary from building to building depending on many factors, including: 1) the magnitude of PRE demands; 2) the level of PRE leakage; 3) the willingness of tenants to support more efficient behaviors; and, most importantly, 4) the actions taken by property management in response to the sub-metering data to reduce demands. The water savings achieved by the 112 buildings included in this analysis ranged from a minimum of -14 gallons per suite per day to a maximum of +455 gallons per suite per day[6]. While this is a huge range in savings, as presented in Table 1, the <u>average</u> savings achieved by the 112 buildings (including the buildings with negative savings) was significant at 56 gallons (28.6%) per suite per day. The <u>median</u> savings was slightly lower at 47 gallons (26.7%) per suite per day.

Table 1

Measurement	Avg. PRE Demand, gallons per suite per day	Avg. POST Demand, gallons per suite per day	Avg. Savings, gallons per suite per day	Avg. Savings, percent
Average	196	140	56	28.6%
Median	174	128	47	26.7%

Participating building managers are asked at the start of each DrizzleX project for an estimate of the average apartment suite occupancy rate for the building. While the occupancy rate cannot

[6] Note that negative savings may be related to the natural variation in water demands from month to month or some other factor rather than the act of installing micrometers because, as stated earlier, metering, by itself, does not impact demands either positively or negatively. It is assumed that buildings with extremely high levels of savings after the installation of a DrizzleX system had very high PRE levels of leakage.

be verified with 100% accuracy, it does help to provide an approximation of the water savings per tenant[7]. Based on estimated occupancy rates, there is a huge range in PRE per capita demands - from a low of 16 gpcd to a high of 263 gpcd – once again supporting the notion that the billing data is reflecting far more than in-suite water demands.

The average PRE water demand of the 112 analyzed buildings was 69 gallons per capita per day (gpcd), compared to an average POST demand of 50 gpcd (median demands were 59 gpcd PRE and 44 gpcd POST).

Table 2 presents savings rates for eight separate 10 gpcd ranges of PRE demands from a low range of between 30 to 40 gpcd to a high of 90 to 100 gpcd. Higher PRE demands may be indicative of high levels of leakage, an inefficient stock of fixtures and appliances, inefficient tenant behavior, and/or a high level of non-in-suite water demands. As such, buildings with high PRE demands tend to provide a better opportunity for savings than buildings with low PRE demands. The data in Table 1 support this contention – but, it seems, only up to a point. For example, the average savings rate increases quickly when PRE demands increase from 30 - 40 gcd to 70 – 80 gpcd, after which the savings rate seems to somewhat stabilize at between 25 and 30 gpcd. This result may be an indication that multi-residential per capita demands greater than about 70 gpcd include much more than just in-suite water demands, i.e., demands that would not be impacted by reducing in-suite demands. Note that the results presented in Table 2 are based on a relatively small sample size of 89 buildings. Further analysis using a larger data set could help refine the data.

Figure 6 presents this same data in chart form.

Table 2

PRE Demand Range, gpcd	Average PRE Demand Rate, gpcd	Number of Buildings	Average POST Demand Rate, gpcd	Average savings, gpcd
30 – 40	35.1	17	32.6	2.5
40 - 50	45.8	16	38.5	7.4
50 - 60	51.2	13	41.8	9.3
60 – 70	64.6	15	47.8	16.8
70 – 80	74.4	11	48.6	25.8
80 – 90	84.0	9	54.1	29.9
90 – 100	94.5	8	66.5	28.0

[7] Many multi-residential apartment building property managers prefer to consider demands on a per-suite basis.

