

16"	15 - 50
10"	15 max.

Class C

Approximate Size (in.) Note 1	Percent Passing (Smaller)
42"	100
36"	80 – 95
28"	50 – 80
22"	15 - 50
14"	15 max.

Note 1 Approximate Size can be determined by taking the average dimension of the three axes of the rock; Length, Width, and Thickness by use of the following calculation:

$$\frac{\text{Length} + \text{Width} + \text{Thickness}}{3} = \text{Approximate Size}$$

Rock for Erosion and Scour Protection shall be visually accepted by the Project Engineer. The Project Engineer shall determine the Suitable Shape, Approximate Size and Grading of the load before it is placed. If so ordered by the Project Engineer, the loads shall be dumped on a flat surface for sorting and measuring the individual rocks contained in the load.

9-14.AP9

**SECTION 9-14, EROSION CONTROL AND ROADSIDE PLANTING
April 4, 2011**

Section 9-14 is deleted in its entirety and replaced with the following:

9-14.1 Soil

9-14.1(1) Topsoil Type A

Topsoil Type A shall be as specified in the Special Provisions.

9-14.1(2) Topsoil Type B

Topsoil Type B shall be native topsoil taken from within the project limits either from the area where roadway excavation is to be performed or from strippings from borrow, pit, or quarry sites, or from other designated sources. The general limits of the material to be utilized for topsoil will be indicated in the Plans or in the Special Provisions. The Engineer will make the final determination of the areas where the most suitable material exists within these general limits. The Contractor shall reserve this material for the specified use. Material for Topsoil Type B shall not be taken from a depth greater than 1 foot from the existing ground unless otherwise designated by the Engineer.

In the production of Topsoil Type B, all vegetative matter less than 4 feet in height, shall become a part of the topsoil. Prior to topsoil removal, the Contractor shall reduce the native vegetation to a height not exceeding 1 foot. Noxious weeds, as designated by

1 authorized State and County officials, shall not be incorporated in the topsoil, and shall
2 be removed and disposed of as designated elsewhere or as approved by the Engineer.
3

4 **9-14.1(3) Topsoil Type C**

5 Topsoil Type C shall be native topsoil meeting the requirements of Topsoil Type B but
6 obtained from a source provided by the Contractor outside of the Contracting Agency
7 owned right of way.
8

9 **9-14.2 Seed**

10 Grasses, legumes, or cover crop seed of the type specified shall conform to the
11 standards for "Certified" grade seed or better as outlined by the State of Washington
12 Department of Agriculture "Rules for Seed Certification," latest edition. Seed shall be
13 furnished in standard containers on which shall be shown the following information:
14

- 15 1. Common and botanical names of seed
 - 16 2. Lot number
 - 17 3. Net weight
 - 18 4. Pure live seed
- 19

20 All seed vendors must have a business license issued by the Washington State
21 Department of Licensing with a "seed dealer" endorsement. Upon request, the
22 Contractor shall furnish the Engineer with copies of the applicable licenses and
23 endorsements.
24

25 Upon request, the Contractor shall furnish to the Engineer duplicate copies of a
26 statement signed by the vendor certifying that each lot of seed has been tested by a
27 recognized seed testing laboratory within six months before the date of delivery on the
28 project. Seed which has become wet, moldy, or otherwise damaged in transit or storage
29 will not be accepted.
30

31 **9-14.3 Fertilizer**

32 Fertilizer shall be a standard commercial grade of organic or inorganic fertilizer of the
33 kind and quality specified. It may be separate or in a mixture containing the percentage
34 of total nitrogen, available phosphoric acid, water-soluble potash, or sulfur in the
35 amounts specified. All fertilizers shall be furnished in standard unopened containers with
36 weight, name of plant nutrients, and manufacturer's guaranteed statement of analysis
37 clearly marked, all in accordance with State and Federal laws.
38

39 Fertilizer shall be supplied in one of the following forms:
40

- 41 1 A dry free-flowing granular fertilizer, suitable for application by agricultural
42 fertilizer spreader.
- 43
- 44 2 A soluble form that will permit complete suspension of insoluble particles in
45 water, suitable for application by power sprayer.
- 46
- 47 3 A homogeneous pellet, suitable for application through a ferti-blast gun.
- 48
- 49 4 A tablet or other form of controlled release with a minimum of a six month
50 release period.
- 51
- 52 5 A liquid suitable for application by a power sprayer or hydroseeder.

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9-14.4 Mulch and Amendments

All amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer’s guaranteed chemical analysis and name. In lieu of containers, amendments may be furnished in bulk. A manufacturer’s certificate of compliance shall accompany each delivery. Compost and other organic amendments shall be accompanied with all applicable health certificates and permits.

9-14.4(1) Straw

Straw shall be in an air dried condition free of noxious weeds, seeds, and other materials detrimental to plant life. Hay is not acceptable.

