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| REVIEW OF NEW SPECIFICATION OR SPECIFICATION CHANGE  | 214-2 |
| **Specification Section No.:** 214 | **Item:** Nursery Stock Containers and Unrooted Cuttings |
| **Originating Office:** Landscaping Section | **By:** Fischer/Banovich |
| **Date Sent For Review:** August 21, 2017 | **Date Comments Due: September 18, 2017** |
| Submit response to: STANDARDS AND SPECIFICATIONS UNIT, DIVISION OF PROJECT SUPPORT 4TH FLOOR, CDOT HEADQUARTERS |
| **Vote****/N** | **Concurrent Reviews – Others Commenting** | The attached Draft Specification is submitted for your review and comments. If not returned by Date Comments Due, the draft specification will be considered to be approved unless the Standards and Specifications Unit of the Project Development Branch [(303) 757-9474, (303) 757-9402] is advised otherwise.**REMARKS:** If these proposed changes are approved, our unit will issue these in a new standard special provision, and a new project special provision worksheet.Both the proposed new standard special and the proposed new worksheet are attached for your review. |
|  | **Spec Committee Members:** |  **✓** |
|  | Co-Chairman: Lacey |  |
|  | Region 1: Quirk |  |
|  | Region 1: Lucerna |  |
|  | Region 2: Phillips |  |
|  | Region 3: Jean |  |
|  | Region 4: Boespflug |  |
|  | Region 5: Valentinelli |  |
|  | Project Development: Vacant |  |
|  | Specifications: Brinck |  |
|  | Bridge: Vacant |  |
|  | Contracts & Market Analysis: Eddy |  |
|  | Materials: Schiebel |  |
|  | Traffic Engineering: Matthews |  | REVIEWER COMMENTS:( ) Approved ( ) Disapproved ( ) ModifiedIf disapproved or modified, give reason why and show any modifications on the attached draft copy: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ Name/Signature Date |
|  | Maintenance: Weldon |  |
|  | FHWA: Larson |  |
|  | Attorney General: Milan |  |
|  |  |  |
|  | **Others:** |  |
|  | Colorado Contractors Assoc.: Moody |  |
|  |  |  |
|  | **Technical Committees:** |  |
|  | PDAC |  |
|  | Drainage Advisory Committee (DAC) |  |
|  | Water Quality Advisory Committee (WQAC) |  |

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| COLORADO DEPARTMENT OF TRANSPORTATIONSUBMITTAL OF NEW SPECIFICATION CHANGE | Log No.(Assigned by Standards and SpecificationsUnit) |
| TO: Standards and Specification Unit, Project Development, Suite 290 | FROM: Mike Banovich, Landscape Architecture Section Manager(Region, Branch or Technical Committee) |
| SPECIFICATION SECTION NO.214 Planting  | ITEM | PriorityRoutine Fast |
| Reason for this new or changed specification:1. Updated specification to conform to the 2014 American Standard for Nursery Stock (ANSI Z60.1-2014).
2. Incorporated nursery container sizes being commercially grown by native plant nursery in the region.
3. Developed a work sheet for the One-Year Extended Landscape Maintenance Pay Item so designers could be prescriptive in what must to be included in the cost of work for the item. Clarified that the Landscape Maintenance Pay Item applies to the 12 month after approval of the Notice of Substantial Landscape Completion.
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| New or Revised Specification:Summary of proposed revisions to the Standard Specification includes the following:1. Changed the title from Plantings to Nursery Stock Containers and Unrooted Cuttings.
2. Added the reference to the latest American Standard for Nursery Stock (ANSI Z60.1-2014).
3. Added a requirement that the contractor provide written statements from suppliers that specified material is not available before plant substitutions will be considered.
4. Added deep rooted containers along with minimum height and volume requirements for native plant material commercial grown in these sizes.
5. Updated the standard nursery container sizes and minimum volume ranges based on ANSI Z60.1-2014.
6. Replaced brush layer cuttings with unrooted cutting stakes.
7. Added construction requirements for brush mattress and fascines.
8. Added construction requirements for flex pipe back protector and wildlife protection fencing.
9. Clarified that landscape maintenance is independent of landscape establishment. Landscape Establishment will be included in the work; Landscape Maintenance will be paid for as a lump sum.
10. Updated Landscape Establishment such that it only applies to Nursery stock larger than DRC #10.
11. Added the following pay items; Unrooted Cutting Stakes, Fascine and Brush Mattress.
12. Clarified maintenance requirements for all project until the Notice of Substantial Landscape Completion is issued for the project.
13. Added the reference to Section 209 to clarify how water required in a non-irrigated area until the Notice of Substantial Landscape Completion will be paid for.
14. Developed a work sheet for the One-Year Extended Landscape Maintenance Pay Item.
15. Added vegetation monitoring requirement for the Landscape Maintenance Pay Item.
16. Developed the following two performance measures for Landscape Maintenance; Nursery stock that dies must be replaced throughout the landscape maintenance period.  Limitations on the plant density of weeds for seeded areas.
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CDOT Form 1215 10/01

