

FALL 2017

Data Collection Report
Soil & Water Consulting



— Est. 1947 —

Tucson Country Club



SOIL and WATER CONSULTING

Course Name: Tucson Country Club

Date of Visit: September 16, 2017

	<u>9/6/16</u>	<u>3/20/17</u>	<u>6/2/17</u>	<u>9/16/17</u>
Humidity/Air Temperature	20%/90°	20%/92°	20%/90°	32%/90°
Greens Temperature	n/t	78°	82°	80°
Fairway Temperature	n/t	79°	80°	80°

	Acceptable Range For Water Sample	Effluent Lake <u>9/6/16</u>	Hole #1 <u>3/20/17</u>	Hole #4 <u>6/2/17</u>	Hole #8 <u>9/16/17</u>
EC	<2.25 mmhos/cm	0.46	0.33	0.37	0.32
Sodium		82.85	29.04	37.46	27.94
Calcium	20 - 60 ppm	17.75	32.35	32.68	38.61
Magnesium	10 - 25 ppm	1.06	2.64	1.80	2.33
Potassium	5 - 20 ppm	1.45	3.55	3.06	1.76
Nitrate	10 - 25 ppm	1.70	0.98	<0.10	0.50
Phosphorus	5 - 20 ppm	<0.20	<0.20	0.24	<0.20
Sulfur	30 - 90 ppm	23.87	29.10	28.66	24.71
Bicarbonate	<120 ppm	195.82	118.79	131.41	129.96
Boron	<0.67 ppm	0.15	0.05	0.06	<0.05
Chloride	<177 ppm	16.00	12.25	14.98	10.55



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TEE	Acceptable Range For Alkaline Soils Sample	7 9/6/16	1 3/20/17	4 6/2/17	17 9/16/17
Organic Matter (Humus)	2 - 3%	2.17	2.56	2.49	2.93
Sulfur	12 - 16 ppm	34.00	17.00	35.00	116.00
Olsen - Phosphorus	13 - 20 ppm	9.00	19.00	14.00	9.00
Calcium - TEC of 6 - 12	1,000 lbs/acre	3,536.00	3,360.00	4,572.00	3,044.00
Magnesium	>7% base saturation or at least 200 lbs/acre	6.79%/184	9.71%/246	8.245/286	8.52%/214
Potassium - TEC of 0 - 35	100 ppm	180.00	116.00	193.00	202.00
Copper	>0.8 ppm	1.37	1.15	1.32	1.42
Manganese	>1 ppm	2.00	3.00	2.00	19.00
Zinc	>1 - 2 ppm	4.63	6.98	4.80	8.60

FAIRWAY	Acceptable Range For Alkaline Soils Sample	7 9/6/16	1 3/20/17	4 6/2/17	17 9/16/17
Organic Matter (Humus)	2 - 3%	2.35	2.37	3.64	2.99
Sulfur	12 - 16 ppm	47.00	23.00	53.00	49.00
Olsen - Phosphorus	13 - 20 ppm	10.00	34.00	27.00	9.00
Calcium - TEC of 6 - 12	1,000 lbs/acre	3,364.00	3,054.00	3,394.00	3,950.00
Magnesium	>7% base saturation or at least 200 lbs/acre	8.10%/214	10.23%/250	10.31%/290	8.43%/258
Potassium - TEC of 0 - 35	100 ppm	245.00	229.00	269.00	297.00
Copper	>0.8 ppm	1.94	1.50	1.18	2.67
Manganese	>1 ppm	3.00	3.00	2.00	5.00
Zinc	>1 - 2 ppm	4.15	4.47	7.58	4.82

GREENS	Acceptable Range For Alkaline Soils Sample	7 9/6/16	1 3/20/17	4 6/2/17	17 9/16/17
Organic Matter (Humus)	2 - 3%	0.42	0.80	0.62	0.66
Sulfur	12 - 16 ppm	11.00	11.00	11.00	24.00
Olsen - Phosphorus	13 - 20 ppm	9.00	17.00	11.00	9.00
Calcium - TEC of 6 - 12	1,000 lbs/acre	2,090.00	2,134.00	2,232.00	2,270.00
Magnesium	>7% base saturation or at least 200 lbs/acre	7.31%/126	9.40%/166	8.62%/162	9.31%/176
Potassium - TEC of 0 - 35	150 ppm	353.00	284.00	370.00	333.00
Copper	>0.8 ppm	1.50	1.40	1.73	1.64
Manganese	4 ppm or more	2.00	2.00	2.00	2.00
Zinc	>1 - 2 ppm	2.98	4.55	5.36	3.97



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TEE	Acceptable Range For Saturated Paste Sample	4,13 (avg) 6/2/17	8,17 (avg) 9/16/17
Nitrate - Ryegrass	5 - 10 ppm		
Nitrate - Bermudagrass	10 -15 ppm	<0.5	9.40
Phosphorus	2 - 10 ppm	2.00	3.65
Potassium	40 - 100 ppm	13.61	118.82
Calcium	60 - 200 ppm	43.38	176.12
Magnesium	20 - 70 ppm	6.64	21.34
Sodium	0 - 30 ppm	116.33	118.31
Soluble Salts	<1,920 ppm	471.00	1,081.00
Bicarbonate	<60 ppm	214.76	286.75
Chloride	<1,000 ppm	51.50	132.00
SAR	<4%	4.30	2.37

