



Data Collection Report Spring 2016

Ron Jaworski's Signature Courses





SOIL and WATER CONSULTING



Data Collection Report ~ Spring 2016



SOIL and WATER CONSULTING

Course Name: Blue Heron Pines Golf Club
Date of Visit: 4/20/2016

	<u>4/24/15</u>	<u>4/20/16</u>
Humidity/Air Temperature	48°	38%/55°
Fairway Temperature	47.4°	51.1°
Greens Temperature	41°	46.6°

Notes from the visit

- Greens Mowing height - 0.135"
- Tees and Fairways height - 0.
- Preferred cultivation practices - Minimum 3" depth using hollow tines.
- Tuckahoe Top-dressing sand is ok to use at BHPGC.
- Preferred top-dressing regiment - Every other week while grass is actively growing.
- Applied Gypsum, Potash and Nitrogen during aerification process. (after samples were collected)
- No fertilizer on tees or fairways in 2016 as of visit.
- Jason moved to Ramblewood CC the week after my visit.



SOIL and WATER CONSULTING

TEE	Acceptable Range For Standard Soil Sample	5,8,13 (avg) 4/24/15	7,14 (avg) 4/20/16
Organic Matter (Humus)	2 - 3%	2.02	1.71
Sulfur	50 - 100 ppm	9.67	11.00
Mehlich III - Phosphorus	350 lbs/acre	169.33	329.50
Calcium	68%	74.27	73.54
Magnesium	15%	14.28	16.26
Potassium	5%	1.25	1.15
Sodium	<2%	2.05	2.29
Boron	1 - 1.5 ppm	0.28	0.44
Iron	120 ppm	196.67	228.50
Manganese	50 ppm	5.33	9.00

TEE	Acceptable Range For Saturated Paste Sample	5,13 (avg) 4/25/15	7,14 (avg) 4/20/16
Nitrate - Bentgrass	5 - 10 ppm	<0.5	<0.5
Phosphorus	2 - 10 ppm	0.21	0.64
Potassium	40 - 100 ppm	1.11	7.31
Calcium	60 - 200 ppm	18.96	34.17
Magnesium	20 - 70 ppm	5.60	11.34
Sodium	0 - 30 ppm	8.77	7.41
Soluble Salts	<1,920 ppm	95.50	174.50
Bicarbonate	<60 ppm	57.35	125.68
Chloride	<1,000 ppm	7.00	16.00
SAR	<4%	0.45	0.28

FAIRWAY	Acceptable Range For Standard Soil Sample	5,8,13 (avg) 4/24/15	7,14 (avg) 4/20/16
Organic Matter (Humus)	2 - 3%	3.69	3.33
Sulfur	50 - 100 ppm	15.33	22.00
Mehlich III - Phosphorus	350 lbs/acre	354.00	391.50
Calcium	68%	70.04	64.87
Magnesium	15%	16.49	19.71
Potassium	5%	2.05	2.86
Sodium	<2%	1.71	1.75
Boron	1 - 1.5 ppm	0.44	0.63
Iron	120 ppm	205.33	338.00
Manganese	50 ppm	8.33	14.00

FAIRWAY	Acceptable Range For Saturated Paste Sample	5,13 (avg) 4/25/15	7,14 (avg) 4/20/16
Nitrate - Bentgrass	5 - 10 ppm	<0.5	<0.5
Phosphorus	2 - 10 ppm	0.50	0.55
Potassium	40 - 100 ppm	9.31	21.38
Calcium	60 - 200 ppm	23.06	35.50
Magnesium	20 - 70 ppm	9.11	16.08
Sodium	0 - 30 ppm	9.07	12.14
Soluble Salts	<1,920 ppm	124.50	231.50
Bicarbonate	<60 ppm	81.76	103.72
Chloride	<1,000 ppm	8.50	23.50
SAR	<4%	0.41	0.43

GREENS	Acceptable Range For Standard Soil Sample	5,8,13 (avg) 4/24/15	7,14 (avg) 4/20/16
Organic Matter (Humus)	2 - 3%	0.70	0.76
Sulfur	50 - 100 ppm	16.33	9.00
Mehlich III - Phosphorus	350 lbs/acre	172.67	222.00
Calcium	68%	67.05	64.09
Magnesium	15%	9.16	15.81
Potassium	5%	2.49	2.41
Sodium	<2%	3.63	3.60
Boron	1 - 1.5 ppm	<0.20	<0.22
Iron	120 ppm	82.67	122.50
Manganese	50 ppm	21.00	30.00

GREENS	Acceptable Range For Saturated Paste Sample	5,13 (avg) 4/25/15	7,14 (avg) 4/20/16
Nitrate - Bentgrass	1-3 ppm	<0.5	<0.5
Phosphorus	2 - 7 ppm	0.56	0.43
Potassium	25-40 ppm	13.07	13.74
Calcium	50- 75 ppm	18.32	19.47
Magnesium	15-30 ppm	3.53	8.23
Sodium	0 - 30 ppm	10.67	5.59
Soluble Salts	<1,000 ppm	137.00	127.00
Bicarbonate	<60 ppm	15.86	71.99
Chloride	<200 ppm	3.50	12.00
SAR	<4%	0.60	0.27

WATER	Acceptable Range For Water Sample	Irrigation Water 4/24/15	Irrigation Water 4/20/16
EC	<2.25 mmhos/cm	0.17	0.18
Sodium		23.12	25.60
Calcium	20 - 60 ppm	6.84	5.95
Magnesium	10 - 25 ppm	1.93	1.63
Potassium	5 - 20 ppm	2.61	2.46
Phosphorus	0.1 - 0.4 ppm	n/t	n/t
Nitrate	5 - 50 ppm	n/t	n/t
Sulfur	30 - 90 ppm	5.49	6.20
Bicarbonate	<120 ppm	35.57	35.28
Boron	<0.67 ppm	<0.05	<0.05
Chloride	<177 ppm	29.11	31.49



