

Independent Test Results

- 2186% Increase in Infiltration Rate
- 85% More Air Pores
- Air Water Balance was 1:2.76 now 1:1.31 – almost textbook ideal!



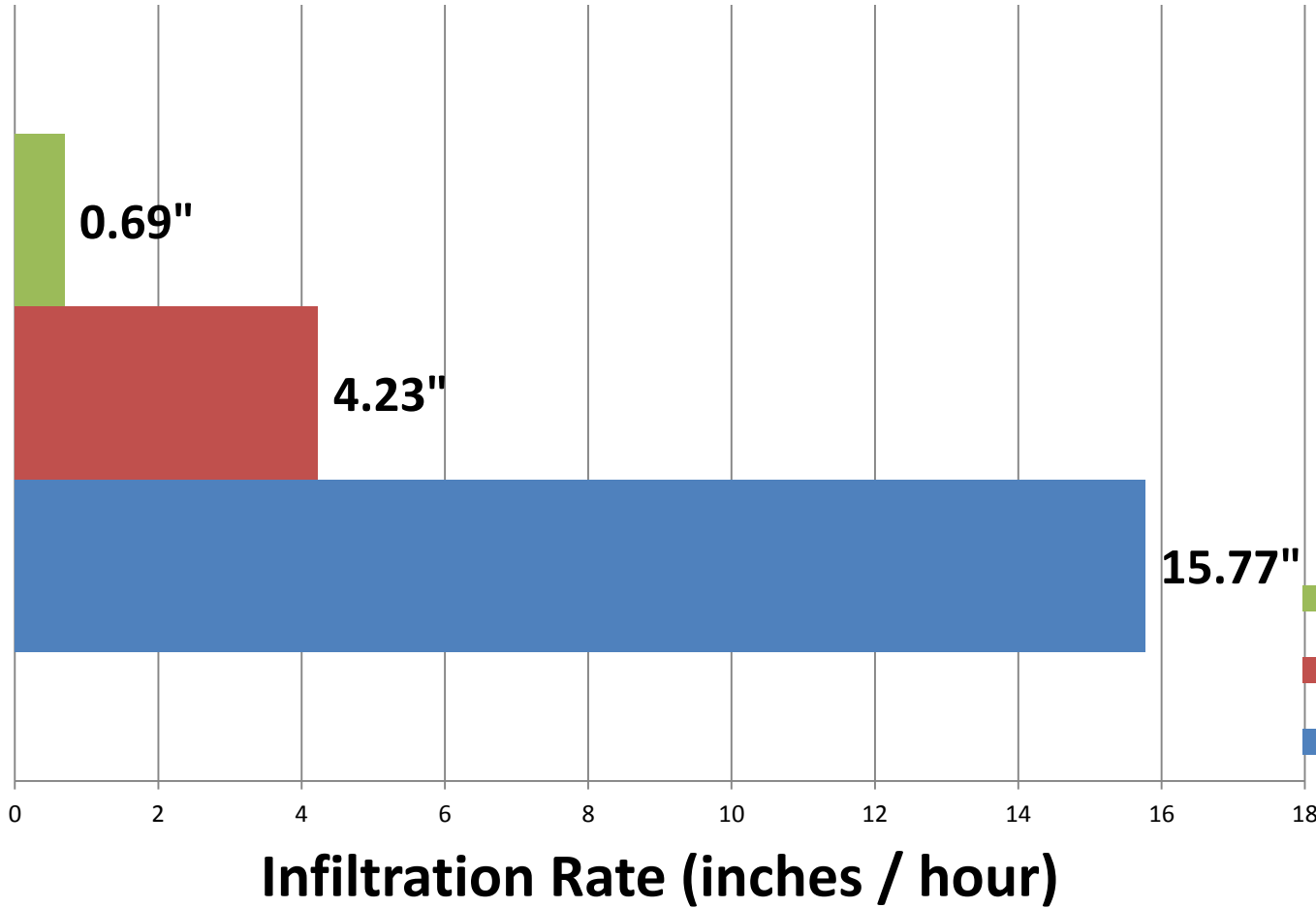
The Left Side of Green #7 has a lower 1st tier (0-4 in.) infiltration rate, lower air porosity and higher water holding properties than the Right Side. With similar OM contents and water holding properties the key variable in the physical properties for both sides is compaction, as measured by the bulk density. At this time it is difficult to say why the Left Side is more compacted, but often it either reflects the design features of the green, shade/air movement differences and/or traffic patterns.



