

Chapter 11

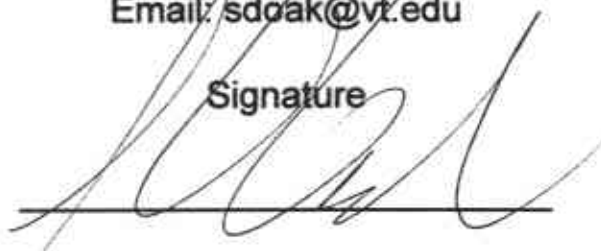
Roadside Management Nutrient Management Plan Virginia Department of Transportation

This Plan Prepared By:

Sam Doak
427 Smyth Hall 0404
Department of Crop and Soil Environmental Sciences
Virginia Tech
Blacksburg, VA 24061

Certification Number: 460
Phone Number (540) 250-6903
Email: sdoak@vt.edu

Signature

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Chapter 11: Roadside Management

Nutrient Management Plan for VDOT

The Virginia Department of Transportation (VDOT) 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 roadside 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 submitting an **Annual Activity Report**.

All nutrient applications performed by VDOT staff shall comply with the provisions of this Nutrient Management Plan as of July 1, 2006. Any contracts bid on or after July 1, 2006 must comply with this Nutrient Management Plan. Nutrient applications performed by those already under contract or bid prior to July 1, 2006 must comply with this Plan by July 1, 2007.

1. Site Description & Sampling Information

This nutrient management plan was written to accommodate lime and fertility management for existing turf type vegetation on roadsides statewide. The data and information presented in this plan were compiled by Jody Booze-Daniels and W. Lee Daniels, CSES Dept., Virginia Tech. 540-231-7175; wdaniels@vt.edu.

Soil Types, Sampling and Fertilizer Application Requirements:

Virtually all portions of VDOT roadsides that receive fertilizers are drastically disturbed cut/fill landscapes which are mapped by USDA-NRCS as either "Udorthents" or "made land". Therefore, it is impossible to assign conventional soil series and associated soil productivity groupings for nutrient management planning. Due to their general lack of native topsoil covers, and frequent occurrence of compaction and poor soil structure, all soils managed by VDOT are assigned to Productivity Group III or IV for the purpose of nutrient management planning.

When dry fertilizer is used, it shall be applied uniformly to the seeding areas at the time of seeding. All slow release and slowly soluble fertilizer may be applied through a hydraulic seeder except for Sulfur Coated Urea (SCU). The method of application for all fertilizer products shall be approved by the Engineer prior to applying the fertilizer. When applied in liquid form or mixed with water, fertilizer shall provide the same value of nutrients per acre as specified for dry fertilizer. Fertilizer applied in liquid form shall be constantly agitated during application.

Soil Tests: Soil tests shall be taken prior to nutrient application for routine maintenance or repair of previously vegetated areas. Soil samples shall be required to represent no more than 20 acres per sample for any non-linear area.

For routine fertilization of existing vegetation to linear projects such as along rights-of-way, one soil test shall be required within each five-mile section; or along interstate highways, one soil sample in each direction between exits, whichever distance is greater. A minimum of 20 sub-samples,

representative of the entire area, taken from the upper 4" of soil per sample shall comprise a soil sample. Soil samples shall be analyzed for pH, phosphorus, and potassium by a Department of Conservation and Recreation approved laboratory; namely, A&L Eastern Agricultural Laboratories, Brookside Laboratories, Spectrum Analytical Laboratories, Virginia Tech Soil Testing Laboratory, or Waters Agricultural Laboratories. Once sampled, soil test data for a given location may be used for all remaining years under this plan.

When repair or re-vegetation occurs, soil samples shall be required to represent no more than 20 acres per sample. For linear projects such as along rights-of-way, a soil test shall be required within each linear mile. A minimum of 20 sub-samples, representative of the entire area, taken from the upper 4" of soil per sample shall comprise a soil sample.

For site disturbance to 2 (two) acres or less of land, whether in a block or along a linear path, fertilizer may be applied without a soil test at the following rate: 45 lbs. N, 90 lbs. P₂O₅, and 90 lbs. K₂O per acre. This provision applies only to areas where existing vegetation and associated topsoil layers are removed or destroyed by grading or other earth moving activity. Lime should be applied at 2 tons per acre when soil test is not available.

When problem sites occur where vegetation is failing, a new soil test shall be required in addition to a site assessment for soil physical problems such as compaction. Once the causal problem has been determined and site-specific remedial action taken (such as low pH followed by lime application) has occurred, any vegetative re-establishment shall follow the specification rates listed in the table on the following page for Roadside Management.

Soil Sampling Methods: Take 20 or more sub-samples from the upper 4" of soil, from different locations within each uniform sampling area to make a composite sample. Take the sub-samples in a random manner, such as with a zigzag pattern to minimize the variability that may be present in your sampling area. This allows you to obtain a reasonably representative soil sample. Soil samples must be analyzed for pH, phosphorus, and potassium.

