City of Sierra Madre Agenda Report

TO: Honorable Mayor Capoccia and Members of the City Council

FROM: Elaine I. Aguilar, City Manager

INITIATED BY: Bruce Inman, Director of Public Works

DATE: July 28, 2015

SUBJECT: AWARD OF PROFESSIONAL SERVICES CONTRACT TO SRI/RAFTELIS FOR PREPARATION OF CITY-WIDE CUSTOMER WATER BUDGETS AND REQUEST FOR AN ADDITIONAL APPROPRIATION OF WATER FUND RESERVES IN THE AMOUNT OF $44,000

SUMMARY

The City Council considered a proposal to implement water budget based water conservation targets at its July 14th meeting and directed staff to return the matter for further discussion at tonight's meeting. The Council requested information regarding simplifying the water budget calculation, information regarding the "Plant Factors", and information regarding other options for encouraging water conservation. The Council also requested information regarding the water budget model utilized by the Irvine Ranch Water District.

Staff recommends that the City Council:

1.) Award a professional services contract to SRI/Raftelis in an amount not to exceed $29,261 for the preparation of citywide water budgets; and,
2.) Direct staff to obtain temporary staff from an agency at a cost not to exceed $14,499 to provide telephone and customer assistance during the implementation period for the water budgets; and,
3.) Approve an additional appropriation of $44,000 in Water Funds to cover these unbudgeted expenses.
4.) Provide direction regarding the water budget methodology.

ANALYSIS

Sierra Madre did not meet its state-mandated 32% water use reduction in June 2015, missing the mark by about 3,348,500 gallons. The city's July conservation marks look

similar, falling short of the goal again with month-to-date water production tracking at roughly 25% compared with the same period in 2013.

Conservation targets were initially established in July 2013 (10% or 20% reductions), and were increased (30%) in July 2014. Currently, the City calculates a customer's water conservation target based upon historical water use in 2013 or 2012, depending upon the Summer or Winter conservation target. To calculate the water conservation target, a customer's use in the base period (2012 or 2013) was reduced by 30%, when the Council implemented Phase III Water Conservation. The lowest conservation target is 12 units (two months); meaning that no customer has a target that is lower than 12 units, even if the calculation resulted in a lower number.

This method of calculating conservation targets is commonly used by other water utilities, because it can be considered "fair" in the sense that it is based upon the customer's actual, past water use (which would take into account number of individuals, landscaping, property size, etc.), ease of implementation, ease in explaining the methodology, and cost effectiveness to the utility. But it can also be considered "unfair" in situations when one customer was contentiously conserving water during the base period, while the property next door (with similar characteristics, similar sized lot, similar sized family, similar landscaping) was not conserving water. This method of calculating conservation targets results in theoretically similar properties being assigned different conservation targets.

Obtaining conservation compliance from customers could be hampered by customer's perception of the conservation requirements being inherently unfair. For this reason, the City Council directed staff to explore other methods of allocating water to its customers in order to improve the 'fairness' of the conservation requirements. It should be noted that it is almost impossible to develop any methodology that would be perceived as "100% fair" by everyone. Each methodology has components that certain customers may perceive as unfair.

To summarize in simple terms, there are basically two water conservation target methodologies that can be used:

1. The City's current method, which uses 2012 or 2013 water use as a base amount of water, and calculating a percentage reduction from actual use in the base year. (The City currently uses a 30% reduction, with 12 units of water as the minimum conservation target.)

2. Water Budgets can be used to establish water conservation targets by taking into account "indoor water use" and "outdoor water use." Indoor water use is normally calculated based upon the number of permanent residents, while outdoor water use is calculated based upon the type of outdoor landscaping. (A modified formula would be developed for non-residential water customers.)

The second part of this staff report addresses possible additional enforcement mechanisms. While it is important that conservation targets be established, it is also important for there to be an enforcement mechanism to encourage compliance with the targets and other conservation measures.

Identification of the Goal

The State Water Resources Control Board has declared the water conservation standard to run for the nine months beginning June 2015, with water production from the current year compared to the production of the same month in 2013-14. Water use will be tracked by the State on a cumulative basis; conservation savings from one month to the next and compared to the amount of water used in the same months in 2013. For example, the cumulative percent savings for September 2015 will be calculated as follows:

$$1 - \frac{\text{Total Production for June, July, August \& September 2015}}{\text{Total Production for June, July, August \& September 2013}}$$

More specifically for Sierra Madre the computation is as follows:

Month	2013/14 Production (gallons)	2013-14 Cumulative Subtotal	32% Reduction Goal
June	81,704,782		55,559,252
July	78,868,096	160,572,878	109,189,557
August	78,143,560	238,716,438	162,327,178
September	80,693,496	319,409,934	217,198,755
October	70,211,812	389,621,746	264,942,787
November	62,471,386	452,093,132	307,423,330
December	54,000,608	506,093,740	344,143,743
January	60,901,412	566,995,152	385,556,703
February	47,708,988	614,704,140	417,998,815

The right-hand column shows the target water production that the City must not exceed each month or risk fines from the state of as much as $10,000 per day. These are hard, finite numbers, and although they might vary slightly from state records, the point is that there is a specific water allocation that the state has granted the City of Sierra Madre, which should be thought of as the absolute limit on the amount of water the City has at its disposal. By establishing water conservation restrictions as discussed below the City is essentially rationing water. Any water allocation program designed by or for the City should be tied to those specific water production values; water conservation targets should not be designed that result in exceeding the goal. The purpose of this entire exercise is to meet the state-mandated goal, so any new conservation program to be developed working backward from the goal. That is, we know what the target is, how do

we balance indoor water needs which are the same for every person, and outdoor water use, which varies from property to property and still meet the target?

Water Allocation Options

The City might consider the use of the State methodology for determining water conservation goals. Like the State has done with water providers, the City could simply require larger water users to save a higher percentage of water. The State set their conservation tiers 1-9 based on the residential gallons per capita daily use for each water agency. Public Works staff contacted multiple State Water Resources Control Board staff to inquire as to what the State's rationale was in determining the thresholds between the conservation tiers. No explanation was given by the State, other than it was a trial and error exercise. There was no statement as to what reasoning went into approving the final "trial" and using it statewide. Inasmuch as the State staff who developed the program could not explain how they arrived at their conclusions, Public Works staff would not recommend this trial and error approach because any conclusion arrived at could be considered arbitrary and unfair.

Another method for leveling the playing field and improving "fairness" is to develop individual water budgets for each metered account. Water budgets can be calculated based on a number of factors, including lot size, size of buildings, areas of impermeable hardscape, number of permanent residents at the site, and areas/types of landscaping, such as turf, flowers, trees and shrubs. Staff has utilized a water budget worksheet to calculate water budgets for customers based on those criteria. A copy of that budget calculation worksheet is attached to this report.

At its most rudimentary level a water budget provides an indoor water allocation based on the number of permanent residents at the site of the water account and an outdoor water budget based on agency-selected variables. For example, a simple budget could be developed using the production goal from the table above. That number would be reduced by the number of residents times 65 gallons per capita daily to determine the citywide indoor use. The remaining amount of water could then be divided by the number of square feet of non-street land within the city to determine a per-square-foot outdoor water use allocation for each metered account. This simple format, however does not consider the area of the house on the lot, paved areas, the presence of pools, or turf/grass. In short, there is no specific factor for irrigated area. So, for example a hillside lot which is largely native brush and trees would be provided a water allocation covering that un-irrigated area.

Water budgets typically utilize some type of "Plant Factor" based on the relative amount of water that type of plant needs in order to survive. The commonly accepted "Plant Factors" are:

Turf/grass	PF = 0.7
Trees/shrubs	PF = 0.60
Drought Tolerants	PF = 0.30

Flowers PF = 0.75
Swimming pools PF = 0.7
(Swimming pools use as much water as lawns, so are given the same plant factor in determining water budgets.)

Irvine Ranch Water District Model

On July 14th, the City Council directed staff to look into the water budget model utilized by the Irvine Ranch Water District in Orange County. Staff reviewed the IRWD website and found the following information on that agency's water budget program.

Account Type	Base Allocation Number of Residents	Landscape Area (LA)	Base Allocation Indoor	Base Allocation Outdoor	Total Allocation
Residential Detached	4	1300 sq. ft (0.03 acres)	# Residents x 50 gpd	ET x Kc x 1.18 x LA	(Indoor x #days in bill service period) + Outdoor
Residential Condo Attached/ Detached*	3	435 sq. ft (0.01 acres)	# Residents x 50 gpd	ET x Kc x 1.18 x LA	(Indoor x #days in bill service period) + Outdoor
Apartments*	2	N/A	# Residents x 50 gpd		Indoor x #days in bill service period
Potable Irrigation		Site specific based on irrigated acreage	N/A	ET x Kc x 1.18 x LA	Outdoor based on bill service period
Recycled Irrigation		Site specific based on irrigated acreage	N/A	ET x Kc x 1.40 x LA	Outdoor based on bill service period
Commercial, Industrial, Institutional			Site specific, adjusted for # of days in a bill service period	Site specific, based on irrigation needs	Site specific, adjusted for # days in bill service period

*For master-metered apartments and condominiums, the base allocation is multiplied by the number of dwelling units.

gpd = gallons per day

CCF = 100 cubic feet. 1 CCF = 1 billing unit = 748 gallons

ET (evapotranspiration) – from IRWD weather stations located in coastal, central or foothill zones.

Kc (crop co-efficient or plant factor) – relative amount of water drought tolerant plants need at various times of the year. Crop-coefficient of 0.5 for drought tolerant plants is applied for potable irrigation, and a crop co-efficient averaging 0.65 for warm-season turf is applied to recycled water irrigation.

1.18 or 1.40 irrigation efficiency – extra water to make up for inefficiencies in the irrigation system. An irrigation efficiency of 85% is applied to potable water and 71% to recycled water. In the formula this is calculated as = 1/0.85 = 1.18 is applied to potable customers and 1/0.71 = 1.4 is applied to recycled water.

LA = irrigated landscape acreage

The IRWD model is in some ways less complex than the model proposed by staff on July 14. The IRWD system is based on standard defaults for residential land uses. For example, a single-family residential property has a standard default value of 4 residents (at 50 GPCD each) and 1,300 square feet of irrigated area. In order to alter that standard default, either in number of residents or square footage of landscape, the customer must file an appeal. In all cases the same plant factor (Kc in IRWD terminology) applies; 0.5 as IRWD's adopted value for drought tolerant planting. (This is important to note – Irvine uses a plant factor for outside watering that assumes a Plant Factor between "drought tolerant planting" and "turf," and not based upon actual landscaping.)

However, the IRWD model has a built-in variable in the form of the evapotranspiration factor (ET) which changes weekly depending on the weather. According to the IRWD website, "*When the weather is hot or windy, your allocation goes up automatically. When it's cool or rainy, your allocation decreases. The goal is to allow you the correct water allocation you need for your landscape to stay healthy and attractive. Using more water than plants need is a waste of water, a waste of your money, leads to unhealthy plants, and can contribute to pollution-causing urban runoff.*" Historic ET data posted on the IRWD website for 2014 showed weekly changes in ET ranging from 1% to 132%.

The IRWD model is essentially a simple indoor/outdoor water budget, with a single water allocation for each use. No consideration is given for irrigation of different types of landscaping or for swimming pools. This model would be relatively easy to explain to the customer, but may also be considered as less fair than other water budget alternatives due to its one-size-fits–all plant factor assignment. (Not everyone would agree that this is more or less fair. Customers with drought tolerant landscape would think it is fair, while customers with more turf/non-drought tolerant landscape, might not think it is fair.)

Appeals would be allowable for additional permanent residents in the home and for greater than the default value for landscape area, however as with Irvine, all landscape areas would be assigned the same plant factor.

A separate discussion of plant factor may be helpful and is explained later in this report. The Council's policy decision regarding the "plant factor" is perhaps the one of the more difficult policy decisions, if the Council decides to change the City's methodology for establishing water conservation targets.

July 14 Staff Proposal

The City Council has previously directed staff to obtain proposals from consultants for the preparation of citywide customer water budgets for use in setting new base water use standards for the community.

Staff has been in contact with three firms through an informal bidding process, based on initial indications from one of the firms that the estimated cost of establishing the budgets would be approximately $17,000. Each of the firms has a slightly different approach to providing water budgets for the City.

Following the July 14th City Council meeting staff contacted each of the three firms that had provided proposals to inquire if simplifying the area calculations to include just total landscape area instead of separating turf, pools, flowers, shrubs and tree, and drought tolerant areas would result in a savings in consultant fees for the city. Each of the firms stated that there would be no cost difference in spite of the fact that at staff's direction each had previously agreed that they would estimate each type of planting area as part of their scope. The water budget to be determined by the consultant would have two components, an indoor allocation based on number of permanent residents at the address and an outdoor allocation based on the measured area of irrigable landscape at the address times a plant factor to be determined by the City Council. Unlike the Irvine model, there would be no default values (except for number of permanent residents) and evapotranspiration factors would only vary between summer and winter months.

