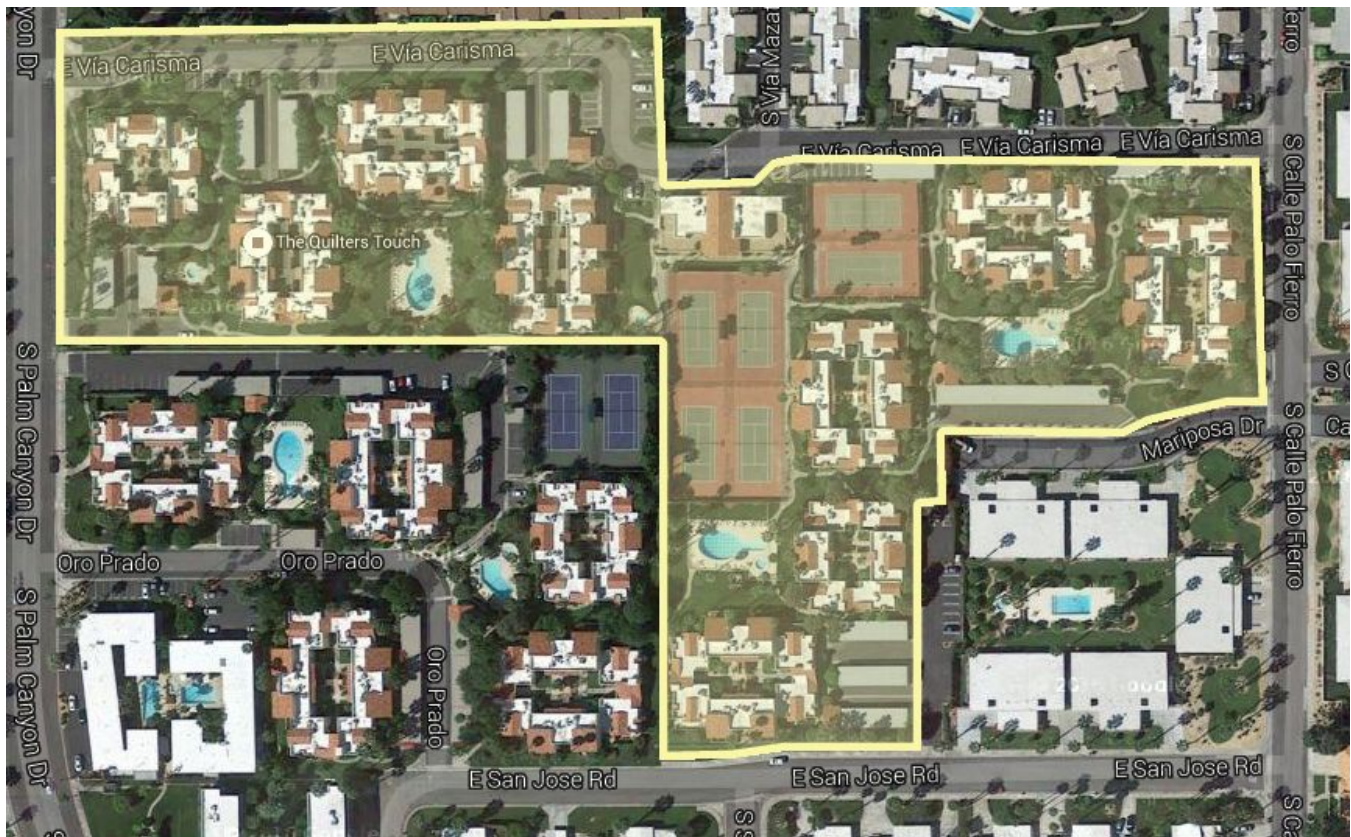




Canyon Country Club Estados Conservation Review Report

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Project Area — A digital map is available for all of the areas mentioned in this document.
<https://drive.google.com/open?id=1tmJuuroCRqgYWpSlgN--NgIPsu4&usp=sharing>

Project Summary

The purpose of this project was to inspect the irrigation system for opportunities to reduce water use in the landscape at Canyon Country Club Estados. All of the deliverables are in this report and include: recommendations for sprinkler system upgrades, areas for turf removal, a general guideline for planting needs, a biddable report by irrigation zone, and a prioritization of where to begin work.

Area Name	Controller:Irrigation Zones	Turf Removal Recommended	Plant Condition	Irrigation Condition	Potential Water Saving	Total Score	Rehab-only Score
		1=YES,5=OPTIONAL,10=NO	1 = BAD, 5 = GRE	1 = BAD/OLD, 5 = GR	1 = HIGH, 5 = LOW		
Buildings, Courtyard + Perimeter (Excluding Lawn)							
Building 2160	1:2, 1:3, 1:4, 1:10, 1:12, 1:15	1	2	2	2	8	4
Building 2170	1:8, 1:9, 1:14	10	1.5	1.5	3	6.75	45
Building 2180	1:8, 1:13, 1:17, 2:1, 2:2, 2:10	10	4	2	2	16	40
Building 2190	2:4, 2:7, 2:8, 2:9	1	3	3	3	27	9
Building 310	3:13, 3:15, 3:18	1	3	3	3	27	9
Building 340	3:19, 3:20, 3:21	1	4	2	2	16	4
Building 351	3:1, 3:2, 3:3	10	4	2.5	2.5	25	62.5
Building 451	3:4, 3:5, 3:6	1	3	2.5	3	22.5	7.5
Building 2255	3:9, 3:11, 3:12, 4:3, 4:4	1	3	3	3	27	9
Inner Common Areas							
Spa 1 + Laundry Room 1	1:7, 1:10	1	4	2.5	2.5	25	6.25
Via Carisma Parking	1:2, 1:4, 1:13	1	3	2	2	12	4
Pool 2	1:16, 2:3	10	4	2	2	16	40
Laundry Room 2	2:1, 2:8	1	4	3.5	4	56	14
Spa 3	2:6	5	4	2	2	16	20
Pool 4 + Spa 4	3:17, 3:18, 3:20	10	4	3	2	24	60
Laundry Room 4 + San Jose Parking	3:14, 3:21	5	3	3	4	36	60
Pool 5 + Spa 5 + Laundry Room 3	3:2, 3:6, 4:5, 4:6	10	4	3.5	3	42	105
Perimeter Common Areas							
Palm Canyon	1:1, 1:3, 1:12	1	3	1.5	1	4.5	1.5
Via Carisma - Palm Canyon to Clubhouse	1:1, 1:2, 1:3, 1:4, 1:13, 1:17, 1:18, 2:8, 2:1	1	4	2	2	16	4
Via Carisma - Clubhouse to Palo Fierro	3:3, 3:5, 3:11	1	3	2.5	2.5	18.75	6.25
Palo Fierro	3:11, 3:12	1	2	2.5	2	10	5
Mariposa	4:3	1	2	1	5	10	5
San Jose	3:14, 3:22, 6:1, 6:2	5	4	3	4	48	60
Southern boundary of the West portion	1:11, 2:5	1	3	3	3	27	9
Clubhouse + Tennis Courts							
Clubhouse	5:1, 5:2	10	4	3.5	4.5	63	157.5
Main Tennis Courts	5:1, 5:2	10	4	3.5	5	70	175
East Tennis Courts	3:3	5	3	3	3	27	45

Controller	Zone	Valve Notes	Pressure Notes	Measured Pressure	Ancients	New	Bubbler	Sprinkler Notes
Controller 1 (iCore)	1	2 minutes to shut down. \$200 estimate to repair; \$370 to replace. No guarantee on repairs, full warranty on replacement.	Pressure problem on the Backflow, see controller notes.	33	26	7	0	Convert planter irrigation to drip, reduce runoff, apply more even watering. Notify adjacent HOA that the watering will change (they have plants being watered by you).
Six valves having a pr	2	Double-valve (6 and 2 are connected)		37	23	8	0	
Too much pressure co	3	30-second shutdown. See #1 for actions.	Pressure problem on the Backflow, see controller notes.	35	21	7	0	Leak by gas meter on west side of 2160
Recommendation: Add	4	No issues		25	19	12	0	Inconsistent spacing
Older valves less able	5	No issues						n/a
	6	Double-valve (6 and 2 are connected); Rewire Valve 6 \$200 (low estimate), hand-digging required.						co-wired with 2
	7	No issues		25	18	16	1	bubblers, emitters for desert plants on same zone as spray/turf = PROBLEM
	8	30-second shutdown. See #1 for actions.	Pressure problem on the Backflow, see controller notes.	40	21	11	0	
	9	No issues		43	10	6	0	51 sprinklers to cap in courtyard; convert to drip
	10	20-second shutdown. See #1 for actions.	Pressure problem on the Backflow, see controller notes.	38	26	9	0	
	11	No issues		30	23	13	2	
	12	No issues		10-15	40	17	8	Irrigation is a mess in this zone
	13	1-minute shutdown. See #1 for actions.	Pressure problem on the Backflow, see controller notes.	44	23	17	3	
	14	1-minute shutdown. See #1 for actions.	Pressure problem on the Backflow, see controller notes.	40	17	8	1	
	15	No issues		n/a	5	10		Ancient = Maxi-paw, New = PGP
	16	No issues		65	3	20	2	11 risers should be capped and replaced with drip
	17	No issues		35	36	21	0	
	18	No issues		43	18	23	3	Should all be converted to drip
Controller 2 (Rain Bird)	1	No issues		63	4	12	3	
	2	No issues		47	13	19	1	Full sprinklers next to wall
	3	Low volume because there are too many sprinklers.		20-25	25	29	12	
	4	No issues		50	15	17	9	Emitters are 2 GPH
	5	No issues		25	4	22	0	Couldn't find all of the sprinklers (in hedge) which means they can't be maintained either
	6	No issues		30	14	13	10	

Controller	Zone	Valve Notes	Pressure Notes	Measured Pressure	Ancients	New	Bubbler	Sprinkler Notes
	7	35-seconds to shutdown. See #1 for actions.		40	8	29	2	
	8	No issues		45	15	14	13	
	9	No issues		55	2	36	13	
	10	No issues		55	6	33	6	2 leaking capped risers
	11	No issues		n/a	0	0	12	25 leaking "closed" sprinklers
	12	No issues						not being used
Controller 3 (LX Modul Needs to be reseque	1	30-second shutdown. See #1 for actions.		17	31	31	16	Valves should be split; unknown number bubblers under lavender which means they can't be maintained
	2	No issues		22	14	17	2	Poor spacing
	3	No issues		25-35	17	77	41	Courtyard + Perimeter; water on tennis courts
	4	No issues		65	1	6	65	Erratic watering, sprinklers in wrong place
	5	21-second shutdown. See #1 for actions.		n/a	32	41	3	
	6	No issues		60	8	11	0	
	7	Not working						not being used
	8	Not working						not being used
	9	No issues		n/a	0	0	98	many adjustable bubblers, many wrong for plant
	10	Not in use						not being used
	11	No issues		20	26	27	4	includes a desertscape circle
	12	No issues		25	34	7	1	
	13	No issues		50	6	18	3	
	14	NO TEST PERFORMED		n/a	11	18	8	broken sprinkler detected during inspection
	15	No issues		40	3	38	33	2 capped risers are leaking; way too much water
	16	Not working						not being used
	17	No issues		17	21	23	0	pressure is very low; spacing is poor
	18	20-second shutdown. See #1 for actions.		10	37	33	0	steep hill; poor spacing;
	19	No issues		20	20	25	0	poor spacing; serious pressure problems; needs total redesign
	20	No issues		40	16	25	13	same notes as 19; around \$625 in parts + 2 days of labor
	21	No issues		50	6	31	34	irrigation is inconsistent in the courtyard
	22	No issues		65	2	4	34	pressure surges to 80psi when it turns on; one leaking capped riser

Controller	Zone	Valve Notes	Pressure Notes	Measured Pressure	Ancients	New	Bubbler	Sprinkler Notes
	23	No issues		n/a	3	15	11	
	24	Not in use						not being used
Controller 4 (Rain Bird)	1	No issues		n/a	1			11 Maxi-paws, 1 PGP, poor coverage
	2	No issues						not being used
	3	No issues		n/a	21	19	3	(valve #5 in diagram)
	4	No issues		n/a	9	2	1	broken lateral at sidewalk reported during inspection
	5	No issues		n/a	1	23		serious pressure problem
	6	No issues		n/a	15	15	0	
	7	No issues						not being used
	8	No issues						not being used
Controller 5 (Rain Bird)	1	1-minute shutdown. See #1 for actions. Buried 2.5+ feet deep, need to be lifted for maintenance. \$600 to fix.		n/a	9	7	34	
Clubhouse	2	No issues (See note about buried for #1)		n/a	2	6	0	major line break fixed during inspection
Controller 6 (Rain Bird)	1	No issues		60	5	1	0	
San Jose	2	No issues		60	6	2	0	

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A Pictorial Survey of the Valves

Review Highlights and Recommendations

There are different ways to achieve water savings and each has a different role or purpose in a landscape or at a site like Canyon Country Club Estados. Here are five ways CCC Estados can find significant water savings. Details regarding the condition of each area on the site are on subsequent pages, and support these recommendations.