REVISION OF SECTION 214
NURSERY STOCK CONTAINERS AND UNROOTED CUTTINGS

**NOTICE**

This is a standard special provision that revises or modifies CDOT’s *Standard Specifications for Road and Bridge Construction.* It has gone through a formal review and approval process and has been issued by CDOT’s Project Development Branch with formal instructions for its use on CDOT construction projects. It is to be used as written without change. Do not use modified versions of this special provision on CDOT construction projects, and do not use this special provision on CDOT projects in a manner other than that specified in the instructions unless such use is first approved by CDOT’s Standards and Specifications Unit. The instructions for use on CDOT construction projects appear below.

Other agencies which use the *Standard Specifications for Road and Bridge Construction* to administer construction projects may use this special provision as appropriate and at their own risk.

**Instructions for use on CDOT construction projects:**

Use on all projects with nursery stock, unrooted cuttings.

REVISION OF SECTION 214
NURSERY STOCK CONTAINERS AND UNROOTED CUTTINGS

Section 214 of the Standard Special Provisions is hereby deleted for this project and replace with the following:

**DESCRIPTION**

**214.01** This work consists of furnishing and installing herbaceous and woody plant material, hereinafter referred to as “nursery stock”. The work may also consist of obtaining “unrooted cuttings” from approved donor plants and installing them on the site as shown on the plans.

All approvals and direction required from the Engineer in this specification will involve the Engineer working directly with Region or Headquarters Environmental Staff, as identified in the Contract.

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**MATERIALS**

**214.02** Nursery Stock and unrooted cuttings shall be of the minimum sizes and species as designated on the plans, in healthy condition with normal well developed branch and root systems, and shall conform to the requirements of the *American Standard for Nursery Stock* (ANSI Z60.1-2014). For specified deep rooted container stock the container class volume ranges shall be substituted with the requirements of this specification. The Contractor shall obtain certificates of inspection of plant materials that are required by Federal, State, or local laws, and submit the certificates to the Engineer. Upon completion of work, the Contractor shall remove plant containers, bags and other debris and leave area in clean, acceptable condition.

All nursery stock and unrooted cuttings shall be free from plant diseases and insect pests. All shipments of plants shall comply with all nursery inspection and plant quarantine regulations of the State of origin and destination, and the Federal regulations governing Interstate movement of nursery stock.

The minimum acceptable sizes of all nursery stock, with branches in normal position, shall conform to the measurements specified in the Contract.

 Nursery Stock hardy in hardiness zones 2, 3, 4, and 5 only will be accepted. Hardiness zones are defined in U.S. Department of Agriculture 2012 Plant Hardiness Zone Map publications.

All nursery stock shall be those plants that have been growing in a nursery for at least one growing season, or plants that have established themselves in accordance with definitions set forth in the Colorado Nursery Act, Title 35, Article 26, CRS.

Trees and shrubs shall have been root-pruned during their growing period in the nursery in accordance with standard nursery practice.

If nursery stock of acceptable quality and specified variety or size are not available locally, the Contractor may:

1. Substitute acceptable nursery stock that are larger than specified at no change in Contract price. For deep rooted nursery stock the minimum depth requirement of the container shall be maintained as stated in this specification.
2. Substitute plants of different genus, species or variety shall submitted at the Site Pre-Vegetation Conference, as described in Section 207, along with the adjusted price in the written request.

Before any substitution of specified nursery species and sizes in the plant schedule will be considered, the Contractor shall furnish to the Engineer written statements from three regional nurseries specializing in native plant material verifying that the nursery stock is not available.