BLUE HERON PINES GC: GREEN #12



GREENS		Green #12 Below 0" (2013)	Green #12 0-2 1/2" (2016)	Green #12 Below 2 1/2" (2016)	Tuckahoe Topdressing Sand	USGA Recommendations
Clay		2.60	1.90	0.90	0.70	<= 3.0%
Silt		1.90	1.50	3.70	0.10	<= 5.0%
Sand		92.70	96.20	94.00	98.60	94 - 100%
Gravel		2.80	0.40	1.40	0.60	
Organic Material		0.83	2.14	0.55	<0.1	
<u>Sieve #:</u>						
Fine Gravel	10	2.80	0.40	1.40	0.60	2.0mm <= 3.0%
Very Coarse Sand	18	3.90	2.70	4.80	9.30	2.0mm + 1.0mm <= 10%
Coarse Sand	35	20.20	21.20	22.50	27.40	
Medium Sand	60	44.20	50.20	44.00	45.40	0.5mm + 0.25mm >= 60%
Fine Sand	100	19.00	17.50	17.10	13.00	0.15mm <= 20%
Very Fine Sand	140	4.40	3.40	4.30	2.90	0.106mm + 0.053mm <= 5.0%
Very Fine Sand	270	1.10	1.20	1.40	0.60	
Infiltration Rate		2.1"	<0.5"	2.7"	n/t	>6 inches per hour



Data Collection Report ~ Spring 2016



SOIL and WATER CONSULTING

Course Name: Downingtown Country Club

Date of Visit: April 29, 2016

	<u>5/22/15</u>	<u>4/29/16</u>
Humidity/Air Temperature	33%/75°	75%/50°
Fairway Temperature	62.4°	51.7°
Greens Temperature	60.1°	50.3°

Notes from the visit

- Greens Mowing height - 0.145"
- Tees and Fairways height - 0.600"
- Preferred cultivation practices - Minimum 5" depth using hollow tines. Drill and Fill recommended.
- Tuckahoe Top-dressing sand is ok to use at DTCC. Use 80/20 to top-dress the New PG.
- Preferred top-dressing regiment - Every other week while grass is actively growing.
- No fertilizer on greens in 2016 as of visit.
- No fertilizer on tees or fairways in 2016 as of visit.
- Noticed a little Yellow Patch on some greens during the visit.



SOIL and WATER CONSULTING

TEE	Acceptable Range For Standard Soil Sample	6,16,18 (avg) 5/22/15	1,10 (avg) 4/29/16
Organic Matter (Humus)	2 - 3%	3.04	1.79
Sulfur	50 - 100 ppm	14.00	16.50
Mehlich III - Phosphorus	350 lbs/acre	670.33	824.50
Calcium	68%	66.05	76.23
Magnesium	15%	16.10	13.41
Potassium	5%	3.32	1.67
Sodium	<2%	2.64	1.99
Boron	1 - 1.5 ppm	0.47	36.00
Iron	120 ppm	241.33	241.00
Manganese	50 ppm	58.00	23.50

TEE	Acceptable Range For Saturated Paste Sample	6,18 (avg) 5/22/15	1,10 (avg) 4/29/16
Nitrate - Poa/Bentgrass	5 - 10 ppm	19.40	<0.5
Phosphorus	2 - 10 ppm	0.43	1.05
Potassium	40 - 100 ppm	14.29	10.38
Calcium	60 - 200 ppm	50.09	42.48
Magnesium	20 - 70 ppm	15.97	10.47
Sodium	0 - 30 ppm	35.43	17.83
Soluble Salts	<1,920 ppm	393.50	236.00
Bicarbonate	<60 ppm	34.17	135.45
Chloride	<1,000 ppm	97.50	23.00
SAR	<4%	1.13	0.00

FAIRWAY	Acceptable Range For Standard Soil Sample	6,16,18 (avg) 5/22/15	1,10 (avg) 4/29/16
Organic Matter (Humus)	2 - 3%	4.19	3.89
Sulfur	50 - 100 ppm	14.67	41.00
Mehlich III - Phosphorus	350 lbs/acre	238.00	261.00
Calcium	68%	55.74	65.43
Magnesium	15%	18.45	15.62
Potassium	5%	4.75	4.65
Sodium	<2%	3.37	1.89
Boron	1 - 1.5 ppm	0.46	0.43
Iron	120 ppm	129.00	99.00
Manganese	50 ppm	57.67	84.00

FAIRWAY	Acceptable Range For Saturated Paste Sample	6,18 (avg) 5/22/15	1,10 (avg) 4/29/16
Nitrate - Poa/Bentgrass	5 - 10 ppm	21.80	<0.5
Phosphorus	2 - 10 ppm	0.17	0.14
Potassium	40 - 100 ppm	18.82	16.07
Calcium	60 - 200 ppm	48.62	49.85
Magnesium	20 - 70 ppm	17.92	13.58
Sodium	0 - 30 ppm	47.49	19.46
Soluble Salts	<1,920 ppm	433.00	289.00
Bicarbonate	<60 ppm	18.30	59.79
Chloride	<1,000 ppm	119.50	20.50
SAR	<4%	1.48	0.65

GREENS	Acceptable Range For Standard Soil Sample	3,6,15,16,18 (avg) 5/22/15	1,10 (avg) 4/29/16
Organic Matter (Humus)	2 - 3%	2.66	2.69
Sulfur	50 - 100 ppm	22.60	13.00
Mehlich III - Phosphorus	350 lbs/acre	534.00	481.00
Calcium	68%	65.33	67.07
Magnesium	15%	20.35	19.90
Potassium	5%	6.16	6.21
Sodium	<2%	4.03	2.69
Boron	1 - 1.5 ppm	0.61	0.52
Iron	120 ppm	240.60	169.50
Manganese	50 ppm	44.00	48.50