1. Lawn Sprinkler Replacement

Throughout the site, there are areas where turfgrass is desirable, but the systems watering it are extraordinarily inefficient. The hilly nature of the site contributes to a significant loss of water due to low head drainage.

- The old Rain Bird Champion sprinklers should all be replaced with modern, efficient sprinklers—spray bodies should have check valves with Hunter MP Rotator sprinkler nozzles. We recommend the Hunter Pro Spray Bodies because the wiper seal holds up better over time than Rain Bird's wiper seal.
- All of the remaining spray sprinklers in turf grass should be upgraded in the same manner.
- When each sprinkler is upgraded, the height needs to be checked: many sprinklers need to be raised or lowered (more raised than lowered). The height of the sprinkler nozzle when active should allow at least one inch of clearance over the top of the grass, but the top of the sprinkler body should be flush with the soil level (or roots of the grass where the roots have become matted and tall). This permits the lawn mower to go over the sprinkler without damaging it, but ensures water is distributed from the correct height. No 2-inch sprinkler bodies should be used on the site.
- In areas where the turf is being watered by sprinklers which also water hedges and shrubs, these sprinklers should be moved out of the planter beds and into the turf. The hedge areas should be converted to drip irrigation, and in many cases, moved to their own valve.

By upgrading all of the sprinklers in these areas and resolving spacing issues (the distance between heads should allow for even coverage of the grass), significant water savings is possible—possibly 25% or more of your total water use given how much is currently being wasted through inefficiency.

2. Pressure Management and Valve Upgrades

When it comes to watering, valves that are operating properly (they open and close quickly), have their pressure properly regulated (pressure should be determined by the kind of sprinklers in place), and have filters installed (reduces clogging in sprinkler nozzles, helping them last longer and provide more even coverage) are critical to system efficiency.

- The pressure measured throughout the site was irregular. Some areas seemed to have a pressure-regulator installed while others did not.
- We found a high level of calcium and sand build-up inside the sprinklers. Currently there are no filters in the system (that we found) and while they are a must for all drip irrigation, we highly

recommend installing them for sprinkler lines, too.

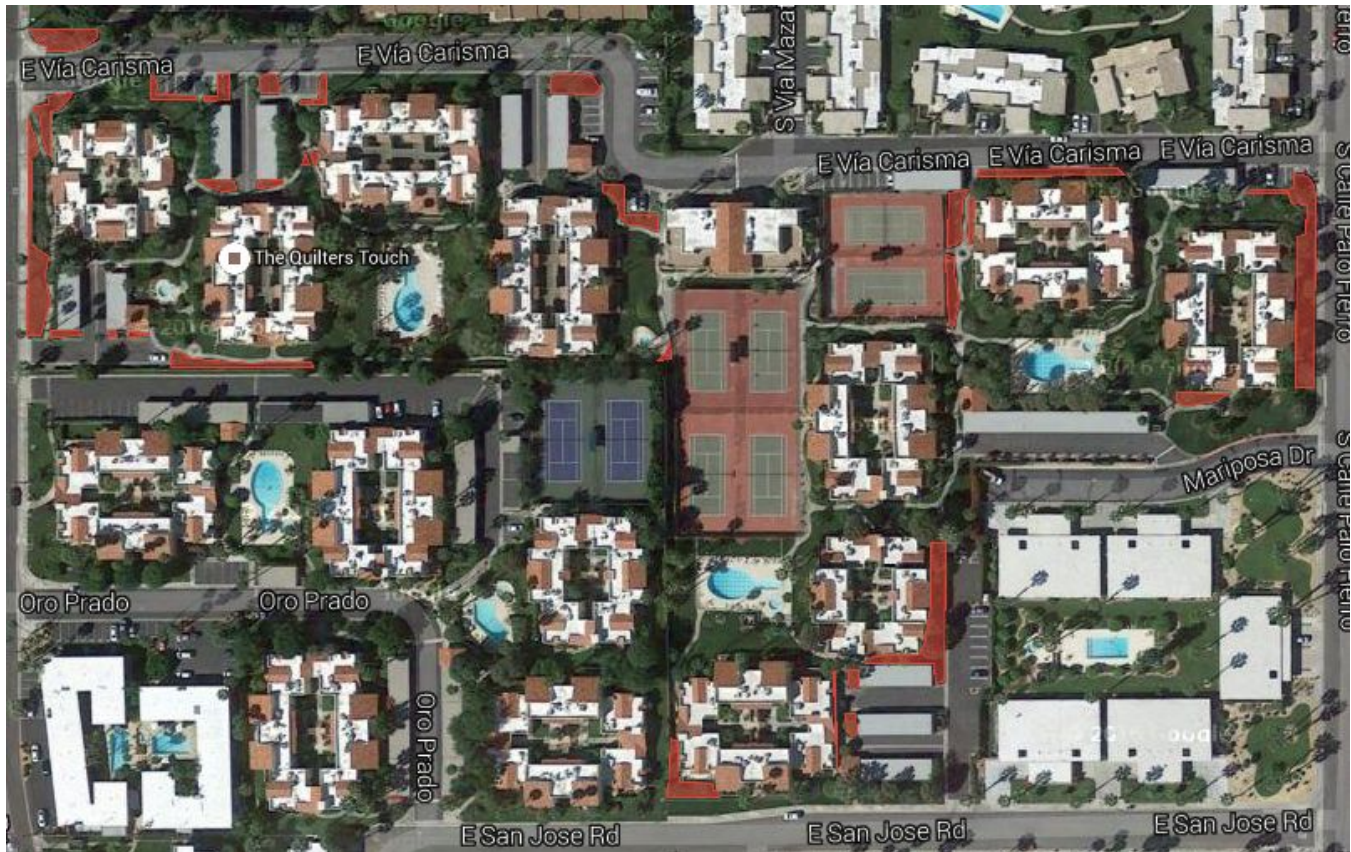
- Many valves are functioning poorly and should be replaced. See notes in the Zone by Zone Overview for detail on this.

3. Turf Removal

There are a few different types of turf removal projects that should be considered on site. Currently there is a great deal of overspray onto sidewalks (slip-and-fall hazard) and onto parked cars. These recommendations seek to reduce those problems.

1. Areas which face the rest of the South Palm Springs community (along Palm Canyon and Palo Fierro in particular).
2. Areas that are too narrow to be watered without creating runoff.
3. Steep areas near sidewalks where watering is challenging and much runoff is being created.

Here is a map of all the places we think turf should be removed. It's best understood by looking at the digital map we created.



4. Desertscaping & Plant Selection

Whether it's in courtyards, around buildings, or along major roadways, choosing desert-adaptive plants can have a major impact on the HOA's overall water use, if it is accompanied by the correct irrigation equipment and scheduling. The existing desertscaping was done reasonably well, but lacks aesthetic cohesiveness and long-term planning.

Additionally, some of the pockets of desertscaping are adjacent to lawn areas, running on the same valves as the grass, and so are getting more water than they should, and are also being watered by runoff and overspray. Future desertscaping installations should consider the contextual plantings and watering methods.

5. Water Management

On a property the size of CCC Estados, where water is shared by the landscape and the residents, it is easy to be unaware of how much water is being used for what purposes. While you can't know what is happening inside people's homes, you can get a better handle on how water is being applied outside.

A. Scheduling

Your irrigation schedule is not correctly maintained. When we were on site, during peak watering season, every single zone throughout the site was set for 5 or 6 minutes, 4 times per day, twice a week. While this approach is working reasonably well, it is wasteful. Some areas are being overwatered and others are being underwatered.

Weather-based irrigation controllers ("smart" controllers) should be installed and used in "smart" mode so that landscaping staff isn't responsible for ongoing scheduling. Your existing controllers could each be upgraded to be weather-based. Smart controllers aren't smart enough to be set-it-and-forget it. They need monitoring and adjusting throughout the year.

B. Timely and Correct Repairs

How your team responds to irrigation issues is a major factor in how much water is ultimately used on site. Regular monitoring (see C below) is needed to find problems, and repairs must be done correctly with the correct replacement equipment. We found a total of 5 major breaks or leaks and 300+ broken or leaking sprinklers.

C. Better Oversight for Major Waste Problems

While we were on site evaluating the sprinkler system, we discovered several major line breaks and leaks, several broken sprinklers or nozzles, and many adjustable bubblers that were using too much water.

A flow monitoring system would be an important step toward reducing your on-site water waste. There are different approaches to this (we would recommend one system flow monitoring if you plan to upgrade your existing controllers and a different system for flow monitoring if you plan to replace your controllers in favor of ones that can be programmed and managed remotely).

An alternative to this would be regular wet runs (where each valve is turned on and problems are sought) conducted by the on-site landscaping staff (weekly from April through October, and bi-weekly from November through March). These are usually performed after each area is mowed. These wet runs will increase the cost of your landscape management contract as it will require either additional personnel or more hours for the existing crew. It will also uncover needed repairs sooner and the repairs may also incur additional cost.

Review of Plants

Throughout the property there are some common planting decisions and the response to them should be the same. We are not arborists and therefore beyond aesthetic concerns we make no recommendations regarding your trees. Additionally, we recommend you hire a planting designer to create a design master plan to unify the overall plant selection on the property.

1. **Olive Trees** - These have not been well cared for and are a visual detractor for your property. We strongly recommend removing them and replacing them with desert trees where they're not planted in lawn, or one of these choices where they are: *Bauhinia species* (Orchid Trees), *Albizia julibrissin* (Mimosa Tree or Silk Tree), *Brachychiton populneus* (Bottle Tree, in smaller areas), *Chorisia speciosa* (Silk Floss Tree), *Dalbergia sissoo* (Indian Rosewood), *Prunus cerasifera* 'Krauter Vesuvius' (Purple Plum Tree, ornamental), or *Sophora secundiflora* (Texas Mountain Laurel, in smaller spaces).
2. ***Pyracantha crenatoserrata* (Firethorn)** - This is used as hedges along walls throughout the property and in some courtyards as a shrub. For the most part it is in excellent condition. There are some areas where it needs to be refreshed, particularly shady areas and very sunny western exposures where it has been damaged.
3. ***Carissa macrocarpa* (Natal Plum)** - These have been used as hedges throughout the site. They're generally in nice condition, but they're exceeding their planting areas, blocking sprinklers from being serviced, and are rather monotonous. We recommend removing these hedges and installing a selection of shrubs offering year-round color (to be determined by a landscape designer) in their place.
4. **Bougainvillea** - Some of the courtyards have bougainvillea growing up the stair rails and posts. It's a beautiful effect and adds a lot of life to the courtyards. We recommend using this plant in this way in all of the courtyards to create a greater sense of unity throughout the site.
5. ***Asparagus densiflorus* 'Springeri' (Ornamental Asparagus)** - This small perennial has been used like a hedge throughout the property. It's been pruned inappropriately and looks ragged, not filling up the beds they're planted in. We recommend removing all of the asparagus and selecting a suitable desert perennial in its place (as opposed to another "hedge" plant, consecutive rows of hedges are hard on the eyes).
6. ***Nandina domestica* (Heavenly Bamboo)** - This is a small shrub that is planted in various areas (courtyards, desert-scape areas by grills) throughout the site. It's not desert appropriate and bears no context to the rest of the plants on site. We recommend not adding any more and considering taking out what is already there.

