

**YOUR
ISTRC SYSTEMTM
REPORT**

**SAMPLE REPORT
GOLF & COUNTRY CLUB**

October 15, 2009
North Course: Greens 5, 6, 8, & 15
South Course: Greens 4, 7, 12, & 14
Lab ID: 0000000

Presented To:

Mr. [REDACTED], GCS

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October 15, 2009

Mr. [REDACTED], GCS
[REDACTED] GOLF CLUB
[REDACTED]

re: Lab ID: [REDACTED]; ISTRC SYSTEM™ BenchMarking of undisturbed core samples from the
North Course: Green #5 [center]; Green #6 [center]; Green #8 [center]; Green #15 [center]; and
South Course: Green #4 [center]; Green #7 [center]; Green #12 [center]; Green #14 [center].

Dear [REDACTED],

We understand you have selected our Summary Report format. Attached are the test results for the greens. The time lapse photos, also attached, were taken to monitor the drying process of your greens and to provide visual confirmation of the tested physical properties. The X's and check marks represent 5-minute increments in the drying process. As a general rule, the more X's & check marks the higher the organic content & water holding properties. Each sample was rotated 360° during the photo process, which accounts for the series of four pictures for each green.

The current test results are often associated with greens that hold water and are slow to drain. With a particle distribution that meets the USGA recommended specifications in the upper 4 inches, we would attribute the physical deficiencies to an accumulation of organic matter & thatch that has been compressed into a relatively dense layer in the upper 2 to 3 inches. Over the years our testing & research has shown as cumulative 1st tier OM contents exceed 7 to 8 percent or 2 ½ to 3 percent, by inch, it not only becomes increasingly more difficult to maintain the health of the root zone but also the playability of the greens. Invariably greens with excess organic matter and/or thatch struggle with extreme contrasts in playability from soft & spongy when wet to rock hard and borderline hydrophobic if allowed to dry out.

Aerification will continue to be a key component to the long-term health & sustainability of the greens. Given the current conditions our general recommendation for your greens would be a program that targets **at least** 20 to 25 percent (calculation based on tine OD). It will be important that you also continue to supplement the larger tine aerifications or deep verti-cuttings with regular venting using non-disruptive equipment such as the HydroJect, Planet Air, needle/pencil tines, bayonet tines, star tines, slicer, or deep spiker. Venting has proven to be extremely beneficial to the health of the turf and promoting gas exchange, particularly when done on a regular basis. Improving the ability for the root zone to breathe will not only encourage a deeper, more sustainable root system but also enhance microbial activity to aid in the natural decomposition of the organic matter & thatch.

Physical Properties

Tables 1 - 8 compare the current test results to our previous testing and to our recommended target range for well-drained, sand-based greens.

North Course

Table 1. +' improvement, '=' no change, '-' regressed

Green #5 1st tier (0-4 in.)	Well-Drained Greens (1st tier Sample)	Comp. Index* + , = , -	September 2009	Sept. 2008	Oct. 2007
Infiltration Rate [In/hr]	At least 6	-	0.81	2.08	1.50
Subsurface Air Capacity [Non-Capillary Porosity]	~20%	-	11.51%	13.08%	15.17%
Water Porosity [Capillary]	15% to 25%	=	35.24%	34.05%	31.91%
Bulk Density [g/cc]	~1.35 to 1.45	=	1.33	1.33	1.35
Water Holding	10% to 20%	=	26.56%	25.58%	23.69%
Organic Content: 0 – 1"	1.5% to 2.5%	=	2.26%	2.39%	2.39%
Organic Content: 1 – 2"	1.0% to 2.0%	-	2.58%	1.68%	2.75%
Organic Content: 2 – 3"	0.5% to 2.0%	=	2.22%	2.12%	1.05%
Organic Content: 3 – 4"	0.5% to 1.5%	-	0.77%	0.54%	0.33%
Root Mass	at least ½ in.	=	5/8 in.	5/8 in.	5/8 in.
Feeder Roots	at least 3.5 in. –med. density	-	3 in. Sparse	4 in. Sparse	4 in. Sparse

Over the years our testing & research has shown the infiltration rates provide a valuable snapshot of the drainage potential of the root zone (0-4 inches in your case); however a more accurate depiction of the overall health & sustainability of the root zone is the balance between the air pores & water pores (highlighted by the yellow shading in Table 1). Our general recommendation for mature sand-based greens would be to stabilize the root zone around a 1:1 air to water ratio. Currently the greens exceed a 2:1 water to air ratio.