All straw material shall be Certified Weed Free Straw using North American Weed Management Association (NAWMA) standards or the Washington Wilderness Hay and Mulch (WWHAM) program run by the Washington State Noxious Weed Control Board. Information can be found at <http://www.nwcb.wa.gov/http://www.nwcb.wa.gov/>

In lieu of Certified Weed Free Straw, the Contractor shall provide documentation that the material is steam or heat treated to kill seeds, or shall provide U.S., Washington, or other State’s Department of Agriculture laboratory test reports, dated within 90 days prior to the date of application, showing there are no viable seeds in the straw.

Straw mulch shall be suitable for spreading with mulch blower equipment.

9-14.4(2) Hydraulically Applied Erosion Control Products (HECPs)

All HECPs shall be biodegradable and in a dry condition free of noxious weeds, seeds, chemical printing ink, germination inhibitors, herbicide residue, chlorine bleach, rock, metal, plastic, and other materials detrimental to plant life. Up to 5 percent by weight may be photodegradable material.

The HECP shall be suitable for spreading with a hydroseeder.

All HECPs shall be furnished premixed by the manufacturer with Type A or Type B Tackifier as specified in 9-14.4(7). Under no circumstances will field mixing of additives or components be acceptable.

The Contractor shall provide test results, dated within three years prior to the date of application, from an independent, accredited laboratory, as approved by the Engineer, showing the product meets the following requirements:

Properties	Test Method	Requirements
Acute Toxicity	EPA-821-R-02-012 Methods for Measuring Acute Toxicity of Effluents. Test leachate from recommended application rate receiving 2 inches of rainfall per hour using static test for No-Observed-Adverse-Effect-Concentration (NOEC)	Four replicates are required with No statistically significant reduction in survival in 100% leachate for a Daphnid at 48 hours and <i>Oncorhynchus mykiss</i> (rainbow trout) at 96 hours

Solvents	EPA 8260B	Benzene - < 0.03 mg/kg Methylene chloride – 0.02 mg/kg Naphthalene – < 5 mg/kg Tetrachloroethylene – < 0.05 mg/kg Toluene – < 7 mg/kg Trichloroethylene – < 0.03 mg/kg Xylenes – < 9 mg/kg		
Heavy Metals	EPA 6020A Total Metals	Antimony – < 4 mg/kg Arsenic – < 6 mg/kg Barium – < 80 mg/kg Boron – < 100 mg/kg Cadmium – < 2 mg/kg Chromium – < 2 mg/kg Copper – < 5 mg/kg Lead – < 5 mg/kg Mercury – < 2 mg/kg Nickel – < 2 mg/kg Selenium – < 10 mg/kg Strontium – < 30 mg/kg Zinc – < 5 mg/kg		
Water Holding Capacity	ASTM D 7367	900 percent minimum		
Organic Matter Content	ASTM D 586	90 percent minimum		
Moisture Content	ASTM D 644	15 percent maximum		
Seed Germination Enhancement	ASTM D 7322	Long Term	Moderate Term	Short Term
		420 percent minimum	400 percent minimum	200 percent minimum

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If the HECP contains cotton or straw, the Contractor shall provide documentation that the material has been steam or heat treated to kill seeds, or shall provide U.S., Washington, or other State’s Department of Agriculture laboratory test reports, dated within 90 days prior to the date of application, showing there are no viable seeds in the mulch.

The HECP shall be manufactured in such a manner that when agitated in slurry tanks with water, the fibers will become uniformly suspended, without clumping, to form a homogeneous slurry. When hydraulically applied, the material shall form a strong moisture-holding mat that allows the continuous absorption and infiltration of water.

The HECP shall contain a dye to facilitate placement and inspection of the material. Dye shall be non-toxic to plants, animals, and aquatic life and shall not stain concrete or painted surfaces.

The HECP shall be furnished with a Material Safety Data Sheet (MSDS) that demonstrates that the product is not harmful to plants, animals, and aquatic life.

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9-14.4(2)A Long Term Mulch

Long Term Mulch shall demonstrate the ability to adhere to the soil and create a blanket-like mass within two hours of application and shall bond with the soil surface to create a continuous, porous, absorbent, and flexible erosion resistant blanket that allows for seed germination and plant growth and conforms to the requirements in Table 1 Long Term Mulch Test Requirements.

The Contractor shall provide test results documenting the mulch meets the requirements in Table 1 Long Term Mulch Test Requirements.

Prior to January 1, 2012, the Contractor shall supply independent ASTM D 6459 test results from one of the following testing facilities:

- National Transportation Product Evaluation Program (NTPEP)
- Utah State University’s Utah Water Research Laboratory
- Texas Transportation Institute
- San Diego State University’s Soil Erosion Research Laboratory
- TRI Environmental, Inc

Effective January 1, 2012, the Contractor shall supply independent test results from the National Transportation Product Evaluation Program (NTPEP).