The larger the area, the more sub-samples that are needed. The more sub-samples you take, the more representative your sample will be of your landscape area. When you realize that your 1/2 pound composite sample could represent up to 2 million pounds of soil, you can understand why proper sampling is so important.

When you have taken sufficient sub-samples from a uniform area, thoroughly mix the sub-sample slices or cores, breaking up clumps and removing all foreign matter such as roots, stalks, rocks, etc. (<http://www.soiltest.vt.edu>)

2. Nutrient & Lime Recommendations and Nutrient Application Worksheet

Appropriate soil sampling and analysis is essential for effective nutrient management planning. In order to maximize fertilizer effectiveness and uptake efficiency, soil pH must be adjusted to the optimal range of 6.0 to 6.5 whenever fertilizers are applied.

Nutrient Recommendations:

Nitrogen Fertilizer: The rate is limited to 45 lb nitrogen /A (1 lb/1000 ft²) at each application and separated by at least 30 days. A maximum of 90 lb/A (2 lb/1000 ft²) of 100 % water soluble nitrogen (WSN) may be applied per year. Cool season grasses should receive at least 75% of their total fertilizer in the fall and the warm season grasses should receive 100% of their fertilizer during the summer. Do not apply fertilizer during periods of drought. Slowly available N (water insoluble nitrogen – WIN) may be used and is strongly encouraged. The application rates of a fertilizer that has at least 30% WIN can be raised to 60lb nitrogen per acre per application. Areas in heavy shade (more than 60% of the day) or low traffic may need only ½ the fertilizer of the full sun areas.

Phosphorus and Potassium Fertilizers: Apply each fertilizer (P₂O₅ and K₂O) as indicated necessary by soil test using the following table.

For Roadside Management: The amount of P₂O₅ & K₂O that will be applied according to appropriate soil test levels.

Soil Test (Va Tech)	P ₂ O ₅		K ₂ O	
	lb/A	lb/1000ft ²	lb/A	lb/1000ft ²
L	90-100	2.00-2.25	90-100	2.00-2.25
M-	75-90	1.75-2.00	75-90	1.75-2.00
M	55-75	1.25-1.75	55-75	1.25-1.75
M+	40-55	1.00-1.25	40-55	1.00-1.25
H	0	0	0	0
VH	0	0	0	0

Liming Recommendations:

For normal soil materials, liming recommendations will be based upon standard agronomic criteria to maintain soil pH between 6.0 and 6.5. Lime rates are based on Tables 3-1 and 3-3 in the Virginia Nutrient Management Standards and Criteria, Revised October 2005.

For sulfidic materials (see Orndorff and Daniels, 2002 for maps and definitions) or **any** soil sample with a water pH < 4.0, liming recommendations must be based on reactive potential acidity or acid-base-accounting analysis.

Citation: Orndorff, Z.W. and W.L. Daniels, 2002. Delineation and Management of Sulfidic Materials in Virginia Highway Corridors, Final Contract Report VTRC 03-CR3. Virginia Trans. Res. Council, Charlottesville, VA. <http://vtrc.virginiadot.org/PubDetails.aspx?PubNo=03-CR3>

3. Nutrient Management Guidelines

A. Season of Application of Fertilizers and Cautions

All fertilizer will be applied between March 15th and November 1st. Fertilization of grasses outside of this window may result in lost nutrients. In the Fredericksburg, Hampton Roads and Richmond Districts, fertilizers may be applied from March 1 to November 15. Cool season grasses should

be fertilized between August 15th and November 15th to encourage good root development in the fall. Warm season grasses should be fertilized between June 1 and August 1. This will result in denser stands of grass the following year.

B. 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.

C. Management to Improve Density of Turf without Use of Fertilizers

1. Returning Grass Clippings – Do not pick up clippings when mowing. This will allow the nutrients to recycle back to the soil.

2. Legumes, such as white clover, may be incorporated into the turf to provide long term N source for grasses. The pH of the soil should not be lower than 6.0 - 6.5, and the level of phosphorus should be at soil test level no higher than “M”.

3. Suggested Mowing Guidelines - cool season grasses should not be mowed lower than 4-6 inches and warm season grasses should not be mowed lower than 2-3 inches. Mowing the grasses below their minimum height (scalping) should never be allowed because this will shock the plant and can kill the vegetation.

4. Mower blades need to be kept sharp. This produces a cleaner cut which reduces the amount of brown leaf ends, stress and disease on the grass plants. The results are a healthier and stronger turfgrass that will need less pest control.