At the Site Pre-Vegetation Conference, the Contractor shall name the nursery stock supplier for all items. Nursery stock will be rejected for not meeting the Contract at any of the four following times and locations:

1. At the named supplier’s location. The Engineer will notify the Contractor when nursery stock will be inspected at the supplier’s location.
2. On the project site at the time of delivery, prior to planting.
3. At the time of installation.
4. At the partial or final acceptance walkthroughs on the project site.

All plant materials shall be supplied by the Contractor at the nursery or growing site and tagged for review by the Region or Headquarters Environmental Staff. Inspection at nursery or growing site does not preclude right of rejection at construction site. Container grown, or balled and burlapped, nursery stock shall have a well-established root system reaching the sides and bottom of the container to provide a firm mass of growing medium. Bare root material will not be accepted as a substitution for container or balled and burlapped specified nursery stock. Each species shall be identified by means of grower’s label affixed to the plant. The grower’s label shall include the data necessary to indicate conformance to specifications. For minimum plant requirements of height, width, minimum multi stems and root ball diameter as appropriate for the specified species type see the Plant Schedule on the Plans.

1. *Nursery stock.* Unless otherwise authorized, the Contractor shall notify the Engineer at least two working days in advance of the anticipated delivery date of any plant material. Invoices shall be submitted for each shipment of nursery stock showing the quantities, kinds, and sizes of materials along with the certificate of inspection. Contractor shall file copies of certificates after acceptance of material. Evidence of inadequate protection following digging, carelessness while in transit, or improper handling or storage, will be cause for rejection. Upon arrival at the temporary storage location or the site of the work, nursery stock will be inspected for proper shipping procedures. If the roots are dried out, large branches are broken, balls of earth are broken or loosened, or areas of bark are torn, the Engineer will reject the injured plant. When a plant has been rejected, the Contractor shall remove it from the area of the work and replace it with one of the required size and quality conforming to one of the following:
2. Deep Rooted Containers (DRC) shall be containers for growing native plants that are narrower in diameter and longer than standard nursery pots of equal volume. Containers must have physical “anti-spiraling” features such as vertical ribs on the inside walls or side slits in the side walls that will air prune roots. Containers that have been treated with compounds such a copper to chemically prune the roots will not be accepted. Deep rooted container classifications shall have the following properties:

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| **Deep Rooted Container Class Specification** | **Minimum Height (Inches)** | **Minimum Volume (CU. IN.)** |
| DRC #10 | 8” | 10 |
| DRC #40 | 9” | 40 |
| DRC #60 | 13” | 60 |
| DRC #180 | 14” | 180 |
| DRC #300 | 29” | 300 |

1. Standard Nursery Practice Containers (SNC) shall conform to the recommended specification in the *American Standard for Nursery* Stock (ANSI Z60.1-2014). For minimum plant requirements of height or width as appropriate for the specified species type see the Plant List on the drawings. SNC classifications shall have the following properties:

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| **Standard Container Class Specification** | **Minimum Volume Range (CU. IN.)** |
| #1 | 152-251 |
| #5 | 785-1242 |
| #10 | 2080-2646 |
| #20 | 4520-5152 |

1. Balled and burlapped or large container shall conform to the recommended specifications in the *American Standard for Nursery Stock* (ANSI Z60.1-2014). Single stem deciduous tree caliper measurements shall be taken six inches above the ground for field grown stock and from soil line for container grown stock. Multi-stem deciduous tree and evergreen tree height measurement shall be from ground level for field grown and from soil line for container grown stock.
2. *Unrooted Cuttings.* Unless otherwise authorized, the Contractor shall notify the Engineer at least five working days in advance of the anticipated start of harvesting cuttings.All cuttings shall be harvested from approved parent material. Approval of parent material shall be in writing from the Engineer. This approval will include a detailed description of the approved locations. The Contractor shall select a site, and if outside of the construction boundary, provide written approval from the Owner, when applicable, for access and harvesting the required number of cuttings. The harvesting site shall be left clean and tidy, to the satisfaction of the Engineer and the Owner, when applicable. Unused material including trimmings shall be cut up to 2 feet in length and evenly distributed around the wetland mitigation site.

