Connemara Crossings Homeowner Association Rosemount, MN

Stage I

Landscape Irrigation Assessment Report & Recommendations



JULY 6, 2023

Water in Motion, Inc. Authored by: Timothy Malooly, CLIA, US EPA WaterSense Partner











GENERAL

Date of Site Assessment: July 6, 2023 Approx. Irrigated acres/Ft²: 5.6/243,936 Approximate 2023 value of a well-designed system this location: \$180,000 to \$200,000

The assessor met onsite pre-assessment two members of HOA leadership. The meeting was extensive with detailed information exchanged.



IRRIGATION SYSTEM GENERAL OBSERVATIONS

The irrigation system installation date is not known. The water supply with booster pump and controller are located next to 13892 Blanca Court. The water supply was found to be in operational condition in need of supports for the heavy plumbing elements, conduit to contain wiring, especially line voltage wires and improved placement of the controller to enable convenient maintenance.

There is one Hunter HCC Hydrawise[®] EPA WaterSense[®]-ready SMART irrigation controller with a connected wifi communication module operating 18 stations of sprinklers. A basic wireless rain sensor appeared to be in-service.

GENERAL RECOMMENDATIONS:

- A. Budget for bi-weekly proactive system walk-through maintenance
- B. Require the maintenance vendor to furnish proof of SMART scheduling practices
- C. Assemble a list of suitable replacement components for vendors to install to maintain system integrity. Include pressure-regulated sprinkler bodies to reduce overwatering and check valve sprinklers for low points to reduce waste from low point drainage.
- D. Require matched application rate nozzles on sprinklers to reduce overwatering.
- E. Add sprinklers where needed to improve distribution uniformity.
- F. Re-construct stations 4 and 13 to match the landscape

GENERAL RECOMMENDATIONS ESTIMATED COST RANGES:

ITEM	COST RANGE	ESTIMATED PAYBACK
А	\$5,000-\$6,000 annually, plus parts	
В	Zero cost	
С	Zero cost to create the requirement. Recommended sprinklers cost about 20% more than basic sprinklers	
D	Approximately 10 minutes of Tech time per sprinkler to properly nozzle	1 season
Е	\$2,000 to \$3,000	
F	\$3,000 to \$4,000	

CONTROLLER AND SENSORS

The system is operated from a Hunter HCC Hydrawise[®] EPA WaterSense[®]-ready SMART irrigation controller with a connected wifi communication module operating 18 stations of sprinklers. A basic wireless rain sensor appeared to be in-service.

Monthly schedule changes was in-place, a SMART scheduling practice. The assessor was locked-out of the controller programming and unable to ascertain if other scheduling practices were in-place in addition to monthly reference schedule adjustments.

Additional water-efficient scheduling practices to consider include:

- Station-by-station calculations based on plant/soil/slope and station application rates
- Cycle-and-soak scheduling to reduce runoff and waste

CONTROLLER AND SENSOR RECOMMENDATIONS:

- A. Replace the basic rain sensor with an advanced model with programmable delays after rain events
- B. Calculate, document and input station runtimes based on soil, sun, plant type
- C. Employ and document cycle-and-soak operation to reduce runoff and waste
- D. Consider adding flow sensing to enable action and reporting of malfunctions

CONTROLLER AND SENSOR IMPROVEMENT ESTIMATED COST RANGES:

ITEM	COST RANGE	РАҮВАСК
А	\$250	1 season
В	\$400-\$600 (Approx. 4 hours of professional time)	1 season
С	\$200-\$350 (Approx. 2 hours of professional time)	1 season
D	\$1,500	2-3 seasons

WATER SUPPLY AND BACKFLOW PREVENTION

One municipal irrigation water supply is sized adequately to serve the property. A booster pump was present to improve pressure. The system construction contrasted against the water supply capacity does not allow operating more than one station at a time.

The two reduced pressure zone backflow prevention assemblies did not appear to be tagged as tested per local code. Local code requires that backflow prevention assembles be tested not less than annually and tagged indicating a tested assembly functioned properly at the time of the test. The test tag must be signed and dated by an accredited tester.

WATER SUPPLY AND BACKFLOW RECOMMENDATIONS:

- A. Test, tag and furnish required paperwork for the backflow assembly, per local code.
- B. Add support posts and brace brackets under the plumbing equipment to relieve stress on fittings

WATER SUPPLY IMPROVEMENT ESTIMATED COST RANGES:

ITEM	COST RANGE	РАҮВАСК
А	\$180 +/- annually	
В	\$300 +/-	

IRRIGATION STATIONS/ZONES RECOMMENDATIONS

A "station" or "zone" is a group of sprinklers that operate together.

