Nutrient Management Plan

Prepared For:

The Forest Club
Tom Fox
3601 Dellabrook Street
Ashland, VA 23005
mrFox@gmail.com

Prepared By:

Angela C. Whitehead
Soil Horizons, LLC
300 Buford Rd.
Williamsburg, VA 23188
804-892-6678
Certification Code: # 386
soilmapper@yahoo.com

Acreage			
Total:	113.3	Rough:	49.9
Greens:	3.9	Driving Range:	9.8
Tees:	5.2	Putting Green:	
Fairways:	43.5	Club Grounds:	1

County: Hanover
Watershed: YO11

Plan Written:	03/03/14
Plan Expires:	03/03/19

Planner Signature

The purpose of this Nutrient Management Plan is to ensure minimum movement of nitrogen and phosphorus from the specified area of application to surface and groundwater where they can potentially have a detrimental effect on water quality as well as ensuring that plants have optimum soil nutrient availability for good productivity and quality. By following this soil test based plan you are helping to protect local waters and the Chesapeake Bay.

If you have questions, please contact your plan writer, local Virginia Cooperative Extension Agent, or the Department of Conservation and Recreation Nutrient Management Program.

Nutrient Management Plan for:
The Forest Club

Superintendent Information

Golf Course Name	*The Forest Club*
Superintendent's Name	*Tom Fox*
Mailing Address	*3601 Dellabrook Street*
City State Zip	*Ashland, VA 23005*
Phone	*540-223-3403*
Fax	
Email	mrFox@gmail.com

Planner Information

Planner Name	*Angela C. Whitehead – Soil Horizons, LLC*
Mailing Address	*300 Buford Rd.*
City State Zip	*Williamsburg, VA 23188*
Phone	*804-892-6678*
Fax	*757-253-1742*
Email	*soilmapper@yahoo.com*
Certification Code	*386*

Location Information

Physical Address	*3601 Dellabrook Street*
City State Zip	*Ashland, VA 23005*
Coordinates	*37° 45' 45"N, 77° 36' 16"W*
VAHU6 Watershed Code	*YO11*
County	*Hanover*

Acreage

Total	*113.3*
Greens	*3.9*
Tees	*5.2*
Driving Range+Fairways	*53.3*
Clubhouse Grounds + Rough	*50.9*
Plan Start Date	*03/03/14*
Plan End Date	*03/03/19*

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The Forest Club agrees to comply with all requirements set forth in the Nutrient Management Training and Certification Regulations, 4 VAC 5-15-10 et seq., and to follow recommendations for turf fertilization and management as described in the Virginia Nutrient Management Standards and Criteria, Revised October 2005. This includes implementing the Department of Conservation and Recreation's approved Nutrient Management Plan and maintaining fertilization records. All nutrient applications performed by The Forest Club staff shall comply with the provisions of this Nutrient Management Plan as of March 3, 2014.

1. Site Description and Supporting Information

The Forest Club is located in Ashland, west of I-95 and bounded to the north by the Pamunkey River. The club is located within the Pamunkey Run residential subdivision. The club recognizes the importance of nutrient management as a fundamental way to protect water quality.

The club owns approximately 540 acres of land, which includes a private 18-hole golf course, putting green, driving range, and clubhouse with pool and tennis courts. The course maintains and is comprised of 3.9 acres bentgrass greens and 5.2 acres bentgrass tees, 43.5 acres bentgrass fairways, and 50 acres bluegrass/tall fescue rough. The driving range contains approximately seven acres of bermudagrass and three acres of bentgrass. The driving range also contains an additional 0.5 acre of over-seeded target greens. The clubhouse grounds account for an approximately one acre of blue grass/tall fescue. Both the rough and clubhouse grounds are minimally managed, receiving no more than two fertilizer applications per year. Both areas exhibit similar soil conditions. Greens are sand-based and the entire golf course is irrigated using on-site ponds. The golf course receives approximately 23,000 rounds of play annually.

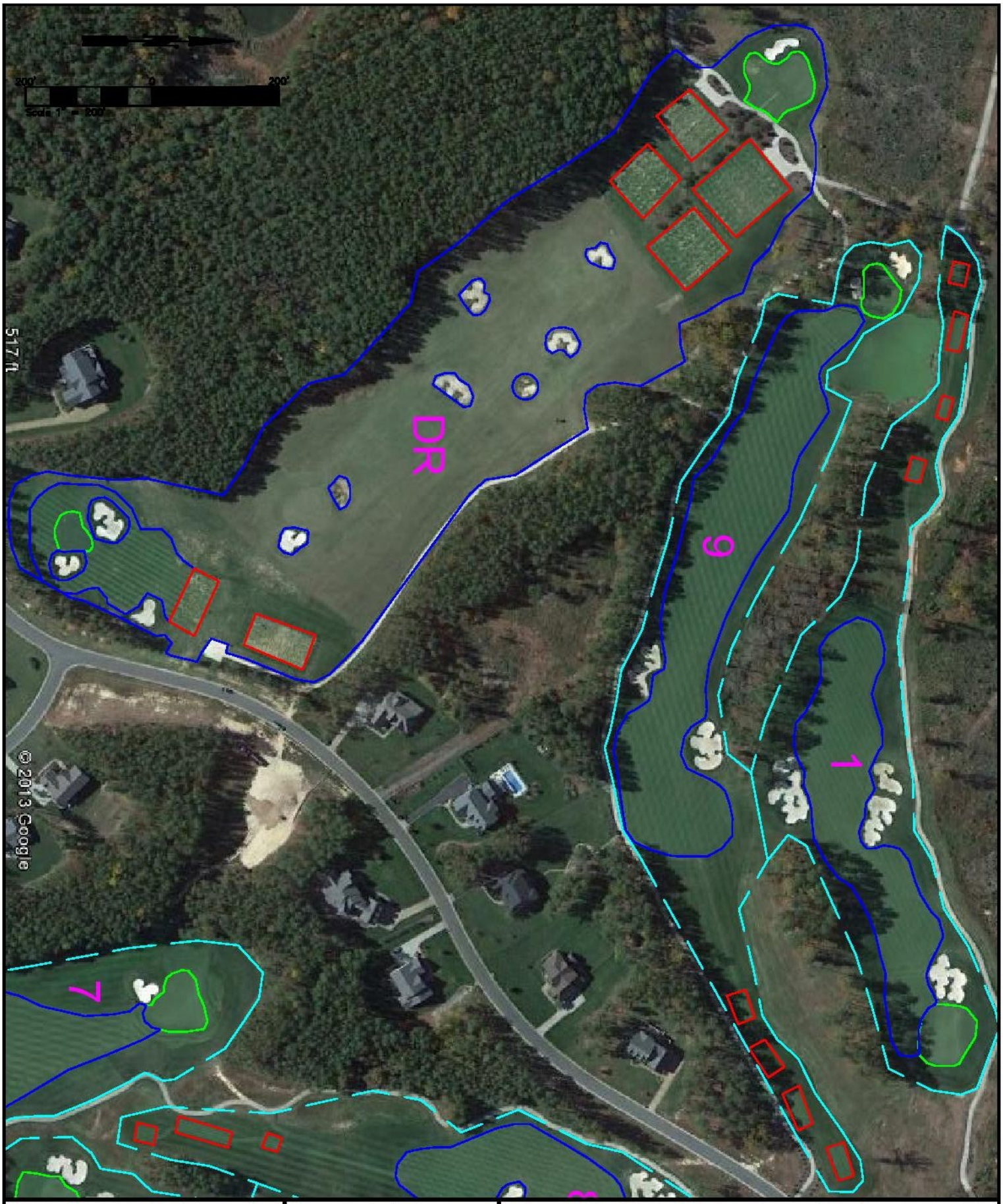
The nutrient management recommended application season for nitrogen fertilizers to cool season turfgrasses begins six weeks prior to the last spring average killing frost date and ends six weeks past the first fall average killing frost date. The acceptable nitrogen fertilizer application season for non-overseeded warm season turfgrass begins no earlier than the last spring average killing frost date and ends no later than one month prior to the first fall average killing frost date.

