

Commercial
Site
Assessment™
Tier II

Prepared for:

**Bellante
Townhome
HOA**

18348 Justice Way
Lakeville, MN 55044

2021 Season



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Irrigated Area



Commercial Site Assessment™

Date of Tier I CSA: September 29, 2021

Certified Technician: Jake Mathre CLIA, CIC, CIT

Date of Tier II CSA: June 30, 2021

Certified Technician: Jake Mathre CLIA, CIC, CIT

Irrigated Acres: 13.1

Irrigated *ft*²: 570,851 *ft*²

Bellante Townhome Audit Observations

Bellante has 3 water sources and 3 controllers for a total of 84 zones.

Controller and Sensor:

The property utilizes three controllers and a single rain sensor which is tied to all three controllers. The property is using Hunter Hydrowise controllers, but they have not been optimized to utilize the real time weather data. The zone run times are accurate based on the sprinkler typer (rotors, sprays, drip, etc.) for each zone, however without setting up the weather “Smart” programming, it is only a simple timer with remote access.

Solution:

- Optimize the programming for the three controllers to utilize the full functionality of the Smart features.

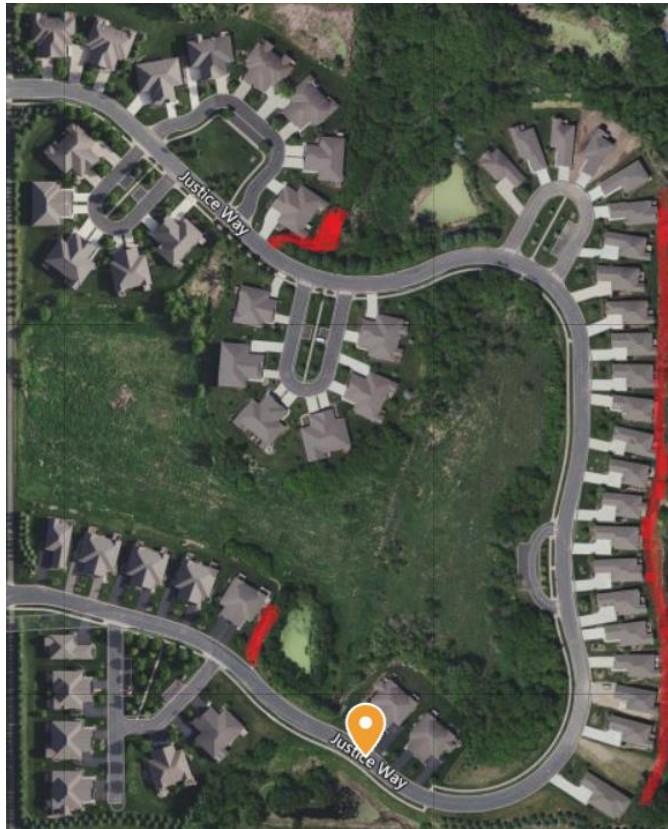
Zone by Zone:

The first thing noticed was there are 250 rotors that are leaking or not functioning properly that need to be replaced. Additionally, there were 2 heads that needed to be raised for proper coverage.

There were many sloped areas where the heads did not have check valves installed. Without check valves, the water in those lines drains out after every cycle through the lowest head on the zone. Additionally, there were some rotors in zones that had the wrong nozzle size installed for their area of coverage. Nozzles of rotors should change depending on area of coverage. If all nozzles are the same and the heads turn at a fixed rate, then areas covered by a 90° head will get more water and those covered by a 360° head will get too little.

There were a few areas with minor design issues that need to be addressed. These areas either need heads added and/or moved for proper spacing and coverage. Many of the heads needing to be moved are in the prairie grass along the entire property.

There were many areas that could use a complete redesign. These areas are noted on the map below and would be addressed and estimates given upon consultation.



Many of the zones along driveways had mixed application devices (sprays with rotors). Traditional spray heads apply water at three to four times the rate rotors apply water. On these zones, the 16 nozzles should be replaced with rotating nozzles to match the precipitation rates.