GREENS	Acceptable Range For Saturated Paste Sample	1,18 (avg) 5/22/15	1,10 (avg) 4/29/16
Nitrate - Bentgrass	1-3 ppm	7.30	<0.5
Phosphorus	2 - 7 ppm	0.47	0.60
Potassium	25-40 ppm	31.80	16.70
Calcium	50- 75 ppm	52.44	22.35
Magnesium	15-30 ppm	18.56	7.52
Sodium	0 - 30 ppm	56.64	18.10
Soluble Salts	<1,000 ppm	480.00	167.50
Bicarbonate	<60 ppm	34.17	97.62
Chloride	<200 ppm	122.50	12.50
SAR	<4%	1.71	0.85

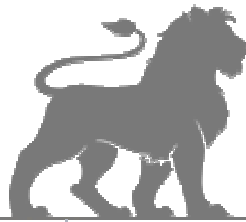
WATER	Acceptable Range For Water Sample	Hole #15 5/22/15	Hole #10 4/29/16
EC	<2.25 mmhos/cm	1.31	1.15
Sodium		160.70	138.50
Calcium	20 - 60 ppm	40.54	64.65
Magnesium	10 - 25 ppm	34.35	14.89
Potassium	5 - 20 ppm	3.53	3.45
Phosphorus	0.1 - 0.4 ppm	<0.20	n/t
Nitrate	5 - 50 ppm	0.52	n/t
Sulfur	30 - 90 ppm	25.37	39.54
Bicarbonate	<120 ppm	212.00	182.14
Boron	<0.67 ppm	<0.05	<0.05
Chloride	<177 ppm	301.61	247.14



DOWNINGTOWN CC: GREEN #10



GREENS		Green #16 0"-4 1/2"	Green #16 Below 4 1/2"	Green #10 0"-4 1/2"	Green #10 Below 4 1/2"	Tuckahoe Topdressing Sand	USGA Specs
Clay		2.90	8.80	9.30	10.70	0.70	<= 3.0%
Silt		17.70	32.50	11.80	35.10	0.10	<= 5.0%
Sand		74.50	32.00	77.50	30.30	98.60	94 - 100%
Gravel		4.90	26.70	1.40	23.90	0.60	
Organic Material		3.86	1.90	3.01	2.49	<0.1	
<u>Sieve #:</u>							
Fine Gravel	10	4.90	26.70	1.40	23.90	0.60	2.0mm <= 3.0%
Very Coarse Sand	18	2.00	12.40	2.40	7.60	9.30	2.0mm + 1.0mm <= 10%
Coarse Sand	35	15.30	6.80	15.10	6.20	27.40	
Medium Sand	60	43.80	5.30	45.10	8.10	45.40	0.5mm + 0.25mm >= 60%
Fine Sand	100	10.60	2.70	12.30	3.30	13.00	0.15mm <= 20%
Very Fine Sand	140	2.10	1.80	1.80	1.90	2.90	0.106mm + 0.053mm <= 5.0%
Very Fine Sand	270	0.70	3.10	0.80	3.10	0.60	
Infiltration Rate		<0.5"	<0.5"	1.8"	<0.5"	n/t	>6 inches per hour



RON JAWORSKI'S
RAMBLEWOOD
COUNTRY CLUB

Data Collection Report ~ Spring 2016



SOIL and WATER CONSULTING

Course Name: Ramblewood Country Club

Date of Visit: April 29, 2016

	<u>4/29/16</u>
Humidity/Air Temperature	50%/75°
Fairway Temperature	53°
Greens Temperature	54°

Notes from the visit

- Greens Mowing height - 0.145"
- Tees and Fairways height - 0.600"
- Preferred cultivation practices - Minimum 6" depth using hollow tines. *Graden* or every other week Verti-cutting while grass is actively growing.
- Tuckahoe Top-dressing sand is ok to use at RWCC.
- Preferred top-dressing regiment - Every other week while grass is actively growing. Watch Nitrogen so you do not make the "wafer cookie" layer worse.
- Some Nitrogen based fertilizer on greens in 2016 as of visit.
- No fertilizer on tees or fairways in 2016 as of visit.
- Very Thatchy greens!



SOIL and WATER CONSULTING

TEE	Acceptable Range For Standard Soil Sample	Red 1, White 1, Blue 7 (avg) 4/29/16
Organic Matter (Humus)	2 - 3%	3.42
Sulfur	50 - 100 ppm	14.33
Mehlich III - Phosphorus	350 lbs/acre	816.66
Calcium	68%	64.03
Magnesium	15%	13.87
Potassium	5%	3.62
Sodium	<2%	1.83
Boron	1 - 1.5 ppm	0.55
Iron	120 ppm	545.33
Manganese	50 ppm	5.00

TEE	Acceptable Range For Saturated Paste Sample	Red 1, White 1, Blue 7 (avg) 4/29/16
Nitrate - Ryegrass	5 - 10 ppm	<0.5
Phosphorus	2 - 10 ppm	0.62
Potassium	40 - 100 ppm	9.33
Calcium	60 - 200 ppm	13.40
Magnesium	20 - 70 ppm	4.09
Sodium	0 - 30 ppm	9.10
Soluble Salts	<1,920 ppm	95.67
Bicarbonate	<60 ppm	30.10
Chloride	<1,000 ppm	10.33
SAR	<4%	0.56