Unrooted cuttings shall be harvested and planted in early spring (March 1st to April 15th) while the plants are still dormant. However, the Engineer may authorize an alternative harvesting and planting timeframe based on project timing. Immediately after cutting, all cuttings shall be place in water so that the cut ends are covered in water, and the cuttings shall be stored in a cool location. Plants shall be completely submerged in containers with water for at least 72 hours and no more than 14 days. The containers shall be continuously shaded and protected from the wind. Cuttings shall be protected from drying at all times.

During transportation, the cuttings shall be kept completely submerged in containers with water in orderly fashion to prevent damage and to facilitate handling. Cuttings should be bundled in uniform groups of 25-100 to allow for easy tracking of quantities.

1. *Unrooted Cutting Stakes*. Stakes shall be approximately 3 feet long and between ½ and ¾ inches in diameter. All side branches shall be trimmed before cutting the main stem. Cuttings shall be obtained from branches with smooth undamaged bark. Branches with thick, cracked bark shall not be used. Cuttings shall be taken approximately one foot from the ground. Cuts shall be clean, without stripping the bark or splitting the wood. The base cuts shall be at a 45 degree angle to identify the root end of the cutting. The top shall be cut off, with a square cut so that the top of the stake is easily distinguishable from the bottom. If the cuttings are to be planted between after April 15th and October 1, then the cut top end shall be dipped into latex paint to seal and reduce desiccation in hot or dry establishment conditions.
2. *Brush Mattress.* Willow unrooted cuttings shall be approximately 10-15 feet long and between ½ and 2 inches in diameter. No trimming of side branches is necessary.
3. *Fascines.* Unrooted cuttings diameter shall vary and shall be a minimum 5 feet long and between ¼ and 2 inches in diameter. Up to 30 percent of the bundle may be plant material that does not root easily or dead plant material. The remaining 70 percent of the bundle shall consist of younger wood between 1 to 4 years old (at a minimum 25 willow cuttings per fascines). Fascines bundles may be stored submersed in water for no longer than two weeks, if necessary.

**CONSTRUCTION REQUIREMENTS**

**214.03** All nursery stock shall be protected from drying out or other injury with acceptable practices within the industry. Broken and damaged roots shall be pruned before planting.

* 1. *Planting Seasons.*  Nursery stock shall be planted in accordance with the Contract.

Areas to be planted shall be brought to the lines and grades designated or approved. The location of plants shown in the Contract is approximate to the degree that unsuitable planting locations shall be avoided. Trees shall be planted outside of the clear zone, except when guardrail or vertical curb exists, this distance may be reduced to 20 feet. Locations and layouts shall be approved before preparatory work for planting is started. Shrubs shall not be planted closer than 6 feet from the edge of pavement.

All layout staking shall be submitted for approval. Planting holes shall not be constructed until written approval has been received from the Engineer.

The Contractor shall place all plant material according to the approved planting plans. If plant relocation is necessary, proposed locations shall be submitted, with a written request including marked planting plans, by the Contractor at least two weeks prior to the start of installing nursery stock.

* 1. *Excavation.* Planting pits shall be circular in outline with vertical or sloped sides. The Contractor shall roughen sides of the pit to remove any compacting or glazing.
	2. *Planting.*  Planting shall be done in accordance with good horticultural practices. Plants of upright growth shall be set plumb and plants of prostrate type shall be set normal to the ground surface. Plants with dry, broken, or crumbling roots will not be accepted for planting. When conditions detrimental to plant growth are encountered, such as over compacted topsoil, rubble fill, debris, or obstructions, notify the Engineer before planting. Use of a tree spade to dig plant pits is prohibited. Pits excavated with a backhoe shall be scarified as needed.

Planting pits shall be dug 2 to 4 inches shallower than the height of the rootball for trees, and 2 inches shallower for shrubs. In non-irrigated areas, planting pits shall be dug so that the top of the rootball is level with the final grade. The tree rootball shall be set in the center of the planting pit on undisturbed soil. Trees shall be stabilized and then the wire basket, any twine or wire, and burlap shall be removed before the pit is backfilled. Shrubs shall be planted in the center of the pit. Plastic, metal, fabric, or peat containers shall be removed. Shallow scores ¼ to ½ inch deep shall be made along the edges of the rootball.

