REVEGETATION

1. SCOPE

The work will consist of furnishing all labor, equipment, and materials for preparing the seedbed; applying soil amendments, seed, mulch, and installing netting. All disturbed areas are to be revegetated unless another surface treatment is specified for the area on the Drawings or Special Conditions.

Areas brought to final grade shall be revegetated within 5 days. Apply temporary mulch and a cover crop to areas that are not to final grade, areas where constructed has ceased for 14 days or longer, and soil stock piles no later than 14 days from the last construction activity.

2. MATERIALS

2.1. **Lime**: Agricultural ground limestone (ag-lime) or its equivalent shall be used. The ground limestone must have minimum 85% calcium carbonate ($CaCO_3$) equivalent, must be fine enough so that no less than 90% passes through a U.S. Standard No. 10 sieve, and no less than 35% passes through a U.S. Standard No. 50 sieve. Agricultural ground limestone shall be purchased from quarries tested by the Kentucky Department of Agriculture. Ag-lime that fails to meet the minimum requirements may be used, but additional ag-lime must be added at no extra cost to the COMMONWEALTH to make up the deficiency using the relative neutralizing value (RNV) calculation based upon values from the current KY Department of Agriculture Division of Regulation and Inspection "Limestone Sample Test" report. On excavated to bedrock areas ag-lime or rock dust shall be used if it meets the above standards and if 100% shall pass through a U.S. Standard No. 50 sieve.

2.1.1. Relative Neutralizing Value Calculation: Shall be calculates as:

RNV = % $CaCO_3$ / 100 x 0.5 x (% passing through No. 10 sieve + % passing No. 50 sieve). The minimum value based upon the DAML standard is 53.125.

The additional quantity required is calculated as:

Reported RNV / 53.125 (AML Minimum) x tons provided

No adjustments / incidental additional quantities are required if the materials meet or exceed the minimums. Any additions required due to deficient material are entirely bore by the CONTRACTOR.

2.2. **Fertilizer**: The fertilizer shall be a commercial fertilizer containing the plant nutrients of nitrogen (N), available phosphoric acid (P_20_5), and soluble potash (K_20). Bagged fertilizer shall display the following information on the bag or on a sticker or tag attached to the bag: net weight, brand and grade, guaranteed analysis, and name and address of manufacturer. Bulk fertilizer (dry or liquid) shall be accompanied by a statement from the manufacturer, which contains the same information required for the bagged fertilizer. Either bagged or bulk (dry or

liquid) fertilizer must be manufactured and sold under the jurisdiction of the Division of Regulatory Services of the University of Kentucky Agricultural Experiment Station.

2.3. **Seed**: Seed is paid as "PURE LIVE SEED". Apply seed to all disturbed areas in accordance with the seed mixture tables in APPENDIX A with no alterations except with the written consent of the ENGINEER. See APPENDIX A for the formula to calculate pure live seed.

The seed mixture shall be totally free of any quack grass, dodder, Johnson grass, Canada thistle seed, and contain less than 2% weed seed. The number of noxious weeds per pound shall not exceed a combined total of 30 seeds per pound. The seed shall also comply with all Kentucky seed laws and regulations (KRS 205.020 to 250.170).

Furnish seed bags fully tagged and labeled in accordance with the State laws and the U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act in effect on the date of invitations for bids. All seed must be from the latest crop available. No seed will be accepted with a date of test of more than 9 months prior to the date of delivery to the site. Any seed, which has become wet, moldy, or otherwise, damaged in transit or storage will not be accepted.

All seed shall be delivered in separate bags or packages according to species. The ENGINEER's representative at the site shall remove the tags from each seed bag. These tags will be required for final payment. **Pre-mixed seed will not be accepted.**

All legume seed shall be treated with inoculants prior to seeding in accordance with this section of these Technical Specifications. All legume seeds shall be applied separate from all other grass seed, unless a hydraulic seeder is used.

Any and all seeding of lespedeza species (i.e., Kobe, Korean, and Sericea) will require unhulled seeding during the period of July 1 to December 31. Hulled and scarified seed will be required during the period of January 1 to June 30.

The percent of hard seed shall be considered as part of the germination rate.