D. Environmentally Sensitive Areas

VDOT will recognize environmentally sensitive sites as defined in Section 1A of the 2005 Virginia Nutrient Management Standards and Criteria and limit N and P applications appropriately. Nutrient application set-backs as set forth in Section 1B (e.g. 100 feet from wells or springs, 50 feet from surface water, 50 feet from sinkholes, 50 feet from naturally occurring limestone outcrops and 25 feet from all other naturally occurring rock outcrops) will be rigorously followed. However, this plan was developed such that the rate and timing of nutrient applications safeguards water quality and the plan is appropriate for use in environmentally sensitive areas.

The use of fertilizers with slow release nitrogen is greatly encouraged, especially where there is any reason to suspect environmental concerns.

E. Use of Iron

Foliar iron supplements may be used to stimulant a greening effect on the turfgrass during the summer months without additional applications of nitrogen. A rate of 1 to 1.5 pounds of iron per acre is appropriate.

F. Use of Organic Sources as Nutrients:

Application of organic sources of nutrients for management of roadside vegetation will only be allowed upon submission and approval of a site-specific Nutrient Management Plan.

G. Samples of Fertilizer Ratios Appropriate for VDOT Use

This chart can be used to determine the best ratio of fertilizer for application to existing roadside vegetation.

Fertilizer Application Chart

Fertilizer Analysis	Pounds of fertilizer/A (lb/1000 ft ²)	Pounds of Nitrogen/A (lb/1000 ft ²)	Pounds of P ₂ O ₅ /A (lb/1000 ft ²)	Pounds of K ₂ O/A (lb/1000 ft ²)
5-10-10	900 (20)	45 (1.0)	90 (2.0)	90 (2.0)
10-10-10	450 (10)	45 (1.0)	45 (1.0)	45 (1.0)
15-30-15	300 (6.7)	45 (1.0)	90 (2.0)	45 (1.0)
46-0-0	96 (2.2)	45 (1.0)	0	0
18-46-0	240 (5.5)	45 (1.0)	110 (2.5)	0
0-46-0	98 (2)	0	45 (1.0)	0

H. Spreader Calibration

All fertilizer spreaders will be calibrated per the guidance given below.

Calibration of Spreaders¹

Pan Method

Push the spreader over a pan(s) and collect and weigh the material that was spread. By knowing the area of the pan and weight of the material, the application rate can be determined by:

$$\text{Material per } \frac{\text{Grams}}{1,000 \text{ sq. ft}} = 1,000 \times \frac{\text{Grams Material Collected}}{\text{ft}^2 \text{ Pan} \times \# \text{ of Pans} \times \# \text{ of Passes}}$$

Sweep and Weigh Method for Drop Spreader

Push a drop spreader over a clean, smooth surface of a known distance and sweep and weigh the material. The application rate can be determined by:

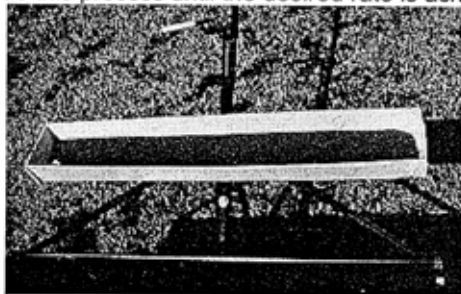
$$\text{Material per } \frac{\text{Grams}}{1,000 \text{ sq. ft}} = 1,000 \times \frac{\text{Grams Material Collected}}{\text{Spreader Width} \times \text{Distance Traveled}}$$

Catch Pan Method

Attach a catch pan to the bottom of the spreader. Establish and mark two points of a known distance. Push the spreader over the known distance, opening the hopper at the starting point, and closing at the finish point, while collecting the material in the catch pan. The application rate is determined by using the following formula:

$$\text{Material per } \frac{\text{Grams}}{1,000 \text{ sq. ft}} = 1,000 \times \frac{\text{Grams Material Collected}}{\text{Spreader Width} \times \text{Distance Traveled}}$$

Whichever method is used, make enough passes or travel enough distance so that the material collected is enough to be weighed accurately. If the calculated rate is too high, reduce the setting adjustment. If it is too low, increase the setting adjustment. Continue this process until the desired rate is achieved.



4. Record of Actual Nutrient Applications July 1, 2006 to July 1, 2007

Roadside Management : Nutrient Management Plan for VDOT					
District: _____			Acreage: _____		
Location: _____ _____					
County: _____					
Year, Month	Fertilizer Ratio Applied	Amount Fertilizer Applied lb/A (lb/1000 ft ²)	Nitrogen Applied lb/A (lb/1000 ft ²)	P ₂ O ₅ Applied lb/A (lb/1000 ft ²)	K ₂ O Applied lb/A (lb/1000 ft ²)
Year, Month	Agricultural limestone applied ton/A (lb/1000 ft ²)				

Date Worksheet Prepared: 7/1/06

Note: This 'Record of Actual Nutrient Applications' sheet must be submitted with the subsequent plan regardless of amount and timing of fertilizer or lime application with this plan's period.