

Physical Properties for Coir Fabric Material			
PROPERTY	TEST VALUE		TEST METHOD
	Greater than	Less than	
Mass/Unit Area, (oz/SY)	8	-	ASTM D6475
Thickness (inches)	0.25	-	ASTM D5199
Resiliency (percent)	75%	-	*ECTC Guidelines
Recommended Flow Velocity (fps)		10 fps	Manufacturer
Swell (percent)		40%	ECTC Guidelines
Water Absorption (percent)	125%		
Machine Direction Tensile Strength (lbs/ft)	340		ASTM D5035
Machine Direction Elongation (percent)		7.60%	ASTM D5035
Transverse Direction Tensile Strength (lbs/ft)	200		ASTM D5035
Transverse Direction Elongation (percent)		11.10%	ASTM D5035
Manning's "n" Factor	0.014	.022	Manufacturer
Permissible Shear Stress, (lbs/sq.ft)	3.0	-	Manufacturer

\*ECTC- Erosion Control Technology Council

- L. Trail Enhancement Geotextile Fabric:
  1. Provide woven or non-woven geotextile fabric which meet or exceed the following performance or physical specifications:

Physical Properties for Trail Enhancement Geotextile Fabric Material		
PROPERTY	TEST VALUE	TEST METHOD
Grab Tensile Strength (lb)	115	ASTM D4632
Grab Tensile Elongation (%)	50	ASTM D4632
Mullen Burst (psi)	230	ASTM D3786
Puncture (lb)	70	ASTM D4833
Trapezoidal Tear (lb)	50	ASTM D4533
UV Resistance (% @ 500 hours)	70%	ASTM D4355
Apparent Opening Size (US Sieve)	70	ASTM D4751
Permittivity(sec <sup>-1</sup> )	1.8	ASTM D4491
Flow Rate (gal/min/ft <sup>2</sup> )	130	ASTM D4491

- M. Wood stakes:
  1. Provide clean soft wood stakes for installation of erosion mat in accordance with manufacturers installation instructions.
  2. Manufactured biodegradable soft wood stakes providing the necessary stake cross-section may be substituted for erosion mat material anchorage.
  3. Stakes are to be a minimum of 1' in length.

2.3 CAP MATERIALS: MURRAY ROAD SITE

- A. Obtain suitable cap materials that meet the specification requirements from off-site areas as approved by Ecology’s Representative.
- B. Provide cap material that is free of trash, vegetation, corrosive, organic or decomposable material, or metals in excess of background concentrations.
- C. Cap materials shall consist of granular material, either naturally occurring or processed. It shall be essentially free from various types of wood waste or other extraneous or objectionable materials.
- D. The maximum particle size shall not exceed 2/3 of the depth of the layer being placed.
- E. Cap material designated in Drawings as “Cap A- Gravel Mix” shall conform to the following gradation requirements:

<b>Murray Road “Cap A- Gravel Mix”</b>	
<b>Sieve Size</b>	<b>Percent Passing by Weight</b>
3-inch	100
2-inch	100-85
1-inch	95-60
1/2-inch	85-50
No. 4	60-30
No. 10	45-20
No. 40	15-5
No. 200	5-0

- F. Cap material designated in Drawings as “Cap B- Upland Mix” shall conform to the following gradation:

<b>Murray Road “Cap B- Upland Mix”</b>	
<b>Sieve Size</b>	<b>Percent Passing by Weight</b>
3-inch	100-60
2-inch	80-45
1-inch	65-30
1/2-inch	50-25
No. 4	35-15
No. 10	25-10
No. 40	10-0
No. 200	5-0

- G. Cap material designated in Drawings as “Cap C- Dual Layer Cap” consists of a one-foot layer of Cap B as specified above, topped with 6-inches of topsoil as specified below:
1. Use imported topsoil consisting of a fertile friable well-drained sandy loam suitable for the growth of plants. Use topsoil free from subsoil, clay, brush, noxious weeds, rocks and dirt clods larger than 1 inch in diameter, and free from materials that would be toxic or harmful to growth. Provide topsoil conforming to the following requirements.
  2. Provide topsoil with a grading analysis per ASTM D422 as follows:

<b>Murray Road “Cap C- Dual Layer Cap” TOPSOIL COMPONENT</b>	
<b>Sieve Size</b>	<b>Percent Passing by Weight</b>
½”	100
No. 4	97-100
No. 10	85-95
No. 30	65-80
No. 50	30-50
No. 100	20-40
No. 200	10-30