7. **“The Desertscape”** - For the most part, these vignettes are fine, but they’re not installed in the right places or designed with the context of the site in mind, creating a visual disconnect from the existing landscape of trees in rolling lawns. To whatever extent it’s possible, we recommend relocating most of the desert landscape to the perimeters of the property and replacing it with medium-water shade-tolerant shrubs that will appreciate the extra water they’re getting from the lawns they’re adjacent to.

8. **Trees planted under overhangs, particularly in the narrow parts of courtyards** - These are fine as they’re being pruned back to fit the space available, but we really question the aesthetic value they’re bringing and we recommend removing them.

Recommendations for Courtyards

All of the courtyards have full shade areas at the entrances. These areas should only be planted with plants that prefer full shade. In the desert this is a limited palette. Additionally, the courtyards all have a part-shade microclimate, given the tight architecture. Plants in these areas need to be able to tolerate some sun (also hard to come by in the desert).

One way to address this would be to **install trees in the courtyards to create a more evenly full-shade environment.**

Some courtyards currently have citrus, which we advocate for if people are eating it, but not if they’re not. It would be best to plant a variety of premium citrus (i.e. Clementine oranges for eating, Navel Oranges for juicing, Meyer Lemon, Limes, and Ruby-Red Grapefruit) to ensure the crops are consumed.

Another way to go would be to plant desert trees in the courtyards but to not overwater them—they grow too big for these settings when they’re heavily irrigated but will stay appropriately sized when watered correctly.

Courtyards that open North-South need to have plants that are okay with part shade but that can tolerate afternoon sun during the summer.

Some performers we recommend for the courtyards: *Callistemon viminalis* 'Little John' (Bottlebrush, red blooms), *Dietes bicolor* (Fortnight Lily, white blooms), *Cuphea llavea* (Bat-faced cuphea, red blooms), *Justicia spicigera* (Mexican honeysuckle, orange blooms), *Oenothera stubbei* (Chihuahuan or Saltillo Primrose, lemon yellow blooms), *Ixora coccinea* (Desert geranium, orange blooms), *Evolvulus glomeratus* (Blue daze, bluish-purple blooms). These plants should also be used under the center stairs in the courtyards constructed this way (all but 2170, 2180, and 2190).

Repair & Upgrade Prioritizations

We evaluated each valve's performance and condition, along with all of the plants being watered and the sprinklers or bubblers doing the watering. Based on all of this data, we've created two prioritization lists for you. One list includes the condition of the plants in the prioritization, the other is strictly irrigation-related. Both lists take into account your potential water savings.

With Planting Changes

Very High Priority	High Priority	Medium Priority	Low Priority
<p>Palm Canyon frontage</p> <p>Building 2170</p> <p>Building 2160</p> <p>Mariposa frontage</p> <p>Palo Fierro frontage</p> <p>Parking areas along Via Carisma</p>	<p>Via Carisma from Palm Canyon to the Clubhouse</p> <p>Building 340</p> <p>Spa 3</p> <p>Pool 2</p> <p>Building 2180</p> <p>Via Carisma from the Clubhouse to Palo Fierro</p>	<p>Building 451</p> <p>Pool 4 + Spa 4</p> <p>Spa 1 + Laundry Room 1</p> <p>Building 351</p> <p>Building 2190</p> <p>Building 310</p> <p>Building 2255</p> <p>Southern boundary of the West portion of the site</p> <p>East Tennis Courts</p>	<p>Pool 5 + Spa 5 + Laundry Room 3</p> <p>San Jose frontage</p> <p>Laundry Room 2</p> <p>Clubhouse</p> <p>Main Tennis Courts</p>

Without Planting Changes

Very High Priority	High Priority	Medium Priority	Low Priority
<p>Palm Canyon frontage</p> <p>Parking areas along Via Carisma</p> <p>Via Carisma from Palm Canyon to the Clubhouse</p> <p>Building 340</p> <p>Building 2160</p> <p>Mariposa frontage</p> <p>Palo Fierro frontage</p>	<p>Via Carisma from the Clubhouse to Palo Fierro</p> <p>Spa 1 + Laundry Room 1</p> <p>Building 451</p> <p>Building 351</p> <p>Southern boundary of the West portion of the site</p> <p>Building 2190</p> <p>Building 310</p> <p>Building 2255</p>	<p>Laundry Room 2</p> <p>Spa 3</p> <p>Pool 2</p> <p>Building 2180</p> <p>East Tennis Courts</p> <p>Building 2180</p> <p>Building 2170</p>	<p>San Jose frontage</p> <p>Laundry Room 4 + San Jose Parking</p> <p>Pool 4 + Spa 4</p> <p>Pool 5 + Spa 5 + Laundry Room 3</p> <p>Clubhouse</p> <p>Main Tennis Courts</p>

Recommended Equipment for Upgrades and System Standardization

We strongly recommend that you only hire a licensed landscape contractor, or a company who will have a licensed contractor on site regularly. While we believe Grand Mark is doing a sufficient job of landscape maintenance, the valve work we watched them do was not done according to best practices.

The installer or foreman should be a licensed C-27 Landscape Contractor (not a general, electrical, or plumbing contractor). Before signing a contract, or possibly before getting an estimate, check the specific license of the installer or foreman yourself here:

<https://www2.cslb.ca.gov/OnlineServices/CheckLicenseII/CheckLicense.aspx>

Valves

We recommend Rain Bird PEB Series valves with a pressure-regulator and filter.

In cases where 40 psi is sufficient pressure for all of the areas being watered, **we suggest the pressure-regulating Quick-Check filter (Rain Bird PRB-QKCHCK-100)**. These are appropriate for most drip zones and turf irrigation.

In cases where the pressure varies greatly within a zone (in hilly areas), the pressure regulation will need to be determined by your contractor. In this case, still use the Rain Bird Quick Check filters, but not the pressure-regulating kind.

The valve and filter assembly should be placed into a large (at least 16-inch by 9-inch) valve box with gravel at the bottom. This makes maintenance and repair easier.

The filters should be checked quarterly for cleaning. The Quick-Check filter has a green indicator on its top that turns red when it's time to clean the filter.

Sprinklers for Turf Areas

In turf, everything should be designed to maximize even coverage. Proper sprinkler spacing is the first part of achieving this, but the right equipment has a lot to do with even coverage, too.

Given the hilly nature of the site, **we recommend only using sprinklers with check valves**. They cost a very small amount more than regular sprinkler bodies (maybe \$0.50), but save a lot of water (more than enough to justify the cost).

We recommend Hunter Pro Spray sprinkler bodies because they have the most long-lasting wiper seal. This is often the first part of the sprinkler to fail and can be hard to detect (it doesn't cause a geyser, it causes a slow leak or shoots water out the side of the sprinkler during operation).

We strongly recommend using Hunter MP Rotator sprinkler nozzles. These are the most reliable rotating sprinkler nozzles, applying water slowly giving it time to sink into the ground instead of running off down the hillside, and operating quietly.

Proper pressure regulation for the type of sprinkler nozzle you're using is critical. MP Rotators are optimized for 40 psi, so in low areas the sprinkler bodies need to be pressure-regulated. Hunter

makes a version of their Pro Spray body with a 40 psi pressure-regulator built in. These are more expensive, so they should only be used in low-lying areas.

Drip Irrigation & Bubblers

Throughout the site there are hedges and planter areas that should all be on drip irrigation. When the zones are mixed and water both turf and hedges at the same time, the zone should be split into two. That way turf can be watered on an appropriate schedule and so can the hedges. The procedure for this conversion should be as follows:

- In each bed all but one sprinkler or bubbler should be removed and capped at the PVC.
- The remaining sprinkler should be removed and replaced with a ½-inch riser, fitted with adapters for the drip tubing.
- Each line of drip tubing should have a manual flush valve on the end to be used during repairs and for quarterly system maintenance.

In most cases, we recommend Netafim Techline CV 0.6 GPH with 12-inch spacing for watering hedges and planter beds outside of the courtyards. Some discretion can be used as to whether or not this is the best solution in a given area, but as a general rule, this is the most appropriate solution. We also recommend filling in all of these areas with 2 to 3 inches of organic mulch, to cover the drip tubing and reduce evaporation from the soil while allowing the roots to receive oxygen.

As a general rule, bubblers should not be used. To use them effectively you need to have a contained area to flood and let the water soak in. These are most useful for deep-watering trees where the turf has been cut into a ring around it. If they're used in uncontained areas they're not being used correctly. Where they must be used, the bubblers should be fixed-emission, with the flow rate chosen for each plant and its location. Adjustable bubblers are rife with issues, most notably that you don't know how much water is coming out of them, making it very hard to water the right amount (they're also prone to tampering and self-adjustment). We typically recommend Rain Bird fixed-emission bubblers because they come in useful flow rates and are quite reliable. The Hunter brand fixed bubblers are also acceptable.

Bubblers and drip emitters should be installed on ½-inch risers (that's the diameter) and placed at grade near the plant being watered. The riser should be on a 12-inch swing joint, not plugged directly into the PVC below ground. This allows it to be moved as the plant grows, always watering the right area (the feeder root zone) and not the root crown of the plant. We typically recommend Bowsmith emitters because they are long lasting and have very consistent flow. For mature shrubs, two bubblers per plant may be appropriate. It needs to be determined on a case-by-case basis.

Current Inventory of Irrigation Controllers

6 Irrigation Controllers

Hunter i-Core (1 unit, West portion of property)

Max capacity 42 zones, using 17 zones

Has a 5-year warranty

Can be upgraded to be “smart” for a limited investment

Can not be used for remote management with a Rain Bird system; Can be managed remotely with a Hermit Crab

Rain Bird ESP-Modular (1 unit, Pool 5)

Max capacity 22 zones, using 6

Has a 1-year warranty

Can be upgraded to be “smart” for a limited investment

Can not be used for remote management with a Rain Bird system; Can be managed remotely with a Hermit Crab

Rain Bird ESP-Me (3 units, West of Clubhouse, Clubhouse, and San Jose Perimeter)

Max capacity 22 zones, using 11 in one, and 2 in the other two

Has a 1-year warranty

Can be upgraded to be “smart” for a limited investment

Can not be used for remote management with a Rain Bird system; Can be managed remotely with a Hermit Crab

Rain Bird LX Modular (1 unit, most of South and East portions of property)

Max capacity 48, using 22

Has a 1-year warranty

Can be upgraded to be “smart” for a limited investment

Can be used for remote management with a Rain Bird system; Can be managed remotely with a Hermit Crab

Zone by Zone Overview

General Note 1: Eleven valves throughout the site are displaying signs of age. This is evidenced by taking a long time to shut off. Your system pressure is very high at the meter and the older valves have worn out from the excess pressure (this is normal). A pressure regulator should be installed on each main line, just after the meter, to reduce overall wear-and-tear on the system.

These 11 valves need to be replaced. They can be repaired, but there is no warranty on the repaired parts and future longevity is uncertain. For each valve, the cost to repair is around \$200 and the cost to replace is around \$400 (the cost may vary depending on specific local conditions). Replacement can be addressed as each area is worked on, or it can be taken on as a separate project.

Many other valves are not situated in a way that makes them maintainable (they're buried in dirt, in small valve boxes that make it difficult to access the valves, the manual controls can't be accessed or are broken, the pressure regulators that are present are buried, the valves are anti-siphon and placed below ground when they shouldn't be, etc.). The remainder of these valves should be cleaned up, dug out, and replaced if necessary depending on their condition.