Solutions:

- Replace 250 rotors
- Raise 2 rotors
- Retrofit the remaining rotors with new heads and correct nozzle sizes and check valves
- Move 38 heads for proper spacing and coverage or move heads out of areas that don't require irrigation
- Add 51 heads for proper spacing and coverage
- Retrofit 16 spray nozzles with rotating nozzles (see mixed head types row of zone tables)



Water Rates:

Meter Reading Interval: Monthly Quarterly Other _____

Units Measured As: 1000 gallons CCF

Converted Units: 1 unit = 1000 gallons

WATER RATES	Irrigation Metered System
Price per unit (per 1,000 gals)	\$5.64
Threshold per quarter	Irrigation Metered System
Sewer Rate per unit (if unmetered):	Does not apply

Historical Water Usage:

Year	Annual Water Usage (gallons)	Annual Water Cost*
2016	5,322,000	\$30,862.08
2017	3,983,000	\$23,310.12
2018	6,034,000	\$35,300.76
2019	2,331,000	\$13,569.84
2020	5,846,000	\$34,240.44
5 Year Average	5,604,700	\$32,879.51

** Average Taken from months with recorded water. Zero usage removed from average. Assuming if system ran, what would the average be?

Plant Water Requirement (ET Data & Average Effective Rainfall):

Plant Material: **2,836,764 gallons** Cost: **\$15,999/year**

$$Eff \% = \frac{\text{water need}}{\text{water use}} \qquad Eff \% = \frac{2,836,764}{5,604,700} = 50.61\%$$

Minimum EPA efficiency standard = **75%**

Water Usage Goals:

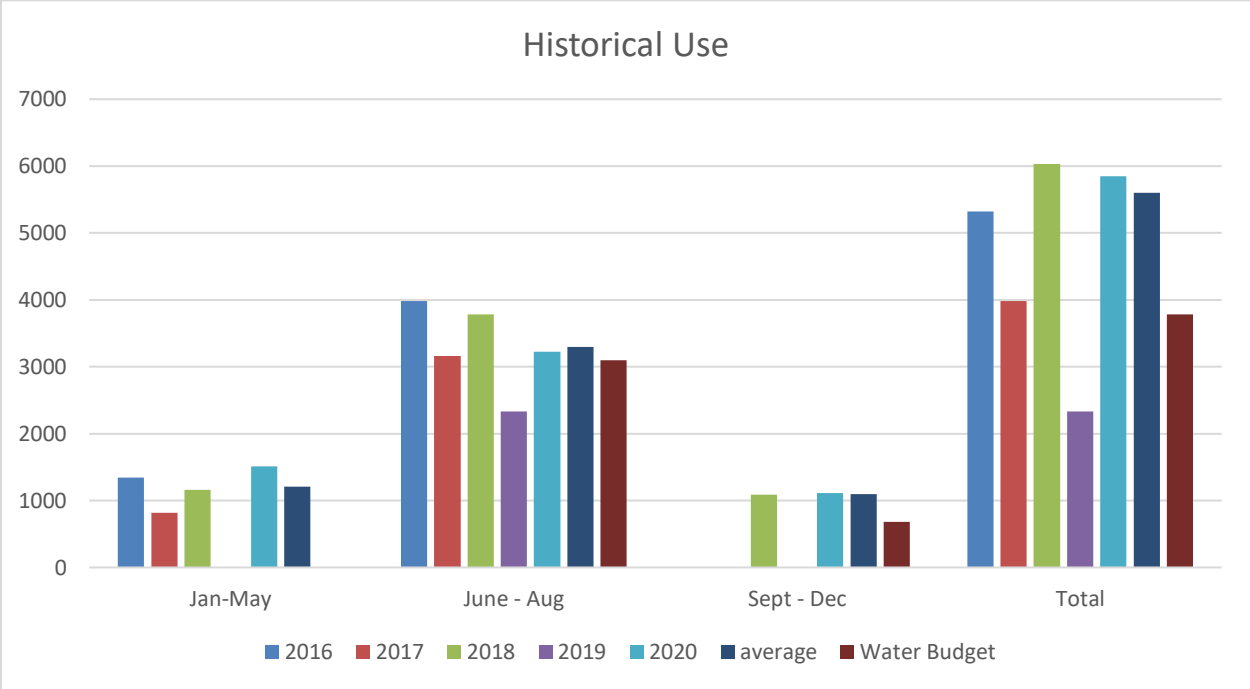
Eff = 75% : 3,782,352 gallons used at an annual cost of **\$21,896**