Table 1. ISTRC Comparison Table

Green #7 1 st tier (0-4")	Modified Soil Greens (1 st tier Sample)	September 2013		July 2013	July 2011
		Left	Right		
Infiltration Rate [in/hr]	At least 4	4.23 [well lower than the sample labeled right side of the green]	15.77 [excellent – the time lapse photo of the right side sample is an excellent confirmation of its tested physical properties]	0.69	7.15
Air Porosity [Non-Capillary]	At least 14%	16.13% [lower than the right sample, but is well higher than the sample submitted in July]	21.83% [excellent]	11.80%	18.66%
Water Porosity [Capillary]	Less than 30%	30.67% [at our upper target range]	28.59% [workable for a soil green]	32.62%	32.56%
Bulk Density [g/cc]	1.35 to 1.45	1.41 [high for the amount of OM – would benefit from less compaction]	1.37 [more in line with what is should be given the amount of OM]	1.44	1.28
Water Holding	Less than 25%	21.70% [workable]	20.91% [workable]	22.66%	25.42%
Organic Content: 0-1"	1.5% to 3.0%	3.34% [high]	3.23% [high]	2.36%	2.52%
Organic Content: 1-2"	1.0% to 2.0%	3.58% [high]	3.22% [high]	2.89%	4.55%
Organic Content: 2-3"	0.5% to 2.0%	2.53% [high]	2.31% [high]	2.22%	3.04%
Organic Content: 3-4"	0.5% to 2.0%	3.76% [high]	3.35% [high]	3.58%	5.40%
Root Mass	at least ½ in.	3/8 in.	3/8 in.	3/8 in.	5/8 in.
Feeder Roots	at least 3.5 in.	3 ½ in. Sparse	3 ½ in. Sparse	3 ½ in.	3 in.

Air₂G₂ Improves Infiltration



14.87" Improvement – 2186%

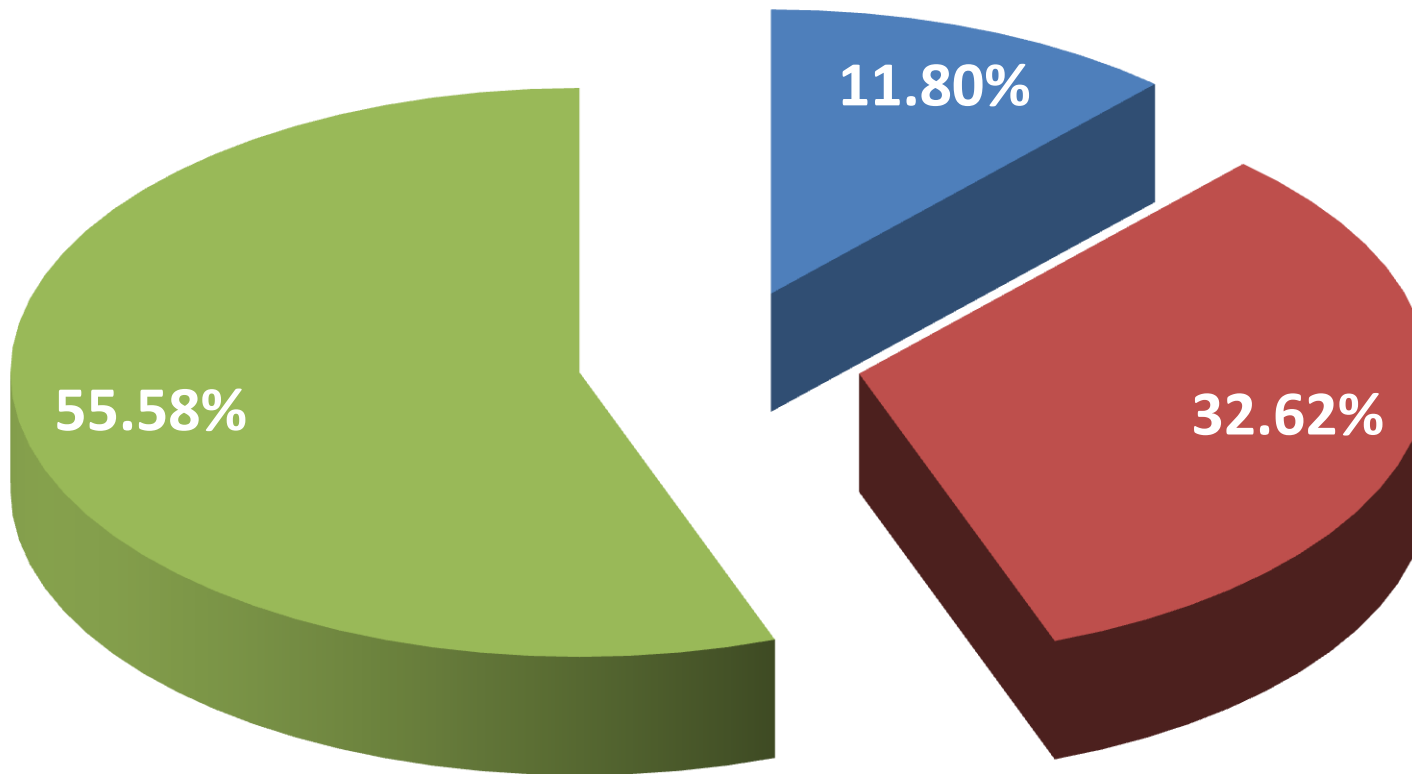
The Left Side of Green #7 has a lower 1" tier (0.4 in.) infiltration rate, lower air porosity and higher water holding properties than the Right Side. With similar OM contents and water holding properties the key variable in the physical properties for both sides is compaction, as measured by the bulk density. At this time it is difficult to say why the Left Side is more compacted, but often it either reflects the design features of the green, shade/air movement differences and/or traffic patterns.