Table 2. +' improvement, '=' no change, '-' regressed

Green #6 1st tier (0-4 in.)	Well-Drained Greens (1st tier Sample)	Comp. Index* + , = , -	September 2009	Sept. 2008	Oct. 2007
Infiltration Rate [In/hr]	At least 6	-	1.77	3.81	0.77
Subsurface Air Capacity [Non-Capillary Porosity]	~20%	=	15.67%	15.67%	16.68%
Water Porosity [Capillary]	15% to 25%	=	31.87%	32.88%	32.64%
Bulk Density [g/cc]	~1.35 to 1.45	-	1.33	1.30	1.29
Water Holding	10% to 20%	+	23.92%	25.25%	25.32%
Organic Content: 0 – 1"	1.5% to 2.5%	-	2.43%	1.99%	2.96%
Organic Content: 1 – 2"	1.0% to 2.0%	-	2.21%	1.83%	2.18%
Organic Content: 2 – 3"	0.5% to 2.0%	=	1.65%	1.81%	1.44%
Organic Content: 3 – 4"	0.5% to 1.5%	=	0.65%	0.60%	0.43%
Root Mass	at least ½ in.	=	5/8 in.	5/8 in.	5/8 in.
Feeder Roots	at least 3.5 in. –med. density	-	3 in. Sparse	3 ½ in. Sparse	4 in. Sparse

The Comparison Index in Tables 1-8 is a quantitative assessment of the changes in the physical properties since their previous testing. It is important to note the +, - & = ratings are **not** an indicator that a specific physical property is optimum or deficient; rather the index is intended to help identify trends.

Table 3. '+ improvement, '=' no change, '- regressed

Green #8 1st tier (0-4 in.)	Well-Drained Greens (1st tier Sample)	Comp. Index* +,=,-	September 2009	Sept. 2008	Oct. 2007
Infiltration Rate [In/hr]	At least 6	-	0.46	3.81	2.04
Subsurface Air Capacity [Non-Capillary Porosity]	~20%	-	13.51%	15.73%	15.84%
Water Porosity [Capillary]	15% to 25%	=	32.49%	31.68%	30.64%
Bulk Density [g/cc]	~1.35 to 1.45	-	1.37	1.30	1.36
Water Holding	10% to 20%	=	23.71%	24.37%	22.52%
Organic Content: 0 – 1"	1.5% to 2.5%	=	2.83%	2.68%	2.60%
Organic Content: 1 – 2"	1.0% to 2.0%	+	1.95%	2.21%	2.27%
Organic Content: 2 – 3"	0.5% to 2.0%	=	1.89%	1.73%	1.44%
Organic Content: 3 – 4"	0.5% to 1.5%	=	0.59%	0.52%	0.46%
Root Mass	at least ½ in.	=	5/8 in.	5/8 in.	5/8 in.
Feeder Roots	at least 3.5 in. –med. density	=	3 ½ in. Sparse	3 ½ in. Sparse	4 in. Sparse

Table 4. '+ improvement, '=' no change, '- regressed

Green #15 1st tier (0-4 in.)	Well-Drained Greens (1st tier Sample)	Comp. Index* +,=,-	September 2009	Sept. 2008	Oct. 2007
Infiltration Rate [In/hr]	At least 6	-	0.42	15.81	5.46
Subsurface Air Capacity [Non-Capillary Porosity]	~20%	=	15.76%	16.82%	14.53%
Water Porosity [Capillary]	15% to 25%	-	33.80%	31.44%	32.75%
Bulk Density [g/cc]	~1.35 to 1.45	-	1.25	1.29	1.34
Water Holding	10% to 20%	-	26.98%	24.37%	24.48%
Organic Content: 0 – 1"	1.5% to 2.5%	-	3.54%	1.67%	2.53%
Organic Content: 1 – 2"	1.0% to 2.0%	-	2.95%	1.99%	2.07%
Organic Content: 2 – 3"	0.5% to 2.0%	-	3.31%	1.92%	1.98%
Organic Content: 3 – 4"	0.5% to 1.5%	-	0.71%	0.47%	0.40%
Root Mass	at least ½ in.	=	5/8 in.	5/8 in.	5/8 in.
Feeder Roots	at least 3.5 in. –med. density	-	3 ½ in. Sparse	4 in. Sparse	4 in. Sparse

South Course

Table 5.