Table 1 Long Term Mulch Test Requirements

Properties	Test Method	Requirements
Performance in Protecting Slopes from Rainfall-Induced Erosion	ASTM D 6459 - Test in one soil type. Soil tested shall be sandy loam as defined by the NRCS Soil Texture Triangle	C Factor = 0.01 maximum using Revised Universal Soil Loss Equation (RUSLE)

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9-14.4(2)B Moderate Term Mulch

Within 48 hours of application, the Moderate Term Mulch shall bond with the soil surface to create a continuous, absorbent, flexible erosion resistant blanket that allows for seed germination and plant growth and conform to the requirements in Table 2 Moderate Term Mulch Test Requirements.

The Contractor shall provide test results documenting the mulch meets the requirements in Table 2 Moderate Term Mulch Test Requirements.

Prior to January 1, 2012, the Contractor shall supply independent ASTM D 6459 test results from one of the following testing facilities:

- National Transportation Product Evaluation Program (NTPEP)
- Utah State University’s Utah Water Research Laboratory
- Texas Transportation Institute
- San Diego State University’s Soil Erosion Research Laboratory
- TRI Environmental, Inc

Effective January 1, 2012, the Contractor shall supply independent test results from the National Transportation Product Evaluation Program (NTPEP).

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Table 2 Moderate Term Mulch Test Requirements

Properties	Test Method	Requirements
Performance in Protecting Slopes from Rainfall-Induced Erosion	ASTM D 6459 - Test in one soil type. Soil tested shall be sandy loam as defined by the NRCS Soil Texture Triangle	C Factor = 0.05 maximum using Revised Universal Soil Loss Equation (RUSLE)

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9-14.4(2)C Short Term Mulch

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The Contractor shall provide test results documenting the mulch meets the requirements in Table 3 Short Term Mulch Test Requirements.

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Prior to January 1, 2012, the Contractor shall supply independent ASTM D 6459 test results from one of the following testing facilities:

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National Transportation Product Evaluation Program (NTPEP)

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Utah State University's Utah Water Research Laboratory

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Texas Transportation Institute

13

San Diego State University's Soil Erosion Research Laboratory

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TRI Environmental, Inc

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Effective January 1, 2012, the Contractor shall supply independent test results from the National Transportation Product Evaluation Program (NTPEP).

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Table 3 Short Term Mulch Test Requirements

Properties	Test Method	Requirements
Performance in Protecting Slopes from Rainfall-Induced Erosion	ASTM D 6459 - Test in one soil type. Soil tested shall be sandy loam as defined by the National Resources Conservation Service (NRCS) Soil Texture Triangle	C Factor = 0.15 maximum using Revised Universal Soil Loss Equation (RUSLE)

21

9-14.4(3) Bark or Wood Chips

22

Bark or wood chip mulch shall be derived from Douglas fir, pine, or hemlock species. It shall not contain resin, tannin, or other compounds in quantities that would be detrimental to plant life. Sawdust shall not be used as mulch.

23

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26

Bark or wood chips, when tested, shall be according to WSDOT Test Method T 123 prior to placement and shall meet the following loose volume gradation:

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29

Sieve Size	Percent Passing	
	Minimum	Maximum
2"	95	100
No. 4	0	30

30

9-14.4(4) Wood Strand Mulch

31

Wood strand mulch shall be a blend of angular, loose, long, thin wood pieces that are frayed, with a high length-to-width ratio and shall be derived from native conifer or

32

33

1 deciduous trees. A minimum of 95 percent of the wood strand shall have lengths
2 between 2 and 10 inches. At least 50 percent of the length of each strand shall have a
3 width and thickness between 1/16 and 1/2 inch. No single strand shall have a width or
4 thickness greater than 1/2 inch.

5
6 The mulch shall not contain salt, preservatives, glue, resin, tannin, or other compounds
7 in quantities that would be detrimental to plant life. Sawdust or wood chips or shavings
8 will not be acceptable. Products shall be tested according to WSDOT Test Method 125
9 prior to acceptance.

10
11 **9-14.4(5) Lime**
12 Agriculture lime shall be of standard manufacture, flour grade or in pelletized form,
13 meeting the requirements of ASTM C 602.

14
15 **9-14.4(6) Gypsum**
16 Gypsum shall consist of Calcium Sulfate (CaSO₄·2H₂O) in a pelletized or granular form.
17 100 percent shall pass through a No. 8 sieve.

18
19 **9-14.4(7) Tackifier**
20 Tackifiers are used as a tie-down for soil, compost, seed, and/or mulch. Tackifier shall
21 contain no growth or germination inhibiting materials, and shall not reduce infiltration
22 rates. Tackifier shall hydrate in water and readily blend with other slurry materials and
23 conform to the requirements in Table 4 Tackifier Test Requirements.

24
25 The Contractor shall provide test results documenting the tackifier meets the
26 requirements in Table 4 Tackifier Test Requirements.