General Note 2: All courtyards and planter areas should be converted to drip irrigation (tubing with either point-source or inline emitters, not drip emitters on polyflex risers). Where bubblers are appropriate, all bubblers should be converted to fixed-volume emission (specific volume to be determined by the plant type and location). These areas should be moved to separate valves from the turf areas, and all of the drip valves will all need to be replaced to allow for high-volume and low-flow, with an additional pressure regulator and filter added to each new valve.

General Note 3: Trees throughout the property have had extra irrigation added to them. Sometimes these are bubblers, sometimes they are spray sprinklers. This was not done correctly. Here is how this should be remedied:

Bubblers in turf that stays: Remove the bubbler and plug the line underground

Bubblers in turf that will be removed: For now, remove the bubbler and cap it. When the turf is removed, replace the bubbler with a tree ring.

Sprays in turf: Remove the spray, and plug the line underground

Sprays in tree circles or in turf that will be removed: For now, remove the sprinkler nozzle and cap the stem. When the turf is removed, replace the bubbler with a tree ring.

Controller 1 (Hunter iCore)



Zone 1



North of Via Carisma, entryway and shrubs along the road

- Pressure was 33 psi
- This valve took 2 minutes to shut down. It is one of the 11 that must be replaced. Since we are recommending drip irrigation in this zone, it should be replaced with a high-volume low-flow valve with a pressure regulator and filter. The valve itself could not be located, as it is buried under the grass. We believe Jose from GrandMark might know where it is located.
- This zone should be converted to drip irrigation. The turf in this zone will be replaced, and the current shrubbery is all in a narrow planting bed. Future planting will be desertscape and should be on drip irrigation.
- 33 sprinklers to be removed and capped at the PVC or converted to drip irrigation.
- There is a fair amount of low head drainage on this valve, so the drip tubing selected to replace the sprinklers should have check valves in it (see the tubing recommendation in the section of this report called Recommended Irrigation Equipment Upgrades for System Standardization)
- Your neighboring HOA will need to be notified of the change to your watering scheme as their plants are currently being watered by you.
- **There is a suspected leak by the entry wall, very wet soil.**

Examples of Zone 1 Issues



Overspray onto sidewalk



Poor (redundant) sprinkler placement

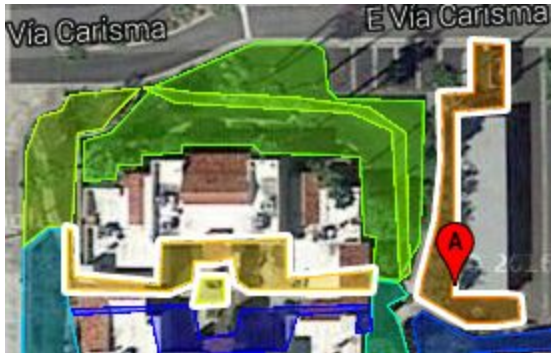


Flood bubblers almost being used correctly (the sprinkler run time is incorrect for this method of watering, but it's right next to a sprinkler on the same valve, so this isn't good design).



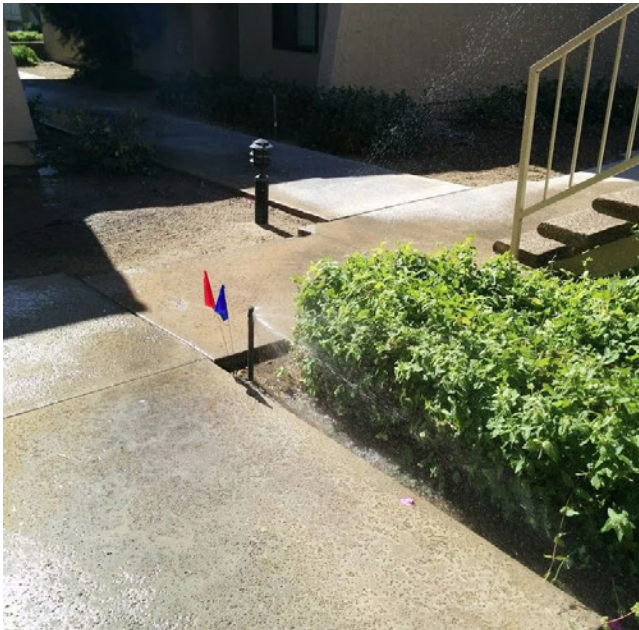
Zone 2

Along west side of carport next to Building 2160, North side and center of Courtyard in Building 2160



- Pressure was 37 psi
- Zones 2 and 6 are co-wired, see Zone 6 for repair information
- 23 sprinklers to be replaced, 8 to be upgraded or replaced

Examples of Zone 2 Issues



Broken sprinklers creating a lot of overspray.



Not a good use of bubblers—too few plants. Oleander isn't a water-intensive plant, either.

Zone 3

Turf area on the Southeast corner of S. Palm Canyon and Via Carisma, center of the turf around the north and northeast perimeter of Building 2160.

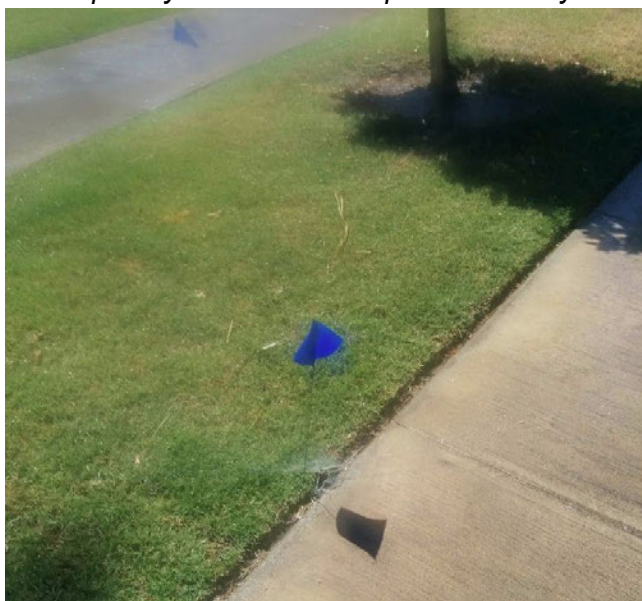


- Pressure was 35 psi
- This valve took 30 seconds to shut down. It needs to be replaced.
- 21 sprinklers to be replaced, 7 to be upgraded or replaced
- **There is a suspected water leak by the gas meter on the west side Building 2160.**
See photo below

Examples of Zone 3 Issues



Brown patchy areas are from poor efficiency



A lot of overspray onto public sidewalks, some from poorly aligned sprinklers



Zone 4

Turf around the north and northeast perimeter of Building 2160, and hedges, some planters.



- Pressure was 25 psi
- 19 sprinklers to be replaced; spacing is inconsistent and should be visited before nozzles are selected. 12 sprinklers to be converted to drip irrigation.

Examples of Zone 4 Issues



Sprinklers by cars, also poor efficiency and overspray.



Overspray onto sidewalks. Turf on left side should be removed.

Zone 5

Not in use

Zone 6

Co-wired with Zone 2 (See Zone 2 for Map)

- The valves must be separated and rewired. The cost to do this will be \$200-400, as hand-digging will be required for this new wiring.

Zone 7

Turf and desertscape around Spa 1, Laundry Room 1, and the adjacent carport.



- Pressure was 25 psi
- 18 sprinklers to be replaced, 16 to be upgraded or replaced.
- Area by the grills should be converted to drip irrigation from spray. Turf should be removed around the carport and dumpster.

Examples of Zone 7 Issues



Uneven watering from poor efficiency



Should be drip, instead of sprinklers here.



Why we don't leave equipment in place if we're not using it. They fail and no one notices.



One of many sprinklers that were broken and would be detected with regular wet runs.

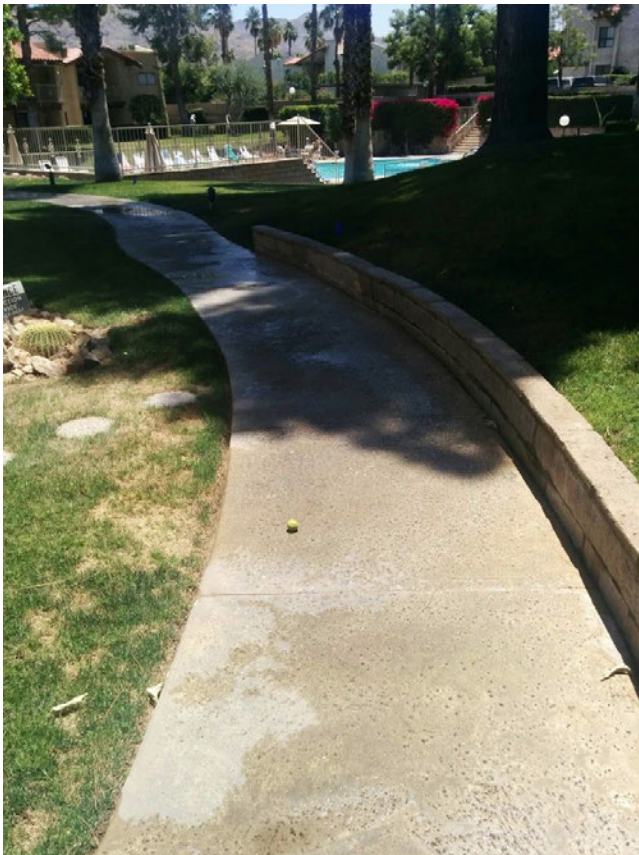
Zone 8

Hilly turf area northeast of Building 2170, hedges along eastern perimeter of Building 2170.



- Pressure was 40 psi
- This valve took 30 seconds to shut down. It needs to be replaced.
- 21 sprinklers to be replaced, 11 sprinklers to be upgraded or replaced. Spacing is inconsistent and should be visited before nozzles are selected. Several sprinklers to be converted to drip irrigation.

Examples of Issues in Zone 8



Overspray from hill and patchy lawn areas in shade



Brown area from inefficiency and poor spacing



Broken sprinkler, doesn't pop up



Another form of broken sprinkler, leaking

Zone 9

Courtyard in Building 2170, as well as planter area and turf area on the southeast corner of Building 2170.

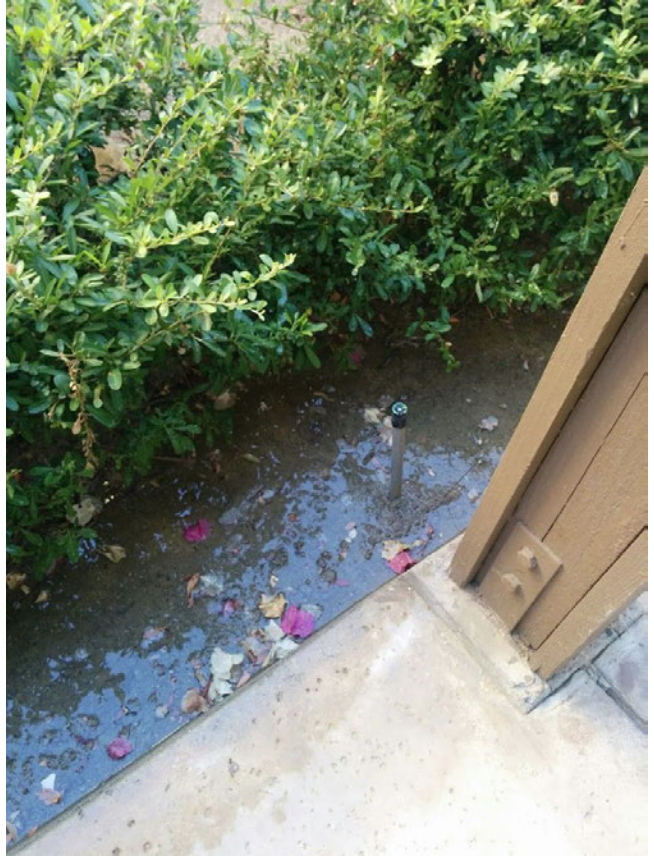


- Pressure was 43 psi
- In turf areas: 10 sprinklers to be replaced, 6 sprinklers to be upgraded or replaced. In courtyard, 51 sprinklers to convert to drip irrigation.
- We recommend moving the turf watering to Zone 8 so the irrigation schedule can be better aligned with the plant's needs and there will be only one irrigation type on the valve.
- Given the current state of this courtyard's planting and irrigation system, it is recommended that the landscape maintenance crew remove the sprinklers in this area and cap them until construction can begin. Sprinklers should be replaced with bubblers for the pygmy palms and the bougainvillea. Everything else should be cleared in preparation for the new installation.