‘+’ improvement, ‘=’ no change, ‘-’ regressed

Green #4 1st tier (0-4 in.)	Well-Drained Greens (1st tier Sample)	Comp. Index* +,-,=	September 2009	Sept. 2008	Sept. 2007
Infiltration Rate [ln/hr]	At least 6	-	2.23	9.58	2.77
Subsurface Air Capacity [Non-Capillary Porosity]	~20%	-	13.58%	16.28%	13.13%
Water Porosity [Capillary]	15% to 25%	-	35.42%	32.97%	31.20%
Bulk Density [g/cc]	~1.35 to 1.45	-	1.31	1.29	1.38
Water Holding	10% to 20%	-	27.02%	25.52%	22.55%
Organic Content: 0 – 1”	1.5% to 2.5%	-	3.18%	2.30%	1.93%
Organic Content: 1 – 2”	1.0% to 2.0%	-	2.70%	1.81%	2.85%
Organic Content: 2 – 3”	0.5% to 2.0%	-	2.14%	1.53%	1.08%
Organic Content: 3 – 4”	0.5% to 1.5%	-	0.81%	0.46%	0.28%
Root Mass	at least ½ in.	=	5/8 in.	5/8 in.	5/8 in.
Feeder Roots	at least 3.5 in. –med. density	-	3 in. Sparse	3 ½ in. Sparse	3 ½ in. Sparse

Table 6.

‘+’ improvement, ‘=’ no change, ‘-’ regressed

Green #7 1st tier (0-4 in.)	Well-Drained Greens (1st tier Sample)	Comp. Index* +,-,=	September 2009	Sept. 2008	Sept. 2007
Infiltration Rate [ln/hr]	At least 6	-	2.19	3.12	3.58
Subsurface Air Capacity [Non-Capillary Porosity]	~20%	=	15.21%	15.22%	12.56%
Water Porosity [Capillary]	15% to 25%	=	33.39%	33.84%	33.02%
Bulk Density [g/cc]	~1.35 to 1.45	=	1.29	1.28	1.37
Water Holding	10% to 20%	=	25.93%	26.41%	24.13%
Organic Content: 0 – 1”	1.5% to 2.5%	-	3.09%	1.56%	2.19%
Organic Content: 1 – 2”	1.0% to 2.0%	-	2.05%	1.86%	2.78%
Organic Content: 2 – 3”	0.5% to 2.0%	-	2.42%	1.97%	0.99%
Organic Content: 3 – 4”	0.5% to 1.5%	=	0.62%	0.53%	0.29%
Root Mass	at least ½ in.	=	5/8 in.	5/8 in.	5/8 in.
Feeder Roots	at least 3.5 in. –med. density	-	3 in. Sparse	3 ½ in. Sparse	4 in. Sparse

Table 7.

'+' improvement, '=' no change, '-' regressed

Green #12 1 st tier (0-4 in.)	Well-Drained Greens (1 st tier Sample)	Comp. Index* +,-,=	September 2009	Sept. 2008	Sept. 2007
Infiltration Rate [ln/hr]	At least 6	-	1.62	5.65	4.73
Subsurface Air Capacity [Non-Capillary Porosity]	~20%	+	18.54%	15.69%	12.48%
Water Porosity [Capillary]	15% to 25%	+	30.47%	32.54%	36.54%
Bulk Density [g/cc]	~1.35 to 1.45	+	1.28	1.30	1.31
Water Holding	10% to 20%	+	23.72%	24.96%	27.88%
Organic Content: 0 – 1"	1.5% to 2.5%	-	3.10%	2.05%	2.66%
Organic Content: 1 – 2"	1.0% to 2.0%	-	2.35%	1.99%	2.70%
Organic Content: 2 – 3"	0.5% to 2.0%	-	2.23%	1.69%	1.80%
Organic Content: 3 – 4"	0.5% to 1.5%	=	0.54%	0.48%	0.42%
Root Mass	at least ½ in.	=	5/8 in.	5/8 in.	5/8 in.
Feeder Roots	at least 3.5 in. -med. density	+	3 ½ in. Sparse	3 in. Sparse	4 in. Sparse

Table 8.

'+' improvement, '=' no change, '-' regressed

Green #14 1 st tier (0-4 in.)	Well-Drained Greens (1 st tier Sample)	Comp. Index* +,-,=	September 2009	Sept. 2008	Sept. 2007
Infiltration Rate [ln/hr]	At least 6	-	0.69	3.46	2.08
Subsurface Air Capacity [Non-Capillary Porosity]	~20%	=	14.66%	15.38%	12.31%
Water Porosity [Capillary]	15% to 25%	-	34.98%	32.76%	37.60%
Bulk Density [g/cc]	~1.35 to 1.45	=	1.26	1.27	1.28
Water Holding	10% to 20%	-	27.78%	25.74%	29.44%
Organic Content: 0 – 1"	1.5% to 2.5%	+	3.41%	3.78%	3.01%
Organic Content: 1 – 2"	1.0% to 2.0%	-	3.16%	1.74%	2.85%
Organic Content: 2 – 3"	0.5% to 2.0%	+	2.28%	2.76%	1.89%
Organic Content: 3 – 4"	0.5% to 1.5%	-	0.64%	0.39%	0.39%
Root Mass	at least ½ in.	=	5/8 in.	5/8 in.	5/8 in.
Feeder Roots	at least 3.5 in. -med. density	-	3 in. Sparse	3 ½ in. Sparse	4 in. Sparse