FAIRWAY	Acceptable Range For Standard Soil Sample	Red 1, White 1, Blue 7 (avg) 4/29/16
Organic Matter (Humus)	2 - 3%	3.78
Sulfur	50 - 100 ppm	23.00
Mehlich III - Phosphorus	350 lbs/acre	757.00
Calcium	68%	74.10
Magnesium	15%	13.07
Potassium	5%	3.38
Sodium	<2%	1.37
Boron	1 - 1.5 ppm	0.65
Iron	120 ppm	555.33
Manganese	50 ppm	4.33

FAIRWAY	Acceptable Range For Saturated Paste Sample	Red 1, White 1, Blue 7 (avg) 4/29/16
Nitrate - Ryegrass	5 - 10 ppm	<0.5
Phosphorus	2 - 10 ppm	0.39
Potassium	40 - 100 ppm	11.21
Calcium	60 - 200 ppm	33.77
Magnesium	20 - 70 ppm	8.66
Sodium	0 - 30 ppm	11.62
Soluble Salts	<1,920 ppm	185.00
Bicarbonate	<60 ppm	69.96
Chloride	<1,000 ppm	14.67
SAR	<4%	0.45

GREENS	Acceptable Range For Standard Soil Sample	Red 1, White 1, Blue 7 (avg) 4/29/16
Organic Matter (Humus)	2 - 3%	2.14
Sulfur	50 - 100 ppm	42.66
Mehlich III - Phosphorus	350 lbs/acre	832.00
Calcium	68%	58.69
Magnesium	15%	11.03
Potassium	5%	2.48
Sodium	<2%	2.09
Boron	1 - 1.5 ppm	0.56
Iron	120 ppm	494.00
Manganese	50 ppm	17.33

GREENS	Acceptable Range For Saturated Paste Sample	Red 1, White 1, Blue 7 (avg) 4/29/16
Nitrate - Bentgrass	1-3 ppm	<0.5
Phosphorus	2 - 7 ppm	0.46
Potassium	25-40 ppm	17.53
Calcium	50- 75 ppm	39.54
Magnesium	15-30 ppm	10.88
Sodium	0 - 30 ppm	11.82
Soluble Salts	<1,000 ppm	249.33
Bicarbonate	<60 ppm	15.45
Chloride	<200 ppm	9.33
SAR	<4%	0.43

WATER	Acceptable Range For Water Sample	Pond 4/29/16
EC	<2.25 mmhos/cm	0.41
Sodium		24.36
Calcium	20 - 60 ppm	37.84
Magnesium	10 - 25 ppm	5.42
Potassium	5 - 20 ppm	5.76
Phosphorus	0.1 - 0.4 ppm	<0.20
Nitrate	5 - 50 ppm	0.17
Sulfur	30 - 90 ppm	59.82
Bicarbonate	<120 ppm	58.31
Boron	<0.67 ppm	<0.05
Chloride	<177 ppm	46.98



RAMBLEWOOD CC: RED GREEN #1



GREENS		Red Green #1 1"-6"	Red Green #1 Below 6"	Tuckahoe Topdressing Sand	<u>USGA Specs</u>
Clay		2.60	5.60	0.70	$\leq 3.0\%$
Silt		10.50	29.30	0.10	$\leq 5.0\%$
Sand		85.80	62.80	98.60	94 - 100%
Gravel		1.10	2.30	0.60	
Organic Material		1.08	5.41	<0.1	
<u>Sieve #:</u>					
Fine Gravel	10	1.10	2.30	0.60	2.0mm $\leq 3.0\%$
Very Coarse Sand	18	5.90	4.30	9.30	2.0mm + 1.0mm $\leq 10\%$
Coarse Sand	35	21.10	12.50	27.40	
Medium Sand	60	41.20	24.50	45.40	0.5mm + 0.25mm $\geq 60\%$
Fine Sand	100	14.10	12.00	13.00	0.15mm $\leq 20\%$
Very Fine Sand	140	3.00	6.80	2.90	0.106mm + 0.053mm $\leq 5.0\%$
Very Fine Sand	270	0.60	2.70	0.60	
Infiltration Rate		5.4"	0.6"	n/t	>6 inches per hour



Data Collection Report - Spring 2016



SOIL and WATER CONSULTING

Course Name: Riverwinds Golf and Tennis Club

Date of Visit: April 28, 2016

	<u>5/23/15</u>	<u>4/28/16</u>
Humidity/Air Temperature	39%/74°	65%/50°
Fairway Temperature	63.7°	51.5°
Greens Temperature	63.9°	50.8°

Notes from the visit

- Greens Mowing height - 0.140"
- Tees and Fairways height - 0.500"
- Preferred cultivation practices - Minimum 4" depth using hollow tines. Drill and Fill to incorporate Organic material deeper in the profile recommended.
- Tuckahoe Top-dressing sand is ok to use at RWG & TC.
- Preferred top-dressing regiment - Every other week while grass is actively growing.
- Gypsum, 0-0-50 and Nitrogen on greens prior to visit.
- No fertilizer on tees or fairways in 2016 as of visit.
- Noticed a few small spots of what looked like dollar spot during the visit.
- Noticeable increase in raised nutrient levels from 2015!