The irrigation system was operated station-by-station with photos taken and basic observations noted.

- A. Implement a plan to replace rotor-sprinklers randomly nozzled with matched application rate nozzles to improve distribution uniformity and water efficiency*
- B. Move sprinklers to overcome changes or growth of landscape over time
- C. Add sprinklers in areas of inadequate coverage
- D. Add check valve sprinklers at low points to reduce drainage water waste
- E. Use pressure regulated sprinkler bodies on replacement sprinklers

* A nozzle is the orifice that emits water from a sprinkler. Nozzles come in assorted sizes resulting in different amounts of water applied to the landscape. Best design and maintenance practices include matching application rates to the area being covered by a sprinkler – smaller nozzles on ¼ circle sprinklers, larger nozzles on sprinklers with greater coverage. "Distribution uniformity" is the evenness that sprinklers deliver water onto the landscape.

IRRIGATION STATION IMPROVEMENT ESTIMATED COST RANGES:

ITEM	COST RANGE	РАҮВАСК
А	\$5,000 +/- one time then maintain as part of M&O	3-4 seasons
В	\$1,500 +/- one time then maintain as part of M&O	2-3 seasons
С	\$2,500 +/- one time then maintain as part of M&O	3-4 seasons
D	\$500 +/- one time then maintain as part of M&O	4-5 seasons
F	Approximately 20% more cost than basic sprinkler bodies	

EXAMPLES OF REPLACEMENT PRODUCTS FOR FUTURE MAINTENANCE

ORIGINAL ITEM	REPLACE WITH	OPTIONAL
Hunter PgP rotor style	EPA WS-labeled sprinkler	Hunter MP rotator [®]
sprinkler	body like Hunter I20-Utra	nozzle on a WS-labeled
	or Rain Bird 5004-Plus	sprinkler body like
	w/matched application	Hunter ProSPray40 or
	rate nozzles	Rain Bird 1804-PRS-SAM
Hunter PgJ small rotor	Same or Rain Bird 3500	Hunter MP rotator [®]
style sprinkler	series w/matched	nozzle on a WS-labeled
	application rate nozzles	sprinkler body like
		Hunter ProSPray40 or
		Rain Bird 1804-PRS-SAM

EXAMPLES OF HOW TO ADD MATCHED APPLICATION RATE NOZZLES TO ROTOR-STYLE SPRINKLERS

Where rotor sprinklers	Where rotor sprinklers simultaneously water	
water same/similar areas	fronts/sides/backs	OPTIONAL
Small nozzles on 1/4 to 1/3 arc, medium nozzles on 1/2 to 2/3, large nozzles on 3/4 to full circle	Small nozzles in shady areas, larger nozzles in sunny areas	Convert rotors to MSMT nozzles on WS-labeled sprinkler bodies

SAMPLE IRRIGATION MAINTENANCE REQUEST FOR PROPOSAL GUIDANCE CAN BE FOUND AT:

https://www.vermillionriverwatershed.org/wp-content/uploads/2020/03/HOA-Irrigation-System-Services-RFP-Template-Final-3 6 2020.docx

WATER INFORMATION

Rosemount, MN 2023 monthly outdoor water price per unit (1,000 gallons) is \$4.19.

WATER USE HISTORY:

YEAR	ANNUAL USAGE (GALS)	APPROX. ANNUAL COST
2022	2,427,000	\$10,169
2021	2,780,000	\$11,648
2020	2,314,000	\$ 9,696
2019	873,000	\$ 3,658
AVERAGE (3 YRS)	2,098,500	\$ 8,737

ESTIMATED WATER NEED (BASED ON ET DATA & EFFECTIVE RAINFALL)

TURF (full sun to mostly sunny):1,348,714 gallonsCost: \$ 5,651

APPLICATION EFFIENCY RANGES AND SYSTEM OBSERVATIONS

An exceptionally well-designed and maintained sprinkler irrigation system may achieve up to 70% efficiency. Estimating the efficiency of this system depicts annual water use as follows:

"A Level" effectiveness and water use based on 70% efficiency = 1,926,734-gals Water Cost: \$ 8,073

"B Level" effectiveness and water use based on 60% efficiency = 2,119,407-gals Water Cost: \$ 8,880

"C Level" effectiveness and water use based on 50% efficiency = 2,312,080-gals Water Cost: \$ 9,687

Efficient irrigation system designs include consideration for plant type(s), soil, slope, sun, water requirement, water supply, watering timeframes and sprinkler performance -known as distribution uniformity (how evenly a sprinkler applies water). Rainfall is considered 100% uniform and is a reference when factoring sprinkler performance.