2.4. **Mulch**: Mulch shall consist of hay or straw. The mulch material shall be air dry, reasonably light in color, low in weed content, and shall not be musty, caked, or otherwise of low quality. Mulch containing thistles, Johnson grass, or wild onion is not permitted. On excavated to bedrock areas, hydro-mulch shall be cellulose fiber or processed straw.

Delivery is only permissible when the Resident Inspector is on the job site.

2.5. **Hardwood Bark Mulch**: This material is a composted hardwood bark mulch product free of noxious weeds or debris produced from trees. The product should be composted and have a moisture content no greater than 50%. The mulch pieces should be less than 3 inches long x 1inch wide.

2.6. **Netting**: Plastic netting manufactured from extruded rectangular mesh plastic, a minimum of 45 inches wide, approximately 3/4 inch x 1 inch mesh openings, and weighing no less than 2.6 lbs. per 1,000 sq. ft. shall be used. Other netting may be used if approved by the ENGINEER. Staples will be U-shaped and made from No. W1-W1.5 or W2 steel wire or a manufactured recommended product. The staples shall have a minimum length of 6 inches. Staples shall be driven flush with soil surface.

2.7. **Tack**: Tack is an organic tackifier used during hydromulch / hydroseeding and applied at the manufactures recommended rate.

2.8. **Inoculants**: The inoculants for treating legume seeds shall be a pure culture of nitrogen-fixing bacteria prepared specifically for the species and shall not be used later than the date indicated on the container or otherwise specified. Use the amount of the inoculants recommended by the manufacturer except when seed is applied by use of a hydraulic seeder, and then four times the amount of inoculants recommended by the manufacturer shall be used. Seed shall be sown within 24 hours of treatment and shall not remain in a hydraulic seeder longer than 4 hours.

2.9. **Cover Crop**: Apply the material whenever the project is to be shut down for greater than 14 days. Use winter wheat for fall/winter seeding and German foxtail millet for spring/summer seeding at 1 bushel per acre.

2.10. **Disk**: The disk shall be either a tandem or offset disk meeting the following specifications:

1) Disk size: 22-inches minimum.
2) Disk spacing: 13-inches maximum.
3) Weight: 400 lbs. per foot of cut minimum.
4) Equipped with a drag of sufficient weight to remove any furrows left by the disk.

3. CONSTRUCTION

3.1. **Lime**: Apply agriculture limestone to the site and incorporate into the upper 6 inches (min.) with the fertilizer. Application on strip to rock areas is not incorporated. Supply a blower or side casting type piece of equipment to apply lime to steep slopes (incidental). For acidic soil incorporate lime into the borrow material during excavation.

The general application rate is 10 tons per acre furrow slice for surface soils. For acidic soil the application rate may be increase to 25-100 tons per acre furrow slice and be either incorporated throughout the cover material during harvesting or applied as an agriculture limestone barrier. The Design Drawings and Special Conditions will note when the large application rates are required.

Delivery is only permissible when the Resident Inspector is on the job site.

3.2. **Fertilizer**: Apply fertilizer only when it can incorporate into the soil the same work day without the threat of large scale precipitation events. Generally, the application rate will be 0.35 tons/acre of an 18-46-60 mixture made from mixing 500 lbs of 18-46-0 and 200 lbs 0-0-60 fertilizers together. If a second application is required by the ENGINEER within 1 year of the original application then a generally application of 100 lbs/acre of 33-0-0 should be used. These rates do not apply if a different rate is stated on the Design Drawings, Special Conditions, or instructed by the Engineer.

3.3. **Seedbed Preparation**: Immediately following final grading, the areas to be seeded shall be dressed to a reasonably smooth, firm surface as determined by the Resident Inspector. Till the surface to a minimum depth of 6 inches with either a tandem or offset disk. Suspend seedbed preparation when soil conditions are not suitable for the preparation of a satisfactory seedbed. The ENGINEER's designee shall make this determination.

On slopes too steep to disk use tracked equipment to "walk-in" and break up the surface of the soil prior to seeding (incidental) with the track groves parallel to the slope contours.

3.4. **Seeding**: Apply the specified mixtures of pure live seed (PLS) on all disturbed areas within the project limits designated on the Drawings using the seasonal variations shown **immediately following seedbed preparation**. In the event the date does not concur with the seeding schedules specified, seeding shall be accomplished using any one of the specified rates or an equivalent rate designed to fit the site and weather conditions, as directed by the ENGINEER.