FAIRWAY	Acceptable Range For Saturated Paste Sample	4,13 (avg) 6/2/17	8,17 (avg) 9/16/17
Nitrate - Ryegrass	5 - 10 ppm		
Nitrate - Bermudagrass	10 -15 ppm	<0.7	37.80
Phosphorus	2 - 10 ppm	2.81	2.21
Potassium	40 - 100 ppm	41.32	56.66
Calcium	60 - 200 ppm	60.07	156.63
Magnesium	20 - 70 ppm	10.19	20.52
Sodium	0 - 30 ppm	138.95	150.19
Soluble Salts	<1,920 ppm	652.00	943.00
Bicarbonate	<60 ppm	178.15	333.12
Chloride	<1,000 ppm	85.50	78.00
SAR	<4%	4.38	3.02

GREENS	Acceptable Range For Saturated Paste Sample	4,13 (avg) 6/2/17	8,17 (avg) 9/16/17
Nitrate - Bentgrass	1-3 ppm	<0.5	4.75
Phosphorus	2 - 7 ppm	1.95	2.17
Potassium	25-40 ppm	20.37	33.94
Calcium	50- 75 ppm	26.72	46.63
Magnesium	15-30 ppm	4.06	6.58
Sodium	0 - 30 ppm	38.15	55.51
Soluble Salts	<1,000 ppm	233.50	391.00
Bicarbonate	<60 ppm	125.68	124.46
Chloride	<200 ppm	23.00	25.00
SAR	<4%	1.84	2.04



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TEE	Acceptable Range For Tissue Sample	8,17 (avg) <u>9/16/17</u>
Nitrogen	2.49%-4.56%	2.81
Phosphorus	0.26% - 0.38%	0.32
Potassium	0.95% - 1.97%	1.16
Calcium	0.50%-0.90%	0.65
Magnesium	0.13%-0.16%	0.11
Sodium	622-1709 ppm	1,030.00

FAIRWAY	Acceptable Range For Tissue Sample	8,17 (avg) <u>9/16/17</u>
Nitrogen	2.49%-4.56%	2.97
Phosphorus	0.26% - 0.38%	0.32
Potassium	0.95% - 1.97%	1.45
Calcium	0.50%-0.90%	0.60
Magnesium	0.13%-0.16%	0.12
Sodium	622-1709 ppm	1,325.00

GREENS	Acceptable Range For Tissue Sample	8,17 (avg) <u>9/16/17</u>
Nitrogen	3.0%-6.5%	4.91
Phosphorus	0.2%-0.55%	0.59
Potassium	0.86%-2.55%	2.68
Calcium	0.21%-0.50%	0.50
Magnesium	0.09%-0.22%	0.19
Sodium	506- 2264 ppm	960.00



RECOMMENDATIONS



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Thoughts on the course visit

What I believe the picture below shows is physical shortcomings in greens. Your fertility program seems to be solid based on the data. You have reached a fairly stable situation in the chemistry where I don't see dramatic deficiencies and ups and downs in some levels of nutrients. Your cultural programs and use of different aerification machines has made a difference as well. (for example green #12) More fans will help during the monsoon season and the increased humidity that comes along with it. However, the greens-mix is very difficult to work with when you are in a wet weather pattern. As you know, cool season turf such as bentgrass and poa cannot stay wet for too long without damage occurring. So during the Summer months the green's soil profile needs to be quick to drain and move water off the surface and through root-zone. The way this mix was blended prevents this from happening. I am not recommending a complete renovation of the greens, but things like drill and fill could amend the soil and make it better draining. Essentially, with the drill and fill process, you would be changing the greens-mix one 1" round hole at a time.

Until that process begins, things like fans will help to make the turf better but will never cure the root problem. The best example you have is the new practice facility. There you used a better greens-mix and have had fans from the beginning. So, I don't believe the problem is the grass type, but the physical properties of the greens-mix.



Notes from the visit

- Greens mowing height- closed.
- 0-0-50 and Pro-mag and 28-8-18 spray.
- Interseeding bentgrass after aerification of greens.
- Fairways mowing height- scalped.
- No recent fairway fertility.
- Fans approved for next year on greens.
- All bunkers have been reshaped.

Fertilizer and Product Recommendations

Tees & Fairways (ONE TIME BEFORE WINTER)

Phosphorus- 150 pounds of product per acre.(11-55-00)

*** Spray Epsom salts in tank mixes that will allow.**

Greens (Monthly applications)

Phosphorus- 3 pounds of product per 1,000 square feet. (11-55-00)

Potassium- 2 pounds of product per 1,000 square feet (**Poly-K** 0-0-50)

***Spray Epsom salts in tank mixes that will allow.**