SOIL and WATER CONSULTING

TEE	Acceptable Range For Standard Soil Sample	10,18 (avg) 5/23/15	9,16 (avg) 4/28/16
Organic Matter (Humus)	2 - 3%	2.37	2.20
Sulfur	50 - 100 ppm	27.00	19.50
Mehlich III - Phosphorus	350 lbs/acre	629.50	673.00
Calcium	68%	66.29	69.95
Magnesium	15%	11.79	13.40
Potassium	5%	3.35	2.75
Sodium	<2%	2.22	2.30
Boron	1 - 1.5 ppm	0.53	0.47
Iron	120 ppm	589.00	583.00
Manganese	50 ppm	10.00	12.00

TEE	Acceptable Range For Saturated Paste Sample	10,18 (avg) 5/23/2015	9,16 (avg) 4/28/16
Nitrate - Bentgrass	5 - 10 ppm	<0.5	<0.5
Phosphorus	2 - 10 ppm	0.51	0.43
Potassium	40 - 100 ppm	21.11	11.14
Calcium	60 - 200 ppm	53.95	39.00
Magnesium	20 - 70 ppm	12.38	8.67
Sodium	0 - 30 ppm	20.46	21.75
Soluble Salts	<1,920 ppm	342.00	238.50
Bicarbonate	<60 ppm	89.08	59.79
Chloride	<1,000 ppm	39.00	24.50
SAR	<4%	0.65	0.82

FAIRWAY	Acceptable Range For Standard Soil Sample	5,10,18 (avg) 5/23/15	9,16 (avg) 4/28/16
Organic Matter (Humus)	2 - 3%	1.95	1.90
Sulfur	50 - 100 ppm	64.67	29.00
Mehlich III - Phosphorus	350 lbs/acre	612.00	568.00
Calcium	68%	53.20	63.12
Magnesium	15%	12.00	14.58
Potassium	5%	3.14	3.26
Sodium	<2%	2.72	3.42
Boron	1 - 1.5 ppm	0.55	0.65
Iron	120 ppm	617.67	661.50
Manganese	50 ppm	10.33	9.50

FAIRWAY	Acceptable Range For Saturated Paste Sample	5,10,18 (avg) 5/23/15	9,16 (avg) 4/28/16
Nitrate - Bentgrass	5 - 10 ppm	<0.5	<0.5
Phosphorus	2 - 10 ppm	0.29	0.26
Potassium	40 - 100 ppm	21.45	11.35
Calcium	60 - 200 ppm	71.93	45.66
Magnesium	20 - 70 ppm	18.20	11.56
Sodium	0 - 30 ppm	35.33	32.86
Soluble Salts	<1,920 ppm	463.33	288.50
Bicarbonate	<60 ppm	54.50	52.47
Chloride	<1,000 ppm	50.00	32.50
SAR	<4%	0.95	1.13

GREENS	Acceptable Range For Standard Soil Sample	5,10,18 (avg) 5/23/15	9,16 (avg) 4/28/16
Organic Matter (Humus)	2 - 3%	0.42	0.34
Sulfur	50 - 100 ppm	7.67	57.00
Mehlich III - Phosphorus	350 lbs/acre	156.00	188.00
Calcium	68%	66.23	60.52
Magnesium	15%	13.25	14.77
Potassium	5%	3.92	8.23
Sodium	<2%	3.67	4.93
Boron	1 - 1.5 ppm	<0.20	<0.20
Iron	120 ppm	69.33	94.00
Manganese	50 ppm	10.33	10.00

GREENS	Acceptable Range For Saturated Paste Sample	5,10,18 (avg) 5/23/15	9,16 (avg) 4/28/16
Nitrate - Bentgrass	1-3 ppm	<0.5	<0.5
Phosphorus	2 - 7 ppm	2.51	0.85
Potassium	25-40 ppm	12.78	81.18
Calcium	50- 75 ppm	11.57	62.04
Magnesium	15-30 ppm	3.84	14.83
Sodium	0 - 30 ppm	6.37	13.24
Soluble Salts	<1,000 ppm	106.33	442.50
Bicarbonate	<60 ppm	46.37	42.71
Chloride	<200 ppm	4.67	4.00
SAR	<4%	0.42	0.39

WATER	Acceptable Range For Water Sample	Pond 5/23/15	Pond 4/28/16
EC	<2.25 mmhos/cm	0.28	0.31
Sodium		19.28	17.01
Calcium	20 - 60 ppm	22.57	29.19
Magnesium	10 - 25 ppm	5.53	7.66
Potassium	5 - 20 ppm	3.38	3.90
Phosphorus	0.1 - 0.4 ppm	<0.20	<0.20
Nitrate	5 - 50 ppm	0.18	0.94
Sulfur	30 - 90 ppm	26.62	43.08
Bicarbonate	<120 ppm	31.22	82.79
Boron	<0.67 ppm	0.06	0.06
Chloride	<177 ppm	24.51	21.79



RIVERWINDS G & TC: GREEN #16



GREENS		Green #16 0- 3 "	Green #16 Below 3"	Tuckahoe Topdressing Sand	<u>USGA Recommendations</u>
	Clay	2.60	0.60	0.70	<= 3.0%
	Silt	24.10	7.50	0.10	<= 5.0%
	Sand	70.60	91.80	98.60	94 - 100%
	Gravel	2.70	0.10	0.60	
	Organic Material	3.70	<0.10	<0.1	
	<u>Sieve #:</u>				
	Fine Gravel 10	2.70	0.10	0.60	2.0mm <= 3.0%
	Very Coarse Sand 18	2.50	1.90	9.30	2.0mm + 1.0mm <= 10%
	Coarse Sand 35	15.40	13.80	27.40	
	Medium Sand 60	36.20	46.80	45.40	0.5mm + 0.25mm >= 60%
	Fine Sand 100	12.80	22.20	13.00	0.15mm <= 20%
	Very Fine Sand 140	3.00	6.00	2.90	0.106mm + 0.053mm <= 5.0%
	Very Fine Sand 270	0.70	1.20	0.60	
	Infiltration Rate	0.9"	8.7"	n/t	>6 inches per hour



Data Collection Report - Spring 2016



SOIL and WATER CONSULTING

Course Name: Running Deer Golf Club
Date & Time of Visit: 4/20/16

	<u>5/1/15</u>	<u>4/20/16</u>
Humidity/Air Temperature	50%/60°	20%/68°
Fairway Temperature	59.8°	61.3°
Greens Temperature	61.3°	67°

Notes from the visit

- Greens Mowing height - 0.135"
- Tees and Fairways height - 0.600"
- Preferred cultivation practices - Minimum 5" depth using hollow tines.
- Tuckahoe Top-dressing sand is ok to use at RDGC.
- Preferred top-dressing regiment - Every other week while grass is actively growing.
- Very good rooting on greens.
- No fertilizer on tees or fairways in 2016 as of visit.
- Noticed more poa annua on greens than in 2015.
- Late May scheduled greens aerification.