Based only on a calculation of irrigation system efficiency (avg. water use/water need) at this location, the efficiency of the system appears to approach 61%. Removing 2019 water use total from the calculation results in "C level" effectiveness or lower (approaching 50% or more water waste).

It should be the desire to operate the irrigation system in a manner to achieve "A level" effectiveness that includes both efficient water application and best practice-based scheduling.

Watering with a system that has had leaks repaired, employs water-saving components, uses nozzles that are sized for their respective application areas, a SMART irrigation controller with working rain sensor and automatic, SMART-based scheduling practices will help to achieve greater effectiveness and efficiency.

Because of such changes, the resulting health of the landscape will improve over time.

STATION FINDINGS



		SITE										STAT		ON							
				7		8		9		10		11		12		13		14		15	
	SITE	Location	BO mont secured 13001	13889, 13897, 13901, 13889, 13997, 13901, 13919	FFORT PROFILE ON	RO around 13975, 13977, 13979 & Jarge open back Blarney ct Blarney ct RO around 13900, 13918 and along Biscayne Ave and along Biscayne Ave		RO around 13900, 13918 and along Biscayne Ave	RO around 13936, 13954, 13972 ?			tO around 13990, 14088 7		RO around 13974, 13976, 13978 Blarnet ct		RO around 13980, 13982 & ctr island Blarney ct		RO/MSMT around 13987, 13985 Blarney ct	burner TMSM bur On	13983, 13981 Trail to gazebo	
				əmiT nuA		əmiT nuA		ອເຫເັT ຕມກິ		əmiT nuЯ		əmiT nuA		əmiT nuA		əmiT nuA		əmiT nuA		əmiT nuA	Γ
	Ö		A		A		A		A		A		A		A		A		A		A
	NTRO	Program	BC	_	B C	-	8 C		B C		B C		B C		B C		B C	<u></u>	BC		8 C
	SI		0		0		0		0		0		0		0		0		0		0
			E		ш		ш		ш		ш		ч		ш		Е		ш		ш
		Plant Material		Notes		Notes		Notes		Notes		Notes		Notes	Turf	Notes:	Turf	Notes:	Turf	Notes:	Turf
		Sprinkler Type		This stati		Missing s		Throwing				change ti		Throwing				Throwing		Overload	
	TYPE	Sprinkler Brand		on is margi		prinklers h		over walk				o msmt bet		over walk,				over walk,		ed station,	
		Sprinkler Model		nully overlo		alfway up di		along ? an				ween home		change to i				soddo ppy		MPN	
		Number of Sprinklers	740	aded, ? of	26	rive of 139	730	d throwing	26		25	NdW / s	26	msmt betw	22			ing msats,	730		
		Valve Malfunctions	Π.	nozzle		17 / se		into si						een hv				MPN, 3			
		Low Pressure		~		veral b		treet a						mes, i				See im.			
		High Pressure				lown F		ong 8						nove/				ages			
		Tilted Sprinklers	×			gP sea	×	scayne	×		×		×	aise fo	×		×		×		Π
	0	Spray Deflection				ils / sta		: / see	H				×	or grov	×						Η
	BSERV	Sunken Sprinklers	×		-	ition o	F	image	Η		1			/th of I							×
	/ED PF	Plugged Equipment	1		-	overs		s / MP	\vdash		12-1	e.		landsc			-				
	ROBLE	Arc Misalignment	×		-	large	×	N	×		-		×	/ ade			×	1			×
1	MS	Low Sprinkler Drainage				of ba	┝	• •	-		-		-	NHM			-				Η
		Leaky Seals or Eittings	×		×	ck yarı	-	5	×		-		×		_		-				H
Ž.		Missing or Broken Heads			-	d, oper			\vdash	5			_				()(Н
şt		Slow Drainage or Ponding			-) space			\vdash						-						Н
2		Needs matched application rate nozzles	×		×	too - t	×		×		×		×		×		×		×		×

