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## Greenville County Technical Specification for EC-12 BIOLOGICAL GROWTH STIMULANTS

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### 1.0 Biological Growth Stimulants

- 1.1 Provide biological growth stimulants for all permanent cover and temporary cover by seeding applications. Use biological growth stimulants that provide an immediate seedbed adjustment to help stimulate seed germination, improve the availability of nutrients to the plant, increase the number and depth of root development, and generate robust plant growth which is more tolerant of changes in environmental conditions.

Use biological growth stimulants that:

- Contain natural components that encourage nutrient uptake, nitrogen metabolism, and carbohydrates storage,
- Improve fertilizer utilization in the soil by increasing the enzymatic and microbial nutrient conversion activity,
- Improve photosynthetic production resulting in greater root mass and improved disease resistance,
- Contain components to improve nutrient and water uptake by the plant,
- Contain plant growth hormones which act as a stimulant to improve vegetative growth and intake of micro nutrients and can reduce damage from disease and insect infestation, and
- Contain components that increases biological activity in the soil to improve stress tolerance/drought resistance, reduces sodium uptake in sandy soils, provides more phosphorus availability, and increases cation exchange capacity resulting in earlier germination and better root establishment.

### 1.2 Materials

Provide biological growth stimulants that contain compounds such as:

- Humic acid (humates),
- Humectants,
- Cold water processed seaweed/kelp extract,
- Beneficial microbes,
- Cytokinins,
- Gibberellins,
- Auxins (growth hormones), and
- Endo-mycorrhizae.

Animal by-products or municipal waste products are not acceptable biological growth stimulants under this specification. Liquid fertilizers **are not** acceptable as biological growth stimulants under this specification.

Provide biological growth stimulants composed of non-toxic materials.

Provide Biological Growth Stimulants that have no germination or growth inhibiting factors and do not form a water-resistant crust that can inhibit plant growth. Furnish biological growth stimulants where all components are pre-packaged by the manufacturer to assure material performance and compliance with the minimum requirements in Table 1.

**Table 1: Minimum Biological Growth Stimulant Requirements**

BGS Property	Test Method	Required Value
<b>Physical</b>		
Acute Toxicity	ASTM 7101 EPA Method 2021 or EPA Method 2002	Non Toxic
<b>Performance</b>		
Seed Germination	ASTM D7322 <sup>1</sup>	200% minimum
Plant Height	ASTM D7322 <sup>1</sup>	200% minimum
Plant Mass	ASTM D7322 <sup>1</sup>	110% minimum

<sup>1</sup> ASTM test methods developed for Rolled Erosion Control Products (RECPs) that have been modified for comparison to control between 14 and 21 days.

Provide biological growth stimulants from a manufacturer listed on the most recent edition of the *SCDOT Qualified Product List 74* and provide documentation of testing at an approved independent laboratory demonstrating performance based on enhanced plant germination.

### 1.2.1 Quality Assurance

Provide the following information from the manufacturer:

- Written quality control program conforming to the requirements of subsection 1.2.2 *Quality Control*.

Ensure that each package of biological growth stimulants bears complete identification including, but not limited to, the following:

- Manufacturer's name and location,
- Manufacturer's telephone number,
- Biological growth stimulant name, model, and/or serial number, and
- Biological growth stimulant physical composition.

Biological growth stimulants are listed on the most recent edition of *SCDOT Qualified Product List 74* prior to being accepted for use. Prior to inclusion on *SCDOT Qualified Products List 74*, biological growth stimulants must meet the criteria outlined in this Specification.

### 1.2.2 Quality Control

Provide the following information from the manufacturer:

- Documentation of laboratory testing that quantifies the performance of the specific Biological Growth Stimulant conforming to the requirements of the specification.
- Independent qualified test facility name and location,
- Signature of responsible person or party certifying the Biological Growth Stimulant,
- Biological Growth Stimulant manufacturer,
- Biological Growth Stimulant name and model number,
- Test ID, and
- Test date.
- Acute toxicity testing methods and results. Perform Acute Toxicity testing using ASTM 7101 or equivalent to ensure samples of runoff/effluent are taken from a small/bench scale mulch application and perform acute toxicity testing following EPA-821-R-02-012 Test Method 2021 (*Acute Toxicity Tests*)

*with Effluents and Receiving Waters using Daphnia*), or most current edition or EPA-821-R-02-012 Test Method 2002 (*Acute Toxicity Tests with Effluents and Receiving Waters using Ceriodaphnia dubia*), or most current edition.

- Certification that the Biological Growth Stimulant performs to the minimum performance standards under the specific conditions stated in the specification.
- Instructions on the proper installation of the Biological Growth Stimulant.

### 1.3 Construction Requirements

#### 1.3.1 Site Preparation

Examine substrates and conditions where materials will be applied. Do not proceed with installation until unsatisfactory conditions are corrected.

#### 1.3.2 Installation

Use biological growth stimulants for permanent cover and temporary cover by seeding applications. Apply biological growth stimulants strictly at the manufacturer's recommended rates. Ensure that all biological growth stimulant applications strictly follow the manufacturer's recommendations to avoid damage or burning of the seedbed. Use approved hydro-spraying machines to apply growth stimulants.

#### 1.3.3 Delivery, Storage, and Handling

Deliver materials and products in factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage from weather, excessive temperatures, and construction operations.

#### 1.3.4 Inspection and Maintenance

Prepare a biological growth stimulant maintenance plan that includes the following:

- Reapplication of biological growth stimulants as directed by ENGINEER to areas where vegetation is not establishment.
- Maintenance of equipment to provide uniform application rates.
- Rinsing all biological growth stimulants mixing and application equipment thoroughly with water to avoid formation of residues and appropriate discharge of rinse water.

Degradation of biological growth stimulants can be expected to occur as a result of mechanical degradation, chemical degradation, biological hydrolysis, sunlight, salt, and temperature. Where necessary, reapply biological growth stimulants in accordance with the manufacturer's instructions. Reapplication is not required unless biological growth stimulant treated soils are disturbed or turbidity or water quality shows the need for an additional application. If biological growth stimulant treated soils are left undisturbed, the necessity of reapplication will be determined by the ENGINEER. The Department will not pay for the reapplication of biological growth stimulants within 45 days of the initial application unless the reapplication is approved by the ENGINEER.

#### 1.3.5 Acceptance

Obtain ENGINEER acceptance and approval of biological growth stimulants application. When requested by the ENGINEER, ensure that a manufacturer's representative is on-site to oversee and approve the initial application of biological growth stimulants. Obtain a letter from the manufacturer approving the application when requested by the ENGINEER.