Some Examples of Issues in Zone 9



A lot of overspray and slippery concrete



Flooding from blocked spray heads. This is a good place for drip tubing.



A lot of overspray near the lawn area, too.



Large areas with no plants are being watered

Zone 10

Turf, hedges, and planters along the south and southeast perimeter of Building 2160.



- Pressure was 38 psi
- This valve took 30 seconds to shut down. It needs to be replaced.
- 26 sprinklers to be replaced, 9 sprinklers to be upgraded or replaced. Spacing is inconsistent and should be visited before nozzles are selected. Several sprinklers to be converted to drip irrigation.
- **There is a suspected water leak by perimeter wall at southwest corner of the building.**

Some Examples of Issues in Zone 10



Overspray and patchy grass from inefficient sprinklers



Flooding from blocked spray heads, another opportunity for drip tubing

Overspray onto sidewalks and asphalt (causing damage to the asphalt)

Zone 11

Turf, hedges along south perimeter wall, ends at east side of building 2170.



- Pressure was 30 psi
- 36 sprinklers to be converted to drip irrigation.
- We recommend all of the turf in this zone be removed.
- We recommend replacing the hedges along this entire boundary wall, as they are overgrown and the sprinklers can not be properly maintained.

Some Examples of Issues in Zone 11



A lot of overspray and runoff into publically visible areas. Blocked sprays are causing flooding.



Overgrown hedges make it hard to maintain sprinklers in this area. These are bubblers, but you can see from the spray on the tree that there are also spray heads mixed in.

Zone 12

Turf, hedges along S. Palm Canyon, wraps around carport.



- Pressure was 30 psi
- 65 sprinklers and bubblers to be replaced. Irrigation is in very poor condition in this area and turf removal plans will dictate whether these sprinklers are upgraded/replaced or converted to drip irrigation.
- Turf removal recommended by carport. Turf removal recommended outside the wall. If keeping turf inside the wall, the zone should be split into two zones (one for turf, one for desertscape).

Examples Issue in Zone 12



Broken sprinkler creating interesting ecosystem in the corner of the wall, very little grass, lots of other plants (weeds)

Zone 13

Turf and trees between carport and Building 2180.



- Pressure was 44 psi
- This valve took 1 minute to shut down. It needs to be replaced.
- 23 sprinklers to be replaced, 17 sprinklers to be replaced or upgraded, 3 bubblers. Spacing should be visited before upgrades are made. This zone's irrigation is in poor condition and repairs depend on turf removal plan.
- Turf removal recommended by carport and parking area.

No issues in Area 13 were photographed.

Zone 14

Turf, hedges surrounding western half of Building 2170.



- Pressure was 40 psi
- This valve took 1 minute to shut down. It needs to be replaced.
- 17 sprinklers to be replaced, 8 sprinklers to be replaced or upgraded, 1 bubbler.

No issues in Area 14 were photographed.

Zone 15

South portion of courtyard in Building 2160.



- Pressure was 65 psi
- 3 sprinklers to be replaced, 20 sprinklers to be replaced or upgraded, 2 bubblers. Also, 11 risers should be capped and replaced with drip tubing.

No issues in Area 15 were photographed.

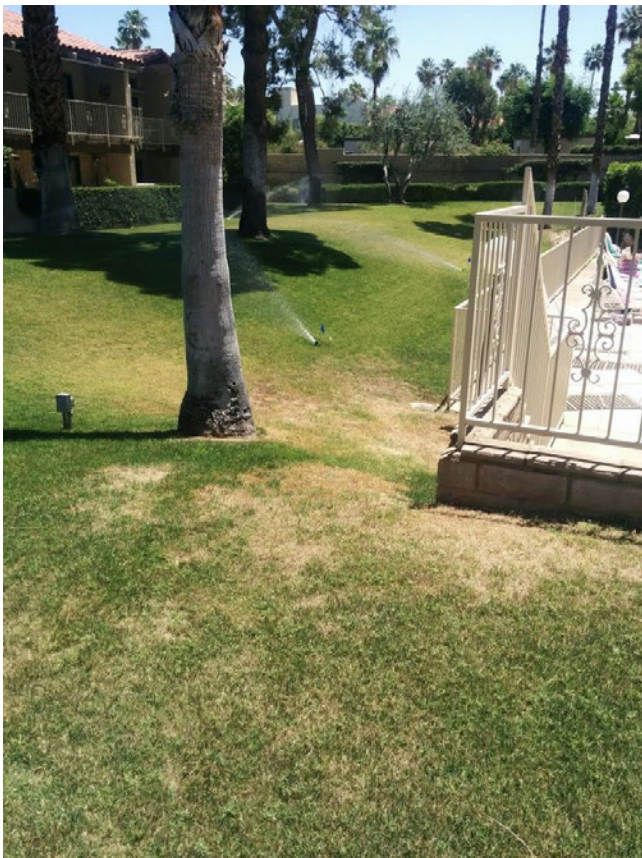
Zone 16

Large turf areas east and west of Pool 2.



- Pressure was not measured in this zone.
- 5 Maxi-Paw sprinklers to be replaced with Hunter PGP Rotors.
- The spacing in this area is a little off and should be adjusted.

Some Examples of Issues in Zone 16



Patchy areas in turf related to poor coverage. Adjustments need to be made to spacing and sprinkler types.



Zone 17

Turf area along Via Carisma from Building 2180 east to the end of the end of the parking area.

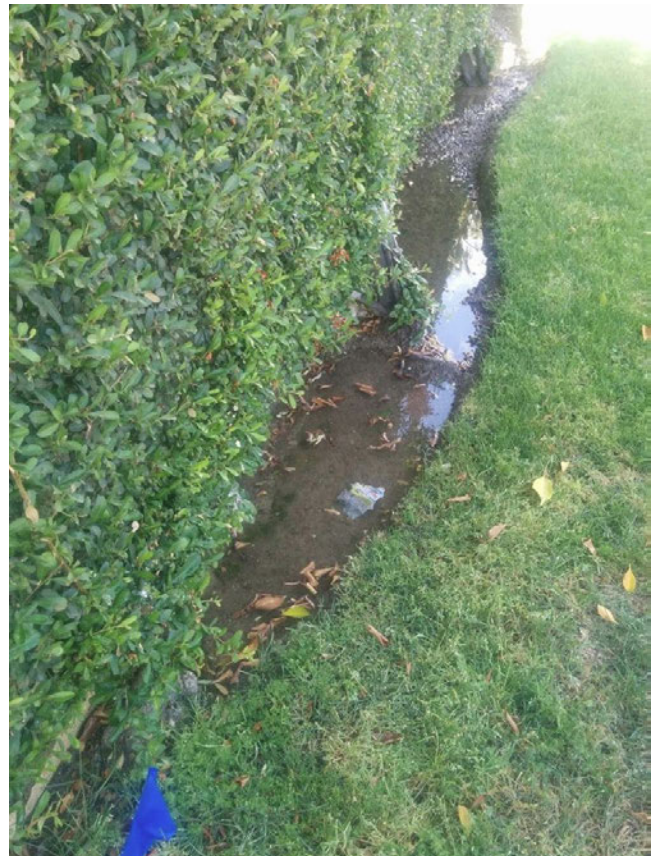


- Pressure was 35 psi (possibly impacted by big break in the line repaired while we were on site)
- 36 sprinklers to be replaced, 21 sprinklers to be upgraded.
- It is recommended that the sprinklers in this section be moved 12 inches in from the curb to reduce runoff.

Some Examples of Issues in Zone 17



Broken sprinkler found during review. This sort of break would be detectable with wet runs or flow sensors.



More flooding caused by using spray heads where drip tubing is more suitable.

Zone 18

Hedges along the north and east side of Via Carisma.



- Pressure was 43 psi
- This zone should be converted to drip irrigation. The turf in this zone will be replaced, and the current shrubbery is all in a narrow planting bed.
- 44 sprinklers and bubblers to be removed and capped at the PVC or converted to drip irrigation.

No issues were photographed in Zone 18.

Controller 2 (Rain Bird ESP-Me)



Zone 1

East side of Building 2180, and area between Building 2190 and the west carport.



- Pressure was 63 psi
- 4 sprinklers to be replaced, 12 sprinklers to be upgraded, 3 bubblers.
- There is a large sunken area (trip hazard) on the east side of the building, between the building and the carport.



No additional issues were photographed in Zone 1.

Zone 2

South perimeter of Building 2180.

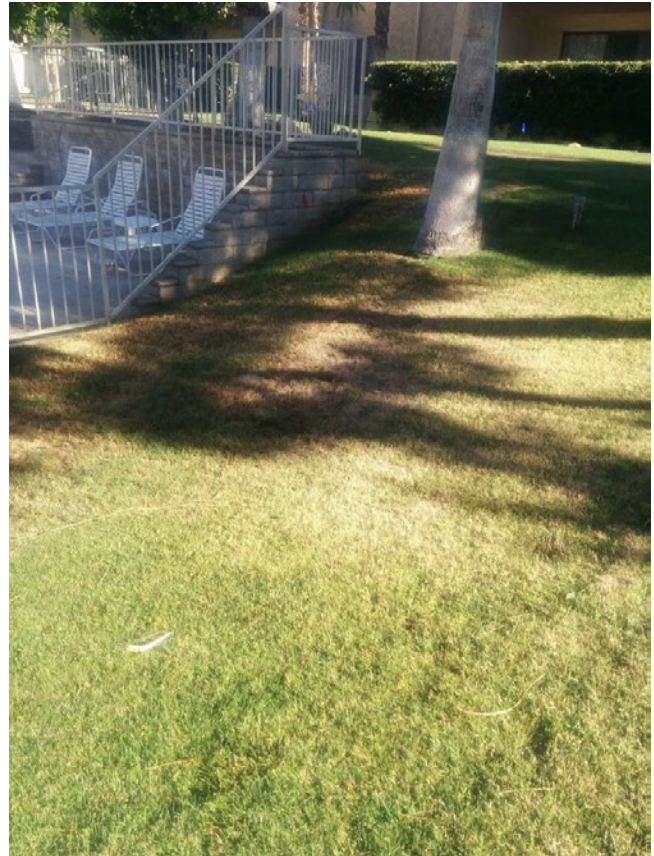


- Pressure was 47 psi
- 4 sprinklers to be replaced, 12 sprinklers to be upgraded, 3 bubblers.
- The planters with mixed sprinklers are showing erratic watering. Some areas are dry and some are wet, so these areas should be evaluated carefully.
- In the turf area, there is too much overspray on the sidewalk. The cause is a mix of poor placement and out-of-date technology. Most of this area is too narrow to really be watered effectively with overhead sprinklers. Either selective or complete turf removal recommended in this area, north of the walkway.

Examples of Issues in Zone 2



Overspray, not just onto sidewalk, but also into desertscape. This isn't good for either.



Patchy areas from poor sprinkler coverage and efficiency. Possibly also affected by shade, may need a blend of fescue and bermuda in this area for a greener look.

Zone 3

Perimeter of Pool 2 as well as most of the turf in the south portions of lawn and trees around Pool 2.