Areas to be planted with ground cover shall be prepared by placing topsoil and a ½ inch layer of soil conditioner on the ground surface, and roto-tilling to a depth of 6 inches. Ground cover shall be planted by excavating to a depth sufficient to accommodate the root structure of plant materials without crimping or bending roots. After planting, backfill shall be placed around the ground cover and compacted firmly around the roots. The planted areas shall be brought to a smooth and uniform grade, and then top dressed with a 2 inch mulch cover of the type specified on the plans.

* 1. *Backfilling.* Backfill material consist of conditioned topsoil in accordance with the Contract requirements of Section 207 and additional compost material thoroughly mixed together and free of rocks and plant material. All other foreign material shall be removed. Subsoil removed from planting pits shall not be used as backfill. Compost shall be mixed into the backfill material at a rate of 25 percent by volume.

Unrooted cutting applications do not require additional compost in the backfill material.

Backfill shall be thoroughly worked and watered-in to eliminate air pockets. Watering shall be done immediately after the plant is placed. Backfilling of the planting pit shall be resumed after this water is absorbed. Roots and crown shall be covered with soil at this time. After the soil has settled, nursery stock must be in the proper position and at the proper depth. Saucers shall be prepared around each plant to the dimensions shown on the planting details. When saucers are required they shall be covered with a 4 inch thick layer of fresh moist wood chip mulch conforming to Section 213. After completion of all planting and before acceptance of the work, the Contractor shall water nursery stock installed under this Contract, as needed to maintain a moist root zone optimum for plant growth. Nursery stock damaged by the Contractor's operations shall be replaced at the Contractor's expense.

Surplus soil remaining after backfilling is completed shall be used for constructing water retention berms, or, if not needed for berms, shall be thinly distributed (wasted) in the vicinity, subject to approval of the Engineer.

* 1. *Wood Mulch*. Mulch shall consist of fresh, moist wood shavings having approximate dimensions of: Width: ¼ to ½ inch, Length 3 to 4 inches.

The Contractor shall submit a sample to the Engineer for approval at least 30 days prior to start of planting nursery stock.

* 1. *Flex Pipe Bark Protector.* Bark Protector shall be made of flexible UV stabilized plastic which shall be able to push off and separate with tree growth.
	2. *Wildlife Protection Fencing.* Fencing shall be made of 20-gage steel with black-vinyl coating, with a maximum opening of 1 inch.
	3. *Pruning.* All deciduous trees and shrubs shall be pruned in accordance with standard horticultural practice, preserving the natural character of the plant. Guidelines for pruning are indicated in the planting details. Pruning cuts shall be made with sharp clean tools.

 All clippings shall become the property of the Contractor and be removed from the site.

* 1. *Staking.*  All deciduous trees 2 inch caliper and greater shall be staked as designated on the plans.

Coniferous trees 4 feet or taller shall be staked as designated on the plans.

* 1. *Wrapping Materials.* Wrapping material shall be horticulturally standard waterproof tree wrap. Wrapping shall be applied from the base of the tree upward to the second scaffold branch and secured with arbor tape. Populus species shall be exempt from tree wrap. The Contractor shall submit the manufacturer's certification for the wrapping material requirements. Wrapping shall be done in the fall months prior to freeze, and removed in the spring. Wrapping shall not remain on any trees throughout the summer months. Wrapping shall be removed by the Contractor.

All plant tags shall be removed from plants and all packing or other material used by the Contractor shall be removed from the site.

1. *Unrooted Cuttings.* Upon arrival at the construction site, cuttings shall be inspected for acceptability. Only healthy, undamaged material will be accepted. During installation activities, the cuttings shall be kept wet and out of the direct sun light. No cuttings shall be out of water for more than 10 minutes before planting. Water shall be applied to areas around the cuttings until the soil mass is saturated. Cuttings shall be watered thoroughly every day for a period of one month, unless natural soil saturation occurs within 12 inches of soil surface, as verified by the Engineer. Unrooted cuttings shall be used in the following:
2. *Unrooted Cutting Stakes*. Live unrooted cutting stakes shall use either willow or cottonwood as shown on the plans. Using a rock bar at least 20 inches deep or other mechanical method such as a stinger backhoe attachment or trenching equipment, the Contractor shall create a vertical hole or trench deep enough to reach the water table throughout the growing season. Cut ends shall be about 2/3 of the 45 degree cut end into the hole so that the end of the cutting maintains contact with the natural water table throughout the entire growing season; planting depth shall consider the natural fall of the water table that typically occurs in late summer. The placement of these cuttings shall be in areas shown on the plans and at the spacing specified.