Eff = 85% : 3,337,369 gallons used at an annual cost of **\$19,387**

Eff = 95% : 2,986,067 gallons used at an annual cost of **\$17,405**

Water Budgeting

	2016	2017	2018	2019	2020	average	Water Budget
Jan-May	1342	820	1161	0	1513	1209	0.00
June - Aug	3980	3163	3785	2331	3222	3296.2	3098.57
Sept - Dec	0	0	1088	0	1111	1099.5	683.78
Total	5322	3983	6034	2331	5846	5604.70	3782.35



Water Source and Backflow Prevention:

WATER SOURCE						
Water Source #1	Location Address	Villas - 18292 Doghouse				
	Water Source					
	Backflow Device					
	Brand	Febco		Model		
	Type	RPZ		Size	2"	
	Visual Inspection	Leaks?	No	Notes	Looks Good	
	Date of Last Backflow Test	None		Unknown		
	Meter / Deduct Meter					
	Brand	Neptune		Model		
	Type	Analog		Size	2"	
	Serial Number	1545329786				
	Reading	2,929,599			Leak Detector Spinning?	No
	Visual Inspection	Leaks?	No	Notes	Looks Good	

WATER SOURCE						
Water Source #2	Location Address	Meadows - 18350 Doghouse				
	Water Source					
	Backflow Device					
	Brand	Febco		Model		
	Type	RPZ		Size	2"	
	Visual Inspection	Leaks?	No	Notes	Looks Good	
	Date of Last Backflow Test	None			Unknown	
	Meter / Deduct Meter					
	Brand	Sensus		Model		
	Type	Analog		Size	2"	
	Serial Number	11031210				
	Reading	20,630,910			Leak Detector Spinning?	No
	Visual Inspection	Leaks?	No	Notes	Looks Good	

WATER SOURCE						
Water Source #3	Location Address	Greens - 18248 Justice Way				
	Water Source					
	Backflow Device					
	Brand	Febco		Model		
	Type	RPZ		Size	2"	
	Visual Inspection	Leaks?	No	Notes	Looks Good	
	Date of Last Backflow Test	None			Unknown	
	Meter / Deduct Meter					
	Brand	Sensus		Model		
	Type	Analog		Size	2"	
	Serial Number	30873				
	Reading	17,249,806			Leak Detector Spinning?	No
	Visual Inspection	Leaks?	No	Notes	Looks Good	

Controller Data:

IRRIGATION CONTROLLER											
Location:		Left Side of 18296									
Brand:		Hunter			Model:		Hydrawise		Zone Count	26	
Start Times	#	Program A	Program B	Program C	Program D	Auxiliary	Sensors:		Rain	Weather	
	1	11:59 PM	8:00 PM				Installed?		Yes	Y N	
	2						Bypassed?		No	Y N	
	3						Tested?		Yes	Y N	
	4						Functional?		Yes	Y N	
	5						Notes	All 3 share a sensor			
	6										
Water Days		Even	Odd				Remote Access Installed?				
							Cell Card	Yes	Active?	Yes	
							WiFi		Active?		
							Hand Held		Active?		
Ohm Reading	Zone	Zone Runtime	Zone Runtime	Zone Runtime	Zone Runtime	Zone Runtime	Zone Type	R = Rotor S = Spray D = Drip MP = MP Rotator B = Bubbler			
	1	30						9 Volt Back-up Battery			
	2	30						Installed?	Tested?	Voltage	
	3	30						Y	Y		
	4	30									
	5	30						Controller Working?			
	6	30						Powered Up?	LCD Panel and Buttons Working?		
	7	30						Y	Y		
	8	30									
	9	30									
	10	30						Seasonal Adjust			
	11	30						Global Adjust %			
	12	30						Monthly Adjust			
	13	30									
	14	30									
	15	30						Month	Currently Set As	Recommend	
	16	30						January			
	17	30						February			
	18	30						March			
	19		30					April			
	20		30					May			
Open	21		30					June			
	22		30					July			
Open	23		30					August			
	24		30					Sept			
Open	25		30					October			
	26		30					November			
	27							December			
	28	Time Based should be Solar Sync									