The Forest Club Fertilization Season

	Killing Frost Dates	**Cool Season Applications**	**Warm Season Applications**
Spring	April 15	March 4	April 15
Fall	October 21	December 2	September 23

2. Site Maps

Course Acreage	TEES	GREENS	FAIRWAY	ROUGH
1	0.20	0.2	2.23	2.57
2	0.22	0.12	0.91	0.92
3	0.20	0.2	2.68	2.64
4	0.20	0.25	3.08	2.46
5	0.19	0.32	0.88	0.94
6	0.21	0.15	3.77	2.32
7	0.26	0.2	5.16	3.14
8	0.20	0.15	2.14	2.44
9	0.25	0.12	3.21	2.29
10	0.19	0.17	2.03	3.77
11	0.21	0.2	0.75	0.88
12	0.21	0.16	2.44	2.08
13	0.25	0.18	4.66	4.24
14	0.23	0.15	0.99	1.48
15	0.21	0.2	2.75	4.84
16	0.36	0.13	5.79	3.94
17	0.22	0.34	0.00	2.12
18	0.28	0.23	0.00	6.82
Practice	1.11	0.1	9.78	
Total:	**5.19**	**3.57**	**53.27**	**49.89**



FACILITY: THE Forest CLUB

HOLES: 1, 9, RANGE

DATE: 3/3/14
SCALE: 1 IN = 200 FT
JOB #:7072
BASE MAP PROVIDED BY: GOOGLE EARTH, 10/21/12

SOIL HORIZONS, LLC
300 BUFORD ROAD
WILLIAMSBURG, VA 23188 804-892-6678

200' 0 200'
Scale 1" = 200'

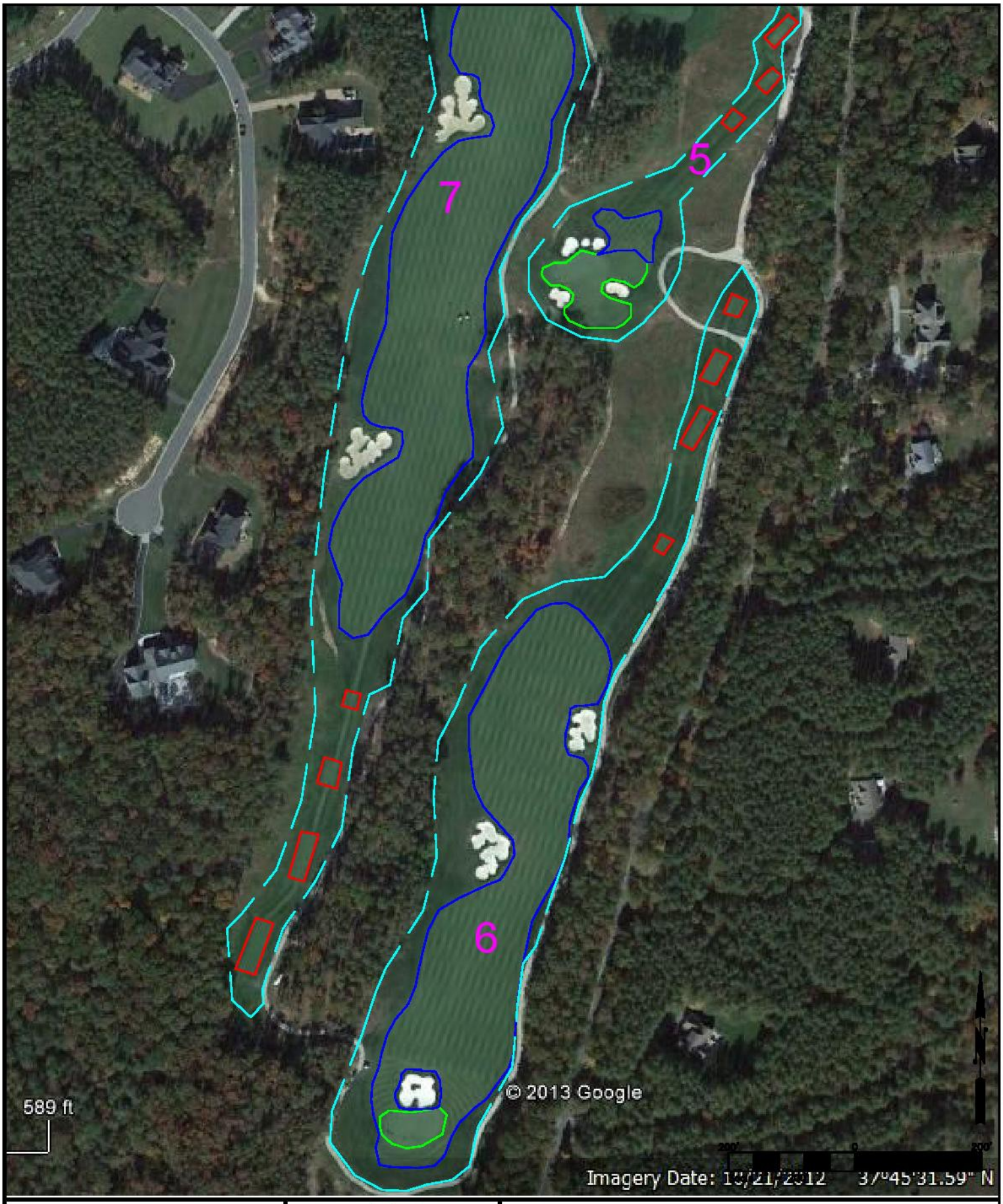
FACILITY: THE Forest CLUB HOLES: 2 3	DATE: 3/3/14 SCALE: 1 IN = 200 FT JOB #: 7072 BASE MAP PROVIDED BY: GOOGLE EARTH, 10/21/12	SOIL HORIZONS, LLC 300 BUFORD ROAD WILLIAMSBURG, VA 23188 804-892-6678

