

**A REPORT ON HILL FARM'S WATER USE  
PREPARED BY THE RESOURCE STEWARDSHIP  
COMMITTEE  
FOR THE HILL FARM BOARD OF DIRECTORS**

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***Hill Farm relies on two sources of water, groundwater from our well and potable water delivered by our local utility, Tucson Water.***

We are legally limited to how much well water we can use: 50,400 gallons/day<sup>1</sup> (or 18.4 million gallons annually) of groundwater. Typically, we consume close to that total amount every year. Hill Farm's well is probably not at physical risk unless there is a significant lowering of the water table which could be the case if the City turns on their high production wells in the area.

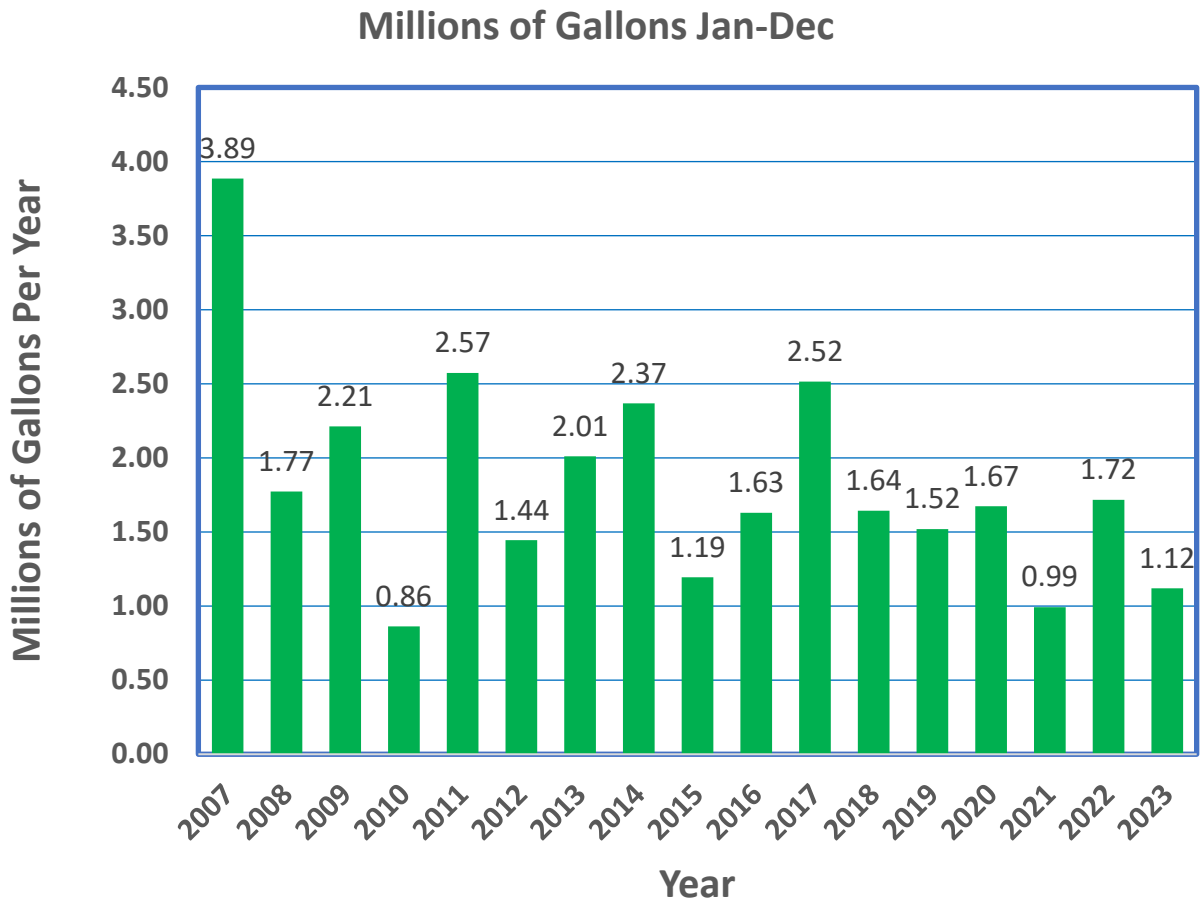
There are times when we cannot rely exclusively on well water, at which point we turn to potable (city) water to meet our needs. This occurs primarily during the summer when it is hot and especially when we don't get monsoon rains. Most of the water purchased is to maintain lake levels when periods of extreme heat result in high water-evaporation rates and require increased landscaping irrigation. Occasionally, we rely on potable water for short periods when our well pump or water distribution system require repairs.

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<sup>1</sup> Because we cannot run the well pumps continuously over 24-hour period (giving them a one-hour rest period), the actual available amount of well water on a daily basis is 48,300 gallons/day.