Staff continues to recommend the use of consultants to develop the water budgets. While it may be possible for city staff to develop a water budget program and defaults, to do so will be extremely time consuming. Additionally, with a default-based system it can be expected that there will be a great number of appeals. Each appeal would have to have an outdoor budget determined in response. With a consultant-developed outdoor budget, the water use factor will be based on a measured landscape area rather than a default; there will be lessened possibility of appeals.

The three firms that staff has been working with are:

Statistical Research, Inc.

Statistical Research, Inc. (SRI) was recommended to staff by Raftelis as the firm that they work with when developing water budget-based water rates. SRI was the firm which provided staff with the original estimate of approximately $17,000 to establish the water budgets, and will provide the water budget database to the City. SRI intends to

team with Raftelis, which will provide the interface between SRI's water budgets and the city's water billing system and billing data. Raftelis will provide a Budget Model that will calculate the impacts of conservation on the city's water revenue, as well as the impact on individual customers of any adopted water budgets and over use penalties. Raftelis, as the firm which completed the City's most recent water rate study, is aware of the city's current rate structure and billing system. SRI's fee is $16,761 (the original quote) and Raftelis' fee is $12,500 for a total of $29,261. Raftelis quoted a cost of $91,200 for temporary staffing. When asked by staff why that amount is so high, they indicated that it is due to their assigning a senior staff member to the task. Inasmuch as that cost is so high and a senior staff member of that firm is not needed, Public Works would recommend that the staffing proposal of Rafteis be disregarded.

SRI will utilize 2015 imagery. SRI has not provided a proposed schedule for the work in spite of repeated requests for that information. Raftelis will determine whether or not the initiation of water budgets alone will provide the necessary 32% reduction in Sierra Madre water use. If it is found that the water budgets alone will not provide the necessary water conservation levels, Raftelis will provide the calculation of what the additional reduction in water use must be.

Eagle Aerial Solutions

Staff became aware of Eagle Aerial's ability to provide the services the city is seeking through a marketing email and a mailed flyer. Eagle Aerial (Eagle) is an established business and a recognized name in the field of aerial photography and photogrammetry. Eagle will provide the spatial data needed to calculate water budgets. Eagle is teaming with Robert D. Niehaus (RDN) to use that data to provide the actual water budgets.

Under Eagle's proposal the project work tasks/deliverables are assigned as noted below:

Eagle:

- Accurate Landscape area measurements, classified by type and total irrigable area specifically. Using their color-infrared imagery and a semi-automated (*not* fully-automated) remote-sensing process. This is how they achieve high accuracy.
- Color aerial ortho image data is provided.
- Parcel data if not provided by City is provided to RDN

RDN:

- Combines Eagle Aerial's irrigable landscape data above with:
- CIMIS evapotranspiration data
- People per household as provided by the City (or US census data, if PPH not available).
- Customer usage data (history). Provided by the City.
- Drought factor variable.

The Eagle proposal allows for a single run of RDN's Water Efficiency Calculator, which is the tool which develops the actual per parcel water budgets. Additional runs of the Water Efficiency Calculator are $1,755 each. RDN is providing the option for the City to purchase the license for the Calculator at a cost of $12,150. Staff recommends that if the City Council awards the project to the Eagle team, that the purchase of the Calculator be included.

Eagle's proposed fee was not broken down as to the respective shares between themselves and RDN. The total cost of the Eagle/RDN proposal, including the purchase of their water budget calculator would be $48,721.

Eagle proposes to complete the project in six to eight weeks and will use 2013 imagery.

Eckersall, LLC

Eckersall, LLC is the City's GIS provider. The firm, originally under the name AMN Options, first developed the city's web-hosted GIS system in 2003. The firm has kept the system up to date and added new features from time to time since that start. Eckersall, LLC is planning to team with Tri-GEO an international GIS and IT firm. Eckersall will utilize the existing city GIS system and develop a land cover data overlay on which to base the budgets. Then the budgets will be developed utilizing the identified areas and types of ground cover. As part of its proposal, Eckersall has offered to provide a two page mailer describing the water budgets, how they were derived, and outlining the appeal process. Eckersall will also provide the City with an update of the City's property ownership list and a mailing list.

Eckersall's proposed fee was not broken down as to the respective shares between themselves and Tri-GEO. Eckersall's total cost is $48,115.

Eckersall will utilize 2013 imagery and proposes to complete the project in 8 weeks. They will also drive the city's streets to confirm that their review of groundcovers has not changed, or to pick up areas where their calculations need to be adjusted.

Temporary Staffing

Should water budgets be adopted as a new basis for water conservation goals in Sierra Madre, it is anticipated that it will generate a considerable level of customer feedback. As a concept new to water customers there will be many questions and concerns expressed by the city's water customers. There will be a written explanation of the program that will be mailed out to customers notifying them of the change and explaining how the budgets are developed. Nevertheless there will be a lot of explanation needed, and quite likely numerous appeals to be handled. For that reason, staff has requested each of the proposers to provide the city with a cost to staff a position here at City Hall for 60 days with a staff member of their own to answer calls, process appeals, and handle drop in visits. This is necessary due to current staffing levels and current work load at the front counter.

Staff has provided an option in the table below under which the City would hire someone from a temporary agency to provide the in-house assistance, combined with the budget development services from one of the outside firms.

Staff has reviewed the proposals, spoken with all three proposers, and selected the team of SRI and Raftelis for recommendation to the City Council. While the SRI/Raftelis team was not the most responsive in working with staff and answering questions about their proposal, they will provide their water budget calculator for the city's future use at no additional cost, something that Eagle would charge $12,150 for and Eckersall did not offer at all. It will be critical that City staff and the temporary employees have access to the budget-setting model so that corrections can be made due to customer appeals.

It is noted that in order to implement water budgets as a conservation measure, it will be necessary to modify the existing water conservation ordinance. That code amendment process can take place during the budget development period if so directed by Council, or it can be delayed until the budgets are developed and the impact on conservation and on customers citywide is more clearly defined.

Outdoor Water Use (Plant Factors) – Irrigated Area

As mentioned previously, the plant factor is an important part of the Water Budget methodology. Basically it is used to determine the amount of water for outdoor irrigation use. The City can adopt a methodology that:

1. Takes into account the various, specific type of existing landscaping, or
2. Uses the same plant factor (Irvine model) for all irrigated areas, or
3. Uses only two or three plant factors for the irrigated areas

Keeping in mind that the ultimate goal is to achieve a fair conservation target, while making sure that the City's total water use meets the State mandated conservation target, one way to decide upon the PF factor is to wait until the consultant completes the calculation of the City's total indoor use (based upon population) and then determines the amount of water that can be allocated to outdoor irrigation use (after total irrigated area is calculated).

Another alternative would be for the Council to select one of the three options: a detailed PF based upon specific types of existing landscaping, using one PF (the IRWD model), or using two or three PF's. Under the first alternative (various PF's), it is possible that achieving the State mandated reduction, means the City would need to reduce the resulting water budget by a specified percentage, because total water use would possibly exceed the State target. The City would calculate a property's water budget, but then reduce the budget by 5% or 10%, or more, based upon the exceedance in city-wide total water use. (A decision would need to be made regarding reductions to a conservation target for a property that has drought tolerant landscaping. This is to consider "fairness" – is it fair for a property that has drought tolerant landscaping to have their target reduced the same amount as a property with higher PF

landscaping?) Another consideration would be how to handle changes in property landscaping after the water budget is calculated.

Under the second alternative (using a single PF), the City would have to decide on what PF to assign to all irrigated areas of the City. This is what IRWD has done, selecting a PF value between that of turf and that of drought tolerant. This will give the owners of drought tolerant landscape a little more irrigation water than they need, and owners of turf/grass a little less irrigation water.

The third option (using two or three PF's) could be utilized as a form of compromise allowing slightly higher PF's for turf than other forms of landscape, but could possibly result in a higher consultant costs, and more appeals based on areas of differing landscape types. The possibly higher consultant costs and additional appeals would be the result of more detailed landscape measurements. Additionally, there would be the additional consideration of how to handle changes in property landscaping after the water budget is calculated.

The most significant policy decision for the Council regarding the PF, is whether properties are allowed more irrigation water (a higher PF) because they have non-drought tolerant landscaping, such as some types of turf, and other properties receive less irrigation water (a lower PF) because they have drought tolerant landscaping; or, whether one PF is used that is somewhere in between turf and drought tolerant landscaping; or whether a PF is used that assumes everyone has turf, or everyone has drought tolerant landscaping. Ultimately, the resulting water use needs to hit the state mandated target.

FINANCIAL REVIEW

Team	Water Budgets	Temp. Staffing	Extras	Total
SRI/Raftelis	$29,261	$91,200		$120,461
Eagle Aerial/RDN	$26,011	$10,560	$12,150	$48,721
Eckersall, LLC/Tri-GEO	$27,315	$20,800		$48,115
SRI/Raftelis/City Temp. Staff	$29,261	$14,739		$43,760

These costs were not available to staff at the time of budget preparation, thus are not included in the recently adopted FY 2015-16 Budget. Therefore, should the City Council choose to proceed with having a consultant prepare the water budgets, staff requests an additional appropriation from the Water Fund not to exceed $44,000 to cover the cost of the water budget calculations and the temporary supplemental staffing.

WATER BUDGET ALTERNATIVES

1.) Award a professional services contract to SRI for the development of water budgets in an amount not to exceed $29,261, provide an additional appropriation from Water Fund Reserves in the amount of $44,000, and direct staff to obtain temporary staffing from a temp agency to provide telephone coverage and customer service at a cost not to exceed $14,500 regarding the implementation of the water budgets. Staff would need direction regarding the water budget factors (gallons per day and PF) and the preferred methodology.

2.) Direct staff to develop a default-based water budget program similar to that utilized by IRWD and bring it back to City Council for final approval before implementation. Staff does not recommend this option at this time. Under this scenario, staff would not only have to develop the budget program, but would also have to establish the budgets for each individual property, and prepare the code amendment to incorporate the new base year information. Staff would also have to a large number of questions about the program and appeals of water budgets. It is envisioned that to undertake this task, public works staff at City Hall would be diverted from other regular tasks for an extended period of time. If the Council selects this option, staff would need direction regarding the water budget factors (gallons per day and PF) and the preferred methodology.

3.) Award a professional services contract to Eagle Aerial Solutions in an amount not to exceed $48,721 for the preparation of citywide water budgets and provide an additional appropriation from the water fund in the amount of $48,721. Staff does not recommend this option due to the higher cost of the services. Again, staff would need direction regarding the water budget factors (gallons per day and PF) and the preferred methodology.

4.) Award a professional services contract to Eckersall, LLC for the development of water budgets in an amount not to exceed $48,115, provide an additional appropriation from Water Fund Reserves in the amount of $48,115. Staff does not recommend this option, as a principal with the firm has indicated that this would be the first time his firm has undertaken the development of water budgets. Although based on staff's long experience with the firm would cause us to believe that the firm is up to the challenge of developing the water budgets, considering the amount of community concern over the program that can be expected, it is in the best interest of the City to enlist the services of a firm which has experience in providing these services. In addition, Eckersall has not offered the City direct access to the tools they will utilize for development of the water budgets. Again, staff would need direction regarding the water budget factors (gallons per day and PF) and the preferred methodology.

5.) The City Council may elect to reject the proposals and to take no further action at this time, or direct staff to return at some time in the future. Under this option, the City's current conservation targets would remain unchanged.

ADDITIONAL WATER CONSERVATION MEASURES

At the July 14th meeting, the City Council also asked staff to bring back a list of other measures that could be implemented to encourage compliance. Staff recommends that the City Council wait until two billing cycles have been completed, so that a more accurate assessment of the issues can be made. The City just initiated penalties (for exceeding water conservation targets) with the July billings, which covered only half the city. It would be helpful to obtain data from the other half of the city, and also see whether the imposition of penalties obtains additional compliance with in the subsequent billing period.

In the meantime, the proposed list below is presented for discussion purposes. The list includes increased penalties/fines, changes in allowable uses of water, and modification to current processes. However, should the Council desire to proceed with any of these options, it is possible for staff to return with implementing legislation at a future meeting.

1. Increase the penalty amount for exceedance of water conservation targets. (Current penalty is two times the Tier 1 rate.)
2. Prohibit charity car washes.
3. Prohibit car washing water from reaching the street.
4. Allow staff to reduce allocations during the appeal process if it is found that original conservation goal was calculated incorrectly or if preparation of a water budget demonstrates that less water is needed at an appellant's address than is currently allocated.
5. Prohibit installation of new lawn or turf.
6. Allow the installation of flow restrictors for:
    a. Failure to pay citations
    b. For fourth violation of specific irrigation restrictions.
    c. For third or fourth exceedance of the water conservation target, in a to–be- determined period of time.
7. No water allocation appeal to be considered within 60 days of the issuance of a Courtesy Letter, Notice of Violation, or Administrative Citation.
8. Adopt state prohibition on watering within 48 hours of measureable rainfall.

PUBLIC NOTICE PROCESS

This item has been noticed though the regular agenda notification process. Copies of the report are available via the City's website at www.cityofsierramadre.com, at the City Hall public counter, and the Sierra Madre Public Library.