27
28
29 **Table 4 Tackifier Test Requirements**

Properties	Test Method	Requirements
Heavy Metals Solvents Acute Toxicity	See Table in Section 9-14.4(2). Test at manufacturer's recommended application rate	See Table in Section 9- 14.4(2)
Viscosity	ASTM D 2364. Testing shall be performed by an accredited, independent laboratory	4000 cPs minimum

30
31 **9-14.4(7)A Organic Tackifier**
32 Organic tackifier shall be derived from natural plant sources and shall have an MSDS
33 that demonstrates to the satisfaction of the Engineer that the product is not harmful to
34 plants, animals, and aquatic life.

35
36 **9-14.4(7)B Synthetic Tackifier**
37 Synthetic tackifier shall have an MSDS that demonstrates to the satisfaction of the
38 Engineer that the product is not harmful to plants, animals, and aquatic life.

39
40 **9-14.4(8) Compost**
41 Compost products shall be the result of the biological degradation and transformation of
42 organic materials under controlled conditions designed to promote aerobic
43 decomposition. Compost shall be stable with regard to oxygen consumption and carbon
44 dioxide generation. Compost shall be mature with regard to its suitability for serving as

1 a soil amendment or an erosion control BMP as defined below. The compost shall have
2 a moisture content that has no visible free water or dust produced when handling the
3 material.

4
5 Compost production and quality shall comply with Chapter 173-350 WAC.

6
7 Compost products shall meet the following physical criteria:

- 8
9 1. Compost material shall be tested in accordance with U.S. Composting Council
10 Testing Methods for the Examination of Compost and Composting (TMECC) 02.02-
11 B, "Sample Sieving for Aggregate Size Classification".

12
13 Fine compost shall meet the following gradation:

14

Sieve Size	Percent Passing	
	Minimum	Maximum
2"	100	
1"	95	100
5/8"	90	100
1/4"	75	100

15 Maximum particle length of 6 inches.

16
17 Medium compost shall meet the following gradation:

18

Sieve Size	Percent Passing	
	Minimum	Maximum
2"	100	
1"	95	100
5/8"	90	100
1/4"	70	85

19 Maximum particle length of 6 inches.

20
21 Medium compost shall have a carbon to nitrogen ratio (C:N) between 18:1 and
22 30:1. The carbon to nitrogen ratio shall be calculated using the dry weight of
23 "Organic Carbon" using TMECC 04.01A divided by the dry weight of "Total N" using
24 TMECC 04.02D.

25
26 Coarse compost shall meet the following gradation:

27

Sieve Size	Percent Passing	
	Minimum	Maximum
3"	100	
1"	90	100
3/4"	70	100
1/4"	40	60

28 Maximum particle length of 6 inches.

29 Coarse Compost shall have a Carbon to Nitrogen ratio (C:N) between 25:1
30 and 35:1. The Carbon to Nitrogen ratio shall be calculated using the dry
31 weight of "Organic Carbon" using TMECC 04.01A divided by the dry weight of
32 "Total N" using TMECC 04.02D.

33

- 1 2. The pH shall be between 6.0 and 8.5 when tested in accordance with U.S.
2 Composting Council TMECC 04.11-A, "1:5 Slurry pH".
3
- 4 3. Manufactured inert material (plastic, concrete, ceramics, metal, etc.) shall be less
5 than 1.0 percent by weight as determined by U.S. Composting Council TMECC
6 03.08-A "Classification of Inerts by Sieve Size".
7
- 8 4. Minimum organic matter shall be 40 percent by dry weight basis as determined by
9 U.S. Composting Council TMECC 05.07A "Loss-On-Ignition Organic Matter Method
10 (LOI)".
11
- 12 5. Soluble salt contents shall be less than 4.0 mmhos/cm when tested in accordance
13 with U.S. Composting Council TMECC 04.10 "Electrical Conductivity".
14
- 15 6. Maturity shall be greater than 80 percent in accordance with U.S. Composting
16 Council TMECC 05.05-A, "Germination and Root Elongation".
17
- 18 7. Stability shall be 7 mg CO₂-C/g OM/day or below in accordance with U.S.
19 Composting Council TMECC 05.08-B "Carbon Dioxide Evolution Rate".
20
- 21 8. The compost product shall originate from recycled plant waste as defined in WAC
22 173-350 as "Type 1 Feedstocks", "Type 2 Feedstocks," and/or "Type 3 Feedstocks".
23 The Contractor shall provide a list of feedstock sources by percentage in the final
24 compost product.
25
- 26 9. The Engineer may evaluate compost for maturity using U.S. Composting Council
27 TMECC 05.08-E "Solvita® Maturity Index". Fine compost shall score a number 6 or
28 above on the Solvita® Compost Maturity Test. Medium and Coarse compost shall
29 score a 5 or above on the Solvita® Compost Maturity Test.
30