**Below is a graph of Hill Farm’s use of city potable water from 2007 through 2023 (with 2023 tallying use through August).**

As you can see, our use is variable. Of more recent note, 2021 was low, mostly due to that year’s exceptionally wet monsoon (12.8 inches). 2022 was more typical of our increasingly common hot and dry years (4.9 inches). There also was a leak in the lake that contributed to that year’s higher amount. Since 2023 includes June-August, it likely totals our use potable water for this year. The reduced amount reflects in part the impact of our water conservation actions to date.



***To cut down on our water use***, the Resource Committee is focusing on reduced irrigation for landscaping for two reasons. First, it comprises our greatest water use. Based on data collected over an 24-month period, we have come up with these preliminary findings: annual lake and irrigation (common areas and front yards) water use are split about 45% to 55%, respectively. Second, we are limited in what we can do to reduce the lake’s evaporation, which drives its increased water demand and would require reducing the size/surface of the lake or covering portions of it.

***As previously noted, the Resource Stewardship Committee has one goal: to eliminate Hill Farm’s reliance on potable water within 10 years.***

We have selected this goal because we believe it addresses our greatest vulnerability: potential future restrictions on the use of potable water for landscaping and/or increased costs associated with its use. For example, in June 2023, Tucson Mayor and Council approved limits on turf irrigation for new development<sup>2</sup>, and may consider these and other restrictions on existing development at a future date.

Based on our average annual use for the past six years, meeting our goal would require in part reducing our overall use of irrigation water for landscaping by 1.5M gallons annually over the next 10 years. However, simply reducing our overall use of water won’t get us to our goal, as there is the timing of when we use potable water for irrigation, what the Resource Stewardship Committee calls “peak water demand.”

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<sup>2</sup> [https://www.tucsonaz.gov/Departments/Planning-Development-Services/PDSD-News/Prohibition-of-Ornamental-Turf-amendment-approved-by-Mayor-Council#:~:text=On%20June%206%2C%202023%2C%20Mayor,Development%20Services%20\(PDSD\)%20and%20Tucson.](https://www.tucsonaz.gov/Departments/Planning-Development-Services/PDSD-News/Prohibition-of-Ornamental-Turf-amendment-approved-by-Mayor-Council#:~:text=On%20June%206%2C%202023%2C%20Mayor,Development%20Services%20(PDSD)%20and%20Tucson.)

Below is a table that provides a history of our use of potable water for irrigation/landscaping on a monthly basis. As indicated, the months of May-August represent our highest average monthly water use (our period of “peak water demand”). For 2020 and 2022 (during two periods of relatively low monsoon rainfall), the total amount of water used from May-August was 2.1M and 1.5M gallons of water used, respectively. So, if we are to reach our goal of eliminating our use of potable water, we will need to focus on water conservation strategies that reduce our water use during that time period.

HILL FARM CITY WATER CONSUMPTION 2007- AUGUST 2023														
Year	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Total CCF for Year	Monsoon Rainfall @ Airport
2007	0	0	45	192	701	1500	759	259	608	868	62	0	4,994.00	6.57
2008	0	8	38	161	572	569	262	193	348	117	11	0	2,279.00	5.52
2009	0	9	17	225	177	504	378	565	601	351	17	0	2,844.00	2.86
2010	0	32	2	2	0	120	799	109	21	15	9	0	1,109.00	5.45
2011	3	0	2	81	83	779	865	507	804	181	2	0	3,307.00	8.62
2012	0	0	0	0	52	855	680	78	167	25	0	0	1,857.00	6.02
2013	0	0	0	0	91	645	325	556	753	213	2	0	2,585.00	3.74
2014	0	0	0	2	246	1126	1117	415	130	8	0	0	3,044.00	6.08
2015	3	3	3	70	275	369	342	359	104	7	0	0	1,535.00	6.63
2016	2	15	39	138	393	542	362	255	220	128	0	0	2,094.00	7.40
2017	0	0	0	123	254	1301	421	364	586	19	65	0	3,133.00	8.57
2018	62	3	0	23	414	1060	318	135	98	0	0	0	2,113.00	7.02
2019	0	0	0	155	228	624	495	409	42	0	0	0	1,953.00	5.06
2020	0	0	0	58	524	554	627	240	110	39	0	0	2,152.00	1.62
2021	0	0	0	11	206	584	104	94	113	10	87	67	1,276.00	12.79
2022	0	0	0	172	1152	539	211	133	0	0	0	0	2,207.00	4.94
2023	0	0	0	31	214	548	480	65					1,338.00	
<b>Averages</b>	<b>4.12</b>	<b>4.12</b>	<b>8.59</b>	<b>84.94</b>	<b>328.35</b>	<b>718.76</b>	<b>502.65</b>	<b>278.59</b>	<b>294.06</b>	<b>123.81</b>	<b>15.94</b>	<b>4.19</b>	<b>2342.35</b>	<b>6.18</b>

Notes: The figures in this spread sheet are in CCF's (units of water) not dollars.  
 These figures are only for the HFHOA meter by the well and do not include any water consumed at the Farm House.  
 Meter No. 150099-153666, address 5211 E Fort Lowell Rd  
 Rainfall: Monsoon Rainfall from June thru September at Tucson Int'l Airport measured in inches. Source National Weather Service website.  
<http://www.wrh.noaa.gov/twc/monsoo> <http://www.wrh.noaa.gov/twc/monsoon/monsoon.php>

***With the Board’s approval, the Committee has taken steps to reduce its water usage.***

These have included improvements in its water delivery infrastructure, turf conversions, and changes to irrigation schedules. (See Appendix A for details regarding water savings improvements.)