STAFF RECOMMENDATION

Staff recommends that the City Council:

1.) Award a professional services contract to SRI/Raftelis in an amount not to exceed $29,261 for the preparation of citywide water budgets; and,

2.) Direct staff to obtain temporary staff from an agency at a cost not to exceed $14,499 to provide telephone and customer assistance during the implementation period for the water budgets; and,
3.) Approve an additional appropriation of $44,000 to cover these unbudgeted expenses.
4.) Provide direction regarding the Water Budget methodology

Attachments: SRI/Raftelis Proposal
Eagle Aerial/RDN Proposal
Eckersall, LLC Proposal
Website Data from IRWD

STATISTICAL RESEARCH, Inc.

ARCHAEOLOGY • ANTHROPOLOGY • HISTORY • HISTORIC ARCHITECTURE

May 20, 2015

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Re: Proposal for Landscape Area Measurements for Water Budgeting

Dear Mr. Inman,

Statistical Research, Inc. (SRI) is pleased to present this proposal to assist the City of Sierra Madre in developing a database for the water billing system that estimates landscape areas calculated by remote sensing and Geographic Information System (GIS) technology. This project will develop the following data sets:

1. GIS Aerial Imagery (Color and Near Infra-Red)
2. GIS Landform/Landscape Polygon Classification
3. GIS Meter Point Locations (from address file)
4. GIS Meter Service Areas (MSAs) showing areas watered
5. Excel Spreadsheet for import into Tyler Billing System

SRI has extensive experience working aerial imagery and classifying it based on landforms. SRI also has experience working with water agencies, cities, land owners, HOAs, agriculture, and school districts regarding landscape and water consumption. SRI will help the City facilitate and enable data sets that help large users analyze their water usage.

At the kickoff meeting, SRI will work with the City to clarify the project, purpose, and deliverables and discuss the budget (see attachment). SRI will also introduce the project members and briefly discuss their roles. At the meeting, SRI will receive the addresses of the meters and other consumption and meter-type data from the Tyler system. SRI will also discuss QA process and summarize accuracy and data integrity issues.

After the kickoff meeting, SRI will begin conversion of the data and begin the classification process. A map will be provided showing the areas such as turf, tree, and shrub showing the differences between neighbors and relating it to meter type and consumption. Follow-up meetings will be conducted as-needed or when deliverables are presented (such as the cost schedule benchmarks). Monthly reporting and project tracking will also be provided by the project manager.

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555 W. Beech St.
Suite 215
P.O. Box 82404
San Diego, CA
92138
(619) 299-9766
(619) 299-9774 (fax)

Woodland
211 Court St.
Woodland, CA
95695
(530) 661-1400
(530) 662-5500 (fax)

ARIZONA
Phoenix
P.O. Box 27748
Tempe, AZ
85285-7748
(480) 774-1920
(voice & fax)
(480) 600-8692 (cell)

Tucson
6099 E. Speedway Blvd.
P.O. Box 31865
Tucson, AZ
85751-1865
(520) 721-4309
(520) 298-7044 (fax)

NEW MEXICO
Albuquerque
4425 Juan Tabo Blvd. NE
Suite 112
Albuquerque, NM
87111-2681
(505) 323-8300
(505) 323-8314 (fax)
(505) 331-2491 (cell)

TEXAS
El Paso
8201 Lockheed Dr.
Suite 125
El Paso, TX
79925
(915) 781-2200
(877) 781-2205
(915) 781-2201 (fax)

WASHINGTON
Lacey
1110 Golf Club Rd. SE
Suite 102
Lacey, WA
98503
(360) 918-8621
(360) 915-6531 (fax)
(360) 480-5601 (cell)

www.sricrm.com

The final data set will be provided for loading into Tyler pre-define database fields. SRI will also meet with staff to help them understand the data and how to educate customers.

SRI will assume no responsibility for the accuracy contained in the original data but maintains responsibility for the faithful reproduction of the data converted into database and GIS formats.

Sincerely,

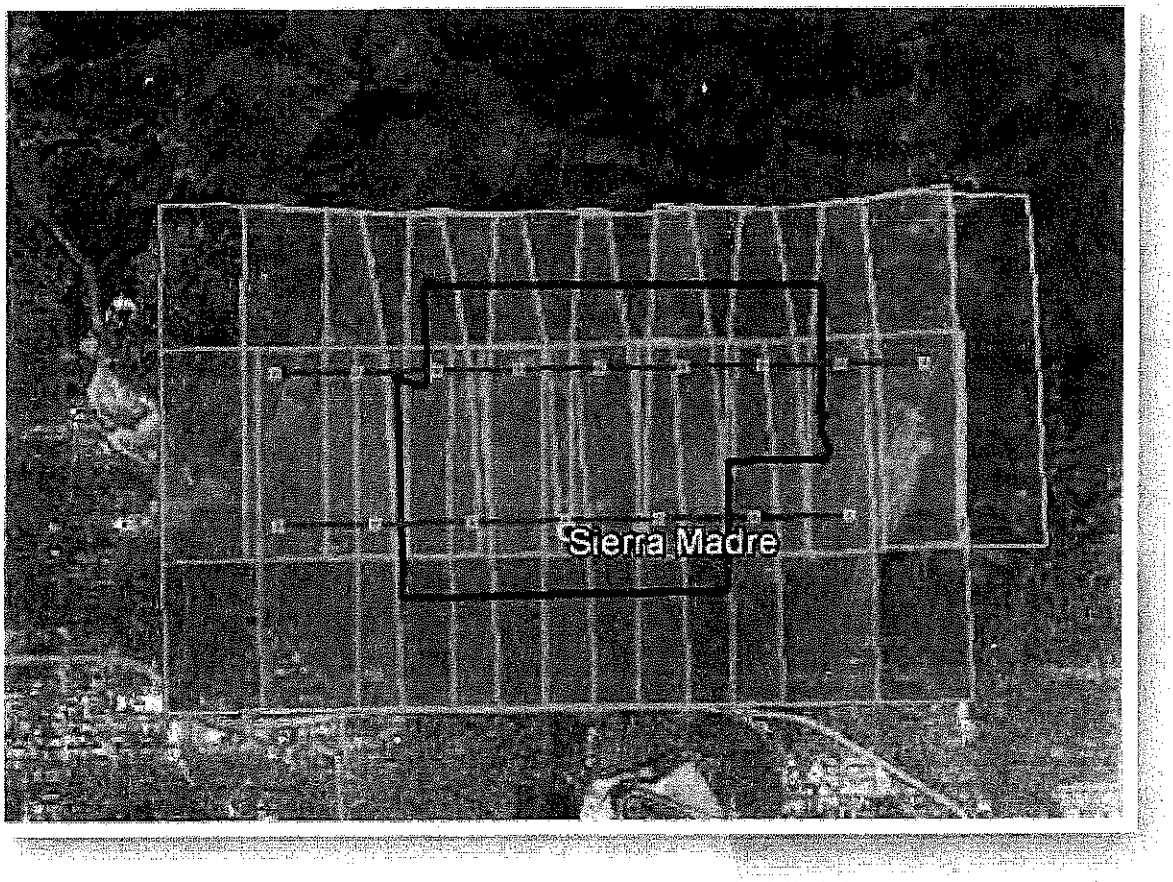
Donn R. Grenda, Ph.D., RPA
President
Statistical Research, Inc.

STATISTICAL RESEARCH, INC.

Sierra Madre Water Budget Estimation Project

					Rates:	$135.00	$95.00	$60.00			$0.575	5/20/2015	
ID	Task	Total Cost	Labor Cost	Fixed Cost		Doug Mende (Project Manager)	RS/GIS Specialist	GIS Technican	Total Hours		Travel		Equipment Use
1	Meetings/Project Management (Kickoff plus Other)	$ 937	$ 810	$ -		6			6	$	127		
1	Imagery Acquistition/Format	$ 3,810	$ 325	$ 3,485		1	2		3				
2	Imagery/Unsupervised Classification	$ 515	$ 515	$ -		1	4		5				
3	Imagery/Landform Categorization (Turf, Tree, Pool, etc.)	$ 895	$ 895	$ -		1	8		9				
4	Imagery/Supervised Classification (Coding & Verification	$ 1,085	$ 1,085	$ -		1	10		11				
5	Imagery/Landform Identification Sampling/QA	$ 1,473	$ 1,410	$ -		2	12		14	$	63		
6	Digitize Meters/Acquire Meter Address List/Parcels	$ 135	$ 135	$ -		1			1				
7	Digitize Meters/Create from Address List	$ 1,740	$ 1,740	$ -		4		20	24				
8	Digitize Meters/ID Clean Up/Link to Database	$ 1,140	$ 1,140	$ -		4		10	14				
9	Digitize Meters/Meter Service Areas (MSA)	$ 2,340	$ 2,340	$ -		4		30	34				
10	Analysis/Overlay & Calculate Square Footage	$ 1,620	$ 1,620	$ -		12			12				
11	Analysis/Database Format for Tyler Export	$ 135	$ 135	$ -		1			1				
12	Additional Meetings with HOA, City, etc. (2)	$ 937	$ 810	$ -		6			6	$	127		
	TOTALS	*$ 16,761*	*$ 12,960*	*$ 3,485*		*44*	*36*	*60*	*140*	*$*	*316*	*$*	-

aero-graphics



Proposal

For

Sierra Madre

Doug Mende

4-Band Orthorectified Imagery

May 2015

Aero-Graphics, Inc.
Casey Francis, Owner

40 West Oakland Avenue
Salt Lake City, UT 84115
tel: 801.487.3273
fax: 801.487.3313
email: cfrancis@aero-graphics.com

aero-graphics

Dear Doug,

I have prepared the following brief proposal to provide 3-band orthorectified imagery for approximately 3 sq. miles.

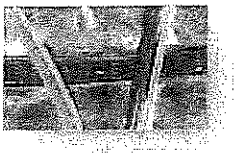
Scope of Services

By permission of San Bernardino County, Aero-Graphics will furnish the following services:

- Restore San Bernardino imagery covering AOI
- Verify survey datum - NAD83 CA SP Zone 5 - CA CSRS 2011 Epoch - US Survey Feet
- 4-band orthorectified imagery in GeoTIFF format at 1.0 ft GSD
- FGDC compliant metadata for overall project and individual tiles
- Overall MrSID compressed mosaic

Technical Approach

Orthorectified Imagery. 3-band CIR Imagery will be orthorectified and delivered from the 6" GSD flight (acquired with San Bernardino 2015 flight as off the shelf imagery). Digital orthorectified imagery will be delivered according to the following specifications:



- Uncompressed GeoTIFF 8-bit (4-band) CIR orthos at 6" GSD
- Tiled according to San Bernardino tiling scheme
- FGDC compliant metadata for the project and individual tiles
- Overall MrSID compressed mosaic
- Delivered via external USB hard drive

Accuracy. All orthoimagery deliverables for this project will meet or exceed ASPRS Class I standards, and will be reported according to NSSDA standards.

Schedule

Imagery Acquisition	May 2015
Deliverables	3 weeks

aero-graphics

Pricing

8-bit CIR Orthorectified Imagery (6" GSD)..... **$3,485**

Terms are Net 30.

In the event any party to this Agreement defaults in the performance of any of its obligations and duties hereunder, including without limitation the payment of any fees due hereunder, such defaulting party agrees to pay all costs and expenses, including reasonable attorney's fees and expenses, incurred by the non-defaulting party in exercising, pursuing, or protecting any right or remedy available to it as a result of such default, or in interpreting or enforcing any term of this Agreement, whether such costs and expenses are incurred prior to, during, or subsequent to any arbitration, litigation, bankruptcy, reorganization, receivership, appellate, or other proceeding.

If you are in agreement with this proposal, and would like Aero-Graphics to proceed with this project, please sign and return this proposal, keeping a copy for your records.

Should you have any questions or require further information, please call me at (801) 428-3104. Thank you for considering Aero-Graphics for this project.