- Pressure was 20-25 psi
- 25 sprinklers to be replaced, 29 sprinklers to be upgraded, and 12 bubblers.
- There is low volume in this area because there are too many sprinklers on one valve. Parts of this zone should be relocated to other zones OR some sprinklers should be removed and capped. Longer-range nozzles or Hunter PGP Rotors should be installed in place of the remaining sprinklers.

No issues were photographed in Zone 3.

Zone 4

West and southwest perimeter of Building 2190, turf and hedges.



- Pressure was 50 psi
- 15 sprinklers to be replaced, 17 sprinklers to be upgraded, and 9 bubblers/drip emitters.
- The drip emitters are 2 GPH. Given that these are installed on cactus that are being watered on the turf's schedule, it might make sense to cut these back to 1 GPH.

No issues were photographed in Zone 4.

Zone 5

Hedge along south side of walkway from Building 2170 east to the end of Building 2190.



- Pressure was 25 psi
- 4 sprinklers to be replaced, 22 sprinklers to be upgraded.
- The hedge is overgrown and the sprinklers could not all be located. This also means they can't be repaired. It is recommended that this entire hedge is removed (it's all Natal Plum) and replaced with a variety of plants set up on proper drip irrigation.

No issues were photographed in Zone 5.

Zone 6

Turf area east of Building 2190.



- Pressure was 30 psi
- 14 sprinklers to be replaced, 13 sprinklers to be upgraded, and 10 drip emitters.

Example of Issues in Zone 6



This corner is awkward for watering turf and it should be removed. Also note the overspray onto the tennis court.

Zone 7

Perimeter on eastern half of Building 2190, turf and hedges.



- Pressure was 40 psi
- This valve took 35 seconds to shut down. It needs to be replaced.
- 8 sprinklers to be replaced, 29 sprinklers to be upgraded, and 2 bubblers.

No issues were photographed in Zone 7.

Zone 8

Corner of Via Carisma, turf and hedges wrapped from carport, around to the north east portion of building 2180, and around to the clubhouse.



- Pressure was 45 psi
- 15 sprinklers to be replaced, 14 sprinklers to be upgraded, and 13 bubblers.
- We recommend removing much of the turf in this area. It's steeply hilly and in some places dangerous. The bubblers need to be replaced with fixed-emission bubblers.

No issues were photographed in Zone 8.

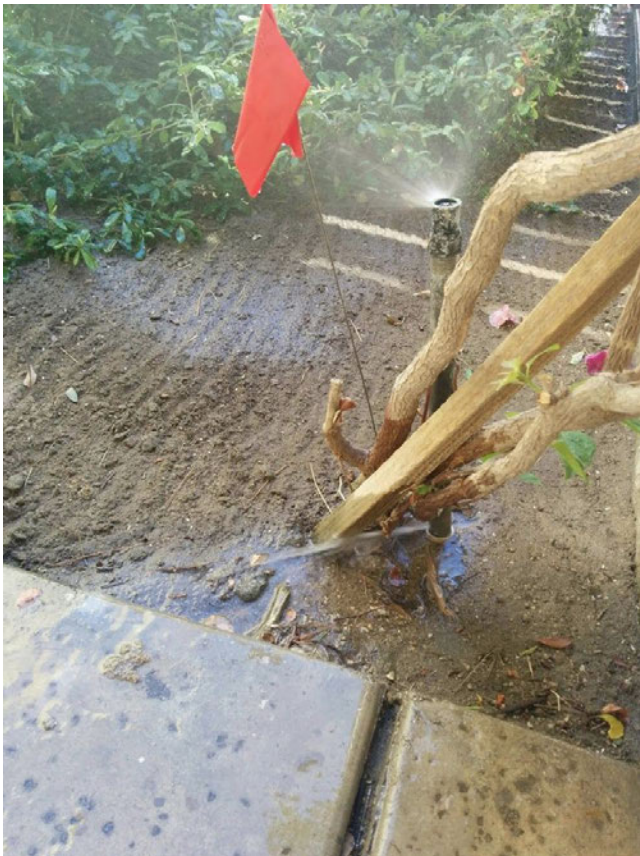
Zone 9

Courtyard of Building 2190.

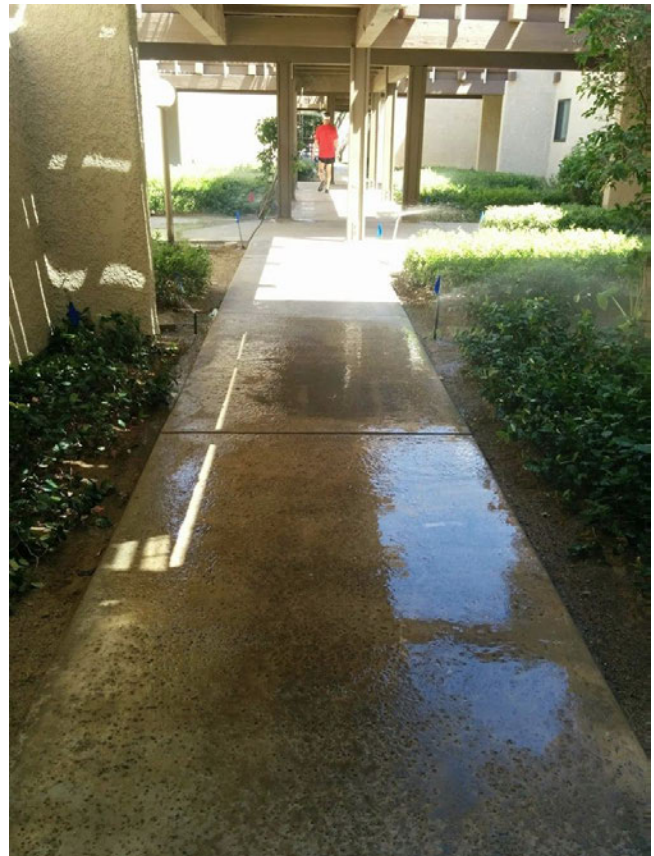


- Pressure was 55 psi
- 2 sprinklers to be replaced, 36 sprinklers to be upgraded, and 13 bubblers.

Examples of Issues in Zone 9



Broken sprinkler on a riser, probably caused by root damage because it was installed too close to the bougainvillea.



Tons of overspray creating dangerous conditions.

Zone 10

Courtyard of Building 2180 and northeast planter.



- Pressure was 55 psi
- 6 sprinklers to be replaced, 33 sprinklers to be upgraded, and 6 bubblers.
- 2 capped risers were leaking.

No issues were photographed in Zone 10.

Zone 11

East median on Via Carisma.



- Pressure was not measured.
- 12 bubblers and 25 "closed" sprinklers not in use but leaking during valve operation.

Examples of Issues in Zone 11



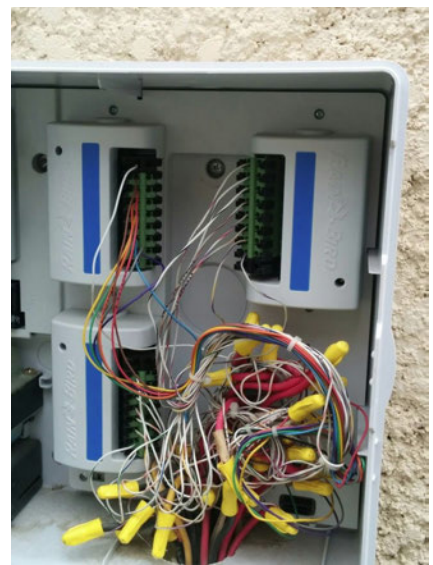
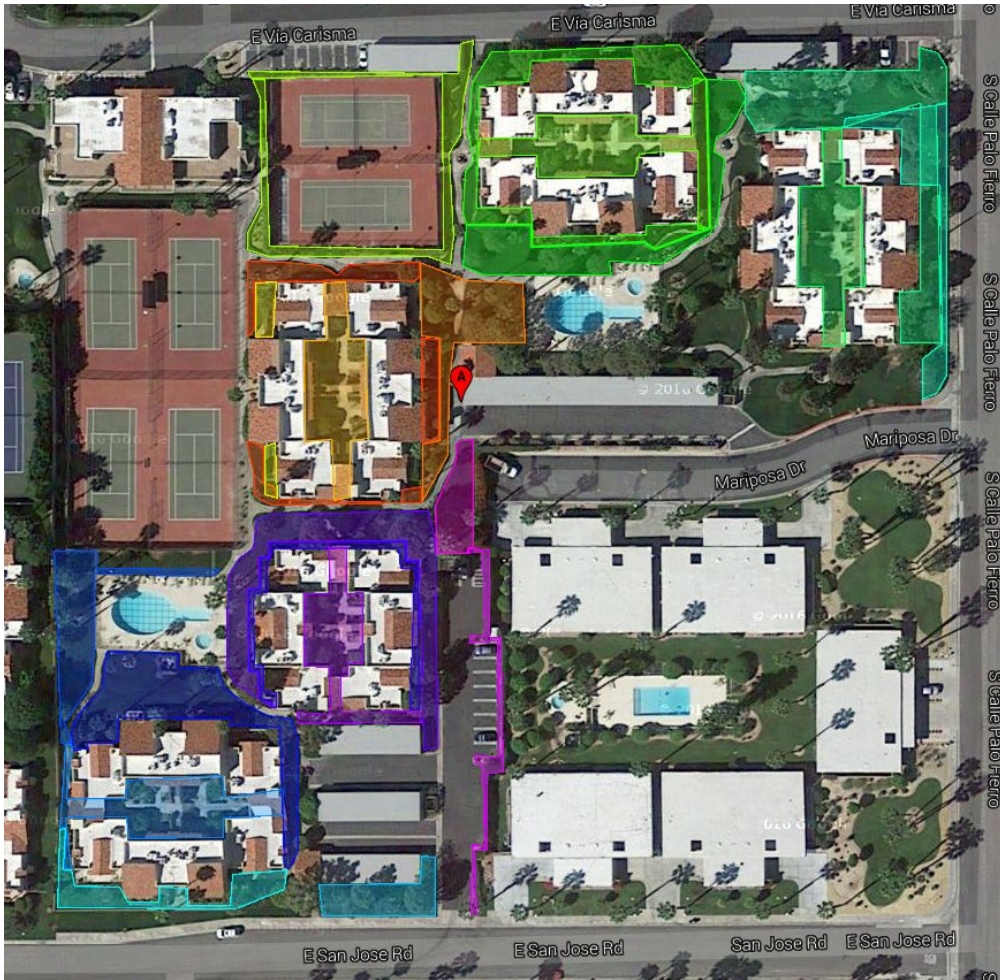
Bubbler not providing enough water for this palm tree. This was common in the median.

Zone 12

Not in use

Controller 3 (Rain Bird LX Modular)

This controller needs to be resequenced for easier maintenance.



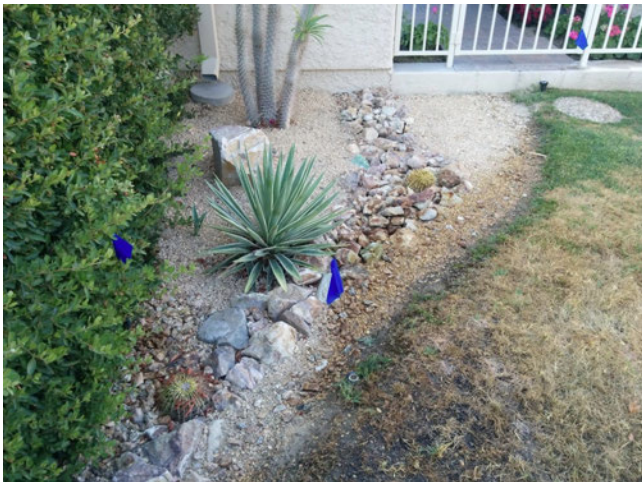
Zone 1

Perimeter of Building 351, turf and hedges.