_				_														
	Needs matched application	×		×														
	Slow Drainage or Ponding		5			1									1			
	Missing or Broken Heads																	
	Lateral or Drip Line Leaks																	
	Leaky Seals or Fittings		2															
EMS	Low Sprinkler Drainage																	
ROBL	Arc Misalignment																	
IVED F	Plugged Equipment				ingly													
OBSER	Sunken Sprinklers				accord													
	Spray Deflection		2	×	edule												1	
	Tilted Sprinklers			×	st sche	1												
	High Pressure				, adju													
	Low Pressure				haded			Γ										
	Valve Malfunctions				shiy s													
	Number of Sprinklers	22			d wood?, move in hig													
	Sprinkler Model		NPN					-										
TYPE	Sprinkler Brand		imt sides/ I		klers behin													
	Sprinkler Type		nge to ms	Η	eral sprin			-										
			Cha		Sev													
	Plant Material		Notes		Notes		Notes				Notes		Notes	Turf	Notes:	Turf	Notes:	Turf
		Ε		Ε		ш		ш		E		Е		E		Ε		Э
S		0		D		0		0		0		D		D		٥	-	0
ITRO	Program	C	-	C C		U m		0		C T		0		C	-	c	-	C S
ğ		A B	-	A B		E E	-	4	_	A F	-	A	-	8	2	A		4
			emiT nuA	-	əmiT nuA		emiT nuA	-	əmiT nuA		emiT nuß	~	əmiT nuß		əmiT nuA		əmiT nuð	
-			6,	-										_				
SITE	Location		RO around 13984, 13986 13988		RO behind trees alon(gazebo path													
Γ			17		18													
	SITE										STAT	10	ON					

Water in

STATION MAP



STATION BY STATION OBSERVATIONS



Created: Thu 06 Jul 14:45 2023

Connemara Crossings HOA

Plumbing is all metal to below grade. 2" Service, meter & Wilkins backflow prevention assembly.

Flint & Walling booster pump w/Munro Start relay w/out pump protection.



Created: Thu 06 Jul 14:47 2023

Connemara Crossings HOA

Hunter HCC Hydrawise wifi controller connected to wifi. Not very accessible to perform maintenance. Monthly seasonal scheduling adjustment is in place.



Created: Thu 06 Jul 14:50 2023

Connemara Crossings HOA

18 stations of sprinklers, multi strand field wire, heavy gauge pump start wire. Irritrol basic wireless basic rain sensor appears to be in service.



Created: Thu 06 Jul 15:14 2023

Connemara Crossings HOA

Station 2 between 13890 & 13882 Blanca. 1 rotor sprinkler not turning. Recommend changing to multi-stream, multi-trajectory (MSMT) sprinklers between homes to reduce overwatering.



Created: Thu 06 Jul 15:17 2023

Connemara Crossings HOA

Station 2 backs of homes recommend changing to MSMT sprinklers to reduce overwatering and reduce direct spray into mature trees.



Created: Thu 06 Jul 15:32 2023

Connemara Crossings HOA

Station 3 - sample of need to move or change to high-rise sprinklers to accommodate landscape growth.



Created: Thu 06 Jul 15:38 2023

Connemara Crossings HOA

Station 4 - 2 rotor sprinklers to cover the entire teardrop planting bed. Recommend changing to several 12" pop-up MSMTs placed for efficient coverage and reduced waste onto the road.



Created: Thu 06 Jul 15:43 2023

Connemara Crossings HOA

Station 4 - example of need to move or change to 12" pop-up sprinkler to overcome obstacles.



Created: Thu 06 Jul 15:49 2023

Connemara Crossings HOA

Station 5 - throwing over walk path. Spacing is beyond manufacturer recommendations. Recommend adding sprinklers where needed to avoid throwing over walks. Recommend matched application rate nozzles for improved efficiency.

(10)



Created: Thu 06 Jul 16:03 2023

Connemara Crossings HOA

Station 6 - another example of need to move or change to high popup sprinklers to accommodate landscape growth.



Created: Thu 06 Jul 16:07 2023

Connemara Crossings HOA

Station 7 - pointing to a severely pitched sprinkler resulting in water waste and surrounding dry area from resultant lack of coverage.

Created: Thu 06 Jul 16:44 2023

Connemara Crossings HOA

Station 9 - several sprinklers throwing onto Biscayne Ave.



Created: Thu 06 Jul 16:45 2023

Connemara Crossings HOA

Station 9 - sprinklers throwing over walks along 139th.



Created: Thu 06 Jul 16:50 2023

Connemara Crossings HOA

Station 10 - side of 13972 sprinkler is significantly cut down and tilted resulting in ineffective coverage, water waste and resultant dry area.



Created: Thu 06 Jul 17:03 2023

Connemara Crossings HOA

Station 13 – center island planter with the same poor configuration as the station 4 planter. Recommend reconstructing w/12" popup sprinklers spaced appropriately.



Created: Thu 06 Jul 17:07 2023

Connemara Crossings HOA

Station 14- right side of 13985. Sprinkler placement and nozzle selection is largely ineffective. Recommend adding opposing MSMTs as needed for improved coverage and re-nozzle sprinklers to avoid throwing over the walk path.