Broadcast the seed evenly over the area immediately following tilling using a cyclone seeder, hydroseeder, or equivalent (incidental). Hydroseeder slurry water pH must remain above a pH of 5.0 and the CONTRACTOR shall provide an accurate pH meter to monitor the slurry at all times. The use of a hydroseeder is only paid when designed on the Drawings and Special Conditions.

3.5. **Mulching**: The mulch shall be applied uniformly over all seeded areas to obtain at least 90% cover. Mulch application must immediately follow seeding unless otherwise noted. Clumps of mulch must be spread. Hardwood bark mulch may be prescribed on the Drawings for acidic soils with low organic matter in lieu of mulch. The Drawings for project documents will specify the application rate.

3.6. **Crimper**: Crimping shall be performed immediately following mulching. On all designated areas that require crimping, a crimper meeting the following specifications shall be used:

1. Minimum disk size: 20 inches
2. Minimum depth spacing: 8 inches
3. Minimum depth of crimping: 3 inches
4. Minimum weight: 1,300 pounds*

*This weight can be increased at the discretion of the ENGINEER if soil conditions warrant such an increase.

3.7. **Netting**: Install netting on all slopes exceeding 30% (3:1 and steeper slopes). Overlap the netting a minimum of 6 inch with previous row. Apply staples at 4 feet maximum spacing on all edges and laps, with interior rows of staples at a 4 feet maximum spacing and spaced in the row at 8 feet maximum spacing. Staples in an interior row shall alternate in spacing with staples on an adjacent interior row. All staples shall be driven flush with the soil surface.

3.8. **Hydromulch & Hydroseeding**: **The equipment, hydromulch, seed, lime, fertilizer, and tack are all incidental to the bid item.** The ENGINEER will only pay for the use of a hydroseeder when used to apply hydromulch on project areas specified in the Drawings, Special Conditions, and on all areas where soil material has been removed to bedrock. No seedbed preparation or netting is required on these areas. Hydro-mulch, either cellulose fiber or processed straw, shall be used and applied at a net dry rate of 1,500 pounds per acre. Mix the cellulose fiber with water to attain a mixture with a maximum of 50 pounds cellulose fiber per 100 gallons of water. Use the seed mixture stated in the Drawings and/or Special Condition. Apply agriculture lime or rock dust at 1 ton/acre and fertilizer at 0.35 tons/acre of an 18-46-60 mixture made from 500 lbs of 18-46-0 and 200 lbs 0-0-60 fertilizers.

3.9. **Residential Seeding**: **This includes seedbed preparation, lime, seed, fertilizer, mulch and any other material or items necessary to complete the required work.** In areas around houses, lime, fertilizer, and seeding rates will vary and additional seedbed preparation work will be required for revegetation of residential areas. Hydrated lime (90% $CaCO_3$ equivalent content and 85% passing a #200 sieve) shall be applied at a rate of 20 pounds per 1,000 square feet. Fertilizer will be applied at a rate of 15 pounds per 1,000 square feet using a "10-10-10" fertilizer. Seed shall consist of a 3:1 mixture of turf type fescue (**NOT KY31**) and Perennial Ryegrass applied at a combined rate of 4 pounds (PLS) per 1,000 square feet. Additional seedbed preparation shall be required to remove all rock and debris larger than 2 inches and to rake the area to a completely smooth surface. Do not seed on hard ground. Hand raking and tilling will be required. Straw only mulch shall be applied at rates indicated in these Technical Specifications following all other operations.

3.10. **Landscape Allowance**: This shall consist of replacement “in kind” of any landscape in and around residential areas as part of normal construction techniques to facilitate the completion of other construction bid items. “In Kind” shall be determined in writing by the ENGINEER prior to the disturbance. When approved, landscape to be replaced shall be of the same species. To qualify for reimbursement, advanced approval from the ENGINEER must be given for removal and subsequent replacement. All removal and replacement shall be documented by the inspector. Any landscape damaged due to CONTRACTOR carelessness shall be replaced at the CONTRACTOR’S expense.