FACILITY: THE Forest CLUB

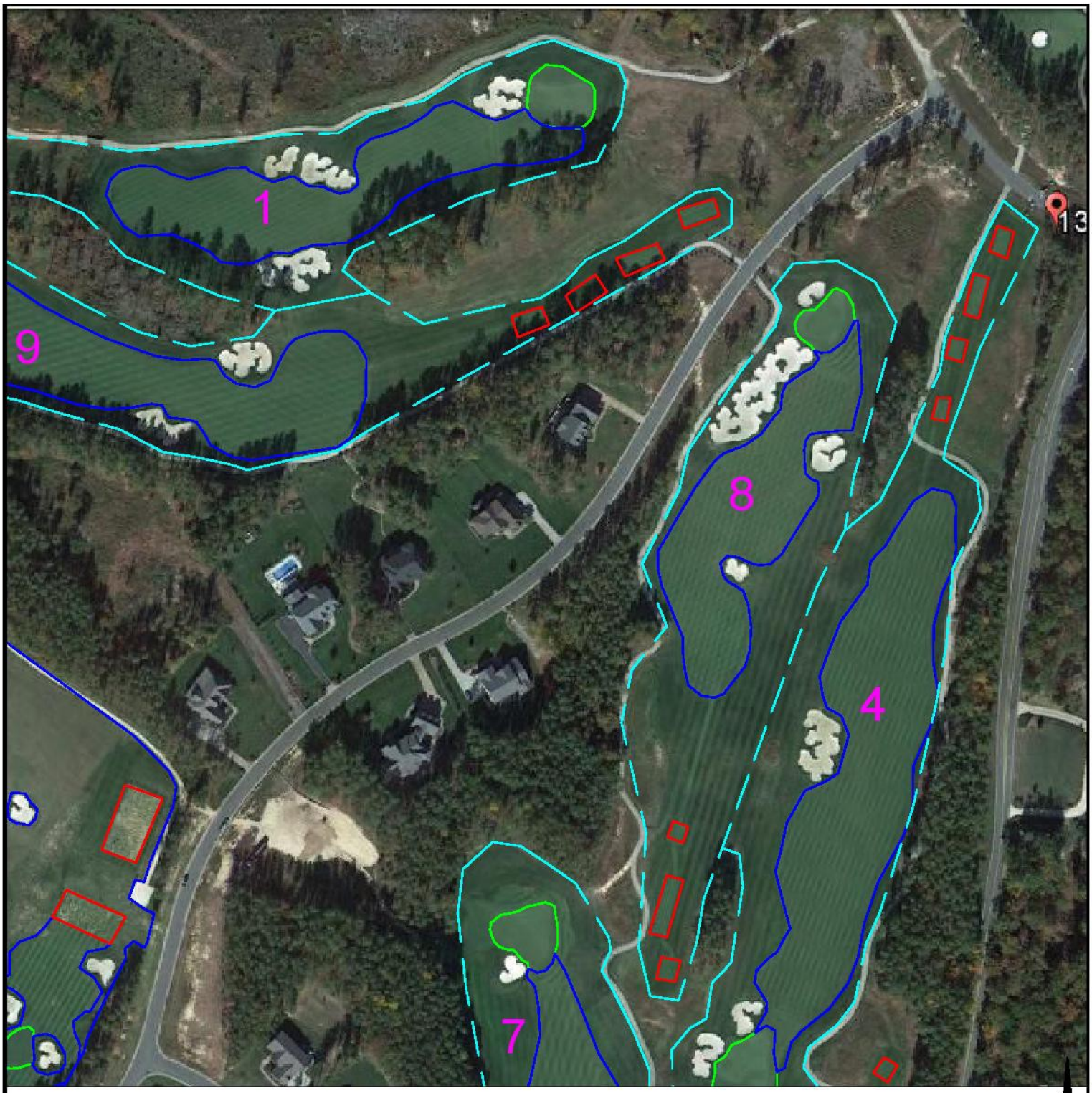
HOLES: 4 5 7 8

DATE: 3/3/14
SCALE: 1 IN = 200 FT
JOB #:7072
BASE MAP PROVIDED BY: GOOGLE EARTH, 10/21/12

SOIL HORIZONS, LLC
300 BUFORD ROAD
WILLIAMSBURG, VA 23188 804-892-6678



FACILITY: THE Forest CLUB HOLES: 5 6 7	DATE: 3/3/14 SCALE: 1 IN = 200 FT JOB #:7072 BASE MAP PROVIDED BY: GOOGLE EARTH, 10/21/12	SOIL HORIZONS, LLC 300 BUFORD ROAD WILLIAMSBURG, VA 23188 804-892-6678



N

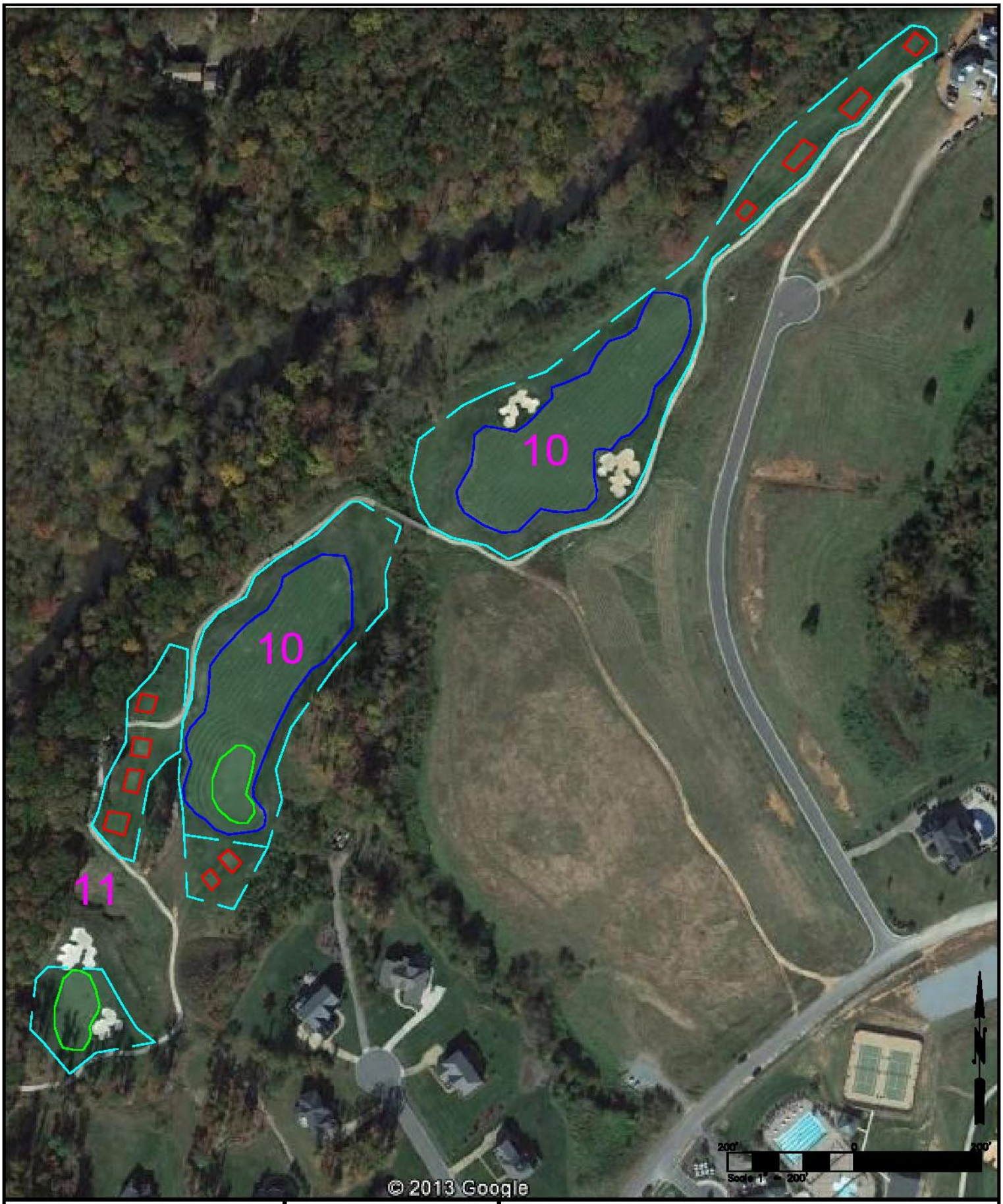
200' 0 200'
Scale 1" = 200'