***These actions have resulted in approximately 4.5M gallons in water savings a year.*** (See Appendix A for how the Committee arrived at this estimate.)

This represents a meaningful step forward in meeting the Committee's goal, but we as a community are going to have to do more.

The Resource Stewardship Committee remains committed to eliminating our reliance on potable water, while maintaining much of the ambience of Hill Farm. Reaching the Committee's goal will likely involve some choices about what aspects of Hill Farm's ambience we will maintain going forward. This requires a broader conversation among the Hill Farm community which the Committee is happy to lead or otherwise support with the Board's direction.

## Appendix A: Calculating Hill Farm's Water Savings to Date Sept 2023

Following is a summary of the estimated irrigation quantities for the *turf and Vinca* areas within the Common Areas plus the front yards maintained by the HOA. There are some qualifiers associated with this summary.

- The numbers are estimates based on fixture units and system run times. There is no way to effectively meter actual water usage so these estimates are the best that we can do.
- This summary and analysis cannot differentiate between sources, i.e., well or City meter, so the only way to track real usages and reductions is through our City water bills.
- Numbers are based on *annual* totals since there are so many weather-related variables that impact actual usage. Seasonal variations for the winter and summer system schedules are taken into account, however.
- Consequently, this summary doesn't reflect the seasonal peaking factor in our City water usage.
- This summary is limited to turf and Vinca. Lake-fill and general irrigation (trees, shrubs, and groundcovers other than Vinca) are separate.
- While this summary looks at turf and Vinca, it is only one part of the needed water management program. Equal attention needs to be given to the lake, general irrigation, and the efficiency of our supply and delivery systems.

## **January 2022 Initial Calculations/ Establish Baseline**

The initial calculation performed by the Resource Committee shortly after its formation and the baseline for turf and Vinca, based on long established watering schedules is: **8.8 million gallons(mg) a year.**

### **2022 Initial Steps**

The committee recommended and then implemented a number of modifications to the watering schedule:

- Shortened the turf irrigation season from 24 to 20 weeks.
- Reduced the turf rotor cycle from 30 to 25 minutes.
- Reduced the Vinca sprayer cycle from 30 minutes/7 days a week to 20 minutes/ 5 days a week.

These system modifications resulted in **reducing our baseline use number from 8.8 mg to 6.4mg.**

### **2023 System Adjustments**

The committee continued to make adjustments throughout the year:

- Reduced the popup cycle from 15 minutes to 13 minutes.
- Reduced the number of watering days during the summer season from 5 to 4.
- Shortened the summer season by an additional week in August.

These system modifications resulted in **reducing our baseline use number from 6.4 mg to 4.9 mg.**

## **Spot Conversions**

A number of standalone turf/vinca conversions have been completed, or are underway, or are being planned:

- West Side Entry HFD (Complete). 60,000 gallons net annual reduction.
- Newman residence (owner initiated, complete). 43,000 gallons net annual reduction.
- Woodgate East (complete). 43,500 gallons net annual reduction.
- Farmhouse Vinca (complete). 57,500 gallons net annual reduction.
- Campbell residence (Owner initiated, underway). 90,000 gallons net annual reduction.
- Drainageway/walkway by Nardi residence (Complete). This is the demonstration project for new higher efficiency popups (reduction in number needed and a lower use rate). 100,000 gallons net annual reduction.
- Darling residence (Owner initiated, complete). 40,000 gallons net annual reduction.
- Woodgate West (planned, pending approval). 57,600 gallons net annual reduction.
- Vinca at south walkway (under design). 75,000 gallons net annual reduction.



Taken all together, if all these standalone turf/vinca conversions are completed, it would result in a potential net annual reduction of 572,600 gallons, **further reducing our baseline use number from 4.9 mg to 4.3 mg.**

### **Soft Adjustments**

The committee has initiated some “soft” procedures to further manage our water consumption. These procedures are not quantifiable but are beneficial to the program:

- Initiated daily readings of meters to identify problems early.
- Implemented a hard shutdown of City water during the winter off-season.
- Reduced the threshold rainfall event for temporary irrigation shutdowns from .5 inch to .25 inch.
- Topped off the lake to maximum capacity with well water in late spring before the City water is turned on in order to use the lake for additional storage of “free” water.