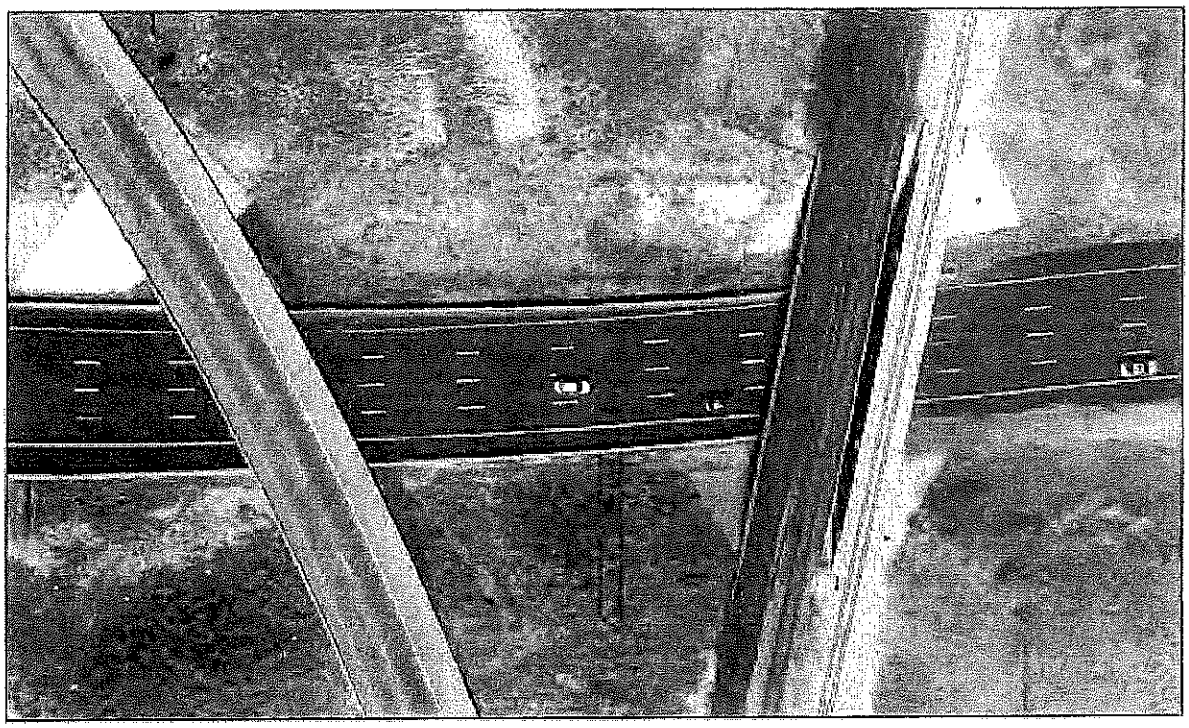
Sincerely,

AERO-GRAPHICS, INC.

Casey Francis, CP

aero-graphics

4-Band Imagery Example
(bridge corrections may exhibit 4-band anomalies)



RAFTELIS
FINANCIAL CONSULTANTS, INC

24640 Jefferson Avenue Phone 951. 698. 0985 www.raftelis.com
Suite 207
Murrieta, CA 92562

June 29, 2015

Mr. Bruce Inman
Public Works Director
City of Sierra Madre
232 W. Sierra Madre Blvd
Sierra Madre, CA 91024

Subject: Scope of Services for Water Budget Allocations

Dear Mr. Inman:

Raftelis Financial Consultants, Inc. (RFC) is pleased to submit this scope of services to conduct an analysis on determining budget-based allocations for each water account within the City's service area. The city intends to utilize the specific account level data to encourage conservation and equitably apply restrictions to its customers as a whole. RFC will work closely with the City and Doug Mende for this engagement. The scope of services outlined below lists each proposed task.

Scope of Services

TASK 1 - WATER BUDGET RATE ANALYSIS

RFC has been instrumental in the evolution of water budget rate structures in California and is very familiar with the requirements of SB x7-7, the recent Mandatory Conservation through the Governor's Executive Order (B-29-15), and how budget-based allocations can be used as a tool to provide information to customers on what is defined as efficient water use.

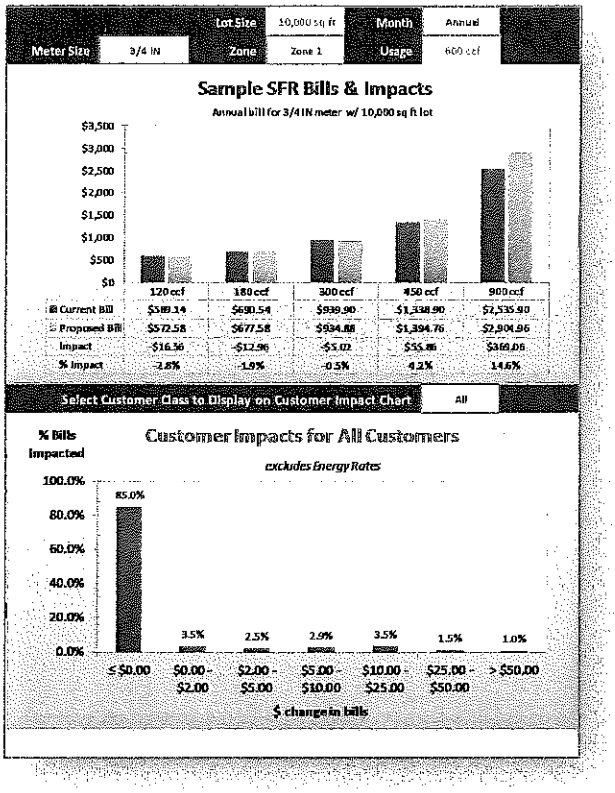
If the City employs drought restrictions through the use of Budget-Based Allocations then RFC will develop a Water Budget Model that will calculate impacts on revenue to the utility and to its customers due to drought surcharges. The Water Budget Rate Model will take into account household population, seasonal effects, and landscape areas, based on GIS data. This task may include the integration of parcel data from the County and GIS data, as well as consumption files from billing system. Based on discussions with the City, it is our understanding that the City will already connect parcel numbers to each and every water account in the City. The Water Budget Rate Model will have the following features:

- **Allocation for Water Budget.** The ability to evaluate different policy options associated with defining indoor and outdoor use efficiency such as landscape area and weather, by semi-annual season. Although water budgets can be assigned to each account for each and every month, due

to the bi-monthly billing period, the City will employ two water budget allocations: One during winter and one during summer; where the summer water budget provides greater water allotment due to seasonality and outdoor water needs. In addition, users can easily adjust variables for household size and the gallons used per capita per day for reviewing various possible restrictions to reach conservation goals. Outdoor water lot size ranges can be set to the user's preference to create equitable break points and reflect a general cross-section of customers' lot sizes.

- **Rate Calculations and Customer Impact Analysis.** The model determines the revenues recovered in each tier and how customers will be impacted from either penalty rates or drought surcharges.

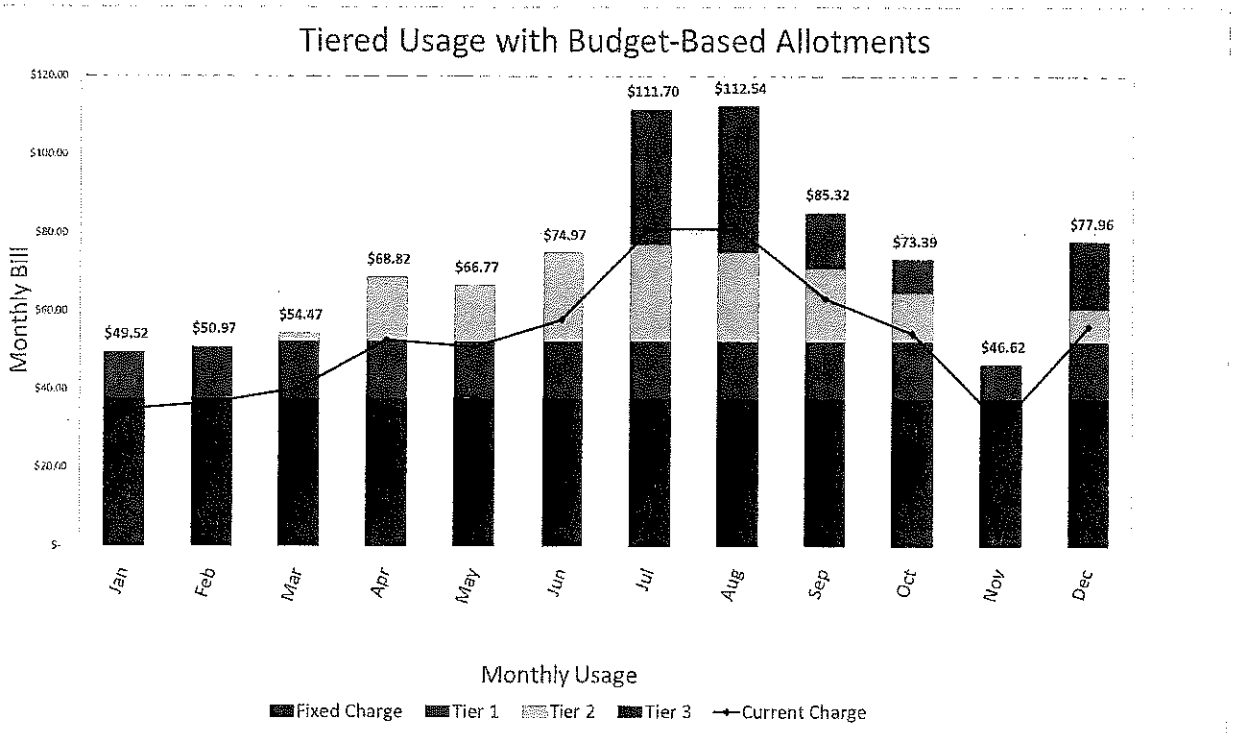
1. **Sample SFR bills impacts at various usage levels** — a graphical representation of how the proposed surcharges will impact customers' bills. Note the ability to change the meter size, lot size, and billing period for the bill calculations. This tool has proven particularly useful for public outreach campaigns and describing each customer's water budget.
2. **Overall customer impact (City-Wide)** — a summary of how customers will see changes in their bills if the proposed surcharges are imposed. This is an invaluable tool to facilitate informed decision making and to assist the City in determining whether Budget-based allocations is the most equitable way to employ restrictions and related penalties.



TASK 2 – PERFORM INDIVIDUAL CUSTOMER IMPACT ANALYSIS

Besides the overall impact to the City's customer as a whole. RFC will also provide graphical information on an account level, where the City ca review and provide statistical data for each individual customer over the last 12 month-period. The Impact Analysis charts will identify the budget allocation for each account and how the customer actual usage information compared to their individualized water budget. This analysis and module is has proven particularly useful during the community outreach stage of implementing water budgets. Below is a sample customer bill impact chart from East Valley Water District. This chart shows an individual customers actual usage versus their new budget allocation. The Bars represent the customer's usage each month and their water budgets for indoor and outdoor, which is represented as the lighter blue bars, respectively. In this case, the customer is using over their budget in

the summer months, which is reflected as the usage in "Red." In the case of Sierra Madre, the "Red" bar would reflect when penalties would be imposed to its customers. The "Black" trend line, shows the current bill without penalties.



Meeting(s)/Conference(s): (2) webinars with City Staff and 1 City Council Meeting to discuss Budget-based allocations

Deliverable(s): Water Budget Allocation Model and Budget Based Account Database.

RAFTELIS
FINANCIAL CONSULTANTS, INC.

24640 Jefferson Avenue Phone 951. 698. 0985 www.raftelis.com
Suite 207
Murrieta, CA 92562

Project Fees

We propose to complete the scope of work outlined above for a "not-to-exceed" cost of $12,500.

We appreciate the opportunity to submit this proposal and look forward to assisting the city on this important project. If you have any questions or need additional information, please contact me at (951) 595-9354.

Sincerely,

Habib Isaac

Habib Isaac
Manager

Eagle Aerial Solutions
3420 Bristol St. Ste 605
Costa Mesa CA 92626
714-754-7670

SCOPE OF WORK – MEASUREABLE IRRIGATION SOLUTION

June 17th 2015

Prepared for City for Sierra Madre
By Eagle Aerial Solutions

BACKGROUND

The City of Sierra Madre ("CSM") desires to engage Eagle Aerial Solutions ("Eagle") to determine certain on-the-ground conditions of individual parcels (the "City Parcels"). The intention is to use Eagle's data and remote sensing analysis expertise to calculate, to a degree of high accuracy, the following surface characteristics of each parcel: 1) Impervious surfaces (concrete, asphalt, other pavement types); 2) Swimming pools; 3) Land that appears to be irrigated (lawn, flower beds, trees, surrounding lawns, etc.); and 4) Land that appears to be natural vegetation and not irrigated. This effort is part of establishing procedures that will be made available to CSM in its effort to understand water usage help with drought restrictions and other conservation goals, including but not limited to potential water budget rates later if needed. Eagle will use its specialized GIS-based remote sensing analysis, combined with color infra-red high resolution imagery and Eagle's proprietary techniques with software and expertise to provide the analytical data requested by CSM. The goal of the Project is to achieve an accuracy level of 90% or higher which will provide significant savings over other potential ways to accurately determine the indicated surface conditions within the City's parcels. In addition to the technical data need, administrative support is necessary to handle resident inquiries as it relates to changes in billing.

SCOPE OF WORK

Four band Imagery (Red, Green, Blue, and Near Infrared) imagery will be used to identify the pervious & impervious land cover. All four bands will be analyzed accurately based on the seven recognition elements of air photo interpretation, pixel values (tone or color), shape, size, pattern, shadow, texture, association, spectral signature and site. Accuracy level is targeted at 90% or above. This level of accuracy can be achieved with current 2013 imagery used with color photography including the 4th band of Color Infra-Red and using key proprietary software and techniques.