Particle Distribution

Below is the inch-by-inch analysis (upper 4") of the Textural & Particle Size Distribution for the greens. A complete inch-by-inch analysis for all the tested greens is also attached to the end of the report. The lower box contains the USGA specifications & ISTRC Guidelines - the upper set is the USGA specifications and the lower set is the expanded guidelines from ISTRC.

	Textural Analysis				Sand Particle Size Distribution							
	Sand	Silt	Clay	Gravel	Very Coarse	Coarse	Medium	Medium	Med/Fine	Fine	Very Fine	
USDA (mm)	.05 to 2.00	.002 to .05	<.002	2.00	1.00	0.50	0.25	0.18	0.15	0.10	0.05	
U.S. Sieve (mesh)	270 to 18	(Pan)	(Pan)	10	18	35	60	80	100	140	270	
SAMPLE NAME	% Retained on Sieve											
North G5 1 st tier	25 - 1.0 in.	97.01	2.60	0.01	0.38	11.85	31.00	37.48	9.70	3.60	2.23	1.15
	1.0 - 2.0 in.	96.96	1.40	1.41	0.23	6.13	31.10	40.55	10.65	3.25	3.73	1.55
	2.0 - 3.0 in.	96.87	1.30	1.30	0.53	8.48	36.73	35.80	8.60	3.78	2.05	1.43
	3.0 - 4.0 in.	97.04	2.85	0.01	0.10	4.58	34.95	41.33	9.65	2.55	2.85	1.13
North G6 1 st tier	25 - 1.0 in.	96.59	1.38	1.38	0.65	10.53	33.30	36.10	9.88	3.70	1.88	1.20
	1.0 - 2.0 in.	96.49	1.60	1.61	0.30	7.20	32.95	38.50	10.08	2.88	3.35	1.53
	2.0 - 3.0 in.	96.69	3.15	0.01	0.15	9.45	39.03	34.70	7.58	2.85	1.80	1.28
	3.0 - 4.0 in.	94.74	3.44	1.72	0.10	6.93	37.38	33.98	8.50	2.85	3.40	1.70
North G8 1 st tier	25 - 1.0 in.	96.42	0.03	3.30	0.25	10.60	31.30	35.83	11.68	3.15	2.43	1.43
	1.0 - 2.0 in.	96.31	1.77	1.77	0.15	5.85	32.65	40.18	9.98	3.00	3.25	1.40
	2.0 - 3.0 in.	96.27	1.76	1.77	0.20	7.98	35.13	36.50	9.15	3.33	2.58	1.60
	3.0 - 4.0 in.	95.49	2.20	2.21	0.10	6.25	31.48	38.45	10.25	3.45	3.88	1.73
North G15 1 st tier	25 - 1.0 in.	96.26	0.03	3.11	0.60	9.70	33.63	35.58	10.15	3.55	2.25	1.40
	1.0 - 2.0 in.	97.01	1.37	1.37	0.25	9.45	31.30	38.43	10.80	2.50	3.23	1.30
	2.0 - 3.0 in.	95.71	2.00	2.01	0.28	7.75	34.30	37.63	8.95	3.23	2.35	1.50
	3.0 - 4.0 in.	96.46	1.65	1.66	0.23	7.60	38.73	35.48	8.15	2.35	2.90	1.25
South G4 1 st tier	25 - 1.0 in.	96.03	1.79	1.80	0.38	9.33	34.58	35.63	9.53	3.33	2.15	1.48
	1.0 - 2.0 in.	96.22	1.72	1.73	0.33	7.48	34.55	37.55	9.63	2.43	3.10	1.48
	2.0 - 3.0 in.	96.47	1.64	1.64	0.25	9.68	34.40	36.23	9.05	3.20	2.38	1.53
	3.0 - 4.0 in.	95.80	2.07	2.08	0.05	5.45	34.03	36.68	9.78	3.25	4.53	2.08
South G7 1 st tier	25 - 1.0 in.	97.00	1.31	1.31	0.38	12.30	32.08	35.95	10.48	2.78	2.23	1.18
	1.0 - 2.0 in.	96.99	0.01	2.75	0.25	7.93	33.15	38.75	10.05	2.83	3.05	1.23
	2.0 - 3.0 in.	96.52	0.01	3.12	0.35	11.40	33.58	36.25	8.73	2.98	2.25	1.33
	3.0 - 4.0 in.	96.35	3.54	0.03	0.08	7.28	40.78	33.23	7.85	2.48	3.23	1.50
South G12 1 st tier	25 - 1.0 in.	97.40	0.02	2.33	0.25	12.78	30.68	36.58	10.98	2.80	2.30	1.28
	1.0 - 2.0 in.	97.26	2.33	0.01	0.40	9.93	34.00	36.95	9.45	2.60	3.05	1.28
	2.0 - 3.0 in.	96.60	0.01	3.14	0.25	9.58	33.38	37.43	9.33	3.05	2.43	1.40
	3.0 - 4.0 in.	96.48	1.64	1.65	0.23	13.98	38.53	31.78	6.65	1.93	2.48	1.13
South G14 1 st tier	25 - 1.0 in.	96.86	0.01	2.68	0.45	8.70	34.55	37.30	9.85	3.03	2.18	1.25
	1.0 - 2.0 in.	96.51	1.67	1.67	0.15	8.40	28.80	39.73	11.25	3.10	3.73	1.50
	2.0 - 3.0 in.	96.51	0.01	3.00	0.48	11.15	34.90	35.50	8.75	2.83	2.18	1.20
	3.0 - 4.0 in.	95.61	0.03	4.08	0.28	6.38	40.10	34.93	7.40	2.55	2.90	1.35
Specifications	89 to 100	5 Max.	3 Max.	3 Max.	10 Max.	At Least 60		20 Max.		5 Max.		
Guidelines	89 to 100	5 Max. w/ Fine & V.F.	3 Max.	3 Max.	10 Max.	15 to 25	40+	10 to 15	20 - #80	10 Max. w/Silt & Clay		
		10 Max. w/ Fine & V.F.	3 Max.	3 Max.	10 Max.	65 to 85 Optimum				10 Max. w/Silt & Clay		