Irrigation Controller #1

IRRIGATION CONTROLLER										
Location:		18341								
Brand:		Hunter			Model:		Hydrawise		Zone Count	27
Start Times	#	Program A	Program B	Program C	Program D	Auxiliary	Sensors:		Rain	Weather
	1	11:59 PM	8:00 PM				Installed?		Yes	Y N
	2						Bypassed?		No	Y N
	3						Tested?		Yes	Y N
	4						Functional?		Yes	Y N
	5						Notes	All 3 share a sensor		
	6									
Water Days		Even	Odd				Remote Access Installed?			
							Cell Card	Yes	Active?	Yes
							WiFi		Active?	
							Hand Held		Active?	
Ohm Reading	Zone	Zone Runtime	Zone Runtime	Zone Runtime	Zone Runtime	Zone Runtime	Zone Type	R = Rotor S = Spray D = Drip MP = MP Rotator B = Bubbler		
	1	30						9 Volt Back-up Battery		
	2	30						Installed?	Tested?	Voltage
	3	30						Y	Y	
	4	30						Controller Working?		
	5	30						Powered Up?	LCD Panel and Buttons Working?	
	6	30						Y	Y	
	7	30						Seasonal Adjust		
	8	30						Global Adjust %		
	9	30						Monthly Adjust		
	10	30						Month	Currently Set As	Recommend
	11	30						January		
	12	30						February		
	13	30						March		
	14	30						April		
	15	30						May		
Open	16	30						June		
	17	30						July		
Open	18	30						August		
	19		40					Sept		
	20							October		
	21							November		
	22							December		
	23							Time Based should be Solar Sync		
	24									
Open	25									
	26									
	27									
	28									

Irrigation Controller #2



IRRIGATION CONTROLLER									
Location:		Monument Sign							
Brand:		Hunter			Model:		Hydrawise	Zone Count	31
Start Times	#	Program A	Program B	Program C	Program D	Auxiliary	Sensors:	Rain	Weather
	1	11:59 PM	8:00 PM				Installed?	Yes	
	2						Bypassed?	No	
	3						Tested?	Yes	
	4						Functional?	Yes	
	5						Notes	All 3 share a sensor	
Water Days		Even	Odd				Remote Access Installed?		
							Cell Card	Yes	Active? Yes
							WiFi		Active?
							Hand Held		Active?
Ohm Reading	Zone	Zone Runtime	Zone Runtime	Zone Runtime	Zone Runtime	Zone Runtime	Zone Type	R = Rotor S = Spray D = Drip MP = MP Rotator B = Bubblers	
	1	30						9 Volt Back-up Battery	
	2	30						Installed?	Tested? Voltage
	3	30						Y	Y
	4	30						Controller Working?	
	5	30						Powered Up?	LCD Panel and Buttons Working?
	6	30						Y	Y
	7	30						Seasonal Adjust	
	8	30						Global Adjust %	
	9	30						Monthly Adjust	
	10	30						Month	Currently Set As
	11	30						January	Recommend
	12	30						February	
	13	30						March	
	14	30						April	
	15	30						May	
	16	30						June	
	17	30						July	
	18	30						August	
	19	30						Sept	
	20	30						October	
	21	30						November	
	22	30						December	
	23	30						Time Based should be Solar Sync	
	24	30							
	25	30							
	26	30							
	27	30							
	28	30							

Irrigation Controller #3

Zone by Zone Findings:

Controller 1

Controller 1 - ZONE DATA										
ZONE	1	2	3	4	5	6	7	8	9	10
TOTAL # of Rotors	11	27	13	16	16	20	19	19	30	16
4" Rotor Broken	3	8		3		1		5	3	
TOTAL # of Sprays					12				6	
4" Spray Broken										
Replace Spray Nzl										
Swap Mixed Head					13				7	
Add Heads										3
Eliminate Heads			1							
Move Heads		4	1			1				
Raise / Straighten										

Controller 1 - ZONE DATA										
ZONE	11	12	13	14	15	16	17	18	19	20
TOTAL # of Rotors	5	18	24	18	31	29	21	12	32	23
4" Rotor Broken			2		3		1			5
TOTAL # of Sprays		1			1	6	1	3		
4" Spray Broken										
Replace Spray Nzl										
Swap Mixed Head		1			1	6	1	3		
Replace 4" Spray with 6"										
Add Heads			1	8	4	1				
Move Heads			1				1			
Raise / Straighten										

Controller 1 - ZONE DATA										
ZONE	21	22	23	24	25	26	27	28	9	10
TOTAL # of Rotors	17	11	19		18					
4" Rotor Broken	10	6	6							
TOTAL # of Sprays										
4" Spray Broken										
Replace Spray Nzl										
Swap Mixed Head										
Add Heads										
Move Heads					4					
Raise / Straighten										