ADD 2 METERS @ $2.13

In addition to the landscape measurement data the Water Efficiency Calculator by our partner RDN will provide CSM the following:

- Application of the following data sets: irrigated square footage (Eagle Aerial), customer usage (CSM), household size (RDN), and evapotranspiration (RDN).
- Work with the City to finalize variable values for daily indoor per capita allocation, landscape factors, and drought factors. State legislative guidelines will be used as the baseline.
- One-time application of the Water Efficiency Calculator.

Materials: This is the data to be supplied to Eagle from CSM either directly or through their consultant:

- Parcel shape files of the parcel data for The City of Sierra Madre.
- Corresponding addresses and/or parcel #'s will be used that are connected to the parcel. This will tie the customer to the parcel.
- Customers per household

Deliverables: The deliverables that CSM will receive are as follows:

- Parcel polygons of geographic locations are identified for the Target Parcels. These polygons will be 100% compatible with most GIS software provided by consultants. When imported into GIS software, each of the Target Parcels are identified by a parcel polygon 1) Impervious surfaces (concrete, asphalt, other pavement types); 2) Swimming pools; 3) Land that appears to be irrigated (lawn, flower beds, trees, surrounding lawns, etc.); and 4) Land that appears to be natural vegetation and not irrigated. Color identified and textual attribute data identified with square footage information for the individual conditions identified (vegetation, bare soil, pools, and impervious surfaces) will be provided also. The landscape square footage data will be tied to the closest CMIS data station for ET (Evaporation Transpiration) data at the State DWR standards of .8 unless directed otherwise. The ET will be calculated one time [details to be discussed].

- In addition to the above, a corresponding Excel data file will be included, matching parcel number to geographic polygon parcel with the square footage of vegetation, bare soil, pools, and impervious surfaces in each parcel. The attributes in the above parcel polygon will be included in the Excel spreadsheet that is compatible with the City's billing system.

- The RDN Water Calculator will be included (see accompanying RDN document). This will provide a summary report (.pdf) and ranked individual customer water usage database (xlsx). A webinar presentation to City staff is also included. This will give Sierra Madre an accurate Water budget for each SFH residential customer. More info on RDN follows page 5 of this proposal.

- Customer Service Training for any temporary staff potentially hired by either CSM or Eagle Aerial is included for the hours of 8am-2:30pm (with 30 minute break) Monday-Friday for a period of 60 days, from mutually-agreed upon start date (presumably as soon as project is

completed and notifications are sent to the customers). Purpose of this is to provide **support** to handle CSM resident calls that come in to the City as it pertains to their water budget. Training will consist of live web sessions and phone support . The hiring of a temporary person is **optional** and is outlined in the Options shown on page 5 of this proposal.

COORDINATION WITH CSM

Eagle Aerial will coordinate with CSM or its consultants to obtain necessary data (such as parcels, addresses etc…) on an as-needed basis to maximize the accuracy of the project. Conference calls and web meetings will be held as necessary to maximize the results of the project.

SCOPE OF PROJECT

The Project consists of designated parcels that will be provided to Eagle by CSM. The price for the services provided by Eagle under this Scope of Work are limited to those specified herein. Any further services, which are not specifically described herein, but are subsequently identified, shall be negotiated between Eagle and CSM for additional time and compensation. The price includes the entire project to be completed at one time. If fewer areas or portions of service areas change then the price may change significantly due to project set up and other factors.

PROJECT TIMELINE AND KEY TASKS

Tentative Schedule

Project:

Estimated Time Frame: 6-8 weeks for the project from receipt of all materials/data needed to begin. CSM will provide Eagle with a Notice to Proceed in order to authorize the commencement of the project.

START DATE

Once all materials are received and notice to proceed is given, the project will commence.

BUDGET

Eagle Aerial will perform the Project for a lump sum amount of $23,175. This cost will not be exceeded without written authorization from CSM. A 50% up-front payment will be invoiced with the balance of 50% being invoiced after the project is completed and will be payable within 30 days.

OTHER

Additional deliverables that complement the base product and service may be added; these are shown in the table on page 5.

CSM Authorized Signature	Eagle Aerial Signature
Print Name	Print Name
Title	Title
Date	Date

OPTIONAL DELIVERABLES TO THE SCOPE OF WORK	
PRODUCTIVITY APPLICATIONS FOR INTERNAL USE • WaterView web-based GIS Viewer with included landscape data: $6,500 *(Annual fee; no subscription required; stop at any time).* • Dedicated Irrigation Meter field app: $3,500 *Above two discounted 25% as a package but available individually as well.*	$7,500
TEMPORARY EMPLOYEE Temp on site brought on and managed entirely by Eagle Aerial (for 2 months); Essentially 22 working days per month @ 6 hours (8am-2:30pm daily w/ 30 min break)= 264 hours.	$10,560
Each and any follow up WEC application/ After initial application, and at intervals decided by the City, run the Water Efficiency Calculator to gauge effectiveness of drought/conservation outreach on individual customer water usage. This requires delivery of additional individual customer usage data to RDN during each interval. Deliver a summary report (.pdf) and ranked individual customer water usage database (.xlsx) after each additional application.	$1,755
Perpetual WEC license/support for WEC Up to three two-hour training sessions for City personnel via webinar on using the Water Efficiency Calculator (RDN). This can be substituted for one on-site training for City personnel. Includes a perpetual license of the Water Efficiency Calculator in user-friendly Excel format. This will allow the City to use the Water Efficiency Calculator indefinitely. Customer support on the Water Calculator by RDN for one year.	$12,150
Public meeting attendance (RDN) Assist City personnel in preparation for a public meeting. One of RDN's Senior Economists (Dr. Robert Niehaus or Dr. Brianna Briggs) will attend and present at a public meeting.	$1,418

CITY OF SIERRA MADRE WATER EFFICIENCY CALCULATOR

Prepared by Robert D. Niehaus, Inc. (RDN)

Abstract

RDN, in concert with technical experts in the field of water resource management, has designed a Water Efficiency Calculator as a powerful tool for water agencies' use. Our calculator enables water agencies to recognize which customers use water efficiently, under State legislative guidelines (or variable inputs set by an agency), and identify customers who use water inefficiently.

Daniel Brown, Director of Business Development

daniel@rdniehaus.com, 805-618-1349, 140 East Carrillo Street, Santa Barbara, CA 93101

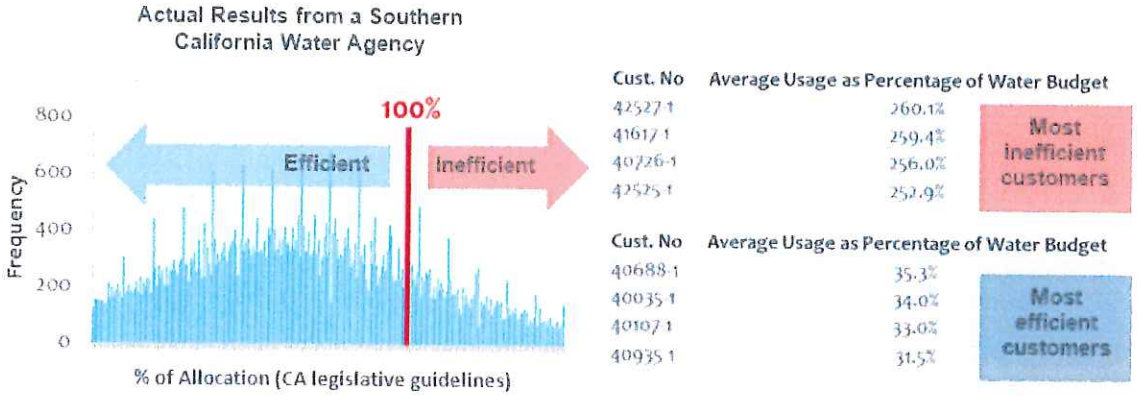
Contents

The Water Efficiency Calculator

RDN, in concert with technical experts in the field of water resource management, has designed a Water Efficiency Calculator as a powerful tool for water agencies' use. Our calculator enables water agencies to recognize which customers use water efficiently, under legislative guidelines (or variable inputs set by an agency), and identify customers who use water inefficiently.

This tool provides water agencies with a targeted public outreach option. As a result, the data and analysis we are able to provide can make necessary efforts to meet drought restrictions more effective with water agencies' time and money, with the ability to target those customers who waste water and/or do not meet the drought goal through a focused public outreach campaign. We help to provide agencies a direct path to those customers who need to reduce water usage in order to meet agency requirements.

With accurate irrigated square footage, local evapotranspiration, local Census data, and State efficiency standards as a guideline, RDN can provide agencies with a ranked and sorted database of customers, from the most efficient up through the highest water-wasting customers. Examples from a summary report are shown below.

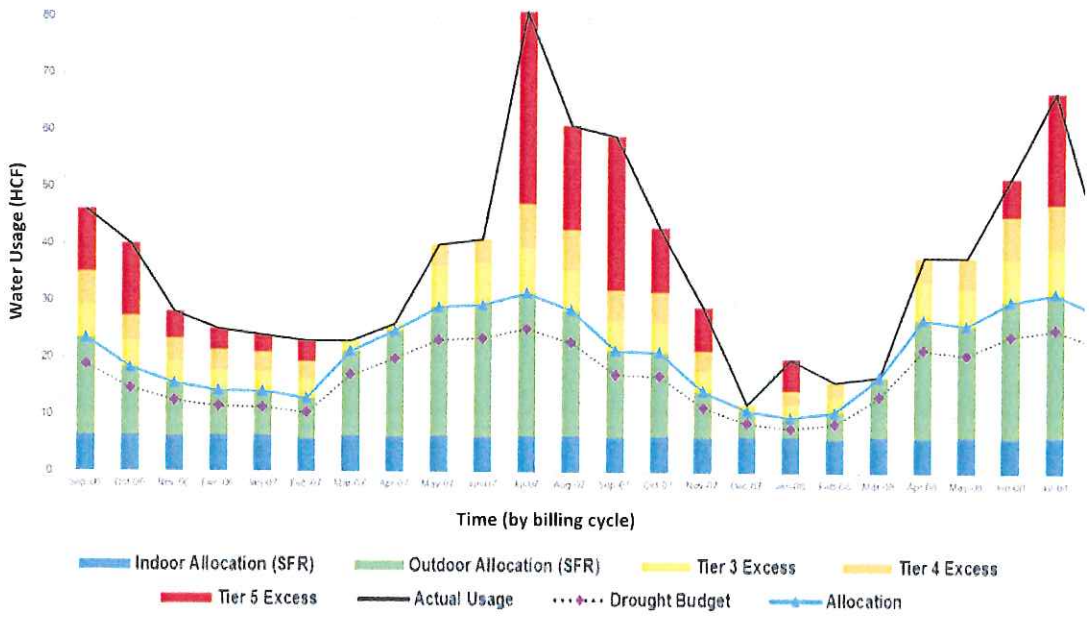


RDN recently demonstrated this tool during an educational workshop for board members of a Southern California water agency. Specifically, the functionality of the calculator was demonstrated as a value-add tool during water supply emergencies (drought or other). The examples below were taken from actual customer data and show (1) the customer's water budget (based on CA guidelines, 80% evapotranspiration, and 55gpcd indoor target use), (2) the actual customer's use, and (3) an adjusted water budget given the CA request for a 20% drought usage reduction.

Components of the graphs below: The solid black line represents actual use (monthly billing). The blue line with triangles represents a water budget using number of residents (U.S. Census defaults or actual number of residents) and irrigated landscape square footage (obtained from our teaming partner, Eagle Aerial Solutions). The dotted black line is the individualized water budget adjusted for a 20% reduction request (but can be adjusted based on an agency's conservation goals). The blue and green portions of each month's usage bar are the indoor and outdoor water allocations, respectively. In the examples below, CA legislative guidelines are used for indoor and outdoor allocations.

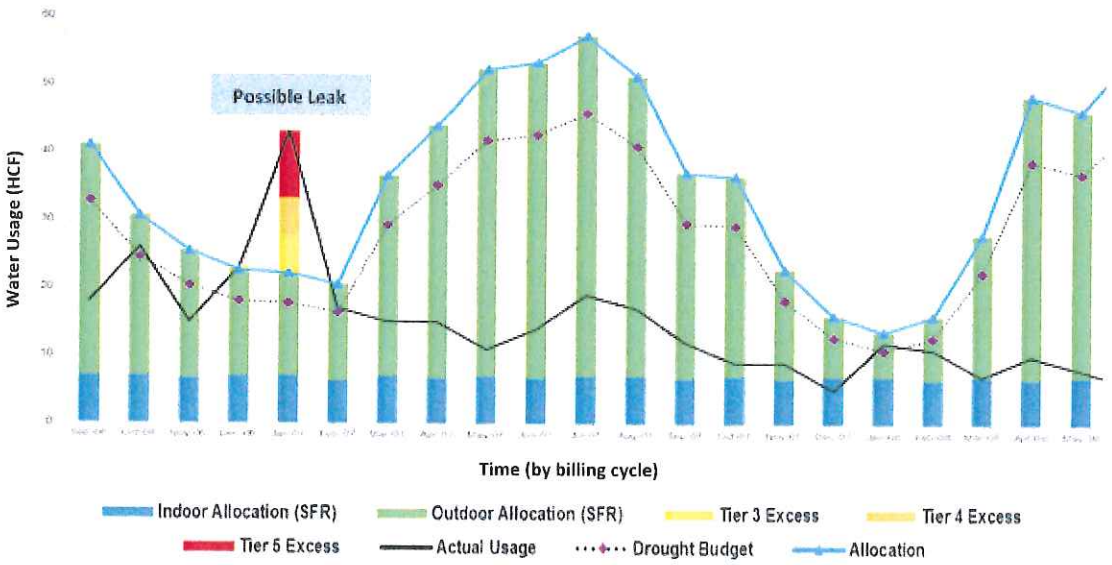
Customer A, for the selected time period, uses water over and above CA's guidelines. This person would be an ideal target for agency drought/conservation outreach.