With the Summary Report consisting of the numerical data with limited written analysis we would encourage you to call if you have any questions or want to discuss the results. We would recommend that you continue to monitor your greens with regular testing. The information derived from regular testing will allow you to monitor the aging process of the greens, evaluate the effectiveness of the current cultural practices, modify the program based on hard data, make adjustments to the program to meet the individual needs of specific greens, and detect problems before they affect the health of the greens.

Sincerely,
I.S.T.R.C.

by:
Matt Pulis, M.S.
Agronomist

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INVOICE
ISTRC EIN: 48-1078972

Invoice Number:

000000

Company:	Facility:	
[REDACTED]	North: Greens 5, 6, 8, 15 & South: Greens 4, 7, 12, 14	
Address:	Material tested:	
[REDACTED]	N/A	
City:	Invoice Date:	
[REDACTED]	10/15/09	
Attention:	Due Date:	
[REDACTED]	11/15/09	
Phone:	Secondary Phone or E-mail:	Fax:
[REDACTED]		
Lab ID #:	Customer Rep.:	Account No.:
[REDACTED]	[REDACTED]	[REDACTED]

Quantity	Description	Unit Price	Invoiced Amount
8	ISTRC SYSTEM Undisturbed Core Analysis	\$475.00	\$ 3,800.00
8	LESS: Summary Report Discount	(\$75.00)	(\$ 600.00)
TOTAL DUE THIS INVOICE:			\$ 3,200.00

Thank You For Your Business



*\$10.00 Convenience fee for credit card processing will be applied

I.S.T.R.C.

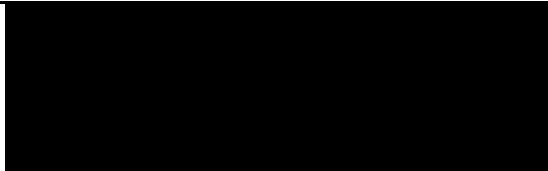
"International Sports Turf Research Center, Inc."