Created: Thu 06 Jul 17:09 2023

Connemara Crossings HOA

Station 14 – right side of 13985. Adjust sprinklers to avoid throwing over the walk and add sprinklers as needed for proper coverage.



Created: Thu 06 Jul 17:22 2023

Connemara Crossings HOA

Station 18 - several sprinklers behind grassline. Heavy shade for much of the station. Recommend moving blocked sprinklers, add matched application rate nozzles and adjust runtimes accordingly.

GLOSSARY

Arc – The area a part-circle sprinkler irrigates, expressed in degrees of a circle. For example, a 90-degree arc provides quarter-circle coverage, while a 180-degree arc provides half-circle coverage.

Backflow Preventer – A mechanical assembly installed to protect the potable water supply from potentially contaminated irrigation water.

Best Management Practices – An irrigation BMP is a voluntary irrigation practice that is both economical and practical and is designed to reduce water consumption and protect water quality while maintaining plant health at the desired level.

Certified Landscape Irrigation Auditor – The Certified Landscape Irrigation Auditor is involved in the analysis of landscape irrigation water use. Auditors collect site data, make maintenance recommendations and perform water audits. Through their analytical work at the site, these irrigation professionals develop monthly irrigation base schedules.

Controller – An automatic timing device that sends an electric signal for automatic valves to open or close according to a set irrigation schedule.

Cycle-and-Soak – Allows the user to divide a station's run time into more usable, shorter duration cycles. Cycle-and-soak is particularly applicable for slopes and tight soil (such as clay) and helps prevent excessive runoff. The cycle time is entered into the controller as a fraction of the station's watering time, and the soak time as the minimum soak required before the watering of the next portion. The total number of cycles is determined by taking the total programmed station run time and dividing it by the cycle time.

Distribution Uniformity – (Also referred as "Performance") Measure of the uniformity of irrigation water over an area.

EPA WaterSense Partner – WaterSense is a voluntary, public-private partnership program sponsored by the U.S. Environmental Protection Agency. WaterSense works to protect the future of national water supplies by promoting water-efficient products, practices and professionals. EPA WaterSense Partners are committed to bringing water-efficient products and practices to the market.

Fixed Arc Nozzles – Rotor style sprinkler where the arc stays static and is non-adjustable.

Hydrozone – Grouping of plants with similar water requirements so that they can be irrigated with a common zone.

Maintenance – The work of keeping something in operating condition.

Matched Application Rates – Refers to sprinklers that apply water at the same rate per hour no matter the arc of coverage or part of a circle they cover.

Microclimate – The unique environmental conditions in a particular area of the landscape. Factors include amount of sunlight or shade, soil type, slope and wind.

MSMT – A "multi-stream, multi-trajectory" sprinkler that uses individual, rotating streams of water to distribute irrigation water.

Municipal Water – Domestic or drinking water. It can be used as a source of irrigation water, but once water enters an irrigation system (and passes through the backflow device) it is no longer considered potable.

Nozzle – The final opening through which water passes from the sprinkler or emitter. Nozzle shape, size, and placement has a direct effect on the distance, watering pattern, and distribution efficiency. Pitched Sprinkler Head – A sprinkler that is slanted or tilted.

Point of Connection – Location where irrigation system is connected to a (potable) water supply. Rain Sensor – A device that automatically interrupts irrigation events during periods of sufficient moisture.

Rotor Sprinkler – A type of sprinkler where a primary stream of water is distributed back and forth across the area being watered.

Runoff – Portion of precipitation, snow melt or irrigation, that flows over the soil, eventually making its way to surface water supplies.

Spray Sprinkler – A sprinkler that does not rotate.

Sprinkler to Sprinkler Coverage – Single sprinklers generally do not provide even distribution of water

throughout their range of throw. When overlapping coverage is provided, the weak areas from one sprinkler are supplemented by the strong areas from another sprinkler. Overlapping coverage also reduces time necessary to complete an irrigation cycle from the perspective of total water required.

Station/Zone/Circuit – Section of an irrigation system served by a single point of control. Also known as a Hydrozone, optimally comprised of similar sprinkler types and plant material types and applying water onto a consistent topography or microclimate.

Topography – The arrangement of the natural and artificial physical features of an area. Valve Box – A protective container installed around an underground valve to allow operation or maintenance access to underground pipeline valves.

Variable Arc Nozzles – Rotor style sprinkler where the arc can be adjusted to more accurately apply irrigation to nonconvention landscape areas.

WiM – Water in Motion, Inc.