SOIL and WATER CONSULTING

TEE	Acceptable Range For Standard Soil Sample	5,7,13 (avg) 5/1/15	9,15 (avg) 4/20/16
Organic Matter (Humus)	2 - 3%	0.95	0.95
Sulfur	50 - 100 ppm	19.00	8.00
Mehlich III - Phosphorus	350 lbs/acre	270.33	460.00
Calcium	68%	66.29	75.24
Magnesium	15%	12.84	15.10
Potassium	5%	2.18	1.75
Sodium	<2%	4.10	2.76
Boron	1 - 1.5 ppm	0.28	0.30
Iron	120 ppm	213.67	215.00
Manganese	50 ppm	2.33	9.00

TEE	Acceptable Range For Saturated Paste Sample	5,13 (avg) 5/1/15	9,15 (avg) 4/20/16
Nitrate - Bentgrass	5 - 10 ppm	<0.5	<0.5
Phosphorus	2 - 10 ppm	0.51	0.79
Potassium	40 - 100 ppm	11.80	10.06
Calcium	60 - 200 ppm	25.54	25.14
Magnesium	20 - 70 ppm	7.12	8.07
Sodium	0 - 30 ppm	7.59	5.65
Soluble Salts	<1,920 ppm	163.50	131.00
Bicarbonate	<60 ppm	46.37	73.21
Chloride	<1,000 ppm	3.00	10.00
SAR	<4%	0.38	0.26

FAIRWAY	Acceptable Range For Standard Soil Sample	13 5/1/15	9,15 (avg) 4/20/16
Organic Matter (Humus)	2 - 3%	4.93	3.49
Sulfur	50 - 100 ppm	17.00	17.00
Mehlich III - Phosphorus	350 lbs/acre	119.00	167.00
Calcium	68%	64.19	66.72
Magnesium	15%	13.24	17.55
Potassium	5%	3.37	3.62
Sodium	<2%	1.93	1.33
Boron	1 - 1.5 ppm	0.44	0.32
Iron	120 ppm	375.00	304.00
Manganese	50 ppm	8.00	6.50

FAIRWAY	Acceptable Range For Saturated Paste Sample	13 5/1/15	9,15 (avg) 4/20/16
Nitrate - Bentgrass	5 - 10 ppm	<0.5	<0.5
Phosphorus	2 - 10 ppm	0.20	0.35
Potassium	40 - 100 ppm	8.52	22.16
Calcium	60 - 200 ppm	15.69	42.40
Magnesium	20 - 70 ppm	4.50	15.08
Sodium	0 - 30 ppm	6.04	6.13
Soluble Salts	<1,920 ppm	110.00	223.00
Bicarbonate	<60 ppm	43.93	107.38
Chloride	<1,000 ppm	4.00	23.50
SAR	<4%	0.35	0.21

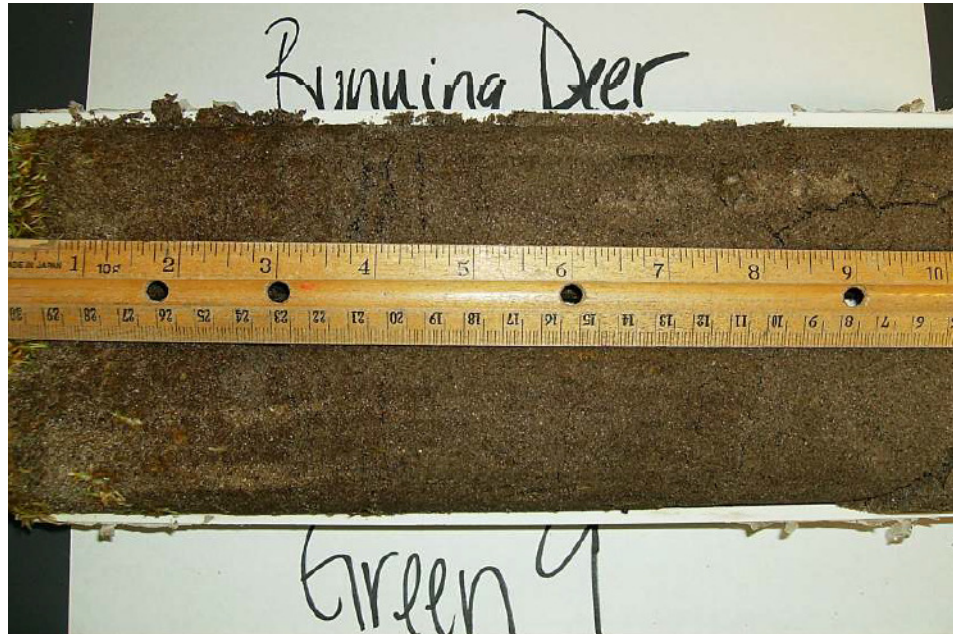
GREENS	Acceptable Range For Standard Soil Sample	5,7,13 (avg) 5/1/15	9,15 (avg) 4/20/16
Organic Matter (Humus)	2 - 3%	0.75	0.75
Sulfur	50 - 100 ppm	13.00	7.00
Mehlich III - Phosphorus	350 lbs/acre	273.33	325.50
Calcium	68%	66.20	65.53
Magnesium	15%	9.29	16.29
Potassium	5%	2.05	1.80
Sodium	<2%	4.61	3.29
Boron	1 - 1.5 ppm	0.23	0.21
Iron	120 ppm	156.00	166.50
Manganese	50 ppm	12.00	22.50