31 **9-14.4(8)A Compost Submittal Requirements**

32 The Contractor shall submit the following information to the Engineer for approval:
33

- 34 1. The Qualified Products List printed page or a Request for Approval of
35 Material(DOT Form 350-071EF).
36
- 37 2. A copy of the Solid Waste Handling Permit issued to the manufacturer by the
38 Jurisdictional Health Department in accordance with WAC 173-350 (Minimum
39 Functional Standards for Solid Waste Handling).
40
- 41 3. The Contractor shall verify in writing, and provide lab analyses, that the
42 material complies with the processes, testing, and standards specified in WAC
43 173-350 and these Specifications. An independent Seal of Testing Assurance
44 (STA) Program certified laboratory shall perform the analysis.
45
- 46 4. A copy of the manufacturer's Seal of Testing Assurance (STA) certification as
47 issued by the U.S. Composting Council.
48

49 **9-14.4(8)B Compost Acceptance**

50 Fourteen days prior to application, the Contractor shall submit a sample of the compost
51 approved for use, and a STA test report dated within 90 calendar days of the

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application, and the list of feed stocks by volume for each compost type to the Engineer for review.

The Contractor shall use only compost that has been tested within 90 calendar days of application and meets the requirements in Section 9-14.4(8). Compost not conforming to the above requirements or taken from a source other than those tested and accepted shall not be used.

9-14.4(9) Vacant

9-14.4(10) Vacant

9-14.5 Erosion Control Devices

9-14.5(1) Polyacrylamide (PAM)

PAM is used as a tie-down for soil, compost, or seed, and is also used as a flocculent. Polyacrylamide (PAM) products shall meet ANSI/NSF Standard 60 for drinking water treatment with an AMD content not to exceed 0.05 percent. PAM shall be anionic, linear, and not cross-linked. The minimum average molecular weight shall be greater than 5 mg/mole and minimum 30 percent charge density. The product shall contain at least 80 percent active ingredients and have a moisture content not exceeding 10 percent by weight. PAM shall be delivered in a dry granular or powder form.

9-14.5(2) Erosion Control Blanket

Temporary erosion control blanket shall be made of natural plant fibers. The Contractor shall supply independent test results from the National Transportation Product Evaluation Program (NTPEP) meeting the requirements in the following table:

Properties	ASTM Test Method	Requirements
Protecting Slopes from Rainfall-Induced Erosion	D 6459 - Test in one soil type. Soil tested shall be sandy loam as defined by the NRCS Soil Texture Triangle	Maximum C factor of 0.15 using Revised Universal Soil Loss Equation (RUSLE)
Dry Weight per Unit Area	D 6475	0.36 lb/sq. yd. minimum
Performance in Protecting Earthen Channels from Stormwater-Induced Erosion	D 6460 Test in one soil type. Soil tested shall be loam as defined by the NRCS Soil Texture Triangle	1.0 lb/sq. ft. minimum
Seed Germination Enhancement	D 7322	200 percent minimum

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Netting, if present, shall be biodegradable with a life span not to exceed two years.

Permanent erosion control blanket/turf reinforcement mats shall meet the following requirements:

Properties	ASTM Test Method	Requirements
UV Stability	D 4355	Minimum 80 percent

		strength retained after 500 hours in a xenon arc device
Protecting Slopes from Rainfall-Induced Erosion	D 6459 with 0.12 inch average raindrop size.* Test in one soil type. Soil tested shall be loam as defined by the NRCS Soil Texture Triangle **	Maximum C factor of 0.15 using Revised Universal Soil Loss Equation (RUSLE)
Dry Weight per Unit Area	D 6566	0.50 lb/sq. yd. minimum
Performance in Protecting Earthen Channels from Stormwater-Induced Erosion	D 6460 Test in one soil type. Soil tested shall be loam as defined by the NRCS Soil Texture Triangle**	2.0 lb/sq. ft. minimum
Seed Germination Enhancement	D 7322	200 percent minimum

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9-14.5(2)A Erosion Control Blanket Approval

The Contractor shall select erosion control blanket products that bear the Quality and Data Oversight and Review (QDOR) seal from the Erosion Control and Technology Council (ECTC). All materials selected shall be currently listed on the QDOR products list available at www.ectc.org/qdor

9-14.5(3) Clear Plastic Covering

Clear plastic covering shall meet the requirements of ASTM D 4397 for polyethylene sheeting having a minimum thickness of 6 mils.

9-14.5(4) Geotextile-Encased Check Dam

The geotextile-encased check dam shall be a urethane foam core encased in geotextile material. The minimum length of the unit shall be 7 feet.

The foam core shall be a minimum of 8 inches in height, and have a minimum base width of 16 inches. The geotextile material shall overhang the foam by at least 6 inches at each end, and shall have apron type flaps that extend a minimum of 24 inches on each side of the check dam. The geotextile material shall meet the requirements in Section 9-33.

9-14.5(5) Wattles

Wattles shall consist of cylinders of biodegradable plant material such as weed-free straw, coir, compost, wood chips, excelsior, or wood fiber or shavings encased within biodegradable netting. Wattles shall be a minimum of 5 inches in diameter. Netting material shall be clean, evenly woven, and free of encrusted concrete or other contaminating materials such as preservatives. Netting material shall be free from cuts, tears, or weak places and shall have a minimum lifespan of 6 months and a maximum lifespan of not more than 24 months.