Green #7 1" tier (0-4")	Modified Soil Green (1" Tier Sample)	September 2013		July 2013	July 2011
		Left	Right		
Infiltration Rate (in/hr)	At least 4	4.23 (well lower than the sample labeled right side of the green)	15.77 (excellent - see time lapse photo of the right side sample in an excellent coordination of its tested physical properties)	0.69	7.15
Air Porosity (Non-Capillary)	At least 14%	14.13% (lower than the right sample, but is well higher than the sample submitted in July)	21.87% (excellent)	11.80%	18.64%
Water Porosity (Capillary)	Less than 10%	30.67% (at our upper target range)	38.59% (workable for a soil green)	32.62%	32.54%
Bulk Density (g/cc)	1.31 to 1.45	1.41 (high for the amount of OM - would benefit from less compaction)	1.31 (more in line with what is should be given the amount of OM)	1.44	1.28
Water Holding	Less than 20%	21.70% (workable)	20.91% (workable)	22.66%	24.42%
Organic Content: 0-1"	1.0% to 1.0%	3.34% (high)	3.27% (high)	2.36%	2.52%
Organic Content: 1-2"	1.0% to 2.0%	3.53% (high)	3.22% (high)	2.89%	4.55%
Organic Content: 2-3"	0.5% to 2.0%	2.27% (high)	2.17% (high)	2.22%	3.64%
Organic Content: 3-4"	0.5% to 2.0%	3.70% (high)	3.35% (high)	2.58%	5.40%
Root Mass	at least 10 in.	3.8 in.	3.8 in.	3.8 in.	5.8 in.
Number Roots	at least 3.2 in.	3.1 in. (same)	3.1 in. (same)	3.1 in.	3 in.

- July 2013
- Sept. 2013 - 1X
- Sept. 2013 - 2X

Initial Air-Water Balance = 1.0 : 2.76

July 2013



The Left Side of Green #7 has a lower 1" air (0.4 in) infiltration rate, lower air porosity and higher water holding properties than the Right Side. With similar OM content and water holding properties the key variable in the physical properties for both sides is compaction, as measured by the bulk density. At this time it is difficult to say why the Left Side is more compacted, but other factors either reflects the design features of the green, stochastic movement differences and/or traffic patterns.