GREENS	Acceptable Range For Saturated Paste Sample	5,7,13 (avg) 5/1/15	9,15 (avg) 4/20/16
Nitrate - Bentgrass	1-3 ppm	<0.5	<0.5
Phosphorus	2 - 7 ppm	0.89	1.31
Potassium	25-40 ppm	12.92	4.61
Calcium	50- 75 ppm	22.19	6.58
Magnesium	15-30 ppm	4.33	2.49
Sodium	0 - 30 ppm	6.20	3.43
Soluble Salts	<1,000 ppm	139.33	46.50
Bicarbonate	<60 ppm	30.81	21.96
Chloride	<200 ppm	5.67	3.00
SAR	<4%	0.33	0.29

WATER	Acceptable Range For Water Sample	Irrigation Water 5/1/15	Irrigation Water 4/20/16
EC	<2.25 mmhos/cm	0.06	0.06
Sodium		2.81	2.08
Calcium	20 - 60 ppm	3.59	5.08
Magnesium	10 - 25 ppm	2.41	1.64
Potassium	5 - 20 ppm	2.69	4.47
Phosphorus	0.1 - 0.4 ppm	n/t	n/t
Nitrate	5 - 50 ppm	n/t	n/t
Sulfur	30 - 90 ppm	5.97	10.25
Bicarbonate	<120 ppm	30.49	22.32
Boron	<0.67 ppm	<0.05	<0.05
Chloride	<177 ppm	<2.0	<2.00



RUNNING DEER GC: GREEN #9



GREENS		Green #9	Green #12	Tuckahoe	<u>USGA Recommendations</u>
		Below 0- 3 1/2"	Below 3 1/2"	Topdressing Sand	
	Clay	1.90	0.90	0.70	<= 3.0%
	Silt	8.94	7.00	0.10	<= 5.0%
	Sand	88.10	89.40	98.60	94 - 100%
	Gravel	1.10	2.70	0.60	
	Organic Material	1.30	0.48	<0.1	
	<u>Sieve #:</u>				
	Fine Gravel 10	1.10	2.70	0.60	2.0mm <= 3.0%
	Very Coarse Sand 18	3.50	4.20	9.30	2.0mm + 1.0mm <= 10%
	Coarse Sand 35	16.90	16.80	27.40	
	Medium Sand 60	47.20	44.50	45.40	0.5mm + 0.25mm >= 60%
	Fine Sand 100	16.50	17.80	13.00	0.15mm <= 20%
	Very Fine Sand 140	3.20	5.30	2.90	0.106mm + 0.053mm <= 5.0%
	Very Fine Sand 270	0.80	0.90	0.60	
	Infiltration Rate	1.7"	2.2"	n/t	>6 inches per hour



Data Collection Report - Spring 2016



SOIL and WATER CONSULTING

Course Name: Valleybrook Country Club

Date & Time of Visit: 4/20/16

	<u>5/2/15</u>	<u>4/20/16</u>
Humidity/Air Temperature	45%/70°	24%/70°
Fairway Temperature	53°	55.1°
Greens Temperature	50.1°	55.3°

Notes from the visit

- Greens Mowing height - 0.150"
- Tees and Fairways height - 0.700"
- Preferred cultivation practices - Minimum 6" depth using hollow tines. Drill and Fill to improve drainage.
- Tuckahoe Top-dressing sand is ok to use at VBCC.
- Preferred top-dressing regiment - Every other week while grass is actively growing.
- No fertilizer on tees or fairways in 2016 as of visit.
- May 9th is first scheduled greens aerification.
- The course was extremely dry but healthy!



SOIL and WATER CONSULTING

TEE	Acceptable Range For Standard Soil Sample	7,8,13 (avg) 5/2/15	1,18 (avg) 4/20/16
Organic Matter (Humus)	2 - 3%	2.50	1.63
Sulfur	50 - 100 ppm	18.67	14.00
Mehlich III - Phosphorus	350 lbs/acre	748.00	719.00
Calcium	68%	63.26	63.97
Magnesium	15%	16.23	17.57
Potassium	5%	3.52	2.93
Sodium	<2%	1.92	2.33
Boron	1 - 1.5 ppm	0.54	0.53
Iron	120 ppm	436.33	443.00
Manganese	50 ppm	11.67	12.50

TEE	Acceptable Range For Saturated Paste Sample	7,13 (avg) 5/2/15	1,18 (avg) 4/20/16
Nitrate - Ryegrass	5 - 10 ppm	<0.5	<0.5
Phosphorus	2 - 10 ppm	0.96	1.35
Potassium	40 - 100 ppm	42.13	20.32
Calcium	60 - 200 ppm	71.91	61.22
Magnesium	20 - 70 ppm	24.12	20.17
Sodium	0 - 30 ppm	12.58	11.09
Soluble Salts	<1,920 ppm	406.00	306.00
Bicarbonate	<60 ppm	183.03	192.80
Chloride	<1,000 ppm	33.50	21.50
SAR	<4%	0.34	0.34

FAIRWAY	Acceptable Range For Standard Soil Sample	7,8,13 (avg) 5/2/15	1,18 (avg) 4/20/16
Organic Matter (Humus)	2 - 3%	3.63	2.35
Sulfur	50 - 100 ppm	21.67	14.00
Mehlich III - Phosphorus	350 lbs/acre	560.00	1062.50
Calcium	68%	59.98	64.65
Magnesium	15%	14.46	17.48
Potassium	5%	3.17	3.33
Sodium	<2%	1.43	1.44
Boron	1 - 1.5 ppm	0.49	0.75
Iron	120 ppm	351.00	468.00
Manganese	50 ppm	7.00	10.00