FACILITY: THE Forest CLUB

HOLES: 8

DATE: 3/3/14
SCALE: 1 IN = 200 FT
JOB #:7072
BASE MAP PROVIDED BY: GOOGLE EARTH, 10/21/12

SOIL HORIZONS, LLC
300 BUFORD ROAD
WILLIAMSBURG, VA 23188 804-892-6678



FACILITY: THE Forest CLUB

HOLES: 10 11

DATE: 3/3/14
SCALE: 1 IN = 200 FT
JOB #:7072
BASE MAP PROVIDED BY: GOOGLE EARTH, 10/21/12

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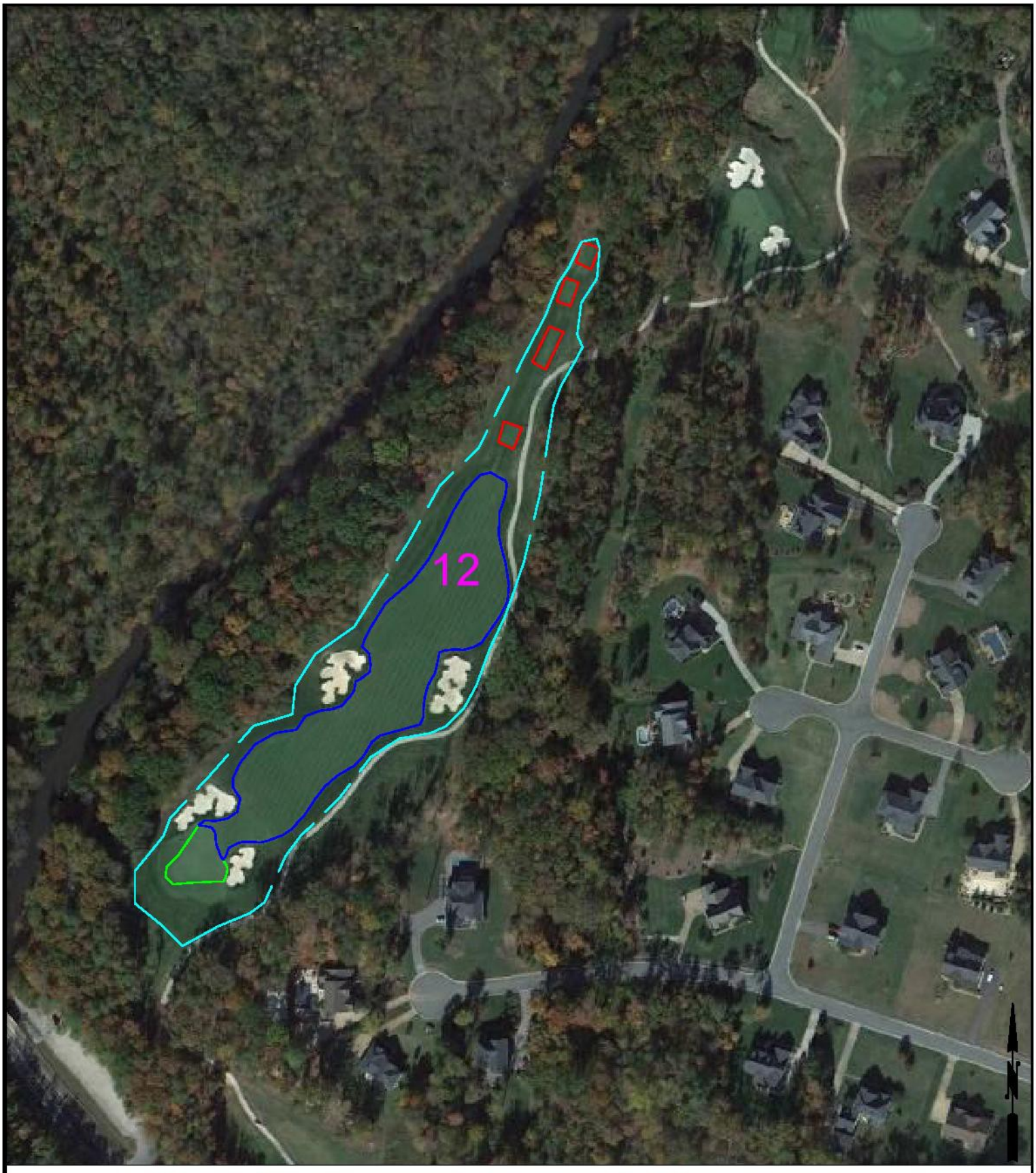
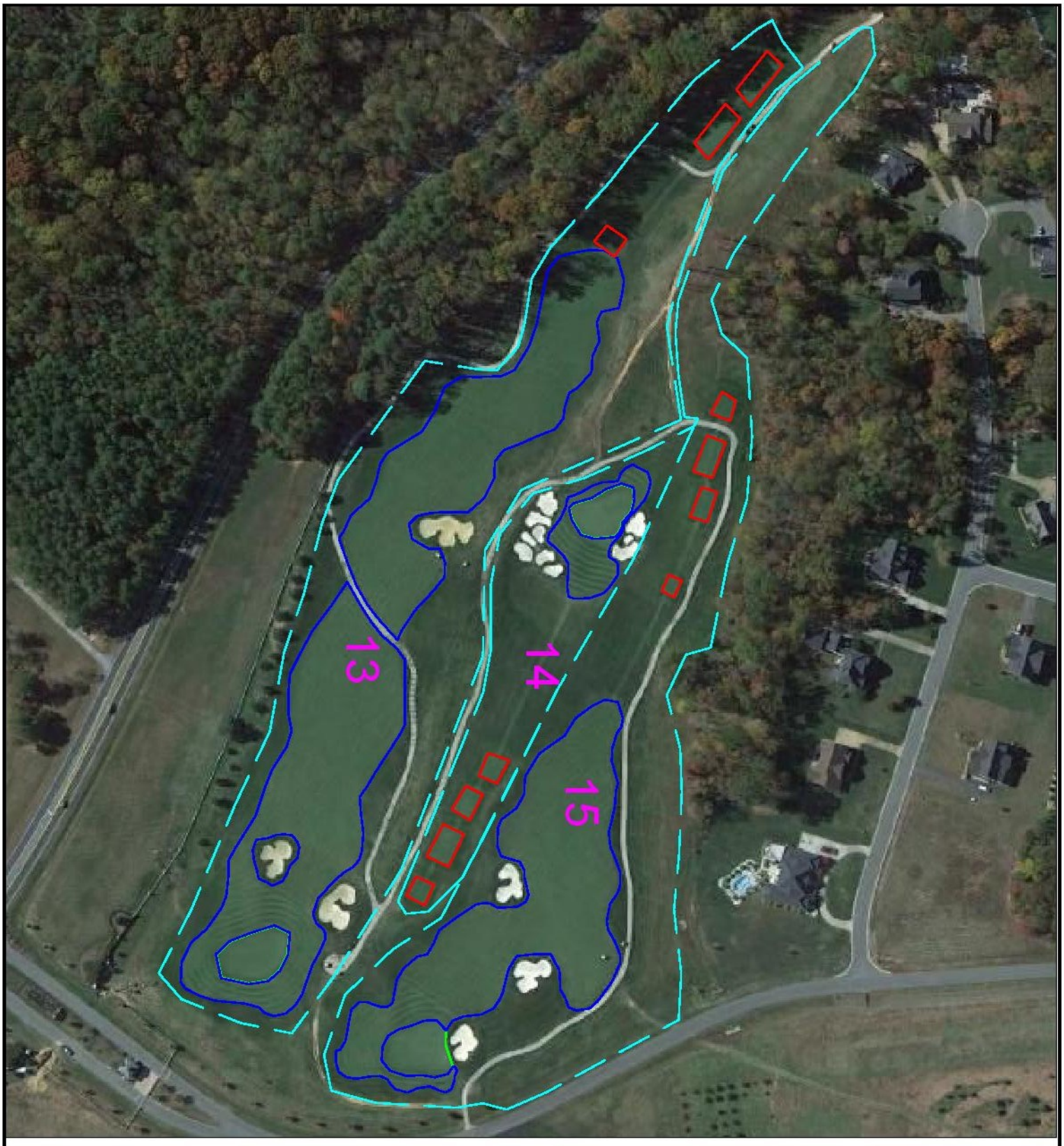


FACILITY: THE Forest CLUB

HOLES: 12

DATE: 3/3/14
SCALE: 1 IN = 200 FT
JOB #:7072
BASE MAP PROVIDED BY: GOOGLE EARTH, 10/21/12

SOIL HORIZONS, LLC
300 BUFORD ROAD
WILLIAMSBURG, VA 23188 804-892-6678



200' 0 200'
Scale 1" = 200'