Compost filler shall be coarse compost and shall meet the material requirements as specified in Section 9-14.4(8). If wood chips are used they shall meet the material

1 requirements as specified in Section 9-14.4(3). If wood shavings are used, 80 percent
2 of the fibers shall have a minimum length of 6 inches between 0.030 and 0.50 inches
3 wide, and between 0.017 and 0.13 inches thick.
4

5 Wood stakes for wattles shall be made from untreated Douglas fir, hemlock, or pine
6 species. Wood stakes shall be 2 inch by 2 inch nominal dimension and 36 inches in
7 length.
8

9 **9-14.5(6) Compost Socks**

10 Compost socks shall consist of extra heavy weight biodegradable fabric, with a
11 minimum strand thickness of 5 mils. The fabric shall be filled with Coarse Compost.
12 Compost socks shall be at least 8 inches in diameter. The fabric shall be clean, evenly
13 woven, and free of encrusted concrete or other contaminating materials and shall be
14 free from cuts, tears, broken or missing yarns, and be free of thin, open, or weak areas
15 and shall be free of any type of preservative. Netting material shall have a minimum
16 lifespan of 6 months and a maximum lifespan of not more than 24 months.
17

18 Coarse compost filler shall meet the material requirements as specified in Section 9-
19 14.4(8).
20

21 Wood stakes for compost socks shall be made from untreated Douglas fir, hemlock, or
22 pine species. Wood stakes shall be 2 inch by 2 inch nominal dimension and 36 inches in
23 length,
24

25 **9-14.5(7) Coir Log**

26 Coir logs shall be made of 100 percent durable coconut (coir) fiber uniformly compacted
27 within woven netting made of bristle coir twine with minimum strength of 80 lbs tensile
28 strength. The netting shall have nominal 2 inch by 2 inch openings. Log segments shall
29 have a maximum length of 20 feet, with a minimum diameter as shown in the Plans.
30 Logs shall have a minimum density of 7 lbs/cf.
31

32 Stakes shall be untreated Douglas fir, hemlock, or pine species. Wood stakes shall have
33 a notch to secure the rope ties. Rope ties shall be of 1/4 inch diameter commercially
34 available hemp rope.
35

36 **9-14.5(8) High Visibility Fencing**

37 High visibility fence shall be UV stabilized, orange, high-density polyethylene or
38 polypropylene mesh, and shall be at least 4-feet in height.
39

40 Support posts shall be wood or steel in accordance with Standard Plan I-10.10-00. The
41 posts shall have sufficient strength and durability to support the fence through the life of
42 the project.
43

44 **9-14.6 Plant Materials**

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46 **9-14.6(1) Description**

47 Bareroot plants are grown in the ground and harvested without soil or growing medium
48 around their roots.
49

50 Container plants are grown in pots or flats that prevent root growth beyond the sides
51 and bottom of the container.
52

1 Balled and burlapped plants are grown in the ground and harvested with soil around a
2 core of undisturbed roots. This rootball is wrapped in burlap and tied or placed in a wire
3 basket or other supportive structure.
4

5 Cuttings are live plant material without a previously developed root system. Source
6 plants for cuttings shall be dormant when cuttings are taken and all cuts shall be made
7 with a sharp instrument. Cuttings may be collected. If cuttings are collected, the
8 requirement to be nursery grown or held in nursery conditions does not apply. Written
9 permission shall be obtained from property owners and provided to the Engineer before
10 cuttings are collected. The Contractor shall collect cuttings in accordance with
11 applicable sensitive area ordinances. Cuttings shall meet the following requirements:
12

- 13 A. Live branch cuttings shall have flexible top growth with terminal buds and may
14 have side branches. The rooting end shall be cut at an approximate 45 degree
15 angle.
16
- 17 B. Live stake cuttings shall have a straight top cut immediately above a bud. The
18 lower, rooting end shall be cut at an approximate 45 degree angle. Live stakes
19 are cut from one to two year old wood. Live stake cuttings shall be cut and
20 installed with the bark intact with no branches or stems attached, and be ½ to
21 1½ inch in diameter.
22
- 23 C. Live pole cuttings shall have a minimum 2 inch diameter and no more than
24 three branches which shall be pruned back to the first bud from the main stem.
25

26 Rhizomes shall be a prostrate or subterranean stem, usually rooting at the nodes and
27 becoming erect at the apex. Rhizomes shall have a minimum of two growth points.
28 Tubers shall be a thickened and short subterranean branch having numerous buds or
29 eyes.
30

31 **9-14.6(2) Quality**

32 At the time of delivery all plant material furnished shall meet the grades established by
33 the latest edition of the American Standard for Nursery Stock, (ASNS) ANSI Z60.1 and
34 shall conform to the size and acceptable conditions as listed in the Contract, and shall
35 be free of all foreign plant material.
36