July 2013

Green #7 1" Air (0-4")	Infiltration Rate (in/hr)	September 2013		2011 Comparison Value	
		Left	Right	July 2013	July 2011
	At least 4	4.23 (bulk lower than the sample labeled right side of the green)	13.17 (available) - the same higher photos of the right side shows it is an actual measurement not its total physical porosity)	6.09	7.13
Air Porosity (Air Capable)	At least 14%	16.17% (lower than the right sample but a well irrigated in July)	23.87% (available)	11.80%	15.68%
Water Holding (Available)	Less than 30%	30.2% (at least equal to OM - would benefit from less compaction)	26.38% (available for a well green)	32.62%	32.58%
Bulk Density (g/cc)	1.25 to 1.45	1.41 (high for the amount of OM - would benefit from less compaction)	1.37 (lower in the soils what is shown for green - the amount of OM)	1.44	1.24
Water Holding	Less than 1.000 in	21.70% (available)	20.93% (available)	22.60%	24.42%
Organic Carbon 0-2"	1.00 to 2.00%	1.14% (high)	2.22% (high)	2.20%	2.52%
Organic Carbon 2-4"	1.00 to 2.00%	1.18% (high)	2.22% (high)	2.08%	4.57%
Organic Carbon 4-6"	0.50 to 1.00%	2.17% (high)	2.17% (high)	2.27%	3.68%
Organic Carbon 6-8"	0.20 to 1.00%	3.36% (high)	2.37% (high)	3.18%	4.68%
Soil Water	At least 1.00 in	1.00 in	1.00 in	1.00 in	0.75 in
Water Run	At least 1.00 in	1.1 in. Water	1.1 in. Water	1.1 in.	0.8 in.

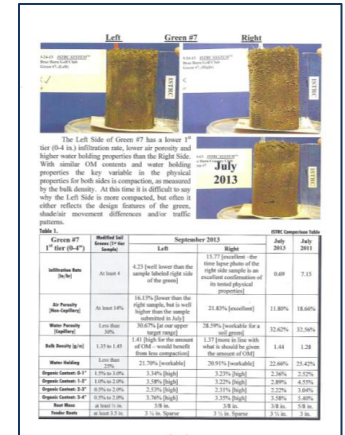
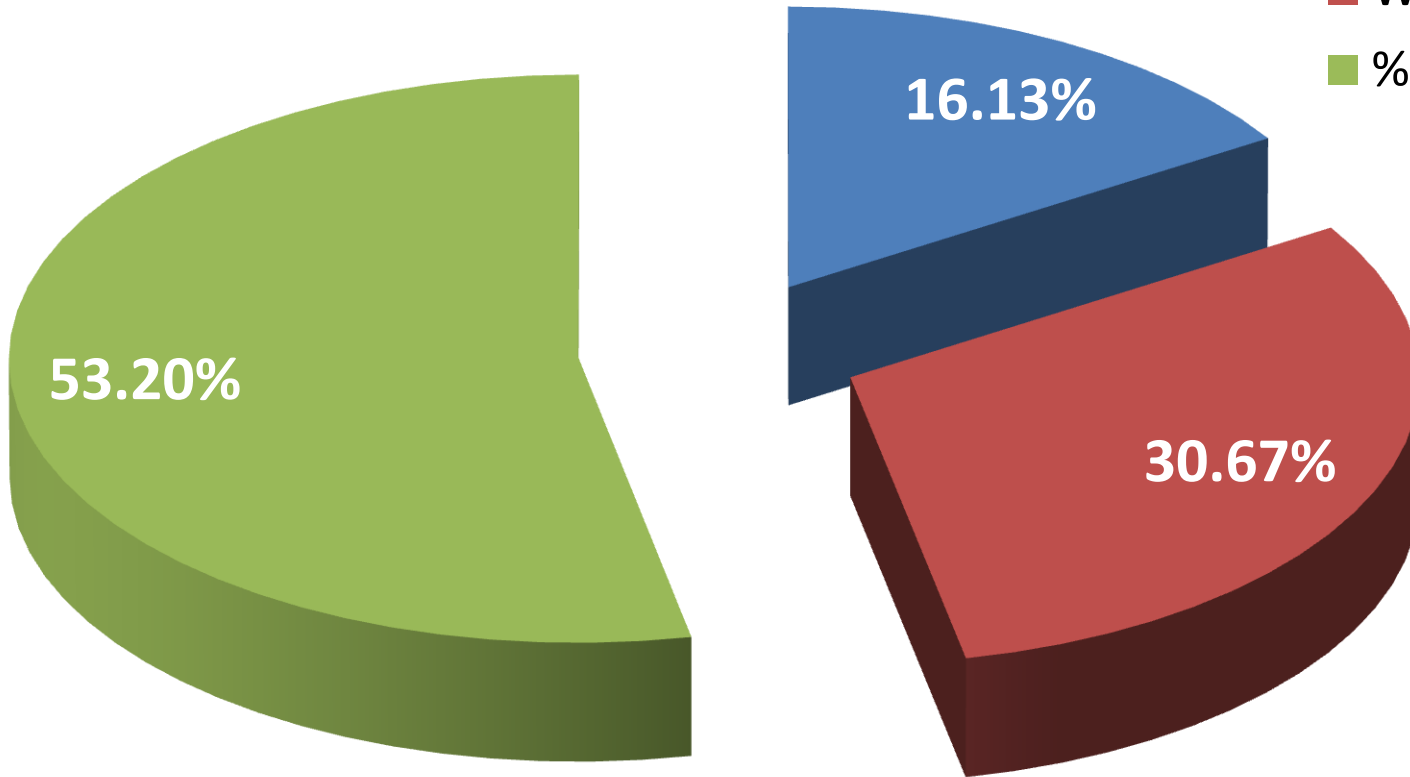
- Air Porosity
- Water Porosity
- % Solids