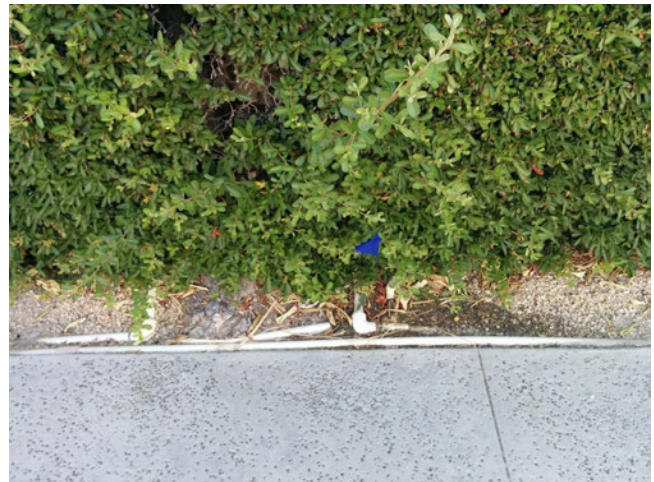


- Pressure was 17 psi.
- This valve took 30 seconds to shut down. It needs to be replaced. It should also be split into two zones, separating the turf from the other plants.
- 31 sprinklers to be replaced, 31 sprinklers to be upgraded, 16 bubblers.
- There are an unknown number of sprinklers under the lavender hedge. This means they can't be maintained. This bed should be refreshed with new lavender plants or something else.

Some Examples of Issues in Zone 1



Brown patchy grass is because of pool sprinkler coverage.



Exposed pipe shortens its lifespan and is not attractive. This area should be watered with drip tubing and the pipe buried when the renovation work is performed.



The mature lavender under which the sprinklers can't be located or maintained.



Brown grass is a result of a broken sprinkler. This should have been detected during wet runs.



A lot of overspray from lawn areas.



Grass is brown here because the sprinkler is blocked by the palm tree. This is an area where a small amount of turf removal would be beneficial.

Zone 2

Turf east of Building 351 and west of Pool 5.



- Pressure was 22 psi.
- 14 sprinklers to be replaced, 17 sprinklers to be upgraded, 2 bubblers.
- Sprinkler spacing in this zone is very poor and needs to be addressed.

Some Examples of Issues in Zone 2



Flooding around the electrical wires for the controller, caused by blocked sprinklers. This is a good area for drip tubing.



These trees are not getting the right kind of watering coverage. The brown loam indicates sprinkler inefficiencies.

Zone 3

Courtyard and portion of west perimeter of Building 351, entire perimeter of east tennis courts.



- Pressure was 25 psi in the courtyard and 35 psi around the tennis courts.
- 135 sprinklers and risers to cap for conversion to drip tubing (water was on tennis courts from spray heads).
- This zone is too large (too many sprinklers, too large of an area). It should be split into two zones (at least).
- **Broken lateral suspected between tennis court and carport on Via Carisma.** This is in a low-traffic area. Jose was informed to look for the leak, but we don't know if it was repaired.

Some Examples of Issues in Zone 3



A lot of overspray from the hedges. These should also be watered with drip tubing.



A very awkwardly shaped area for watering with sprinklers. This turf should be removed and the sprinklers for the hedges should be replaced with drip tubing to reduce the amount of overspray onto the tennis court.

Zone 4

Courtyard and eastern perimeter of Building 451.



- Pressure was 65 psi.
- 72 sprinklers and risers to cap for conversion to drip tubing.
- Watering was highly erratic and many sprinklers were not in the right location for the plants. This will all be moot after switching to drip irrigation.

No issues were photographed in Zone 4.

Zone 5

North, west, and south perimeter of Building 451, hedges and turf.



- Pressure was not measured.
- This valve took 21 seconds to shut down. It needs to be replaced. It should also be split into two zones, separating the turf from the other plants.
- 32 sprinklers to be replaced, 41 sprinklers to be upgraded, 3 bubblers.
- **Corroded electrical conduit along boundary between hedge and turf on south side of building.**

Some Example Issues in Zone 5



Patchy brown grass is from sprinkler inefficiency and underwatering. These shapes are difficult to water efficiently and should probably undergo turf removal.



These exposed pipes are a trip hazard. This should be fixed with a proper pop-up sprinkler and drip tubing in the hedge. The pipe should be buried.



These valves are probably leaking, as the valve box was infested with larvae and slugs.

Zone 6

East and south perimeter of Building 451, hedges and turf.



- Pressure was 60 psi.
- 8 sprinklers to be replaced, 11 sprinklers to be upgraded.

No issues were photographed in Zone 6.

Zone 7

Not in use

Zone 8

Not in use

Zone 9

Courtyard of Building 2255.



- Pressure was not measured.
- 98 adjustable bubblers, many of which were the wrong choice for the plant. This zone needs to be converted to fixed-emission bubblers or drip-tubing (better solution).

An Example of Issues in Zone 9



Water is pooling in the desertscaping from a broken emitter.

Zone 10

Not in use

Zone 11

North and east perimeter of Building 2255 (includes the circle of desertscaping).



- Pressure was 20 psi.
- 26 sprinklers to be replaced, 27 sprinklers to be upgraded, 4 bubblers.

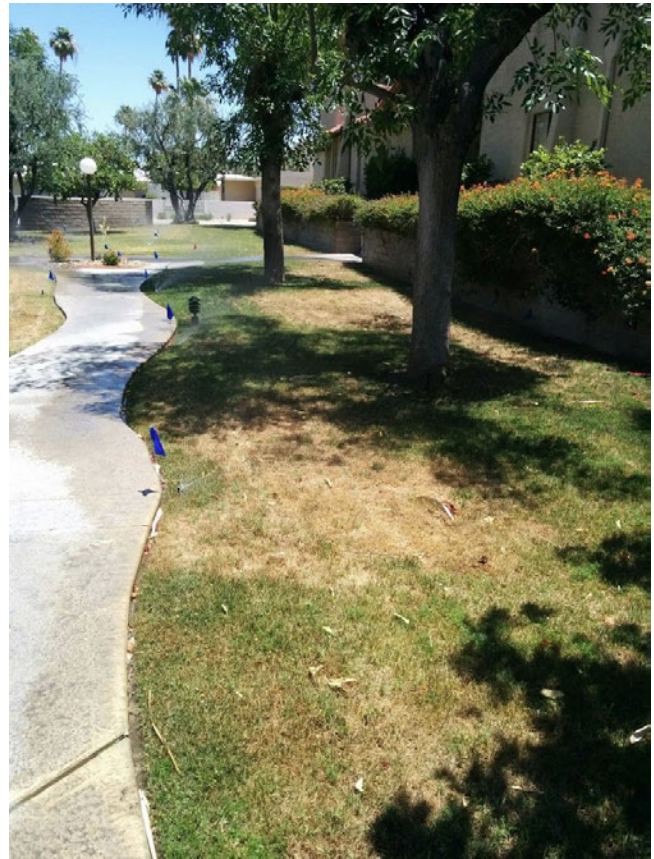
Some Examples of Issues in Zone 11



Inefficient and insufficient watering of these turf areas. A lot of overspray.



This sprinkler has been broken a long time, there is a thick layer of moss growing in this corner.



This photo also shows areas of Zone 12 with the same problems.

Zone 12

East perimeter of Building 2255 down to Mariposa Dr.



- Pressure was 25 psi.
- 34 sprinklers to be replaced, 7 sprinklers to be upgraded, 1 bubbler.
- This area should be considered for turf removal, especially along Palo Fierro where the grass is heavily shaded and on a steep slope.



Overspray from watering turf on hillside

No additional issues were photographed in Zone 12.

Zone 13

Lower south perimeter of Building 310.



- Pressure was 50 psi.
- 6 sprinklers to be replaced, 18 sprinklers to be upgraded, 3 bubblers.
- **Broken lateral suspected in southwest corner, against the building.** This is in a low-traffic area. Jose was informed to look for the leak, but we don't know if it was repaired.



The location of the leak

No additional issues were photographed in Zone 13.

Zone 14

Lower south perimeter of the carport along San Jose.



- Pressure was not measured.
- 11 sprinklers to be replaced, 18 sprinklers to be upgraded, 8 bubblers.
- **Broken sprinkler during test.** Jose was repaired it while we were still there.

No issues were photographed in Zone 14.

Zone 15

Courtyard and west perimeter of Building 310.



- Pressure was 40 psi.
- 74 sprinklers and risers to cap for conversion to drip tubing. This area is significantly overwatered.
- Two capped risers are leaking.

No issues were photographed in Zone 15.

Zone 16

Not in use

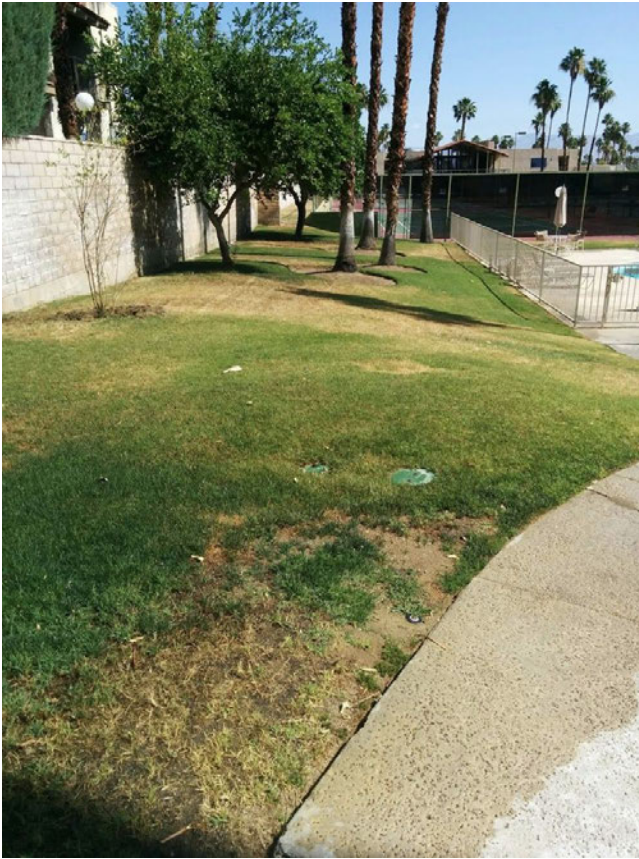
Zone 17

Turf area west of Pool 4 and south row of sprinklers on north side of pool area.



- Pressure was 17 psi (very low, possibly indicating a lateral break somewhere).
- 21 sprinklers to be replaced, 23 sprinklers to be upgraded.
- Spacing is poor and should be addressed, specifically aligned for hillside watering.

Example of Issues in Zone 17



Patchy grass and brown spots are a combination of inefficient and insufficient watering.

Zone 18

Turf area south of Pool 4 and east perimeter of Building 310.



- Pressure was 10 psi (very low, possibly indicating a lateral break somewhere).
- This valve took 20 seconds to shut down. It needs to be replaced.
- 21 sprinklers to be replaced, 23 sprinklers to be upgraded.
- Spacing is poor and should be addressed, specifically aligned for hillside watering.

No photographs of issues were taken in Zone 18.

Zone 19

West, east, and north perimeter of Building 340, hedges only.