37 All plant material shall comply with State and Federal laws with respect to inspection for
38 plant diseases and insect infestation.
39

40 All plant material shall be purchased from a nursery licensed to sell plants in
41 Washington State.
42

43 Live woody or herbaceous plant material, except cuttings, rhizomes, and tubers, shall
44 be vigorous, well formed, with well developed fibrous root systems, free from dead
45 branches, and from damage caused by an absence or an excess of heat or moisture,
46 insects, disease, mechanical or other causes detrimental to good plant development.
47 Evergreen plants shall be well foliated and of good color. Deciduous trees that have
48 solitary leaders shall have only the lateral branches thinned by pruning. All conifer trees
49 shall have only one leader (growing apex) and one terminal bud, and shall not be
50 sheared or shaped. Trees having a damaged or missing leader, multiple leaders, or Y-
51 crotches shall be rejected.
52

1 Root balls of plant materials shall be solidly held together by a fibrous root system and
2 shall be composed only of the soil in which the plant has been actually growing. Balled
3 and burlapped rootballs shall be securely wrapped with jute burlap or other packing
4 material not injurious to the plant life. Root balls shall be free of weed or foreign plant
5 growth.
6

7 Plant materials shall be nursery grown stock. Plant material, with the exception of
8 cuttings, gathered from native stands shall be held under nursery conditions for a
9 minimum of one full growing season, shall be free of all foreign plant material, and meet
10 all of the requirements of these Specifications, the Plans, and the Special Provisions.
11

12 Container grown plants shall be plants transplanted into a container and grown in that
13 container sufficiently long for new fibrous roots to have developed so that the root mass
14 will retain its shape and hold together when removed from the container, without having
15 roots that circle the pot. Plant material which is root bound, as determined by the
16 Engineer, shall be rejected. Container plants shall be free of weed or foreign plant
17 growth.
18

19 Container sizes for plant material of a larger grade than provided for in the container
20 grown Specifications of the ASNS shall be determined by the volume of the root ball
21 specified in the ASNS for the same size plant material.
22

23 All bare root plant materials shall have a heavy fibrous root system and be dormant at
24 the time of planting.
25

26 Average height to spread proportions and branching shall be in accordance with the
27 applicable sections, illustrations, and accompanying notes of the ASNS.
28

29 Plants specified or identified as "Street Tree Grade" shall be trees with straight trunks,
30 full and symmetrical branching, central leader, and be developed, grown, and
31 propagated with a full branching crown. A "Street Tree Grade" designation requires the
32 highest grade of nursery shade or ornamental tree production which shall be supplied.
33

34 Street trees with improperly pruned, broken, or damaged branches, trunk, or root
35 structure shall be rejected. In all cases, whether supplied balled and burlapped or in a
36 container, the root crown (top of root structure) of the tree shall be at the top of the finish
37 soil level. Trees supplied and delivered in a nursery fabric bag will not be accepted.
38

39 Plants which have been determined by the Engineer to have suffered damage for the
40 following reasons will be rejected:
41

- 42 1. Girdling of the roots, stem, or a major branch.
- 43
- 44 2. Deformities of the stem or major branches.
- 45
- 46 3. Lack of symmetry.
- 47
- 48 4. Dead or defoliated tops or branches.
- 49
- 50 5. Defects, injury, and condition which renders the plant unsuitable for its
- 51 intended use.
- 52

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Plants that are grafted shall have roots of the same genus as the specified plant.

9-14.6(3) Handling and Shipping

Handling and shipping shall be done in a manner that is not detrimental to the plants. The nursery shall furnish a notice of shipment in triplicate at the time of shipment of each truck load or other lot of plant material. The original copy shall be delivered to the Project Engineer, the duplicate to the consignee and the triplicate shall accompany the shipment to be furnished to the Inspector at the job site. The notice shall contain the following information:

1. Name of shipper.
2. Date of shipment.
3. Name of commodity. (Including all names as specified in the Contract.)
4. Consignee and delivery point.
5. State Contract number.
6. Point from which shipped.
7. Quantity contained.
8. Size. (Height, runner length, caliper, etc. as required.)
9. Signature of shipper by authorized representative.

To acclimate plant materials to Northwest conditions, all plant materials used on a project shall be grown continuously outdoors north of the 42nd Latitude (Oregon-California border) from not later than August 1 of the year prior to the time of planting.

All container grown plants shall be handled by the container.

All balled and burlapped plants shall be handled by the ball.

Plant material shall be packed for shipment in accordance with prevailing practice for the type of plant being shipped, and shall be protected at all times against drying, sun, wind, heat, freezing, and similar detrimental conditions both during shipment and during related handling. Where necessary, plant material shall be temporarily heeled in. When transported in closed vehicles, plants shall receive adequate ventilation to prevent sweating. When transported in open vehicles, plants shall be protected by tarpaulins or other suitable cover material.