Customer A - Historically Inefficient Water User



Customer B (coincidentally, with a larger comparative lot size), for the selected time period, uses water very efficiently. The individualized usage graph even shows the spike in actual water use resulting from an indoor leak. This person would not be an ideal target for agency drought outreach since he already uses water very efficiently.

Customer B - Historically Efficient Water User



In the short term, the Water Efficiency Calculator helps agencies identify who are efficient and inefficient water users, accurately target the biggest water wasters for the highest conservation payoff, use staff and monetary resources effectively, and avoid the public relations pitfall of asking already efficient water users to conserve more. In the long term, the Water Efficiency Calculator helps to reduce water waste and move agencies towards longer-term and mandated conservation goals. Data used by the calculator can be used to populate a financial model to test the impact of water budget rates as well.

Qualifications and Experience

RDN has an exceptionally strong record of performance for more than 33 years in economic analyses for water, land development, energy, and other projects throughout California and world-wide.

We have within the past five years conducted more than 45 water rate comparison studies in which we analyzed over 200 purveyors' rate structures throughout California, including those with large agricultural contingents. This experience gives us a unique perspective and database on the types of rate schedules in common usage in California. Moreover, we have assisted California utilities in analyzing conservation effectiveness, revenue requirements, and water demand forecasting as part of work completed during the past three years. We are in the process of conducting water rate scenario analyses for the Los Angeles District of Water and Power (LADWP) on behalf of the Natural Resource Defense Council. We bring this perspective, and valuable analytical and data resources, to your specific project requirements and District ecosystem.

Specific project experience is listed below.

LADWP Data Collection and Water Rate Analysis for the Natural Resource Defense Council (NRDC) – We are currently contracted with NRDC to provide data collection and water rate analyses for the Los Angeles Department of Water and Power. Using our in-house water rate model, WaterEcon, we will conduct a series of sensitivity and scenario analyses on over 600,000 accounts to design candidate water rate structures for suitability in meeting NRDC's conservation goals while maintaining District financial stability. Additionally, we will assist NRDC in presenting and explaining recommended rate proposals to LADWP as required.

Analyzing West Basin Municipal District's Landscape Irrigation Efficiency Program – We recently completed a contract with West Basin Municipal Water District to provide a summary report and analysis of the water savings resulting from a conservation program offered to local residents that provided free landscape surveys and free installation of high-efficiency sprinkler nozzles. We worked with the agency to obtain historical customer billing records for those that participated in the program as well as customers that did not. Since West Basin is a wholesaler, this amounts to working with datasets from each of its retailers. Separate analyses were completed for single-family, commercial and multi-family customer classes.

Water Rate Comparison Studies – Prepared comparative residential water rate studies that explained differences in rates among purveyors in neighboring jurisdictions. These analyses estimated nominal and effective costs to residential customers of purchasing water from Golden State Water Company in each of the Company's 24 service areas throughout California and compared these costs to water costs in more than 100 surrounding communities. The analyses measured the full cost-recovery from water sales. Our reports included a comparative analysis of the water rate structure, financial characteristics,

and operating procedures of each purveyor, and econometric analyses of variations in costs among agencies. Our work provided a critical benchmark for Golden State Water Company's water pricing policies and facilitates communication with rate-payers now and into the future.

Fremont Valley Preservation Project Water Rate and Revenue Analysis – Provided a rate analysis and 20-year revenue forecast for the Fremont Valley Preservation Project (FVPP) in eastern Kern County. We gave our private client guidance on project pricing, general management strategy, and mitigation of potential project risks. Critical issues addressed included the demand, supply, and conveyance facilities in Southern California's enormous regional water market; a review of the essential elements of water demand, supply, and pricing for the water agencies in Southern California most likely to serve as customers and partners for the FVPP; and cost of service analysis deriving prices consistent with alternative sales scenarios.

Economics of Groundwater Management – Analyzed groundwater use and management in Santa Barbara County to help develop planning guidelines that affect water and environmental agencies; local water purveyors; environmental, business, labor, and agricultural interest groups; and private individuals. Our study provided an overview of potential economic issues that could emerge if changes in groundwater use and management were instituted in the county. We identified the current status of water use and groundwater depletion in the county and summarized policy approaches. We further provided an initial evaluation of the principal socioeconomic implications of each type of approach.

City of Santa Barbara Long-Term Water Sales and Revenue Requirements Forecast – Provided economic, statistical, and forecasting support to the City in developing its long-term water supply plan. Our technical expertise helped to develop econometric relationships among City water sales, local precipitation and evapotranspiration rates, economic growth, and water-conserving technological advancements. Our work was used by the City as a factor in developing its water supply and budget outlook.

Cachuma Project Water Rate Economics Study – Successfully completed a broad-scoped water rate economic analysis for the U.S. Bureau of Reclamation, the Santa Barbara County Water Agency, and the Cachuma Project Authority which assessed the impacts of alternative patterns of future Cachuma Project water availability and costs. For local water agencies we estimated cost-recovery water rates based on multiple scenarios of water available for municipal and industrial (M&I) use, agricultural use, and in-stream (environmental) uses. These local agencies included the City of Santa Barbara, the Carpinteria District, the Goleta Water District, the Montecito Water District, and the Santa Ynez River Conservation District.

Water Demand and Use Forecasts – Prepared an econometric analysis of M&I water demand with forecasts of water use for the water system serving the communities of Calipatria and Niland in Imperial County, California. Driven by Environmental Protection Agency (EPA) water quality improvement requirements under the Safe Drinking Water Act, our client was obligated to develop plans for costly upgrades to the facilities treating raw water purchased from the Imperial Irrigation District for retail distribution to the customers in these communities.

Economic Analysis of Development Projections – Prepared an economic analysis of residential and commercial development projections for the Goleta Sanitary District and Goleta West Sanitary District service areas in support of the districts' wastewater treatment capacity planning programs. Our analysis

assessed the feasibility of the development projections given projected demand and market conditions. Our work provided the validation these agencies needed to assure their multi-million-dollar capacity plans were economically viable.

USACE Flood Protection and Recreation Studies – Prepared economic (cost-benefit) analyses for flood protection and recreation proposals in Southern California and Arizona for the U.S. Army Corps of Engineers (USACE), Los Angeles District. Projects included the Hansen Dam Recreation Area in Los Angeles County, the Whitewater River Basin in Riverside County, and the Tortolita Drainage Area in Pima and Pinal counties, Arizona.

References

Water Rate Comparison Studies for the Golden State Water Company (2011-2013)

Contact: Patrick Scanlon
Vice President
714-535-7711 ext. 200
pscanlon@gswater.com

Job Description: We prepared 45 comparative water rate studies covering more than 200 purveyors throughout California. The analyses focused on explaining differences in rates among purveyors in neighboring jurisdictions. These analyses estimated and compared nominal and effective costs to residential customers of purchasing water from Golden State Water Company and other purveyors in surrounding communities. The analyses were based on detailed analyses of water agency financial data and budgets, and included detailed descriptions and a comparative analysis of the water rate structure, financial characteristics, and operating procedures of each purveyor with econometric analyses of variations in costs among agencies. Our work provides a critical benchmark for Golden State Water Company's water pricing policies and facilitates communication with rate-payers and the California Public Utilities Commission.

Revenue and Demand Analyses for the Fremont Valley Preservation Project (2013)

Contact: Lawrence Lin
Chief Administrative Officer
8693 Wilshire Blvd
Beverly Hills, CA 90211
310-652-3900
llin@aquahelio.com

Job Description: Provided a rate analysis and 20-year revenue forecast for the Fremont Valley Preservation Project (FVPP). We gave our client guidance on project pricing, general management strategy, and mitigation of potential project risks. Critical issues addressed included the demand, supply,

and conveyance facilities in Southern California's enormous regional water market; a review of the essential elements of water demand, supply, and pricing for the water agencies in Southern California most likely to serve as customers and partners for the FVPP; and cost of service analysis deriving prices consistent with alternative sales scenarios.

Water Rate and Demand Studies for Golden State Water Company (1999-2010)

Contact:

Floyd Wicks
Former President and CEO
1647 Posilipo Lane
Santa Barbara, CA 93108
805-455-1670
floyd1647@gmail.com

Job Description: We prepared the water demand and forecasting model for estimating willingness and ability to pay for water in the Calipatria-Niland service area of Imperial County, California. The analysis included estimates of the price elasticity of demand for water derived from historical water use data in the service area as well as other communities in the arid southwestern United States. These demand relationships were then used to project water use under alternative rate scenarios associated with different investment and compliance approaches. Subsequent efforts addressed water rates for up to 200 public and private water-supply agencies throughout California. Assessments encompassed agency finances and rates structures, composition of revenues, and econometric analyses of rate variations.

Supplemental Services – WaterEcon

Model Description

We have developed for our internal use and agency application WaterEcon, RDN's Water Agency Demand and Financial Analysis Model. The model was developed for the purpose of addressing the demand, supply, rate-setting, and financial analysis needs of local water agencies within the current legal and conservation ecosystem. It is particularly relevant to those agencies serving drought-stricken regions – especially California – where strong seasonal and year-to-year variability in rainfall and water supply is an essential element in local agency planning. The model is applied using entirely agency-specific data and assumptions, with any information gaps filled using appropriate regional industry values as necessary. We have provided here a summary description of the structure, logic, and "baseline" or default configuration of the model, with secondary emphasis on its data and parameter values. Consistent with the budgeting practices of most local water utilities, the forecast horizon for the model typically is five years, with the current or most recent completed fiscal year serving as "year 0." Longer forecasts can be accommodated as needed.

The primary purpose of WaterEcon is to guide rate-setting and financial planning for public and private water agencies, broadly defined to include agencies with wastewater and recycled-water components as well as potable water supply. The model is applicable to analysis of financial viability, extreme drought conditions with supply constraints, and alternative rate and non-rate conservation policies for these same agencies. Its inclusion of capital and operating costs permits both long-term and short-term analysis of agency financial conditions. The basic form of the model documented here addresses potable water supply only, though wastewater and recycling elements can be added as additional functions and water supplies.

Central to the model is the treatment of end-user water demand as variable depending on the number and composition of customers, rainfall and weather patterns, the rate structure and levels of rates employed, and conservation measures in place. Each of these variables is treated explicitly in the model, permitting development of alternative scenarios encompassing the likely range of circumstances the agency faces now and in the future. Also endogenous to the model is the response of agency revenue requirements to the volume of water produced and sold – that is, the capture of the variable nature of significant agency costs such as purchased water, electricity, and chemicals.

The next page illustrates the methodology and structure of the WaterEcon model. It comprises four major components or blocks: Water Demand, Revenue Requirements, Cost of Service, and Rate-Setting Analysis.

City of Sierra Madre

Proposal for Water Budget Analysis and Response

Submitted 6/19/2015 by ECKERSALL, LLC

PROJECT UNDERSTANDING

The City of Sierra Madre is seeking a consulting firm to provide GIS-based Water Budget Analysis services and 2 months of onsite experienced customer service staff to handle incoming communication from water customers. This proposal addresses all facets of those needs, from data collection and analysis to report generation and onsite staff to handle calls, e-mails, and in-person visits. Eckersall has been working with the City of Sierra Madre for 12 years now, and provides the current web-based GIS and other GIS services. As such, we are intimately familiar with the City and its operations as well as the available data and analysis tools to make this project a success.

PROJECT APPROACH

The Eckersall methodology for this project and all other projects is to thoroughly understand the City's needs and develop a plan to meet those needs. Once the plan has been developed and all parties are in agreement, we put that plan into action. Project management is crucial along with effective teamwork between our team and the City.

We provide a unique approach to project management for a small company. Our clients have high expectations that we strive to exceed wherever possible. We use proven project management and communication skills. For this project, the company President will manage all parts of the implementation and ongoing maintenance. This approach provides our clients with a level of confidence and reassurance that the project will be done right the first time. We have worked for larger consulting firms before and understand the challenges that result from staff reassignment and turnover. This project will have the full attention of our company principals.

Eckersall has a process-driven approach with specific steps to help define and attain goals. This process starts with the design, development, production, and concludes with service provided. We employ this process whether we are working on a consulting project or deploying and supporting XY MAPS for a new client.

- **Plan:** Establish objectives and processes required to deliver the desired results.
- **Do:** Implement the process developed.