FACILITY: THE Forest CLUB

HOLES: 13 14 15

DATE: 3/3/14
SCALE: 1 IN = 200 FT
JOB #:7072
BASE MAP PROVIDED BY: GOOGLE EARTH, 10/21/12

SOIL HORIZONS, LLC
300 BUFORD ROAD
WILLIAMSBURG, VA 23188 804-892-6678

FACILITY: THE Forest CLUB

HOLES: 16 17

DATE: 3/3/14
SCALE: 1 IN = 200 FT
JOB #:7072
BASE MAP PROVIDED BY: GOOGLE EARTH, 10/21/12

SOIL HORIZONS, LLC
300 BUFORD ROAD
WILLIAMSBURG, VA 23188 804-892-6678

FACILITY: THE Forest CLUB

HOLES: 18 CLUBHOUSE

DATE: 3/3/14
SCALE: 1 IN = 200 FT
JOB #:7072
BASE MAP PROVIDED BY: GOOGLE EARTH, 10/21/12

SOIL HORIZONS, LLC
300 BUFORD ROAD
WILLIAMSBURG, VA 23188 804-892-6678

3. Soil Test Results

Soil samples were taken from greens, tees, fairways, and rough. Some composite samples were collected across two – four holes where management and soil conditions are similar. Several sub-samples from the upper 4" of soil were taken from the greens, fairways and tees. These sub-samples were taken in a random manner, such as with a zigzag pattern to minimize the variability that is present in the sampling area. When sufficient sub-samples from a uniform area were taken they were thoroughly mixed, breaking apart clumps and removing all foreign matter such as roots, stalks, rocks, etc.

Soil samples were analyzed by Logan Labs, LLC. Standard soil test results provide values for pH, Organic Matter, Total Exchange Capacity, Sulfur, Phosphorous, Calcium, Magnesium, Potassium, Sodium, Boron, Iron, Manganese, Copper, Zinc, Aluminum, and % Base Saturation Ca, Mg, K, Na. The soil samples collected are valid for the life of this plan (five years) or upon a major renovation or redesign of the golf course lands, whichever occurs sooner. Average soil test ratings were used to determine Phosphorous and Potassium recommendations for each management area.

A. Greens 1-18, Putting Green; 3.9 acres

Soil pH measures 7.2. No lime is recommended. Potassium levels averaged in the high - range. Applications of potassium are recommended at a rate of 1 lb/1000ft^2 annually, except for Greens 2, 5, 7, 10). Greens 2, 5, 7, 10 have very high potassium fertility and do not require additional potassium. Phosphorus levels measured in the high range. Phosphorous applications of no more than 0.75 lb/1000ft^2 annually are recommended. Nitrogen applications may not exceed 6 lbs/1000ft^2 annually. Magnesium, sulfur, boron, and manganese levels are below the desired range. Additions of Sul Po Mag or similar product and micronutrients are recommended.

B. Tees 1-18; 5.2 acres

Soil pH measures 7.3. No lime is recommended. Phosphorous levels measure in the high - range. Phosphorous applications of 1 lb/1000ft^2 annually are recommended. Potassium levels averaged in the high + range. Potash applications are recommended at a rate of 0.5 lb/1000ft^2 annually, except for Tee 14). Tee 14 has very high potassium fertility and does not require additional potassium. Nitrogen applications may not exceed 5 lbs/1000ft^2 annually. Magnesium, sulfur, and boron levels are below the desired range. Additions of Sul Po Mag or similar product and micronutrients are recommended.

C. Fairways, 1-18; 43.5 acres

Soil pH (7.1) is near neutral. No lime is recommended. Phosphorous levels measure in the moderate range. Annual Phosphorous applications of 1.5 lbs/1000ft^2 are recommended. Potassium levels averaged in the moderate + range. Potash applications are recommended at a rate of 1 lb/1000ft^2 annually. Annual Nitrogen applications may not exceed 4 lbs/1000ft^2. Magnesium, sulfur, and boron levels are below the desired range. Additions of Sul Po Mag or similar product and micronutrients are recommended.

D. Rough -18; 49.9 acres, Driving Range; 9.8 acres, Clubhouse Grounds; 1 acre

Soil pH measured 6.6. No lime is recommended. Phosphorous levels measure in the moderate + range. Annual Phosphorous applications of 1 lb/1000ft^2 are recommended. Potassium levels averaged in the high range. Potash applications are recommended at a rate of 0.75 lb/1000ft^2 annually. Annual Nitrogen applications may not exceed 3 lbs/1000ft^2. Magnesium and boron levels are below the desired range. Additions of micronutrients are recommended.

4. Soil Test Summaries

A. Soil Test Summary: Greens

Customer Name:	**The Forest Club**
Testing Lab:	**Logan Labs**
Sample Date:	**12/19/13**
Planner Name:	**Angela C. Whitehead**
Certification Number:	**386**

Managed Area	Soil pH	Lab P_2O_5 (lb/ac)	VT P (ppm)	VT (H/M/L)	Lab K (lb/ac)	VT K (ppm)	VT (H/M/L)
1	7.2	438	40	H	420	151	H+
2	6.8	368	33	H	510	184	VH
3	7	380	35	H	428	154	H+
4	7	342	31	H	377	136	H+
5	7	401	37	H	433	156	VH
6	7.1	408	37	H	386	139	H+
7	7.2	492	46	H+	550	198	VH
8	7	426	39	H	408	147	H+
9	7.1	431	40	H	398	143	H+
10	7.2	356	32	H	635	229	VH
11	7.1	337	30	H	198	71	M
12	7.1	345	31	H	248	89	H-
13	7.1	340	31	H	284	102	H-
14	6.8	376	34	H	267	96	H-
15	7.2	314	28	H	280	101	H-
16	7.2	418	38	H	265	95	H-
17	7.2	324	29	H	248	89	H-
18	7.1	348	31	H	278	100	H-
PG	7.1	311	28	H	249	90	H-
Recommendation:			32	H		94	H-

B. Soil Test Summary: Tees

Customer Name:	**The Forest Club**
Testing Lab:	**Logan Labs**
Sample Date:	**12/19/13**
Planner Name:	**Angela C. Whitehead**
Certification Number:	**386**

Managed Area	Soil pH	Lab P_2O_5 (lb/ac)	VT P (ppm)	VT (H/M/L)	Lab K (lb/ac)	VT K (ppm)	VT (H/M/L)
1	7.4	325	29	H	407	147	H+
4	7.4	262	23	H-	307	111	H+
9	7.6	192	16	M+	172	62	M
14	7.4	280	25	H-	433	156	VH
17	7.1	280	25	H-	401	144	H+
Recommendation:			25	H-		150	H+

C. Soil Test Summary: Fairways

Customer Name:	**The Forest Club**
Testing Lab:	**Logan Labs**
Sample Date:	**12/19/13**
Planner Name:	**Angela C. Whitehead**
Certification Number:	**386**

Managed Area	Soil pH	Lab P_2O_5 (lb/ac)	VT P (ppm)	VT (H/M/L)	Lab K (lb/ac)	VT K (ppm)	VT (H/M/L)
1,9	6.5	88	6	M-	262	94	H-
3	5.3	94	6	M-	271	98	H-
6,7	5.6	109	8	M-	229	82	M+
10,12	7.3	140	11	M	200	72	M
13,15	7	168	13	M	252	91	H-
16,18	7	255	22	H-	255	92	H-
Recommendation:			15	M		85	M+

D. Soil Test Summary: Rough

Customer Name:	**The Forest Club**
Testing Lab:	**Logan Labs**
Sample Date:	**12/19/13**
Planner Name:	**Angela C. Whitehead**
Certification Number:	**386**

Managed Area	**Soil pH**	**Lab P_2O_5 (lb/ac)**	**VT P (ppm)**	**VT (H/M/L)**	**Lab K (lb/ac)**	**VT K (ppm)**	**VT (H/M/L)**
2,3	5.1	105	7	M-	295	106	H
4,5,7,8	5.6	223	19	H-	298	107	H
1,9	6.1	111	8	M-	404	145	H+
11,12	6.6	205	17	M+	326	117	H
Recommendation:			17	M+		117	H

