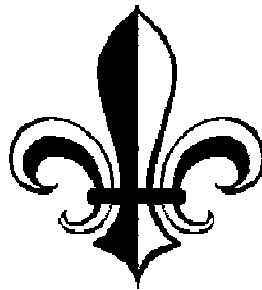


SUMMER 2016
Data Collection Report
Soil & Water Consulting



Las Vegas Country Club



SOIL and WATER CONSULTING

Course Name: Las Vegas Country Club

Date of Visit: June 8, 2016

	<u>6/19/15</u>	<u>9/30/15</u>	<u>3/21/16</u>	<u>6/8/16</u>
Humidity/Air Temperature	15%/110°	20%/100°	9%/84°	10%/105°
Greens Temperature	80°	68.6°	55.6°	83.3°
Fairway Temperature	80°	72°	57.5°	82.6°

	Acceptable Range For Water Sample	Hole #3 <u>6/19/15</u>	Hole #11 <u>9/30/15</u>	Hole #5 <u>3/21/16</u>	Hole #16 <u>6/8/16</u>
EC	<2.25 mmhos/cm	0.82	0.82	0.79	0.80
Sodium		18.54	18.87	21.07	20.40
Calcium	20 - 60 ppm	86.49	80.39	75.53	80.54
Magnesium	10 - 25 ppm	41.22	38.39	38.77	42.38
Potassium	5 - 20 ppm	3.78	3.86	3.63	4.55
Sulfur	30 - 90 ppm	258.33	283.50	195.45	213.72
Bicarbonate	<120 ppm	148.83	123.28	224.61	222.89
Boron	<0.67 ppm	0.25	0.12	0.10	0.10
Chloride	<177 ppm	13.62	19.40	24.51	20.60



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TEE	Acceptable Range For Alkaline Soils Sample	3 6/19/15	2 9/30/15	5 3/21/16	6 6/8/16
Organic Matter (Humus)	2 - 3%	3.73	1.98	2.93	3.94
Sulfur	12 - 16 ppm	57.00	1,280.00	913.00	96.00
Olsen - Phosphorus	13 - 20 ppm	23.00	21.00	26.00	22.00
Calcium - TEC of 6 - 12	1,000 lbs/acre	3,574.00	6,802.00	6,134.00	4,422.00
Magnesium	>7% base saturation or at least 200 lbs/acre	22.17%/704	10.62%/548	16.16%/780	23.45%/928
Potassium - TEC of 0 - 35	100 ppm	273.00	434.00	200.00	269.00
Copper	>0.8 ppm	1.18	0.81	1.25	1.23
Manganese	>1 ppm	<1	2.00	1.00	1.00
Zinc	>1 - 2 ppm	5.13	2.76	5.51	8.57

FAIRWAY	Acceptable Range For Alkaline Soils Sample	3 6/19/15	2 9/30/15	5 3/21/16	6 6/8/16
Organic Matter (Humus)	2 - 3%	4.16	3.97	3.70	5.12
Sulfur	12 - 16 ppm	3,266.00	1,647.00	694.00	894.00
Olsen - Phosphorus	13 - 20 ppm	27.00	19.00	21.00	23.00
Calcium - TEC of 6 - 12	1,000 lbs/acre	12,176.00	8,542.00	6,394.00	6,738.00
Magnesium	>7% base saturation or at least 200 lbs/acre	13.03%/1,178	13.15%/842	19.18%/1006	20.86%/1190
Potassium - TEC of 0 - 35	100 ppm	261.00	237.00	214.00	264.00
Copper	>0.8 ppm	3.22	1.30	2.21	1.64
Manganese	>1 ppm	3.00	2.00	2.00	1.00
Zinc	>1 - 2 ppm	14.05	11.90	13.24	11.38

GREENS	Acceptable Range For Alkaline Soils Sample	3 6/19/15	2 9/30/15	5 3/21/16	6 6/8/16
Organic Matter (Humus)	2 - 3%	0.78	0.64	0.53	0.57
Sulfur	12 - 16 ppm	87.00	47.00	60.00	37.00
Olsen - Phosphorus	13 - 20 ppm	51.00	40.00	26.00	45.00
Calcium - TEC of 6 - 12	1,000 lbs/acre	2,930.00	2,920.00	2,936.00	2,514.00
Magnesium	>7% base saturation or at least 200 lbs/acre	14.10%/312	10.54%/220	12.34%/268	13.03%/242
Potassium - TEC of 0 - 35	150 ppm	84.00	53.00	61.00	41.00
Copper	>0.8 ppm	0.93	0.44	0.95	0.71
Manganese	4 ppm or more	<1	1.00	2.00	2.00
Zinc	>1 - 2 ppm	1.65	2.41	5.20	3.94



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TEE	Acceptable Range For Saturated Paste Sample	5,14 (avg) 3/21/16	6,15 (avg) 6/8/16
Nitrate - Ryegrass	5 - 10 ppm	14.85	26.50
Nitrate - Bermudagrass	10 -15 ppm		
Phosphorus	2 - 10 ppm	1.60	1.48
Potassium	40 - 100 ppm	46.76	76.58
Calcium	60 - 200 ppm	241.08	291.62
Magnesium	20 - 70 ppm	94.27	152.11
Sodium	0 - 30 ppm	59.00	99.29
Soluble Salts	<1,920 ppm	1,363.50	1,951.50
Bicarbonate	<60 ppm	209.88	287.97
Chloride	<1,000 ppm	55.50	104.50
SAR	<4%	0.97	1.17