- **Check:** Monitor and evaluate the implemented process by testing the results against the predetermined objectives
- **Act:** Apply actions necessary for improvement if the results require changes.

Task 1: Data Capture

Our initial task is to complete a comprehensive land cover survey, classifying each type of land cover and manually digitizing those as polygons on top of up-to-date high-resolution aerial photography, parcels, and building outline data. Lawns, pools, concrete, brick, asphalt, planters, und undeveloped areas will be digitized and snapped to building edges and parcel boundaries. Parkways that lie outside parcels but irrigated using water from those parcels will also be digitized and linked to those parcels. This approach will provide a complete and highly precise inventory of all irrigated surfaces. We will also field verify each parcel from the public street to confirm that front yards are correctly captured. With the amount of tree canopy in Sierra Madre, we believe this approach provides the best solution and is superior to an automated process from traditional and/or infrared aerial photo analysis. It also breaks out impervious surfaces for better identification and possible use in future GIS projects. Tree canopy developed in this process can also be used for further analysis in other projects. Finally, tree canopy polygons can overlay other land cover polygons such as turf, something that isn't always possible using an automated approach from aerial photography.

We plan to team with Tri-GEO to complete this manual data entry work. They have experience performing identical work on multiple large projects and will complete this task according to the standards we've set forth while creating the sample shown below. We have worked with Tri-GEO on many other data conversion projects and are always pleased with the results.

At the conclusion of Task 1, the land cover data will be added to XY MAPS so the City can identify polygons to see calculated areas. These also provide a higher level faster performing base map that can be used for creating higher quality base maps.

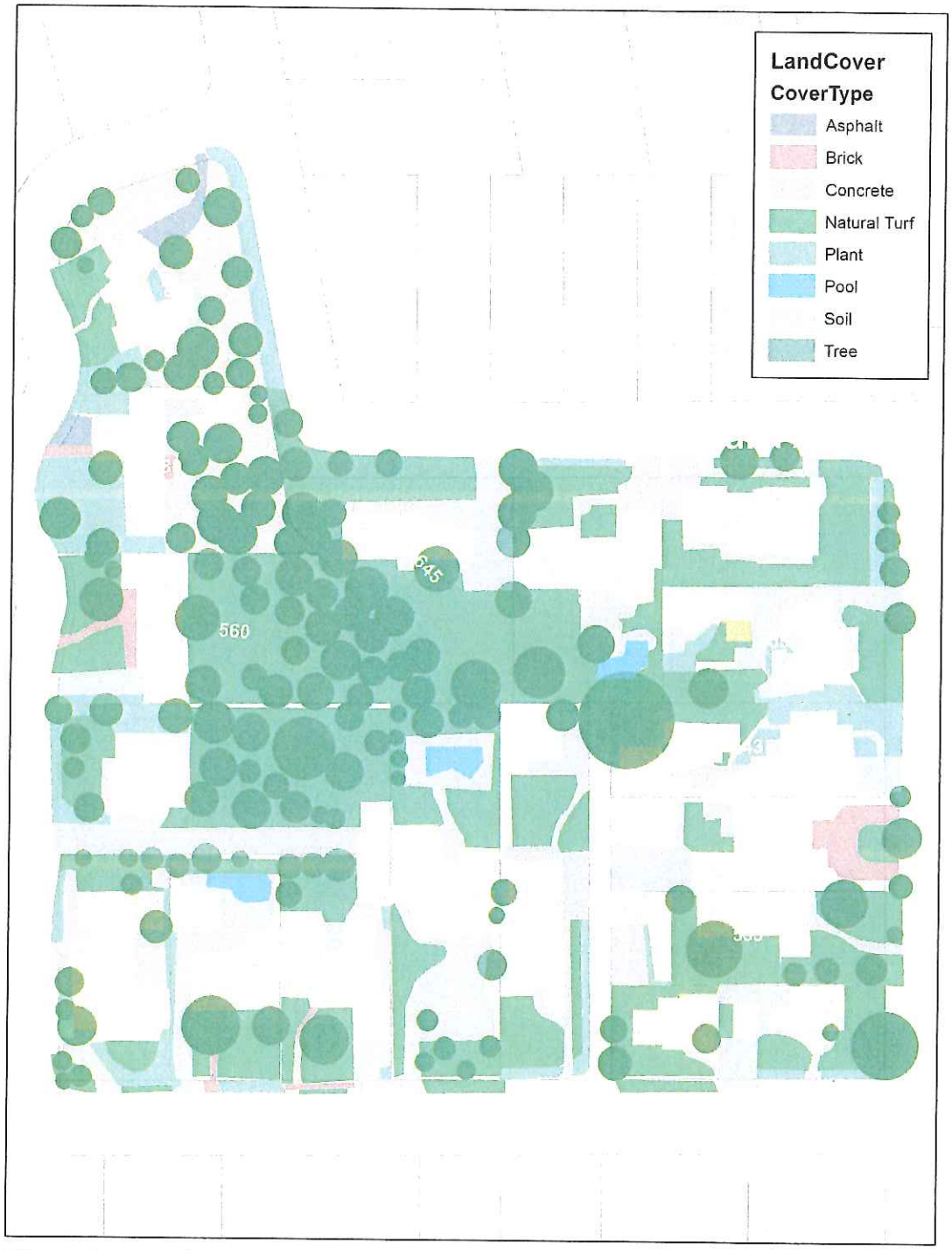


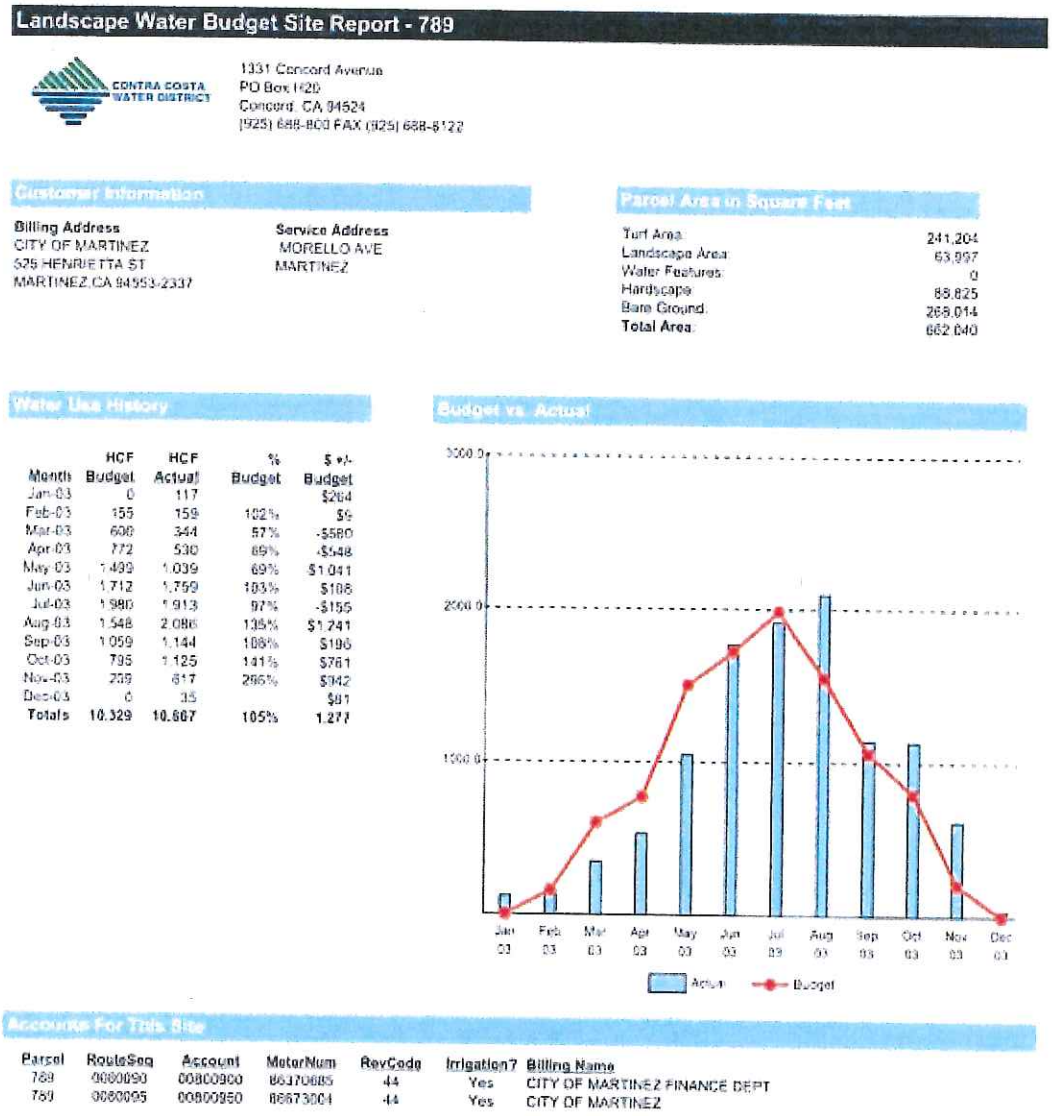
Figure 1: Sample area completed for the City of Sierra Madre

Task 2: Water Budget Analysis

In Task 2, we will perform the analysis in which land cover data is used to develop an irrigation water budget for each parcel in the City. We plan to emulate the work done by the Contra Costa Water District. Total square footages of turf areas, turf under tree canopy, shrubs, bare soil, and water features (including pools) are tallied for each parcel. This will include turf areas outside parcels but still irrigated by those land owners. Average monthly Evapotranspiration and total monthly rainfall will be determined from nearby weather data. These will be used to generate a monthly water budget for each parcel in the City. This task will require a current list of water customers and their CCF usage over the past 12 months.

A two-page mailer will be created for each parcel in the City. Page 1 will be a cover letter on City letterhead which explains in basic terms what is going on with our statewide drought, what the impact is on Sierra Madre, and what each water customer's responsibility will be. It will explain the water budget process, how each parcel's allotment was derived, and what to do to appeal this budget. Page 2 will be a water budget report. We plan to use the Contra Costa report as a starting point, and customize per input from the City of Sierra Madre.

As part of this task, we will update the property ownership data from L.A. County Assessor records and create the mailing list. We can also assist with the physical mailing if there is insufficient City staff to perform this work. The mailer should go out on a Friday, presumably for delivery on Saturday. Our first onsite Customer Service day will begin on the following Monday.



Landscape Water Budget Site Report - 789

CONTRA COSTA WATER DISTRICT

1331 Concord Avenue
PO Box 1420
Concord, CA 94524
(925) 688-800 FAX (925) 688-8122

Customer Information

Billing Address
CITY OF MARTINEZ
525 HENRIETTA ST
MARTINEZ,CA 94553-2337

Service Address
MORELLO AVE
MARTINEZ

Parcel Area in Square Feet

Turf Area:	241,204
Landscape Area:	63,997
Water Features:	0
Hardscape:	88,825
Bare Ground:	268,014
Total Area:	662,040

Water Use History

Month	HCF Budget	HCF Actual	% Budget	$ +/- Budget
Jan-03	0	117		$264
Feb-03	155	159	102%	$9
Mar-03	600	344	57%	-$580
Apr-03	772	530	69%	-$548
May-03	1,499	1,039	69%	$1,041
Jun-03	1,712	1,759	103%	$188
Jul-03	1,980	1,913	97%	-$155
Aug-03	1,548	2,086	135%	$1,241
Sep-03	1,059	1,144	108%	$196
Oct-03	795	1,125	141%	$761
Nov-03	259	617	266%	$942
Dec-03	0	35		$81
Totals	10,329	10,867	105%	1,277

Budget vs. Actual

Accounts For This Site

Parcel	RouteSeq	Account	MeterNum	RevCode	Irrigation?	Billing Name
789	0080090	00800900	86170685	44	Yes	CITY OF MARTINEZ FINANCE DEPT
789	0080095	00800950	86673004	44	Yes	CITY OF MARTINEZ

Figure 2: Sample Water Budget Report

More information on the Contra Costa Water District methodology can be found at http://www.ccwater.com/conserve/landscapedesign

Task 3: Onsite Customer Service

We plan to make experienced staff available for 8 weeks following the Friday mailer. Staff will be onsite from 7:30am-5:30pm Monday-Thursday. We plan to use Amelia, David, and Scott to fill this position. Shifts will typically be a full day or 7:30am-12:30pm and 12:30pm-5:30pm in the event our schedules mandate that no single person is available for a full day. We believe this position is unique; it must be staffed by individuals knowledgeable about water, the drought, what

other cities are doing, how cities work, and how their allotments were derived. Staff in this position must calmly and professionally explain what's going on at the State level, what the City is doing, and the fact that this approach is superior to what other cities are doing. Chino Hills, for example, only allows homeowners to water 2 days a week for 15 min max. At the same time, Chino Hills has a minimum allowable landscape ordinance, so some residents may receive a letter from Chino Hills Code Enforcement saying they need more landscaping that they're unable to irrigate. Each member of our staff has been a homeowner for decades and will address concerns in a calm and courteous manner. We will assist water customers through on-the-fly problem solving, taking a look at a specific water budget to confirm our model work correctly for them, and will help them appeal their allotment. Above all, we will strive to be a seamless extension of City staff and maintain the high standard of customer service the City has maintained for many years.