5. Nutrient Application Worksheets

A. Greens Worksheet

Nutrient Application Worksheet

NAME:	**Forest Club**	**Management Area:**	Greens	
Prepared:	**3/15/14**	**Area (ft²):**	**170,869**	**Species:** bentgrass
Expires:	**3/15/19**			

Total Nutrient Needs	**Application Month/Day**	**Analysis**			**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft²**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft²**			**Gypsum**	**Lime lbs/1000 ft²**	**Total Product (lbs/Area)**
Nitrogen		N	P	K									N	P_2O_5	K_2O			
	Mar 1	0	0	0	5	2 months		Gypsum		lbs	128.00		0.00	0.00	0.00	10.00		8,543
Phosphorus	Mar 1	0	0	50	5	2 months			0.25	lbs	128.00		0.00	0.00	0.63			214
	Mar 30	21	0	0	6	2 weeks		Am. Sulfate	0.48	lbs	128.00		0.60	0.00	0.00			492
Potassium	Apr 1	5	4	5	2	4 months			3.50	lbs	128.00	54%	0.35	0.28	0.35			1,196
	Apr 1	0	0	0	2	5 months		ProMag	2.00	lbs	128.00		0.00	0.00	0.00			683
	Jun 23	46	0	0	7	2 weeks		urea	0.22	lbs	128.00		0.71	0.00	0.00			263
	Oct 15	21	0	0	2	2 weeks		Am. Sulfate	0.48	lbs	128.00		0.20	0.00	0.00			164
	Apr 15	12	0	0	15	2 weeks	foliar	Knife	2.00	oz	11.24		0.32	0.00	0.00			5,126
	Apr 15	23	0	0	15	2 weeks	foliar	Power N	4.00	oz	9.64		1.04	0.00	0.00			10,252
	Sept 1	0	46	0	1			TSP	1.00	lbs	128.00		0.00	0.46	0.00			171
	Mar 30	0	0	0	3	2 weeks		Mg Sulfate	1.00	lbs	128.00		0.00	0.00	0.00			513
	Mar 30	0	0	0	2	1 month		Mn Sulfate	1.00	lbs	128.00		0.00	0.00	0.00			342
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
									Total			3%	3.22	0.74	0.98			
						N Recommendation Range and Soil Test Recommendation							3-6	0.75	1			

Notes:

Greens 2,5,7,10 measured VH K – no K application necessary (Up to an additional 0.5 lb/1000ft2 K_2O may be applied to increase plant vigor, alleviate traffic stress)
Cool Season: Do not apply N between December 2nd and March 4th or when the ground is frozen.
Warm Season: Do not apply N between September 23rd and April 15th or during periods of drought.
Maximum N rate per application: 0.75 lbs/1000ft² (3-6 lbs/1000ft² annually)

B. Tees Worksheet

Nutrient Application Worksheet

NAME:	**Forest Club**	**Management Area:**	Tees	
Prepared:	**3/15/14**	Area (ft²):	**226,280**	**Species:** **bentgrass**
Expires:	**3/15/19**			

Total Nutrient Needs	Application Month/Day	Analysis	# of Apps	Application Interval	Fertilizer Type	Fertilizer Description	Rate per 1000ft²	lbs or oz	Wt. per Gal.	%Slow Release N	Total NPK lbs/1000ft²	Gypsum	Lime lbs/1000 ft²	Total Product (lbs/Area)
Nitrogen		N - P - K									N - P_2O_5 - K_2O			
	March 15	8 - 2 - 2	2	6 months			6.00	lbs	128.00	58%	0.96 - 0.24 - 0.24			2,715
Phosphorus	April 1	19 - 0 - 6	2	1 month		Dimension	3.50	lbs	128.00	27%	1.33 - 0.00 - 0.42			1,584
	September 1	0 - 46 - 0	1			TSP	1.25	lbs	128.00		0.00 - 0.58 - 0.00			283
Potassium	September 15	25 - 3 - 10	1			+Fe	3.00	lbs	128.00	68%	0.75 - 0.09 - 0.30			679
		- -						lbs	128.00		0.00 - 0.00 - 0.00			0
	April 1	0 - 0 - 0	2	5 months		Pro Mag	4.00	lbs	128.00		0.00 - 0.00 - 0.00			1,810
		- -						lbs	128.00		0.00 - 0.00 - 0.00			0
		- -						lbs	128.00		0.00 - 0.00 - 0.00			0
		- -						lbs	128.00		0.00 - 0.00 - 0.00			0
		- -						lbs	128.0		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
							Total			7%	3.04 - 0.91 - 0.96			
				N Recommendation Range and Soil Test Recommendation							2-5 / 1 / 0.5			

Notes:

Tee 14 measured VH K – no K application necessary. (Up to an additional 0.5 lb/1000ft2 K_2O may be applied to increase plant vigor, alleviate traffic stress)
Cool Season: Do not apply N between December 2nd and March 4th or when the ground is frozen.
Warm Season: Do not apply N between September 23rd and April 15th or during periods of drought.
Maximum N rate per application: 0.75 lbs/1000ft² (2-5 lbs/1000ft² annually)

C. Fairways Worksheet

Nutrient Application Worksheet

NAME:	**Forest Club**	**Management Area:**	Fairways	
Prepared:	**3/15/14**	**Acres (ac):**	**43.49**	**Species:** **bentgrass**
Expires:	**3/15/19**			

Total Nutrient Needs	**Application Month/Day**	**Analysis**			**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft²**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/Acre**			**Gypsum**	**Lime lbs/1000 ft2**	**Total Product (lbs/Area)**
Nitrogen		N	P	K									N	P_2O_5	K_2O			
	March 15	8	2	2	2	6 months			6.00	lbs	128.00	58%	0.96	0.24	0.24			22,733
Phosphorus	March 15	46	0	0	16	2 weeks	in sol'n	urea	0.22	lbs	128.00		1.62	0.00	0.00			6,668
	March 30	0	0	50	1			Potash	1.00	lbs	128.00		0.00	0.00	0.50			1,894
Potassium	September 1	0	46	0	1			TSP	2.00	lbs	128.00		0.00	0.92	0.00			3,789
										lbs	128.00		0.00	0.00	0.00			0
	April 1	0	0	0	2	5 months		Pro Mag	4.00	lbs	128.00		0.00	0.00	0.00			15,155
										lbs	128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
										lbs	128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
											128.00		0.00	0.00	0.00			0
									Total			3%	2.58	1.16	0.74			
						N Recommendation Range and Soil Test Recommendation							3-4	1.5	1			

Notes:
Cool Season: Do not apply N between December 2nd and March 4th or when the ground is frozen.
Warm Season: Do not apply N between September 23rd and April 15th or during periods of drought.
Maximum N rate per application: 0.5 lbs/1000ft² (3-4 lbs/1000ft² annually)

D. Rough Worksheet

Nutrient Application Worksheet

NAME:	**Forest Club**	**Management Area:**	Rough + Clubhouse Grounds + Driving Range	
Prepared:	**3/15/14**	**Acres:**	**60.7**	**Species:** bluegrass/fescue rough, fescue clubhouse grounds, bermuda range
Expires:	**3/15/19**			

Total Nutrient Needs	Application Month/Day	Analysis	# of Apps	Application Interval	Fertilizer Type	Fertilizer Description	Rate per 1000ft^2	lbs or oz	Wt. per Gal.	%Slow Release N	Total NPK lbs/Acre	Gypsum	Lime lbs/1000 ft^2	Total Product (lbs/Area)
Nitrogen		N - P - K									N - P_2O_5 - K_2O			
		- -						lbs	128.00		0.00 - 0.00 - 0.00			0
Phosphorus	April 15	19 - 0 - 6	2	1 month		Dimension	3.50	lbs	128.00	27%	1.33 - 0.00 - 0.42			18,509
	September 1	0 - 46 - 0	1			TSP	1.25	lbs	128.00		0.00 - 0.58 - 0.00			3,305
Potassium	September 15	25 - 3 - 10	1			+Fe	3.00	lbs	128.00	68%	0.75 - 0.09 - 0.30			7,932
		- -						lbs	128.00		0.00 - 0.00 - 0.00			0
	April 1	0 - 0 - 0	2	5 months		Pro Mag	4.00	lbs	128.00		0.00 - 0.00 - 0.00			0
		- -						lbs	128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
		- -							128.00		0.00 - 0.00 - 0.00			0
							Total			5%	2.08 - 0.67 - 0.72			
				N Recommendation Range and Soil Test Recommendation							1-3 | 1 | 0.75			

Notes:

(Up to an additional 0.5 lb/1000ft2 K_2O may be applied to increase plant vigor, alleviate traffic stress)

Cool Season: Do not apply N between December 2nd and March 4th or when the ground is frozen.