Controller 2

Controller 2 - ZONE DATA										
ZONE	1	2	3	4	5	6	7	8	9	10
TOTAL # of Rotors	13	14	16	14	12	25	18	21	6	9
4" Rotor Broken	5	8	3	3	2	2	2	6		1
TOTAL # of Sprays		1		2			4	1	5	
4" Spray Broken										
Replace Spray Nzl										
Swap Mixed Head		1		2			4	1	5	
Add Heads			1			1	3			
Eliminate Heads										
Move Heads			1							
Raise / Straighten										

Controller 2 - ZONE DATA										
ZONE	11	12	13	14	15	16	17	18	19	20
TOTAL # of Rotors	8	11	10	25	21	37	25	31		
4" Rotor Broken			4	4	2	8	2	7		
TOTAL # of Sprays	3									
4" Spray Broken										
Replace Spray Nzl										
Swap Mixed Head	3									
Add Heads				2	2	1				
Eliminate Heads										
Move Heads							1			
Raise / Straighten							2			

Controller 2 - ZONE DATA										
ZONE	21	22	23	24	25	26	27	28	9	10
TOTAL # of Rotors		12	19	19	17	15	12			
4" Rotor Broken			2	3	2	9	2			
TOTAL # of Sprays										
4" Spray Broken										
Replace Spray Nzl										
Replace MP Rotator Nzl										
Swap Mixed Head										
Add Heads			1							
Eliminate Heads										
Move Heads			6				1			
Raise / Straighten										

Controller 3

Controller 3 - ZONE DATA										
ZONE	1	2	3	4	5	6	7	8	9	10
TOTAL # of Rotors	19	16	15	17	24	20	13	25	24	15
4" Rotor Broken	7	7	5	5	11	9	2	3		4
TOTAL # of Sprays										
4" Spray Broken										
Replace Spray Nzl										
Swap Mixed Head										
Add Heads								2	4	
Eliminate Heads										
Move Heads							4	1		
Raise / Straighten										

Controller 3 - ZONE DATA										
ZONE	11	12	13	14	15	16	17	18	19	20
TOTAL # of Rotors	14	23	19	26	17	19	17	14	17	22
4" Rotor Broken	3	1		3			3	1	5	6
TOTAL # of Sprays										
4" Spray Broken										
Replace Spray Nzl										
Swap Mixed Head										
Add Heads		1						2	2	
Eliminate Heads										
Move Heads		2		2			5			
Raise / Straighten										

Controller 3 - ZONE DATA										
ZONE	21	22	23	24	25	26	27	28	9	10
TOTAL # of Rotors	22	17	41	21	26	21	17	19	13	12
4" Rotor Broken	6	2	10	2	12	2	1	3	3	1
12" Rotor Broken										
TOTAL # of Sprays										
4" Spray Broken										
Replace Spray Nzl										
Swap Mixed Head										
Add Heads			1		5	2		4		
Eliminate Heads										
Move Heads				1		1		1		
Raise / Straighten										

Critical Repairs and Adjustments

Repairs	Price (each)	Count	Total
Installed Rotor	\$ 65.00	250	\$ 16,250.00
Raise/Straighten Head	\$ 15.00	2	\$ 30.00

Design Issues

Repairs	Price (each)	Count	Total
Heads Needing to be Moved	\$ 150.00	38	\$ 5,700.00
Heads Needing to be Added	\$ 150.00	51	\$ 7,650.00
Redesign Areas Highlighted in Red Above	Bid upon Consultation		
Match Precipitation Rates	\$ 20.00	48	\$ 960.00

Recommended Efficiency Upgrades

Repairs	Price (each)	Count	Total
Optimize Smart Features on Controllers	\$ 250.00	3	\$ 750.00
High-Efficient Spray Nozzle Upgrade	\$ 65.00	46	\$ 2,990.00
Upgrade ALL Rotors w/ Proper Nozzle Size & Check Valves	\$ 65.00	1,210	\$ 78,650.00

In summary, completing the recommended critical repairs and upgrades will result in substantially more efficient water usage and healthier plant material.

Next Steps:

- Fix critical repair issues
- Optimize smart features on controllers
- Move heads out of prairie areas and add heads for coverage issues
- Match precipitation rates with rotating nozzles
- Upgrade existing spray nozzles with high-efficiency nozzles
- Annually maintain and monitor property
- Replace all rotors over time with check valves and proper nozzle size
- Redesign areas where heads are spraying into the prairie grass/tree line