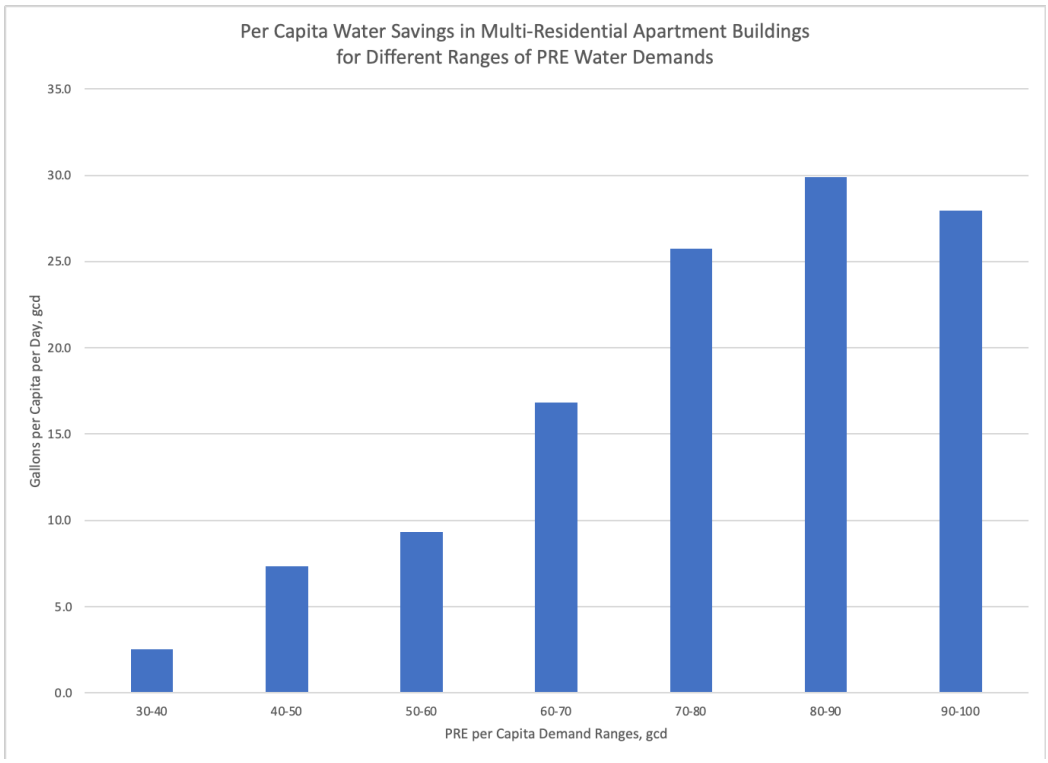

Figure 6

The 2016 Residential End Uses of Water report (published by the Water Research Foundation) predicts that per capita residential water demands in the USA will eventually decline to about 36.7 gpcd in the coming years through the replacement of inefficient residential fixtures and appliances with more efficient models (Chapter 9, Conclusions and Recommendations, section "Indoor Use Will Continue to Decline in the Future"). Stated another way, this 2016 report predicts that even efficient Americans will require an average of approximately 35 to 40 gallons of water each day to meet all of their water demands without experiencing distress.

While this demand rate was estimated based on monitoring single-family homes, it does provide a point of reference when targeting all future residential water savings. For example, multi-residential apartment buildings with PRE in-suite per capita water demands of less than about 40 gpcd are likely to have (1) efficient in-suite fixtures/appliances; (2) little or no leakage; and/or (3) tenants with relatively efficient behaviors and, therefore, should not expect to achieve significant further demand reductions regardless of which efficiency measures are implemented.

A total of eight buildings included in the analysis (representing 119 apartment suites and approximately 334 tenants) showed slight negative savings after installing the DrizzleX system. The PRE and POST per capita water demands for these sites (based on the estimate number of tenants in each building) are presented in Table 3, along with the savings rate. Note that six of these sites had PRE demands of less than 40 gpcd, indicating that these buildings were already

relatively efficient and, therefore, there was little room for additional savings. The other 2 sites had moderately low PRE per capita demands of 47 and 57 gpcd respectively.

Buildings that install sub-meters but do not take any actions to fix leaks, replace fixtures or appliances, or to educate tenants to reduce demands after installation of a DrizzleX system – *regardless of the magnitude of their PRE demands*, would not be expected to exhibit any savings. As such, the slight increase observed after the installation of the DrizzleX system may simply be a reflection of the natural variation in customer demands or of some other non-in-suite related change in water use. The slight increase in demand is not the result of installing sub-meters unless it is related to tenants purposely acting less efficient in response to being sub-metered.