FAIRWAY	Acceptable Range For Saturated Paste Sample	5,14 (avg) 3/21/16	6,15 (avg) 6/8/16
Nitrate - Ryegrass	5 - 10 ppm	34.30	63.95
Nitrate - Bermudagrass	10 -15 ppm		
Phosphorus	2 - 10 ppm	1.12	1.14
Potassium	40 - 100 ppm	85.09	106.69
Calcium	60 - 200 ppm	530.62	507.02
Magnesium	20 - 70 ppm	182.64	226.01
Sodium	0 - 30 ppm	69.10	97.99
Soluble Salts	<1,920 ppm	2,115.00	2,633.50
Bicarbonate	<60 ppm	217.20	217.20
Chloride	<1,000 ppm	78.00	139.50
SAR	<4%	0.66	0.91

GREENS	Acceptable Range For Saturated Paste Sample	5,14 (avg) 3/21/16	6,15 (avg) 6/8/16	PG 6/8/16
Nitrate - Bentgrass	1-3 ppm	6.45	10.85	11.70
Phosphorus	2 - 7 ppm	4.69	4.41	3.90
Potassium	25-40 ppm	44.38	37.28	65.12
Calcium	50- 75 ppm	64.07	53.38	50.84
Magnesium	15-30 ppm	27.92	25.54	24.10
Sodium	0 - 30 ppm	27.99	13.36	22.47
Soluble Salts	<1,000 ppm	563.00	436.00	627.00
Bicarbonate	<60 ppm	156.19	136.67	143.98
Chloride	<200 ppm	20.50	16.50	18.00
SAR	<4%	0.74	0.38	0.65



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TEE	Acceptable Range For Tissue Sample	6,15 (avg) 6/8/2016
Nitrogen	3.34%-5.10%	2.81
Phosphorus	0.35% - 0.55%	0.44
Potassium	2.0% - 3.42%	1.80
Calcium	0.25%-0.5%	0.53
Magnesium	0.16%-0.32%	0.26
Sulfur	0.27% - 0.56%	0.43
Boron	5-17 ppm	17.95
Iron	97-934 ppm	210.00
Manganese	30-73 ppm	39.15
Copper	6-38 ppm	16.45
Zinc	16-84ppm	52.55
Aluminum	52-92 ppm	143.50
Sodium	229-1107 ppm	514.00

FAIRWAY	Acceptable Range For Tissue Sample	6,15 (avg) 6/8/2016
Nitrogen	3.34%-5.10%	3.98
Phosphorus	0.35% - 0.55%	0.48
Potassium	2.0% - 3.42%	2.24
Calcium	0.25%-0.5%	0.90
Magnesium	0.16%-0.32%	0.35
Sulfur	0.27% - 0.56%	0.78
Boron	5-17 ppm	32.40
Iron	97-934 ppm	500.00
Manganese	30-73 ppm	110.15
Copper	6-38 ppm	23.75
Zinc	16-84ppm	55.25
Aluminum	52-92 ppm	317.50
Sodium	229-1107 ppm	552.00

GREENS	Acceptable Range For Tissue Sample	6,15 (avg) 6/8/2016
Nitrogen	3.0%-6.5%	4.42
Phosphorus	0.2%-0.55%	0.45
Potassium	0.86%-2.55%	2.38
Calcium	0.21%-0.50%	0.73
Magnesium	0.09%-0.22%	0.41
Sulfur	0.23%-0.39%	0.64
Boron	5-24 ppm	22.70
Iron	99-500 ppm	257.50
Manganese	30-160 ppm	69.10
Copper	9-40 ppm	13.45
Zinc	5-60 ppm	58.05
Aluminum	63- 408 ppm	101.45
Sodium	506- 2264 ppm	719.50



RECOMMENDATIONS



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Thoughts on the course visit

The drone photo to the right, gives such a different perspective on the 10th hole. The hole looks as good as any on the course, but from above you can see irrigation coverage issues and some effects of cart traffic. We looked at several sprinkler heads that had "green donuts" around them. It sounds to me as if you have done all you can so far with regards to correcting any irrigation system issues- Changing heads, nozzles and asking Toro to get involved. There are always areas that soil physical characteristics may be the limiting factor. Your native fairway and rough soil is very fine and as we saw the day I was sampling, what is usually an easy job, was difficult when things were hot and dry. You do irrigate much less than had been done in the past several years. So, the reaction to that in a given area may take some time to get used to. I don believe the less water you use the better the course will be. However, not using the Sulfur burner anymore will require more amendments. Note the fertilizer recommendations below and consider using them this summer to offset the high Bicarbonates in the well water.



Notes from the visit

- All fans are out on greens- one more is on order.
- Tees and fairways had 21-0-0 applied one day prior to my visit.
- Approach aerification has begun.
- Flew the drone over #10.
- Greens- Aerified, gypsum applied, sprayed pHacid, Flushed and 0-0-50 applied a couple of days prior to sample collection.

Fertilizer and Product Recommendations

Tee & Fairways

Calcium- 500 pounds of product per acre. (Gypsum)

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

*** Synthetic acid spray and water in every month.**

Greens (Monthly applications)

Calcium- 5 pounds of product per acre. (Gypsum) **Once per month flush.**

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

Manganese- 3 ounce rate per 1,000 square feet. (Tech-Magnum)
WATER IN!

*** Synthetic acid spray and water in every two weeks**