Data from 2013 ISTRC Report

Air:Water After 1X Air₂G₂

Sept. 2013 – After Air₂G₂

- Air Porosity
- Water Porosity
- % Solids

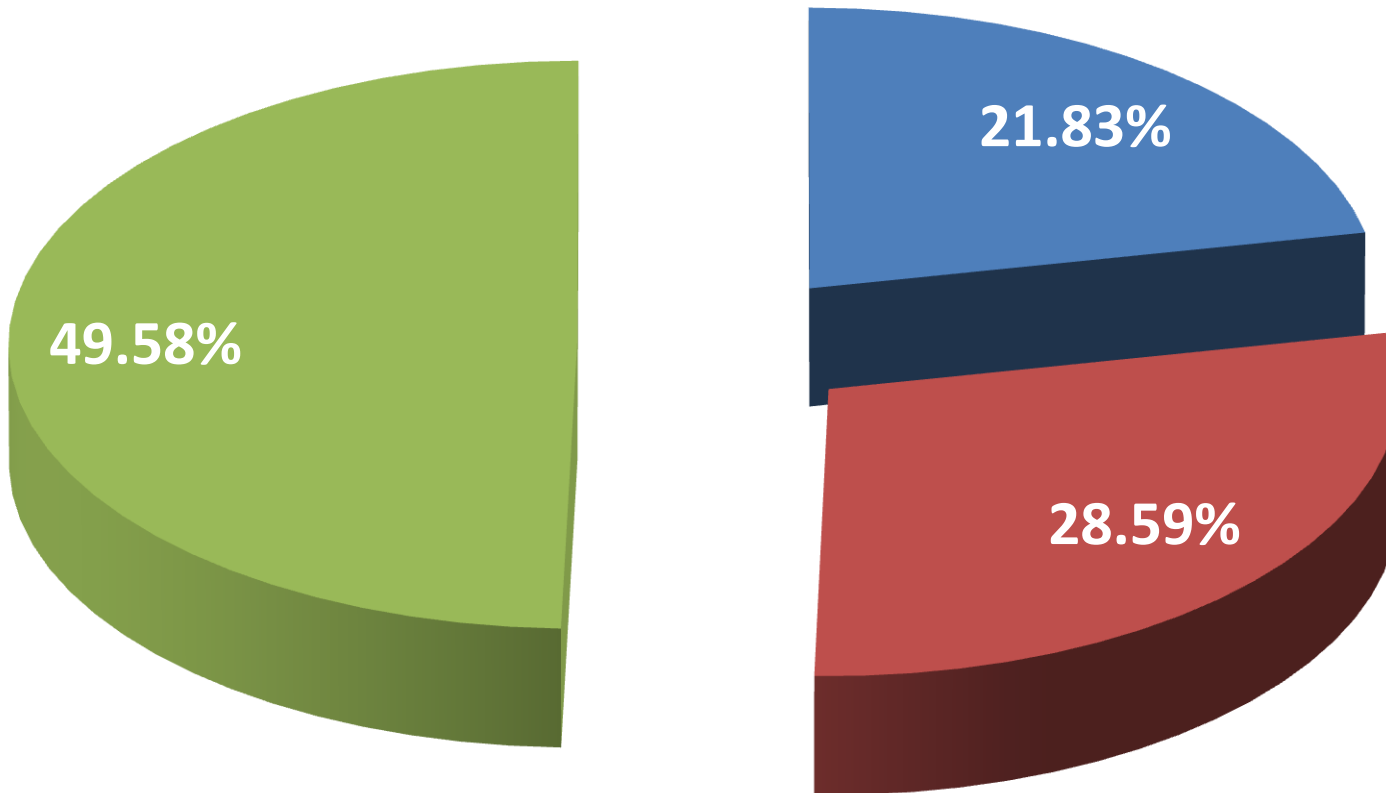


36.7% More Air Pores

Air:Water After 2X Air₂G₂

Sept. 2013 – After 2X Air₂G₂

- Air Porosity
- Water Porosity
- % Solids



Left Right

July 2013

The Left Side of Core #7 has a lower 1" air (0.4 in.) infiltration rate, lower air porosity and higher water holding properties than the Right Side. With similar CM concrete and water holding properties the key variable in the physical properties for both sides is compaction, as measured by the bulk density. At this time it is difficult to say why the Left Side is more compacted, but other it either reflects the design features of the green, shrinkage movement differences and/or traffic patterns.

Core #7 1" Core (0-4")	Infiltration Rate (in/hr)	Air Porosity (% by Volume)	Water Porosity (% by Volume)	Bulk Density (pcf)	September 2013		2014 Comparison	
					Left	Right	July 2013	July 2014
At least 4	4.23 (Left lower than the sample located right side of the green)	13.17 (Lowest)	23.87% (Lowest)	141.1 (Lowest)	13.17 (Lowest)	23.87% (Lowest)	11.80%	13.17%