Table 3

Building #	PRE per Capita Demand, gpcd	POST per Capita Demand, gpcd	Saving, gpcd
1	18	19	-1
2	30	36	-6
3	32	34	-2
4	34	36	-2
5	38	40	-2
6	38	40	-2
7	47	52	-5
8	57	59	-2

While buildings with very low PRE per capita water demands have less opportunity to further reduce demands, all buildings can develop significant leakage over time, suggesting that even currently efficient buildings may benefit in the long term from installing a tenant water demand monitoring system.

5.0 Summary

There is a well-known expression attributed to Peter Drucker[8] – "You can't manage what you can't measure". This is especially true regarding water management. Customers billed on a flat-rate basis generally do not receive any information regarding how much water they use. What's more, even if a flat-rate customer knew they were inefficient, there is no financial incentive for them to make any effort to reduce their demand.

Tenants living in a multi-residential apartment building are often in a similar position – most receive no information regarding how much water they use and there is no financial incentive for them to try to reduce their demand. There is, however, a financial incentive for the building owner to reduce all utility costs, including water costs.

[8] Peter Drucker was an Austrian American management consultant, educator, and author, whose writings contributed to the philosophical and practical foundations of modern management theory.

As stated earlier, there are different ways to "measure" water demands in a multi-unit apartment buildings. The least informative way to measure water demands is by quarterly or monthly billing (flat-rate billing is not considered a "measurement") which simply identifies the volume of water used over the billing period. The most informative way to measure water demands is to sub-meter each individual water-using fixture/appliance in each apartment suite, allowing the property manager to:

- identify leakage and pinpoint the source of the leakage;
- identify and pinpoint the location of any out-of-compliance fixtures/appliances in the building; and to
- identify which, if any, tenants appear to be improving their efficiency as well as any tenants that appear to be wasteful regarding water use.

There was a huge range of savings achieved by the 112 buildings (representing 2,062 suites and approximately 5,901 tenants) included in this analysis - from a low of -14 gallons per suite per day to a maximum of +455 gallons per suite per day. It is assumed that the buildings with extremely high levels of savings also had very high PRE levels of leakage which could be repaired relatively quickly.

The average savings achieved by these 112 buildings was 56 gallons (28.6%) per suite per day and the median savings was 47 gallons (26.7%) per suite per day.

Table 4

Measurement	PRE Demand, gallons per suite per day	POST Demand, gallons per suite per day	Savings, gallons per suite per day	Savings, thousand gallons per suite per year	Savings, percent
Average	196	140	56	20	28.6%
Median	174	128	47	17	26.7%

As mentioned earlier, DrizzleX charges a subscription fee of approximately $72 per year per apartment suite. While the cost-effectiveness of installing a DrizzleX system varies from building to building depending on the level of water savings achieved and the cost spent to achieve those savings, based on an assumed combined water/sewer rate in California of $16.67 per thousand gallons[9], an average savings of 20 thousand gallons per suite per year equals a cost savings of $333, or substantially more than the approximately $72 per suite per year subscription fee.

It appears, based on the results of this analysis, that most property managers are able to utilize the data and notifications provided by DrizzleX to take the actions necessary to reduce their building's water demands. While the level of savings varies from building to building, the DrizzleX data indicate that some buildings, especially buildings with significant unidentified leakage, can save considerable volumes of water.

[9] Based on publicly available August 2023 data for 20 Californian water agencies representing over 14 million persons.

DrizzleX collects vast quantities of highly granular water demand data. The company is planning to use artificial intelligence (AI) and machine learning to improve accuracy when identifying both in-suite and non-in-suite leakage, including outdoor water uses such as automatic irrigation systems and underground piping. It is anticipated that DrizzleX data could be used in the future to help:

- Identify the frequency of residential leakage on a fixture-by-fixture basis, along with leakage flow rates and flow duration;
- Delineate between water used at the kitchen sink vs. lavatory sinks, e.g., average and maximum flow rates, number of draws per day, volume used per day, etc.;
- Quantify hot water vs. cold water faucet residential demands;
- Identify non-compliant fixtures, etc.

We would be please to answer any questions you may have regarding the analysis and results outlined in this report.

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