FAIRWAY	Acceptable Range For Saturated Paste Sample	7,13 (avg) 5/2/15	1,18 (avg) 4/20/16
Nitrate - Ryegrass	5 - 10 ppm	<0.5	<0.5
Phosphorus	2 - 10 ppm	0.53	1.28
Potassium	40 - 100 ppm	17.21	11.62
Calcium	60 - 200 ppm	71.16	22.22
Magnesium	20 - 70 ppm	17.05	8.35
Sodium	0 - 30 ppm	9.61	6.57
Soluble Salts	<1,920 ppm	316.50	129.50
Bicarbonate	<60 ppm	107.38	65.89
Chloride	<1,000 ppm	29.00	12.00
SAR	<4%	0.37	0.31

GREENS	Acceptable Range For Standard Soil Sample	7,8,13 (avg) 5/2/15	1,18 (avg) 4/20/16
Organic Matter (Humus)	2 - 3%	1.63	2.10
Sulfur	50 - 100 ppm	21.67	14.50
Mehlich III - Phosphorus	350 lbs/acre	391.00	834.00
Calcium	68%	63.91	72.28
Magnesium	15%	9.23	11.52
Potassium	5%	4.52	2.30
Sodium	<2%	3.05	1.54
Boron	1 - 1.5 ppm	0.40	0.72
Iron	120 ppm	350.00	460.00
Manganese	50 ppm	12.67	15.00

GREENS	Acceptable Range For Saturated Paste Sample	7,13 (avg) 5/2/15	1,18 (avg) 4/20/16
Nitrate - Bentgrass	1-3 ppm	<0.5	<0.5
Phosphorus	2 - 7 ppm	0.31	0.62
Potassium	25-40 ppm	32.41	8.43
Calcium	50- 75 ppm	29.52	13.14
Magnesium	15-30 ppm	5.60	3.40
Sodium	0 - 30 ppm	8.54	4.94
Soluble Salts	<1,000 ppm	238.00	74.00
Bicarbonate	<60 ppm	24.40	34.17
Chloride	<200 ppm	2.50	6.50
SAR	<4%	0.38	0.32

WATER	Acceptable Range For Water Sample	Pond 5/2/15	Pond 4/20/16
EC	<2.25 mmhos/cm	0.28	0.23
Sodium		28.29	19.66
Calcium	20 - 60 ppm	15.35	15.42
Magnesium	10 - 25 ppm	2.29	2.35
Potassium	5 - 20 ppm	5.53	6.50
Phosphorus	0.1 - 0.4 ppm	n/t	n/t
Nitrate	5 - 50 ppm	n/t	n/t
Sulfur	30 - 90 ppm	33.18	32.19
Bicarbonate	<120 ppm	26.86	26.64
Boron	<0.67 ppm	<0.05	<0.05
Chloride	<177 ppm	46.64	29.62



VALLEYBROOK GC: GREEN #1



GREENS		Green #1 0- 5 1/2"	Green #1 Below 5 1/2 "	Tuckahoe Topdressing Sand	<u>USGA Recommendations</u>
	Clay	5.90	4.90	0.70	<= 3.0%
	Silt	15.90	21.80	0.10	<= 5.0%
	Sand	76.00	70.90	98.60	94 - 100%
	Gravel	2.20	2.40	0.60	
	Organic Material	3.34	1.17	<0.1	
	<u>Sieve #:</u>				
	Fine Gravel 10	2.20	2.40	0.60	2.0mm <= 3.0%
	Very Coarse Sand 18	4.90	7.80	9.30	2.0mm + 1.0mm <= 10%
	Coarse Sand 35	16.00	17.20	27.40	
	Medium Sand 60	34.20	18.50	45.40	0.5mm + 0.25mm >= 60%
	Fine Sand 100	10.40	8.50	13.00	0.15mm <= 20%
	Very Fine Sand 140	4.40	6.10	2.90	0.106mm + 0.053mm <= 5.0%
	Very Fine Sand 270	6.10	12.90	0.60	
	Infiltration Rate	<0.5"	<0.5"	n/t	>6 inches per hour



RECOMMENDATIONS



SOIL and WATER CONSULTING

Spring Application for Tees:	200 pounds of product/acre (0-0-50)	500 pounds of product/acre (Gypsum)
Blue Heron Pines GC	Yes	Yes
Downingtown CC	Yes	Yes
Ramblewood CC	Yes	Yes
Riverwinds Golf & Tennis Club	Yes	Yes
Running Deer GC	No	No
Valleybrook CC	Yes	No

Spring Application for Fairways:	200 pounds of product/acre (0-0-50)	500 pounds of product/acre (Gypsum)
Blue Heron Pines GC	Yes	Yes
Downingtown CC	No	Yes
Ramblewood CC	Yes	Yes
Riverwinds Golf & Tennis Club	Yes	Yes
Running Deer GC	No	Yes
Valleybrook CC	Yes	Yes

Monthly Applications for Greens:	2 pounds of product / 1,000 sq. ft. (0-0-50)	10 pounds of product / 1,000 sq. ft. (Gypsum)	3 pounds of product / 1,000 sq.ft. (Pro-Mag)	3 pounds of product / 1,000 sq.ft. (11-55-00)
Blue Heron Pines GC	Yes	Yes	Yes	Yes
Downingtown CC	Yes	Yes	No	No
Ramblewood CC	Yes	Yes	Yes	No
Riverwinds Golf & Tennis Club	Yes	No	Yes	Yes
Running Deer GC	Yes	Yes	Yes	Yes (1 time only)
Valleybrook CC	Yes	Yes	No	No