At least 10%	16.17% (Lower than the right sample, but is well above the 10% target range)	21.70% (Lowest)	28.59% (Lowest)	141.1 (Lowest)	13.17 (Lowest)	23.87% (Lowest)	32.42%	32.54%
At least 1.00 to 1.45	1.41 (High for the amount of CM - would benefit from less compaction)	21.70% (Lowest)	28.59% (Lowest)	141.1 (Lowest)	13.17 (Lowest)	23.87% (Lowest)	1.44	1.24
At least 1.00 to 1.45	1.41 (High for the amount of CM - would benefit from less compaction)	21.70% (Lowest)	28.59% (Lowest)	141.1 (Lowest)	13.17 (Lowest)	23.87% (Lowest)	1.44	1.24
At least 1.00 to 1.45	1.41 (High for the amount of CM - would benefit from less compaction)	21.70% (Lowest)	28.59% (Lowest)	141.1 (Lowest)	13.17 (Lowest)	23.87% (Lowest)	1.44	1.24
At least 1.00 to 1.45	1.41 (High for the amount of CM - would benefit from less compaction)	21.70% (Lowest)	28.59% (Lowest)	141.1 (Lowest)	13.17 (Lowest)	23.87% (Lowest)	1.44	1.24
At least 1.00 to 1.45	1.41 (High for the amount of CM - would benefit from less compaction)	21.70% (Lowest)	28.59% (Lowest)	141.1 (Lowest)	13.17 (Lowest)	23.87% (Lowest)	1.44	1.24
At least 1.00 to 1.45	1.41 (High for the amount of CM - would benefit from less compaction)	21.70% (Lowest)	28.59% (Lowest)	141.1 (Lowest)	13.17 (Lowest)	23.87% (Lowest)	1.44	1.24

85.0% More Air Pores