Warm Season: Do not apply N between September 23rd and April 15th or during periods of drought.

Maximum N rate per application: 1.0 lbs/1000ft^2 (1-3 lbs/1000ft^2 annually)

6. Fertilizer Application Record

Customer Information		Management Area Information
Name:	The Forest Club	Management Area ID:
Address:	3601 Dellabrook Street	Management Area Size:
	Ashland, VA 23005	Plant Species:
		Notes:
Phone #:		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions: Temp/Wind/Precip			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used

7. Virginia Nutrient Management Standards and Criteria, VI. Turfgrass Nutrient Recommendations

Nitrogen Application Guidelines

A nitrogen fertilization schedule weighted toward fall application is recommended and preferred for agronomic quality and persistence of cool season turfgrass; however, the acceptable window of applications is much wider than this for nutrient management. ***The nutrient management recommended application season for nitrogen fertilizers to cool season turfgrasses begins six weeks prior to the last spring average killing frost date and ends six weeks past the first fall average killing frost date.*** Applications of nitrogen during the intervening late fall and winter period should be avoided due to higher potential leaching or runoff risk, but where necessary, apply no more than 0.5 pounds per 1,000 ft^2 of water soluble nitrogen. Higher application rates may be used during this late fall and winter period by using materials containing slowly available sources of nitrogen, if the water soluble nitrogen contained in the fertilizer does not exceed the recommended maximum of 0.5 pounds per 1,000 ft^2 rate. Do not apply nitrogen or phosphorus fertilizers when the ground is frozen.

The acceptable nitrogen fertilizer application season for non-overseeded warm season turfgrass begins no earlier than the last spring average killing frost date and ends no later than one month prior to the first fall average killing frost date.

Per Application Rates

Do not apply more than one (1) pound of water soluble nitrogen per 1,000 ft^2 within a 30 day period. For applications of materials containing slowly available sources of nitrogen, higher application rates are acceptable if the water soluble nitrogen contained in the fertilizer does not exceed the maximum recommended rate for a 30 day period. Lower per application rates of water soluble nitrogen sources or use of slowly available nitrogen sources should be utilized on very permeable sandy soils, shallow soils over fractured bedrock, or areas near water wells.

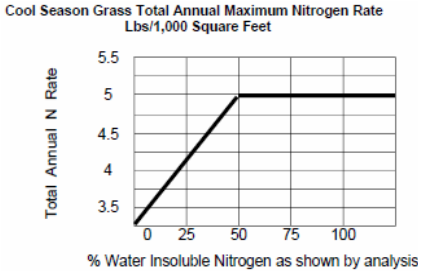
Annual Application Rates for Home Lawns and Commercial Turf

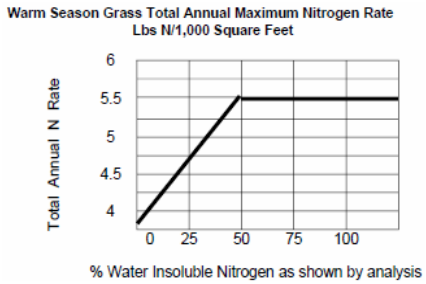
Up to 3.5 pounds per 1,000 ft^2 of nitrogen may be applied annually to cool season grass species or up to 4 pounds per 1,000 ft^2 may be applied annually to warm season grass species using 100 percent water soluble nitrogen sources. Lower rates of nitrogen application may be desirable on those mature stands of grasses that require less nitrogen for long-term quality. As a result, lower application rates will probably be more suited to the fine leaf fescues (hard fescue, chewings fescue, creeping red fescue, and sheep fescue) and non-overseeded zoysiagrass. Lower rates should also be used on less intensively managed areas.

Use of Slowly Available Forms of Nitrogen

For applications of materials containing Water Insoluble Nitrogen (WIN) sources, total annual nitrogen application rates may be adjusted incrementally from Water Soluble Nitrogen (WSN) rates by referring to the following figure (maximum annual N rates when using 50% or greater Water Insoluble Nitrogen are 5.0 lbs/1000 ft^2 for cool season grasses, and 5.5 lbs/1,000 ft^2 for warm season grasses):

Rates already stated as WIN should be applied as stated without adjustment.





Nitrogen Timing

The beginning and ending dates for application of nitrogen shall be determined using guidance and frost date maps contained in the Season of Application for Nitrogen section, Figures 6-1 and 6-2 (pg 96).

If the full rate or the highest rate of the recommendation range for a monthly application is applied in a single application, then the interval of application for nitrogen shall be at least 30 days to allow turf to utilize previous nitrogen applications. If several applications are to be made for the monthly nitrogen rate, then the timing of the applications shall be at approximately even intervals, with the rate per application to be evenly divided between each application with the total nitrogen applied not to exceed the maximum monthly rate. Use of Water Insoluble Nitrogen forms of Nitrogen is encouraged.

Nitrogen Application Rates

	Grass Type	Maximum N Rate per application lbs/1000 ft^2	Total Annual N Rate lbs/1000 ft^2 [a]
Greens		0.75	3-6
Tees		0.75	2-5
Fairways: Normal Management	Warm-season	1.0 [b]	3-4
Fairways: Normal Management	Cool-season [e]	1.0 [b]	2-3
Fairways: Intensive Management	Warm-season[e]	0.5 [c]	3.5-4.5
Fairways: Intensive Management	Cool-season[e]	0.5 [c]	3-4
Fairways: Overseeded	Warm-season	0.5 [d]	1.25
Roughs		1	1-3
Growing-in (land under repair)[g]		1	1-2

• For warm season grasses, 0.50-0.75 lb/1,000 ft^2 of Nitrogen may be applied in the Fall after perennial ryegrass overseeding is well established. An additional N application of 0.50 lb/1,000ft^2 may be made in February-March to overseeded perennial ryegrass if growth and color indicate need.

• Soluble N rates of ¼ lb/1,000 ft^2 or less which may be a component of a pesticide or minor element application, may be applied any time during the application windows described in Recommended Season of Application for Nitrogen Fertilizers of this section, but must be considered with the total annual N application rate.

(a) Use higher rates for intensively used turf where accelerated growth and/or rapid recovery are required, use lower rates for maintenance of lesser used areas; do not exceed total annual N levels as stated above.

(b) Fairways-Normal Management (Non-Irrigated or Irrigated) - Per Application timing must be a minimum of 30 days between applications.

(c) Fairways-Intensive Management (Irrigated)- Per Application timing must be a minimum of 15 days between applications. This option requires optimized timing of more frequent applications of nitrogen with lesser rates per application. Alternatively, a maximum application rate of 1 lb N/1,000 ft^2 of a material with 50% or greater WIN may be applied a minimum of 30 days between applications.

(d) Foliar fertilizer may be applied to warm season grasses within 30 days prior to the first killing frost in the fall, at a rate not to exceed 0.1 lb/1,000ft^2 of nitrogen per application. This application must be accounted for in the total annual nitrogen rate.