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The I.S.T.R.C. System™

Company:
 Name:
 Address:
 City, ST, Zip



Account No. [Redacted]
 Date 6-Oct-09
 Facility [Redacted] C.
 ISTRC Rep. [Redacted]

Physical Evaluation

ISTR SYSTEM™ Core Analysis

Porosity

		Infiltration Rate in/hr	40 cm Water Holding %	Bulk Density g/cc	Solids %	Total Porosity %	Capillary [Water Pores] %	Non-Capillary [Air Pores] %
LAB ID NO.	SAMPLE NAME							
09090038-G05	Green #5, Center, North	0.81	26.56	1.33	53.25	46.75	35.24	11.51
	Organic [ISTRC Walkley/Black] .25 to 1 in.	2.26%				Root Mass: 5/8"		
	Organic [ISTRC Walkley/Black] 1 to 2 in.	2.58%				Feeders: 3" sparse		
	Organic [ISTRC Walkley/Black] 2 to 3 in.	2.22%						
	Organic [ISTRC Walkley/Black] 3 to 4 in.	0.77%						
09090038-G06	Green #6, Center, North	1.77	23.92	1.33	52.46	47.54	31.87	15.67
	Organic [ISTRC Walkley/Black] .25 to 1 in.	2.43%				Root Mass: 5/8"		
	Organic [ISTRC Walkley/Black] 1 to 2 in.	2.21%				Feeders: 3" sparse		
	Organic [ISTRC Walkley/Black] 2 to 3 in.	1.65%						
	Organic [ISTRC Walkley/Black] 3 to 4 in.	0.65%						
09090038-G08	Green #8, Center, North	0.46	23.71	1.37	54.00	46.00	32.49	13.51
	Organic [ISTRC Walkley/Black] .25 to 1 in.	2.83%				Root Mass: 5/8"		
	Organic [ISTRC Walkley/Black] 1 to 2 in.	1.95%				Feeders: 3 1/2" sparse		
	Organic [ISTRC Walkley/Black] 2 to 3 in.	1.89%						
	Organic [ISTRC Walkley/Black] 3 to 4 in.	0.59%						
09090038-G15	Green #15, Center, North	0.42	26.98	1.25	50.44	49.56	33.80	15.76
	Organic [ISTRC Walkley/Black] .25 to 1 in.	3.54%				Root Mass: 5/8"		
	Organic [ISTRC Walkley/Black] 1 to 2 in.	2.95%				Feeders: 3 1/2" sparse		
	Organic [ISTRC Walkley/Black] 2 to 3 in.	3.31%						
	Organic [ISTRC Walkley/Black] 3 to 4 in.	0.71%						
	USGA Sample Range [Root Zone Mix]	at least 6	10 to 20	1.4 to 1.7	45 to 65	35 to 55	15 to 25	15 to 30

Reviewed by: _____

I.S.T.R.C.

"International Sports Turf Research Center, Inc."

11372 Strang Line Rd.
 Lenexa, KS 66215

Phone: 913-829-8873
 Phone: 800-362-8873
 Fax: 913-829-4013

The I.S.T.R.C. System™

Company: [REDACTED]
 Name: [REDACTED]
 Address: [REDACTED]
 City, ST, Zip [REDACTED]

Account No. [REDACTED]
 Date 6-Oct-09
 Facility [REDACTED] C.
 ISTRC Rep. [REDACTED]

Physical Evaluation

ISTRC SYSTEM™ Core Analysis

Porosity

		Infiltration Rate in/hr	40 cm Water Holding %	Bulk Density g/cc	Solids %	Total Porosity %	Capillary [Water Pores] %	Non-Capillary [Air Pores] %
LAB ID NO.	SAMPLE NAME							
09090038-G04	Green #4, Center, South	2.23	27.02	1.31	51.00	49.00	35.42	13.58
	Organic [ISTRC Walkley/Black] .25 to 1 in.	3.18%				Root Mass: 5/8"		
	Organic [ISTRC Walkley/Black] 1 to 2 in.	2.70%				Feeders: 3" sparse		
	Organic [ISTRC Walkley/Black] 2 to 3 in.	2.14%						
	Organic [ISTRC Walkley/Black] 3 to 4 in.	0.81%						
09090038-G07	Green #7, Center, South	2.19	25.93	1.29	51.40	48.60	33.39	15.21
	Organic [ISTRC Walkley/Black] .25 to 1 in.	3.09%				Root Mass: 5/8"		
	Organic [ISTRC Walkley/Black] 1 to 2 in.	2.05%				Feeders: 3" sparse		
	Organic [ISTRC Walkley/Black] 2 to 3 in.	2.42%						
	Organic [ISTRC Walkley/Black] 3 to 4 in.	0.62%						
09090038-G12	Green #12, Center, South	1.62	23.72	1.28	50.99	49.01	30.47	18.54
	Organic [ISTRC Walkley/Black] .25 to 1 in.	3.10%				Root Mass: 5/8"		
	Organic [ISTRC Walkley/Black] 1 to 2 in.	2.35%				Feeders: 3 1/2" sparse		
	Organic [ISTRC Walkley/Black] 2 to 3 in.	2.23%						
	Organic [ISTRC Walkley/Black] 3 to 4 in.	0.54%						
09090038-G14	Green #14, Center, South	0.69	27.78	1.26	50.36	49.64	34.98	14.66
	Organic [ISTRC Walkley/Black] .25 to 1 in.	3.41%				Root Mass: 5/8"		
	Organic [ISTRC Walkley/Black] 1 to 2 in.	3.16%				Feeders: 3" sparse		
	Organic [ISTRC Walkley/Black] 2 to 3 in.	2.28%						
	Organic [ISTRC Walkley/Black] 3 to 4 in.	0.64%						
	USGA Sample Range [Root Zone Mix]	at least 6	10 to 20	1.4 to 1.7	45 to 65	35 to 55	15 to 25	15 to 30