REPRESENTATIVE PROJECT EXPERENCE

City of Downey – *GIS Consulting and Web-Based Mapping Services*

The City of Downey has a population of over 110,000 and is 12.5 square miles. It has its own Police and Fire Departments and is essentially built out. For 50 years, Downey was a hub of the Southern California aerospace industry. In the 10 years since, the City has remained vibrant, having aggressively attracted a mix of other industrial and commercial business.

The City contracted with Eckersall in 2013 to provide the XY MAPS product to deploy its ArcGIS Server GIS to internal and public users. The deployment at the City of Downey is the most complex installation to-date. While XY MAPS has typically been deployed in cities that have little or no existing in-house GIS technology or staff, Downey has both. The City recognized the value of XY MAPS as a "better mouse trap" compared to ESRI's out-of-the-box web client and other costly web mapping solutions. It makes use of a mix of open source and Microsoft .NET ASP.NET MVC 4 components for a powerful, flexible, and configurable web interface.

The Intranet server is currently Windows Server 2003, ArcGIS Server 9.3 and ArcSDE 9.3. Eckersall is configuring a new Windows Server 2008 server with ArcGIS Server 10.2 and ArcSDE 10.2. Existing ArcGIS Server services from 9.3 were migrated to 10.2 and fully tested. XY MAPS was then installed and configured to use the ArcGIS Server 10.2 instance. A separate public-facing

server was also configured with XY MAPS and set up to use separate ArcGIS Server and ArcSDE instances. The City of Downey GIS database contains approximately 80 data layers, all of which are visible internally. A subset is available on the public facing website.

City of Fountain Valley – *City Infrastructure Management Program*

Eckersall has implemented and supported our XY MAPS software at the City since 2007, as well as our ArborPro product at the City since 2010.

Our services include the management, mapping, and implementation of various GIS servers for all departments throughout the City. These departments include:

- Public Works (Water, Sewer, Traffic, Streets, Signs, Storm Drains, Trees)
- Police, Fire
- Planning/Building
- Housing – Code Enforcement

We also converted the Fire Department run book from individual desktop publishing digital pages to an atlas entered, published, and maintained wholly within ArcGIS Desktop. This allowed for updates to underlying GIS layers to automatically appear in subsequent versions of the books, as well as faster editing in ArcGIS.

Eckersall, LLC works closely with the City to ensure that XY MAPS runs smoothly and we work proactively with multiple departments to make sure their unique interactions with XY MAPS are seamless and efficient.

With this level of management come unique requests for data editing, linking, mapping and application development. Over the past 7 years Eckersall has implemented numerous GIS applications, aerial imagery, GIS server improvements, and record retention.

City of Brea – *GIS Consulting and Web-Based Mapping Services*

The City of Brea has a population of over 40,000 and is 12.1 square miles. It has its own Police and Fire Departments and continues to grow. Brea features a

vibrant downtown area, Brea mall, ample industrial and commercial businesses, and a mix of single family and multi-family housing.

The City contracted with Eckersall from 2003-2005 to perform annual parcel and street centerline updates for three years, prior to hiring in-house GIS staff. In 2005, Brea selected Eckersall's XY MAPS web GIS product to serve as its in-house web-based GIS platform. This has been running for nine years now, and has been incrementally upgraded in functionality and in depth of data. During this time, the Sewer and Water layers have been added, along with links to approximately 13,000 scanned construction plans as well as the City's Pictometry oblique imagery.

City of Sierra Madre – *GIS Consulting and Web-Based Mapping Services*

The City of Sierra Madre has a population of approximately 11,000 and is about 3 square miles. Sierra Madre is a small city with limited resources, yet it provides its residents with a high level of service.

Sierra Madre was the first XY MAPS client, signing up in 2003. Eckersall and its business partners were selected to convert the City's water, sewer, and storm drain plans to a comprehensive set of GIS data sets. Our business partners also created a custom high-resolution orthophoto for use in XY MAPS. This effort provided a complete GIS for a client who had no GIS.

PUBLIC AGENCY REFERENCES

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Fountain Valley, CA 92708
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Randy Hornsby
IT Manager
City of Brea
1 Civic Center Cir
Brea, CA
randyh@ci.brea.ca.us
(714) 990-7263

COMPANY PROFILE

Eckersall, LLC (Eckersall) is a privately held company headquartered in Chino, CA. We specialize in GIS software development, spatial data development, consulting, mobile-application customization, field data collection (GPS) and GIS enterprise system integration and operability. Our focus is primarily in the city public works and planning sectors. Eckersall is well known as a premier GIS Consulting Services Company and its staff has a long-standing and well-respected history in the GIS industry. Our teams' profound understanding of geospatial technologies and a broad range of software platforms assure our clients a solution

that best meets their GIS needs and mission critical objectives. Through our experience and years of working with multiple agencies and organizations across Southern California, we have developed a web-browser based suite of GIS tools called XY MAPS that supports a number of vertical markets and provides a user interface that everyone within the organization can use effectively. XY MAPS is currently operational in a dozen Southern California cities and in most cases; it serves as the organization's primary GIS system.

SERVICES

Eckersall provides high quality and cost effective services including:

- Product/Software development using ESRI ArcView/ArcMap 9.x/10.x, ArcGIS Server, ArcIMS, AutoDesk MapGuide, OpenLayers, GeoMedia, Geocortex, and MapServer.
- Product Management: Needs analysis, rapid prototyping, development, testing, and maintenance strategies.
- Data Integration: Ability to fully integrate GIS with Lucity (GBA Master Series), Accela, Maintstar, HDL, Laserfiche, FAMIS, and other databases directly, without relying on any additional vendor-provided gateway products.
- Web development on Windows and UNIX platforms using Microsoft ASP.NET, HTML, JavaScript, PHP, Java client and server components, and Macromedia Cold Fusion.
- Desktop software development in C# .NET, Visual Basic .NET, Microsoft MapPoint, ESRI ArcGIS Engine, MapWindow, MapObjects and MapObjects LT.
- Windows Mobile programming using Visual Studio .NET and ESRI ArcPad.
- Oracle 9i, 10g and SQL Server 2000/2005/2008 installation, configuration, data loading, tuning, maintenance, replication, and backup.
- ESRI ArcSDE/ArcGIS Server setup, database design, implementation, tuning, and programming.
- IT Support including planning, budgeting, implementation, and maintenance of Windows and UNIX hardware, software, and networking.
- Customized training on desktop and web-based GIS.
- GIS data development, requirements analysis, database design, data translation and acquisition, data integration, indexing and linking.
- Document scanning, B&W or color using the latest software and equipment.

- Geo-referencing, indexing, storage and linking of digital documents to GIS spatial features and layers.
- Data conversion, digitizing (as-built) drawings and documents to digital GIS layers using ESRI ArcGIS10.x, AutoCAD Map3D, AutoCAD 2013, and Microstation.

PROJECT TEAM

- **SCOTT ECKERSALL, President**

  Mr. Eckersall will serve as Project Manager and Senior Software Engineer
  - 20 years' GIS experience developing desktop and web software solutions primarily for public works applications
  - B.S. Civil Engineering, California State University Los Angeles – 1996
  - Mr. Eckersall specializes in software development, analysis, integration and network solutions

- **DAVID MANUWA, Vice President**

  Mr. Manuwa will serve as Data Conversion Manager and Customer Service Agent
  - 25 years' GIS experience implementing enterprise systems and spatial solutions
  - Electro/Mechanical Design & Drafting, Long Beach Technical Institute – 1988
  - Mr. Manuwa specializes in GIS program management and data conversion

- **AMELIA NUÑEZ, Vice President**

  Ms. Nuñez will serve as Customer Service Agent
  - 25 years' private sector GIS experience managing GIS implementations at 20+ cities in Southern California
  - Public sector experience with the City of Long Beach

- **RUTH ROBINSON, Office Assistant**
  - Ms. Robinson will serve as GIS QC specialist, GIS Analyst, and mass mailing coordinator
  - 1.5 years GIS experience with ArcGIS and QGIS
  - Experienced with Microsoft Office applications, technical writing, handling address lists, executing mass mailings

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Customer Login
Payment Options
Payment Questions
Rates & Charges
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Quick Links

Orange Park Acres Transition
IRWD Drought Portal
Pay My Bill
Board Meeting
Transparency & Compensation

Residential Water Rates

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Residential Water Rates

IRWD uses an Allocation Based Conservation Rate Structure that is based on the cost of service and has two basic components that make up your water bill: Cost of Water + Service Charge

Cost of Water Calculation

- **The amount of water used - inside & outside your home.**
- **Calculated using cost of local and imported water.**

The cost of water is based on how much water you actually used and whether you stayed within your monthly allocation.

If you use more water than your monthly water allocation, your cost of water will increase due to the increased costs incurred to provide the service.

For example, if you waste water by going over your allocation, IRWD will incur additional costs for imported water (the most expensive type of water for IRWD), urban runoff programs, water banking and water conservation programs.

Service charge calculation

- **Operation & maintenance costs**
- **Infrastructure costs**

Daily operation and and maintenance costs are funded mainly throu user service charges.

There are separate service charges for the water and sewer systems. .

The cost of building water and sewer infrastructure is financed through general obligation bonds and debt service is paid through a combination of property taxes and connection fees. Connection fees are paid by developers.

Your Monthly Indoor & Outdoor Water Allocations

The California State Water Resources Control Board has imposed a statewide drinking water reduction mandate. In order to implement this mandate all IRWD customers will be required to limit their outdoor water use.

Your Indoor Water Allocation has not changed:
It is based on the default number of residents in a home and is 50 gallons per person per day. It is also based on the type of home (attached home/condo, apartment, single family residence)

Your Outdoor Water Allocation has changed and is based on drough tolerant landscaping:
It is no longer based on warm season turf. It is now based on drought tolerant landscaping irrigated with drip or a high efficiency irrigation system, the default outside landscape area, and the actual daily weather and how much water your drought efficient plants need to stay healthy. Your water allocation will change with the weather throughout the year. When the weather is hotter or windier, your allocation goes up automatically. When it's cooler or rains, your allocation decreases automatically. If you have a lawn, your will likely be over allocation and recieve a higher bill.

Default Water Allocations

Your allocation is printed on your monthly bill.

Single Family Home
1300 Square Feet Lanscape Area
Number of Residents 4

Attached Home (Condo)
435 Square Feet Landscape Area
Number of Residents 3

Apartments
No Landscape
Number of Residents 2

Variances From Standard Water Allocation

Variances From Standard Water Allocation are available to make adjustments to the default allocations for more people living in the home, medical needs, additional landscape area or other special circumstances. Please click here to apply for a variance.

Technical Allocation Formula

Water allocations are 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. If you continue to maintain your lawn, you will likely be over your monthly allocation.

For those customers that want to get into the nitty-gritty, below is the actual formula for calculating your allocation. Monthly allocation includes fixed component for indoor usage and variable component based on evapotranspiration (ET) rate for landscape irrigation.

Account Type	Base Allocation Number of Residents	Landscape Area (LA)	Base Allocation Indoor	Base Allocation Outdoor	Total Allocation
Residential Detached	4	1300 sq. ft (0.03 acres)	# Residents x 50 gpd	ET x Kc x 1.18 x LA	(Indoor x #days in bill service period) + Outdoor
Residential Condo Attached/ Detached*	3	435 sq. ft (0.01 acres)	# Residents x 50 gpd	ET x Kc x 1.18 x LA	(Indoor x #days in bill service period) + Outdoor
Apartments*	2	N/A	# Residents x 50 gpd	x	Indoor x #days in bill service period
Potable Irrigation		Site specific based on irrigated acreage	N/A	ET x Kc x 1.18 x LA	Outdoor based on bill service period
Recycled Irrigation		Site specific based on irrigated acreage	N/A	ET x Kc x 1.40 x LA	Outdoor based on bill service period
Commercial, Industrial, Institutional			Site specific, adjusted for # of days in a bill service period	Site specific, based on irrigation needs	Site specific, adjusted for # days in bill service period

*For master-metered apartments and condominiums, the base allocation is multiplied by the number of dwelling units.

gpd = gallons per day

CCF = 100 cubic feet. 1 CCF = 1 billing unit = 748 gallons

ET (evapotranspiration) – from IRWD weather stations located in coastal, central or foothill zones.

Kc (crop co-efficient) – relative amount of water drought tolerant plants need at various times of the year. Crop-coefficient of 0.5 for drought tolerant plants is applied for potable irrigation, and a crop co-efficient averaging 0.65 for warm-season turf is applied to recycled water irrigation.

1.18 or 1.40 irrigation efficiency – extra water to make up for inefficiencies in the irrigation system. An irrigation efficiency of 85% is applied to potable water and 71% to recycled water. In the formula this is calculated as = 1/0.85 = 1.18 is applied to potable customers and 1/0.71 = 1.4 is applied to recycled water.

LA = irrigated landscape acreage

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