Phosphorus and Potassium Recommendations for <u>Established</u> Golf Courses
Apply phosphorus (P_2O_5) and potassium (K_2O) fertilizers as indicated by a soil test using the following guidelines:

Soil Test (VT) Rating	P_2O_5 lb/1000 ft^2	K_2O lb/1000 ft^2
L-	3	3
L	2.5	2.5
L+	2	2
M-	2	2
M	1.5	1.5
M+	1	1
H-	1	1
H	0.75	0.75
H+	0.5	0.5
VH	0	0

- For irrigated turf grown on Naturally Occurring and Modified Sand Based soils only, up to 0.5 lb of P_2O_5 /1,000 ft^2 may be applied, if needed, to aid in recovery of damaged turf during times of extreme use. No phosphorus applications shall be made when the soil phosphorus test level is above 65% saturation, based on the soil test phosphorus values and region as listed in Table 4-1 of Section IV (pg 47).

- Avoid the general use of high phosphorus ratio fertilizers such as 10-10-10 or 5-10-10, unless soil tests indicate phosphorus availability below the M+ level.

Establishment/Grow-In Recommendations for Golf Courses
(These rates replace normal maintenance fertilizer applications that would have occurred during these time periods.)

Warm Season Grasses:

Predominantly Silt/Clay Soils

♦ Plant Date - late May -June for sprigs, plugs, sod, or seeding.

♦ Apply P_2O_5 and K_2O as needed based on soil test recommendations, incorporate into the top 2 inches if possible.

♦ At Planting - Up to 1 lb N/1,000 ft^2 of WIN 50% or greater may be applied as one application or lesser amounts applied at regular intervals, through the first 4 weeks, not to exceed a total of 1 lb N/1,000ft^2.

♦ Four weeks after planting - ¼ - ½ lb. of WSN/1,000 ft2 per week for the next 4 weeks.

Naturally Occurring or Modified Sand Based Soils

♦ Plant Date - late May -June for sprigs, plugs, sod, or seeding.

♦ Apply P_2O_5 and K_2O as needed based on soil test recommendations, incorporate into the top 2 inches if possible.

♦ Pre-plant - 1lb/N 1,000 ft^2 of WIN 50% or greater.

♦ Four weeks after planting - ¼ - ½ lb. of WSN/1,000 ft^2 per week for the next 4 weeks.

Cool Season Grasses:

Predominantly Silt/Clay Soils

♦ Plant Date - August - September (preferred)

♦ Apply P_2O_5 and K_2O as needed based on soil test recommendations, incorporate into the top 2 inches if possible.

♦ At Planting - up to 1 lb N/1,000 ft^2 using a slowly available N source; 30 days after planting, apply up to 0.5 lb N/1,000 ft^2 every week for the next 4 weeks.

Naturally Occurring or Modified Sand Based Soils

♦ Plant Date - August -September (preferred)

♦ Apply P_2O_5 and K_2O as needed based on soil test recommendations, incorporate into the top 2 inches if possible.

♦ At Planting - up to 1 lb N/1,000 ft^2 using a WIN 50% or greater N source.

♦ Apply up to ¼ lb N/1,000 ft2 per week after germination is complete, for the next 8 weeks.

If material is 50% or greater WIN, then apply up to ½ lb N/1,000 ft^2 every two weeks after germination is complete for the next 8 weeks.

Sod Installations:

Site preparation should include a soil test, which can be done several months before the project begins in order to have time to get test results back. Phosphorus, potassium and lime applications should be based on soil test analysis to increase the likelihood of a successful installation. Shallow incorporation of material into the top 2 inches of the soil is preferred prior to sod installation, especially if lime is required.

No more than 0.5 lb of N/1,000 ft^2 as water soluble Nitrogen or 1 lb N/1,000 ft^2 as at least 50% WIN should be applied before sod is installed.

After installation apply adequate amounts of water to maintain sufficient soil moisture (i.e. to prevent visible wilt symptoms). Excessive water will limit initial root development. After roots begin to establish (as verified by lightly tugging on the sod pieces), shift irrigation strategy to a deep and infrequent program in order to encourage deep root growth. Apply approximately 1 inch of water per week (either by rainfall or irrigation), making sure that the water is being accepted by the soil profile without running off. This will insure thorough wetting of the soil profile.

After sod has completed rooting and is well established, initiate the normal nitrogen management program as described for the appropriate use shall be recommended.

Phosphorus and Potassium Recommendations for <u>Establishment/Grow-In/Installation</u>

Soil Test (VT) Rating	P_2O_5 lb/1000 ft^2	K_2O lb/1000 ft^2
L-	4	3
L	3.5	2.5
L+	3	2
M-	3	2
M	2.5	1.5
M+	2	1
H-	2	1
H	1.5	0.75
H+	1	0.5
VH	0	0

Other Turf Management Considerations for Golf Courses

Lime Recommendations
Lime should be recommended based on a soil test to maintain soil pH within an agronomic range for turfgrass.

For new seedings where lime is recommended, incorporate the lime into the topsoil for best results.

Returning Grass Clippings
Recycling of clippings on turf should be encouraged as an effective means of recycling nitrogen, phosphorus, and potassium. Proper mowing practices that ensure no more than 1/3 of the leaf blade is removed in any cutting event will enhance turf appearance and performance when clippings are returned. Return all leaf clippings from mowing events to the turf rather than discharging them onto sidewalks or streets. Rotary mulching mowers can further enhance clipping recycling by reducing the size of clippings being returned to the turfgrass canopy.

Management of Collected Clippings
If clippings are collected they should be disposed of properly. They may be composted or spread uniformly as a thin layer over other turf areas or areas where the nutrient content of the clippings can be recycled through actively growing plants. They should not be blown onto impervious surfaces or surface waters, dumped down stormwater drains, or piled outside where rainwater will leach out the nutrients creating the potential for nutrient loss to the environment.

Use of Iron
Foliar iron supplements may be used to stimulate a greening effect on the turfgrass as an alternative to additional applications of nitrogen. These applications are most beneficial if applied in late spring through summer for cool season grasses and in late summer through fall for warm-season grasses. A rate of 1 to 1.5 pounds of iron per acre is appropriate.

Impervious Surfaces
Do not apply fertilizers containing nitrogen or phosphorus to impervious surfaces (sidewalks, streets, etc.). DO NOT use urea as an ice melting substance in cold weather. Remove any granular materials that land on impervious surfaces by sweeping and collecting, and either put the collected material back in the bag, or spread it onto the turf and/or use a leaf blower etc., to return the fertilizer back to the turfgrass canopy.

Environmentally Sensitive Areas
Avoid fertilizer applications within 15 feet of waterways. This setback is reduced to 10 feet if a drop spreader, rotary spreader with deflector or targeted spray liquid is used to apply the fertilizer. The use of fertilizers with slow release nitrogen is greatly encouraged, especially where there is any reason to suspect environmental concerns.

Recordkeeping requirements and reporting for the application of fertilizer (2VAC5-405-100)
Golf Courses subject to this regulation shall maintain records of each application of fertilizer to non-agricultural land for at least three years following the application. These records shall be available for inspection. Each record shall contain the:

1. Name, mailing address of the application site;
2. Name of the person making or supervising the application;
3. Day, month, and year of application;
4. Weather conditions at the start of the application;
5. Acreage, area, square footage, or plants treated;
6. Analysis of fertilizer applied;
7. Amount of fertilizer used, by weight or volume; and
8. Type of application equipment used.

Spreader Calibration
Spreaders and boom sprayers must be properly calibrated if they are to deliver fertilizers and pesticides to turf at correct rates. If calibration is done incorrectly, the product may be misapplied and either too much or too little of the product will reach the turf. Sprayers and spreaders should be calibrated at first use and every fourth application. Spreaders and sprayers be calibrated in several ways. Refer to the following publication for detailed instructions:

www.turfgrass.ncsu.edu/Articles/admin/2008/Calibration_of_Turfgrass_Boom_Sprayers_and_Spreaders_(AG-628).pdf

8. Soil Reports