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Date 6-Oct-09

Facility [REDACTED]
ISTR Rep. [REDACTED]

		Textural Analysis				Sand Particle Size Distribution						
		Sand	Silt	Clay	Gravel	Very Coarse	Coarse	Medium	Medium	Med/Fine	Fine	Very Fine
USDA (mm)		.05 to 2.00	.002 to .05	<.002	2.00	1.00	0.50	0.25	0.18	0.15	0.10	0.05
U.S. Sieve (mesh)		270 to 18	(Pan)	(Pan)	10	18	35	60	80	100	140	270
LAB ID NO.	SAMPLE NAME	% Retained on Sieve										
09090038-G05	.25 - 1.0 in.	97.01	2.60	0.01	0.38	11.85	31.00	37.48	9.70	3.60	2.23	1.15
Green #5	1.0 - 2.0 in.	96.96	1.40	1.41	0.23	6.13	31.10	40.55	10.65	3.25	3.73	1.55
Center	2.0 - 3.0 in.	96.87	1.30	1.30	0.53	8.48	36.73	35.80	8.60	3.78	2.05	1.43
North	3.0 - 4.0 in.	97.04	2.85	0.01	0.10	4.58	34.95	41.33	9.65	2.55	2.85	1.13
09090038-G06	.25 - 1.0 in.	96.59	1.38	1.38	0.65	10.53	33.30	36.10	9.88	3.70	1.88	1.20
Green #6	1.0 - 2.0 in.	96.49	1.60	1.61	0.30	7.20	32.95	38.50	10.08	2.88	3.35	1.53
Center	2.0 - 3.0 in.	96.69	3.15	0.01	0.15	9.45	39.03	34.70	7.58	2.85	1.80	1.28
North	3.0 - 4.0 in.	94.74	3.44	1.72	0.10	6.93	37.38	33.98	8.50	2.85	3.40	1.70
09090038-G08	.25 - 1.0 in.	96.42	0.03	3.30	0.25	10.60	31.30	35.83	11.68	3.15	2.43	1.43
Green #8	1.0 - 2.0 in.	96.31	1.77	1.77	0.15	5.85	32.65	40.18	9.98	3.00	3.25	1.40
Center	2.0 - 3.0 in.	96.27	1.76	1.77	0.20	7.98	35.13	36.50	9.15	3.33	2.58	1.60
North	3.0 - 4.0 in.	95.49	2.20	2.21	0.10	6.25	31.48	38.45	10.25	3.45	3.88	1.73
09090038-G15	.25 - 1.0 in.	96.26	0.03	3.11	0.60	9.70	33.63	35.58	10.15	3.55	2.25	1.40
Green #15	1.0 - 2.0 in.	97.01	1.37	1.37	0.25	9.45	31.30	38.43	10.80	2.50	3.23	1.30
Center	2.0 - 3.0 in.	95.71	2.00	2.01	0.28	7.75	34.30	37.63	8.95	3.23	2.35	1.50
North	3.0 - 4.0 in.	96.46	1.65	1.66	0.23	7.60	38.73	35.48	8.15	2.35	2.90	1.25
USGA		89 to 100	5 Max.	3 Max.	3 Max.	10 Max.	At least 60		20 Max.		5 Max.	
Recommended Specifications		10 Max. w/ Fine & V.F.		10 Max.						10 Max. w/Silt & Clay		
ISTRC Guidelines		89 to 100	5 Max.	3 Max.	3 Max.	10 Max.	15 to 25	40+	10 to 15	20 - #80	5 Max.	
		10 Max. w/ Fine & V.F.		10 Max.			65 to 85 Optimum			10 Max. w/Silt & Clay		

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Account No. [REDACTED]

Date 6-Oct-09

Facility [REDACTED]
ISTRC Rep. [REDACTED]