- a. The minimum and maximum pH values shall be 6 and 8, respectively as measured by ASTM D4972.
  - b. Provide topsoil containing a minimum of 10 percent and a maximum of 20 percent organic matter as determined by loss on ignition of samples.
  - c. Prior to stripping, topsoil shall have demonstrated that it is of good quality and reasonably free draining, by the occurrence upon it of healthy crops, grass, or other plant growth.
- H. Trail Enhancement Boulders:
1. Boulders provided for the Trail Enhancement Area shall be hard, sound, durable, light-colored granitic rock. They shall be free from fracture, seams, cracks, and other discontinuities tending to adversely impact its resistance to weathering. Boulders shall be a minimum “two-man rock” weighing (400-600 lbs, 18” to 28” in average dimension).
- I. Trail Enhancement Geotextile Fabric:
1. Provide woven or non-woven geotextile fabric which meet or exceed the following performance or physical specifications:

<b>Physical Properties for Trail Enhancement Geotextile Fabric Material</b>		
<b>PROPERTY</b>	<b>TEST VALUE</b>	<b>TEST METHOD</b>
Grab Tensile Strength (lb)	115	ASTM D4632
Grab Tensile Elongation (%)	50	ASTM D4632
Mullen Burst (psi)	230	ASTM D3786
Puncture (lb)	70	ASTM D4833
Trapezoidal Tear (lb)	50	ASTM D4533
UV Resistance (% @ 500 hours)	70%	ASTM D4355
Apparent Opening Size (US Sieve)	70	ASTM D4751
Permittivity(sec <sup>-1</sup> )	1.8	ASTM D4491
Flow Rate (gal/min/ft <sup>2</sup> )	130	ASTM D4491

## 2.4 WATER

- A. Provide clean potable water, free from deleterious substances, trash and vegetation.

## 2.5 EQUIPMENT

- A. Provide equipment of suitable size, weight and traction necessary to perform the Work specified herein and that can access the site via the existing trail from the parking area and traverse the dry gravel/cobble river channel.

## 3 PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 02110 - Site Preparation.
- B. Verify that survey benchmarks, control elevations and intended elevations for the Work are as indicated.
- C. Notify Ecology's Representative immediately of discrepancies between survey information and information in Drawings, should any such discrepancies be identified. Under this circumstance, commence with earthwork operations only as directed by Ecology's Representative.

### 3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Protect benchmarks, survey control points and other features from excavating equipment and vehicular traffic.

### 3.3 STOCKPILING

- A. Stockpile clean materials on liners in non-vegetated areas that are convenient to work-in-progress. Verify location selection with Ecology's Representative.
- B. Stockpile in sufficient quantities to meet project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- E. Cover stockpiles to prevent wind-erosion.
- F. Do not stockpile topsoil greater than 8-feet in height nor for a time period of greater than 1 month.
- G. Upon project completion, remove excess stockpile material and liners, leave area in a clean and neat condition.

### 3.4 CAP PLACEMENT AND COMPACTION

- A. Place cap materials in six-inch lifts. Uniformly operate hauling and spreading equipment over the full width of each lift to prevent differential compaction.
- B. Complete compaction of all lifts of each cap material before placing next layer.
- C. Feather cap, material to existing river bed grade in chevron area.
- D. Trail cap to be compacted to a minimum of approximately 90% standard Proctor density. Ecology's Representative will field verify compaction and determine if testing is required. If testing is required, the in-place density of the cohesion-less materials shall be determined in accordance with ASTM D1556 or ASTM D2922.
- E. Trail enhancement geotextile fabric shall be protected against damage during storage and installation. Damaged materials are not to be used in constructing trail enhancement.

### 3.5 TOPSOIL PLACEMENT, COMPACTION

- A. Avoid topsoil placement and compaction during heavy rain.

- B. Install and attach coir fabric to minimize disturbance to existing vegetation as field directed by Ecology's representative.
- C. Place topsoil in maximum of 6-inch lifts within coir fabric and lightly compact between lifts. Do not compact upper lift of topsoil.
- D. Thoroughly water final surface after placement to consolidate topsoil. Do not over water to create rills and gullies from runoff water.

### 3.6 TOLERANCES

- A. Provide a final grade that is plus or minus 0.20 foot from required elevation.

### 3.7 QUALITY CONTROL

- A. Section 1400 - Quality Control: Field inspection and testing.
- B. Topsoil Material Testing:
  - 1. Gradation in accordance with ASTM D422, 1 per material source.
  - 2. Standard Agricultural Fertility Screen: 1 per material source.
  - 3. pH in accordance with ASTM D4972; 1 per material source.
- C. If tests indicate that the Work does not meet specified requirements, remove Work, replace and retest. Coordinate any retesting with Ecology's Representative.
- D. Provide duplicate samples to Ecology's Representative for CQA testing as outlined in Section 01400.

END OF SECTION