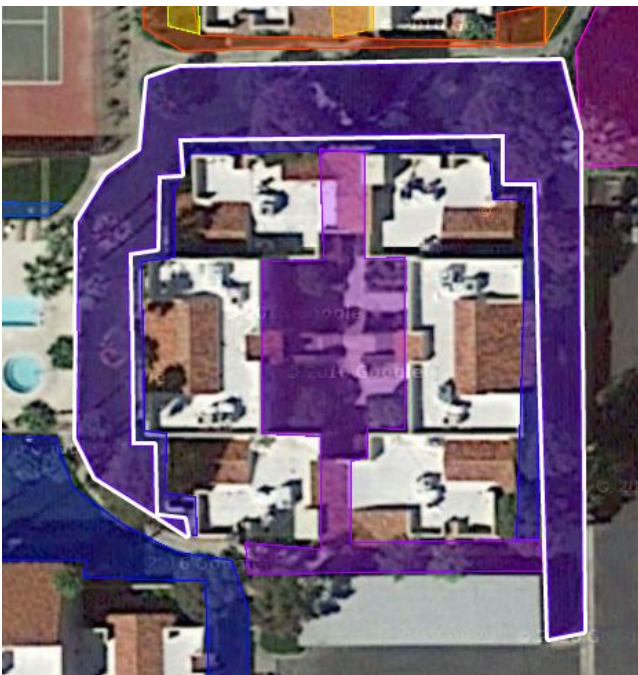


- Pressure was 20 psi (very low, possibly indicating a lateral break somewhere).
- 45 sprinklers and risers to cap for conversion to drip tubing. As an example, this should cost around \$625 in materials.

No photographs of issues were taken in Zone 19.

Zone 20

West, east, and north perimeter of Building 340, turf and trees.



- Pressure was 40 psi.
- 16 sprinklers to be replaced, 25 sprinklers to be upgraded, 13 bubblers.
- Sprinklers are poorly spaced and need to be adjusted.

No photographs of issues were taken in Zone 20.

Zone 21

Courtyard and south perimeter of Building 340.



- Pressure was 50 psi.
- 6 sprinklers to be replaced, 31 sprinklers to be upgraded, 34 bubblers.
- Many plants are getting too much water in the courtyard. Fixed-emission bubblers should replace the existing bubblers.

No photographs of issues were taken in Zone 21.

Zone 22

Hedges along San Jose parking lot.



- Pressure was 65 psi (much too high), surges to 80 when it turns on.
- 45 sprinklers and risers to cap for conversion to drip tubing.

No photographs of issues were taken in Zone 22.

Zone 23

Turf area west of Building 340, along wall.



- Pressure was not measured.
- 3 sprinklers to be replaced, 15 sprinklers to be upgraded, 11 bubblers.

No photographs of issues were taken in Zone 23.

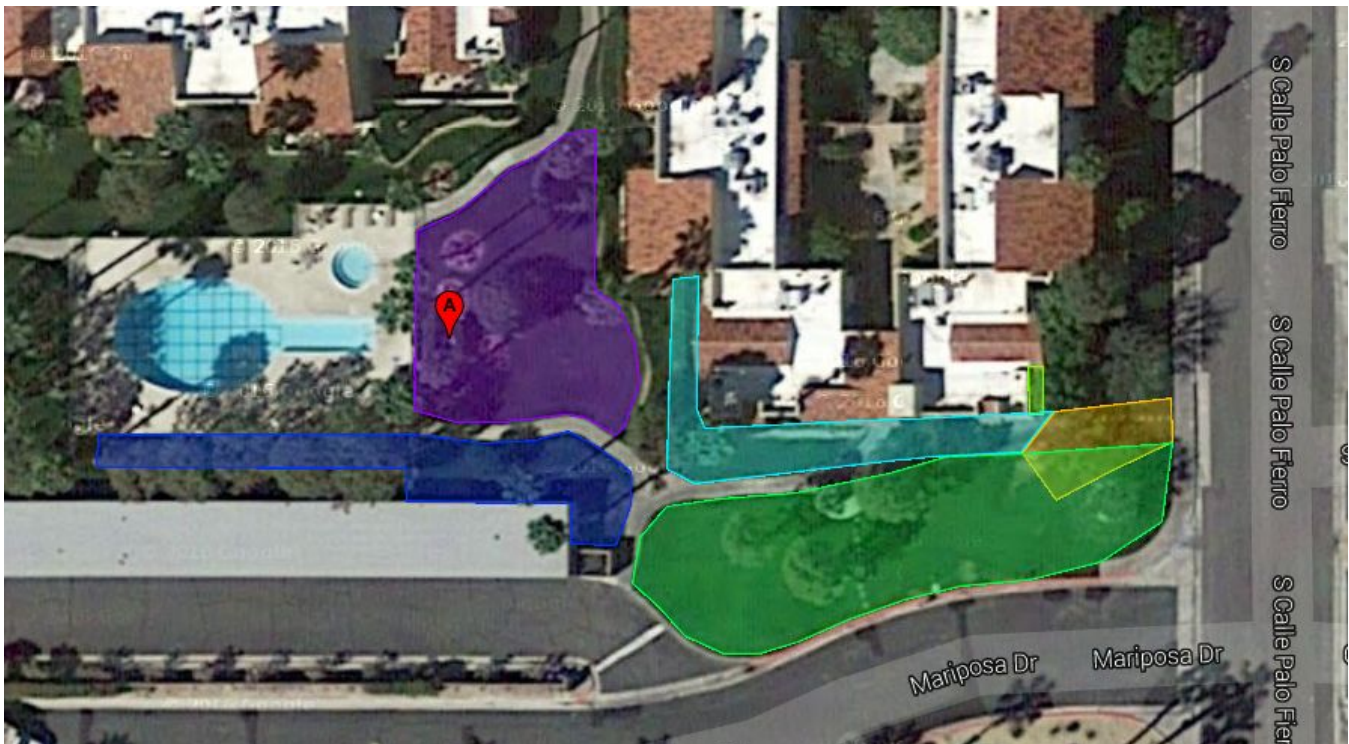
Zone 24

Not in use

Controller 4 (Rain Bird ESP-Modular)

The zones on this controller were a bit of a mess when we were on site. We found 5 newly-installed valves, some of which were not even connected to the controller. Zone 3 hadn't been watered in some time and was repaired while we were there.

In the course of making this repair which we called in, the crew undertook some additional repairs and changes. One zone was moved from Controller #3 Zone 10 to Controller #4 Zone 6 (we think). Zone 2 appears to only water a homeowner's patio (which is jungle-like and may be causing damage to the walls surrounding it). The crew was unable to explain the changes they made to us, so the documentation is spotty.



Zone 1

Southeast corner of Building 2255, trees and turf.

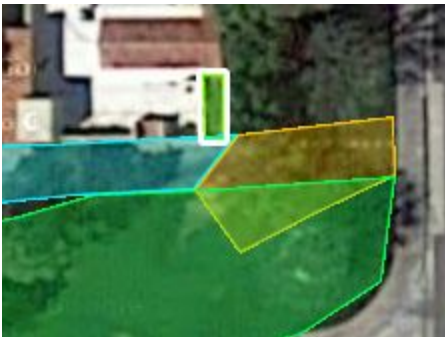


- Pressure was not measured.
- 11 Maxi-Paws to be replaced, 1 Hunter PGP rotor.
- The spacing in this area is very poor and should be addressed. It should be designed in context with Zones 3 and 4 on Controller #4 and Zones 11 and 12 on Controller #3 which also water this area. Ideally the zones would be reconfigured to have this area only watered by one or two zones.

No photographs of issues were taken in Zone 1.

Zone 2

Southeast corner of Building 2255, appears to only water the owner's patio. It's being drastically overwatered for what is there.



- Pressure was not measured.
- Unknown sprinklers as we didn't go on the private property

No photographs of issues were taken in Zone 2.

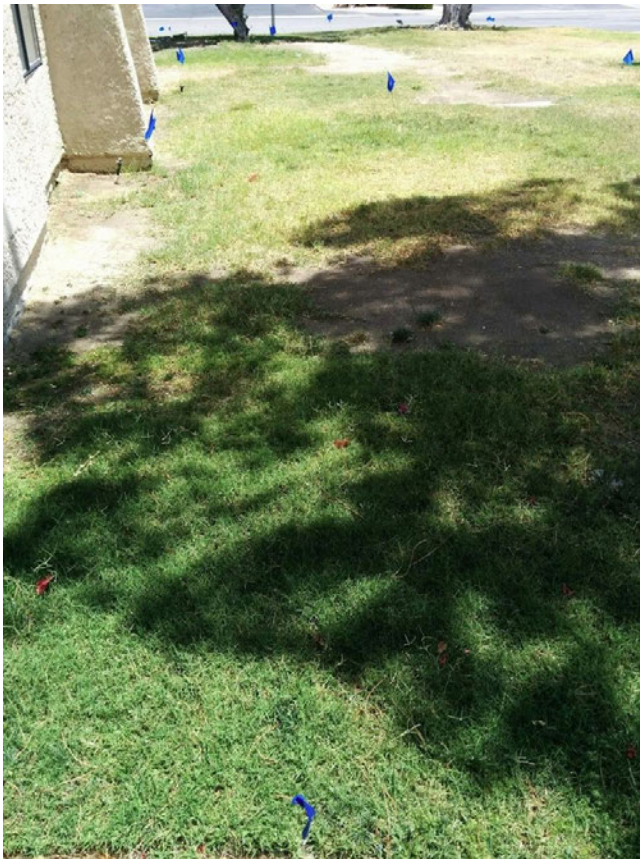
Zone 3

Majority of the lawn and trees at Palo Fierro and Mariposa, west to the carport. This area was not being watered when we visited the site and we called in for repairs.



- Pressure was not measured but it was very low.
- 21 sprinklers to be replaced, 19 sprinklers to be upgraded, 3 bubblers (on trees).

These photos are from Zones 1, 3, and 4 (they're all watering the same general area)



Old sprinklers and broken sprinklers were ubiquitous in these zones. Where there is still grass, it's very patchy as these sprinklers have been in disrepair for a long time.



Zone 4

Area of lawn and hedges which wraps around the southwest corner Building 2255.



- Pressure was not measured but it was very low due to a broken lateral.
- 9 sprinklers to be replaced, 2 sprinklers to be upgraded, 1 bubbler.
- **Broken lateral was discovered on the east side of the sidewalk at the south entrance to the courtyard** and reported to Desert Management. We do not know if it has been repaired.

Zone 5

Area of lawn and trees around between carport and Pool 5.



- Pressure was not measured.
- 15 sprinklers to be replaced, 15 sprinklers to be upgraded.

No photographs of issues were taken in Zone 5.

Zone 6

Area of lawn and trees between Building 2255 and Pool 5.



- Pressure was not measured but it was very low.
- 1 sprinklers to be replaced, 23 sprinklers to be upgraded, 1 bubblers (on tree).

Example of Issues in Zone 6



Very old sprinkler (to be replaced) putting out so much pressure and volume that it's created a crater in the lawn, preventing the water from escaping the little berm it created.

Zone 7 - 22

Not in use

Controller 5 (Rain Bird ESP-Me)



This is a modern Rain Bird ESP Modular controller. It was in good operating condition.

We seem to have lost all pictures we took after 9:14am on May 24th.

Zone 1 (Yellow zone on map)

Perimeter of Clubhouse building and west portion of lawn north of central tennis courts.

- Pressure was not measured.
- This valve took 1minute to shut down. It needs to be replaced. It is buried more than 2 feet below the surface, so it needs to be lifted to an appropriate height for proper maintenance. Repair estimate is \$600.
- 50 sprinklers and bubblers to be replaced with drip irrigation.

Zone 2 (Green zone on map)

East and part of south perimeter of central tennis court and east portion of lawn north of central tennis courts.

- Pressure was not measured.
- This valve is buried more than 2 feet below the surface, so it needs to be lifted to an appropriate height for proper maintenance. Repair estimate (combined with Zone 1 valve is \$600).
- 50 sprinklers and bubblers to be replaced with drip irrigation.
- **A major break in this line was detected, reported, and repaired during our visit.** The break was located along the east side of the central tennis courts and it was a capped riser that had blown out.

Controller 6 (Rain Bird ESP-Me)



Zone 1

East portion of lawn along San Jose.

- Pressure was 60 psi.
- 5 sprinklers to be replaced, 1 sprinkler to be upgraded.

Zone 2

West portion of lawn along San Jose.

- Pressure was 60 psi.
- 6 sprinklers to be replaced, 2 sprinkler to be upgraded.

A Pictorial Survey of the Valves