		Textural Analysis				Sand Particle Size Distribution						
		Sand	Silt	Clay	Gravel	Very Coarse	Coarse	Medium	Medium	Med/Fine	Fine	Very Fine
		.05 to 2.00	.002 to .05	<.002	2.00	1.00	0.50	0.25	0.18	0.15	0.10	0.05
		270 to 18	(Pan)	(Pan)	10	18	35	60	80	100	140	270
LAB ID NO.	SAMPLE NAME	% Retained on Sieve										
09090038-G04	.25 - 1.0 in.	96.03	1.79	1.80	0.38	9.33	34.58	35.63	9.53	3.33	2.15	1.48
Green #4	1.0 - 2.0 in.	96.22	1.72	1.73	0.33	7.48	34.55	37.55	9.63	2.43	3.10	1.48
Center	2.0 - 3.0 in.	96.47	1.64	1.64	0.25	9.68	34.40	36.23	9.05	3.20	2.38	1.53
South	3.0 - 4.0 in.	95.80	2.07	2.08	0.05	5.45	34.03	36.68	9.78	3.25	4.53	2.08
09090038-G07	.25 - 1.0 in.	97.00	1.31	1.31	0.38	12.30	32.08	35.95	10.48	2.78	2.23	1.18
Green #7	1.0 - 2.0 in.	96.99	0.01	2.75	0.25	7.93	33.15	38.75	10.05	2.83	3.05	1.23
Center	2.0 - 3.0 in.	96.52	0.01	3.12	0.35	11.40	33.58	36.25	8.73	2.98	2.25	1.33
South	3.0 - 4.0 in.	96.35	3.54	0.03	0.08	7.28	40.78	33.23	7.85	2.48	3.23	1.50
09090038-G12	.25 - 1.0 in.	97.40	0.02	2.33	0.25	12.78	30.68	36.58	10.98	2.80	2.30	1.28
Green #12	1.0 - 2.0 in.	97.26	2.33	0.01	0.40	9.93	34.00	36.95	9.45	2.60	3.05	1.28
Center	2.0 - 3.0 in.	96.60	0.01	3.14	0.25	9.58	33.38	37.43	9.33	3.05	2.43	1.40
South	3.0 - 4.0 in.	96.48	1.64	1.65	0.23	13.98	38.53	31.78	6.65	1.93	2.48	1.13
09090038-G14	.25 - 1.0 in.	96.86	0.01	2.68	0.45	8.70	34.55	37.30	9.85	3.03	2.18	1.25
Green #14	1.0 - 2.0 in.	96.51	1.67	1.67	0.15	8.40	28.80	39.73	11.25	3.10	3.73	1.50
Center	2.0 - 3.0 in.	96.51	0.01	3.00	0.48	11.15	34.90	35.50	8.75	2.83	2.18	1.20
South	3.0 - 4.0 in.	95.61	0.03	4.08	0.28	6.38	40.10	34.93	7.40	2.55	2.90	1.35
USGA		89 to 100	5 Max.	3 Max.	3 Max.	10 Max.	At Least 60		20 Max.		5 Max.	
Recommended Specifications			10 Max. w/ Fine & V.F.		10 Max.					10 Max. w/Silt & Clay		
ISTRC Guidelines		89 to 100	5 Max.	3 Max.	3 Max.	10 Max.	15 to 25	40+	10 to 15	20 - #80	5 Max.	
			10 Max. w/ Fine & V.F.		10 Max.		65 to 85 Optimum				10 Max. w/Silt & Clay	

Reviewed by: _____

ISTRC

International Sports Turf Research Center Aerification Displacement Chart

Tine Size	1.25" x 1.25" Centers	1.5" x 1.5" Centers	2.0" x 2.0" Centers	2.5" x 2.5" Centers	5" x 5" Centers
1/4" Hollow Tines	3.14%	2.18%	1.23%	0.79%	
3/8" Hollow Tines	7.07%	4.91%	2.76%	1.77%	
1/2" Hollow Tines	12.57%	8.73%	4.91%	3.14%	
5/8" Hollow Tines		13.64%	7.67%	4.91%	
5/8" Hollow Vertidrain					1.23%
3/4" Hollow Tines				7.07%	1.77%
3/4" Hollow Vertidrain					1.77%
1" Hollow Tines					3.14%
1" Hollow Vertidrain					3.14%
7/8" Drill & Fill (7" Ctrs)					1.23%
Graden Verticutter (15 Blades @ 1" Spacings)	<u>1mm Blade</u> 3.93%	<u>2mm Blade</u> 7.87%	<u>3mm Blade</u> 11.81%		

Note: 1/4" Quadtines remove as much material as Regular 1/2" Hollow Tines
 3/8" minimum for ease of topdressing fill if replacement of material is required
 For double aerification make two passes at approx. 37° (slightly less than 45°) to minimize overlap