9-14.6(4) Tagging

Plants delivered as a single unit of 25 or less of the same size, species, and variety, shall be clearly marked and tagged. Plants delivered in large quantities of more than 25 shall be segregated as to variety, grade, and size; and one plant in each 25, or fraction thereof, of each variety, grade, and size shall be tagged.

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9-14.6(5) Inspection

The Contracting Agency will make an inspection of plant material at the source when requested by the Engineer. However, such preliminary approval shall not be considered as final acceptance for payment. Final inspection and approval (or rejection) will only occur when the plant material has been delivered to the Project site. The Contractor shall notify the Engineer, not less than 48 hours in advance, of plant material delivery to the project.

9-14.6(6) Substitution of Plants

No substitution of plant material, species or variety, will be permitted unless evidence is submitted in writing to the Engineer that a specified plant cannot be obtained and has been unobtainable since the Award of the Contract. If substitution is permitted, it can be made only with written approval by the Engineer. The nearest variety, size, and grade, as approved by the Engineer, shall then be furnished.

Container or balled and burlapped plant material may be substituted for bare root plant material. Container grown plant material may be substituted for balled and burlapped plant materials. When substitution is allowed, use current ASNS standards to determine the correct rootball volume (container or balled and burlapped) of the substituted material that corresponds to that of the specified material. These substitutions shall be approved by the Engineer and be at no cost to the Contracting Agency.

9-14.6(7) Temporary Storage

Plants stored under temporary conditions prior to installation shall be the responsibility of the Contractor.

Plants stored on the project shall be protected at all times from extreme weather conditions by insulating the roots, root balls, or containers with sawdust, soil, compost, bark or wood chips, or other approved material and shall be kept moist at all times prior to planting.

Cuttings shall continually be shaded and protected from wind. Cuttings shall be protected from drying at all times and shall be heeled into moist soil or other insulating material or placed in water if not installed within eight hours of cutting. Cuttings to be stored for later installation shall be bundled, laid horizontally, and completely buried under 6 inches of water, moist soil or placed in cold storage at a temperature of 34°F and 90 percent humidity. Cuttings that are not planted within 24 hours of cutting shall be soaked in water for 24 hours prior to planting. Cuttings taken when the temperature is higher than 50°F shall not be stored for later use. Cuttings that already have developed roots shall not be used.

9-14.6(8) Sod

The available grass mixtures on the current market shall be submitted to the Engineer for selection and approval.

The sod shall be field grown one calendar year or older, have a well developed root structure, and be free of all weeds, disease, and insect damage.

Prior to cutting, the sod shall be green, in an active and vigorous state of growth, and mowed to a height not exceeding 1 inch.

The sod shall be cut with a minimum of 1inch of soil adhering.

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9-14.7 Stakes, Guys, and Wrapping

Stakes shall be installed as shown in the Plans.

Commercial plant ties may be used in lieu of hose and wire guying upon approval of the Engineer. The minimum size of wire used for guying shall be 12 gauge, soft drawn.

Hose for guying shall be nylon, rubber, or reinforced plastic and shall have an inside diameter of at least 1 inch.

Tree wrap shall be a crinkled waterproof paper weighing not less than 4.0 pounds per 100 square feet and shall be made up of two sheets cemented together with asphalt.

9-15.AP9

SECTION 9-15, IRRIGATION SYSTEM

January 4, 2010

The first paragraph is supplemented with the following:

When the water supply for the irrigation system is from a non-potable source, irrigation components shall have lavender indicators supplied by the equipment manufacturer.

9-15.3 Automatic Controllers

This section is revised to read:

The automatic controller shall be an electronic timing device for automatically opening and closing control valves for predetermined periods of time. The automatic controller shall be enclosed in a weatherproof, painted, metal housing fabricated from 16 gauge sheet aluminum alloy 6061-T6 or 16 gauge sheet steel or unpainted, non-rusting industrial grade stainless steel. The pedestal shall have a completely removable locking faceplate to allow easy access to wiring.

The automatic controller housing shall have hasp and lock or locking device. All locks or locking devices shall be master keyed and three sets of keys provided to the Engineer. The controller shall be compatible with and capable of operating the irrigation system as designed and constructed and shall include the following operating features:

1. Each controller station shall be adjustable for setting to remain open for any desired period of time, from five minutes or less to at least 99 minutes.
2. Adjustments shall be provided whereby any number of days may be omitted and whereby any one or more positions on the controller can be skipped. When adjustments are made, they shall continue automatically within a 14-day cycle until the operator desires to make new adjustments.
3. Controls shall allow any position to be operated manually, both on or off, whenever desired, without disrupting the 14 day cycle.
4. Controls shall provide for resetting the start of the irrigation cycle at any time and advancing from one position to another.
5. Controllers shall contain a power on-off switch and fuse assembly.
6. Output shall be 24 volt AC with battery back up for memory retention of the 14 day cycle.
7. Both normally-open or normally-closed rain sensor compatibility.