The root end of cuttings shall be tamped into the pilot hole or placed in a trench to a minimum depth of 2 feet, or until the root-end of the cutting meets elevation at which groundwater will be present at the driest point of the growing season. Note that some water tables will vary greatly from April to October; the Contractor shall consult with the Engineer and Region environmental staff for proper depth.

The top of the cutting shall protrude a minimum of 6 inches, but no more than 1/3 of its length with at least two live buds showing above ground. Dead blow hammers or rubber mallets shall be used to tamp in the cuttings into holes, in such manner as to not cause the wood to split. Trench planting should not require any tamping.

Soil shall be placed in any spaces around the cuttings and tamped into place to remove any air pockets.

Water shall be applied to the planted cutting stakes areas until the soil mass is saturated. Cuttings shall be watered thoroughly every day for a period of one month, unless natural soil saturation occurs within 12 inches of soil surface, as determined by the Engineer, in consultation with the Region environmental representative.

1. *Brush Mattress.* Live unrooted cuttings shall be evenly distributed in the dimensions shown on the plans and laid flat against sloped stream bank to create a continuous mat of brush. The cut-end of the *branches* shall be buried in the toe of the slope. At a minimum, the ends shall be buried 6 inches at the toe of slope or otherwise secured with willow fascines, log and/or rock as specified in plans. The Contractor shall ensure that the lower willow tips are in contact with soil that is saturated during normal low flow stream conditions. The mattress will be secured to the stream embankment with a network of wood stakes and twine. Utilize minimum length 24 inch long wood stakes and 0.25 inch diameter machine spun bristle coil twine (tensile strength: 140 pounds).

The Contractor shall cover the mattress with a thin layer of clean topsoil and seed with wetland seed mix. Soil covering should cover 90 percent of the unrooted cuttings. Approximately 10 percent but no more than 20 percent of the cuttings should daylight above the soil covering once soil has settled into the voids of the mattress.

1. *Fascines.* A fascine is a bundle of unrooted cuttings, fastened together with 0.25 inch diameter machine spun bristle coil twine (tensile strength: 140 lbs.) to keep the bundles tightly tied until placed in the ground and buried. Clean topsoil shall be worked over and around the bundles, no compaction is required. The length of the wattle bundle shall be placed parallel with the contour of the ground. Wood stakes shall be placed as shown on the plans centered along bundle. Utilize minimum length 24 inch wood stakes and 0.25 inch diameter machine spun bristle coil twine (tensile strength: 140 pounds). The Contractor shall puddle with water and allow soil to settle, then repeat backfill procedure until wattle bundle is covered to three-quarters of bundle height. Unrooted cuttings installed above reliable ground water supply shall be watered thoroughly every day for a period of one month. Watering shall be continued after the first month at a minimum of once a week until the completion of the project.
2. *Watering*.
3. Watering for nursery stock in irrigated areas (projects with 623 pay items). Irrigation system shall be operating and supplying the correct amount of water to the immediate area prior to any nursery stock being planted. Plants shall be thoroughly watered within 15 minutes of planting.
4. Watering in newly planted nursery stock in non-irrigated areas. The Contractor shall furnish and supply the correct amount of water to the area receiving nursery stock to keep the plants in a healthy and vigorous condition. All plantings shall be watered within four hours of placement. All plant material shown on the plans (excluding seeded areas) shall be watered to ensure successful establishment of the plant. Rate of flow shall allow the water to soak into the soil adjacent to the planting. At no time shall watering operations be applied at a rate or intensity that causes surface run off.
5. *Maintenance of landscape during construction*. Maintenance of landscaping shall start immediately upon placement of first permanent landscaping and continue until the Notice of Substantial Landscape Completion has been received. The Contractor shall maintain the seeded areas nursery stock and unrooted cuttings in a healthy and vigorous growing condition to ensure successful establishment. Maintenance shall consist of the following:

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| **Work Item** | **Function** | **Notes** |
| Weed control of areas having native seed | Areas shall be kept free of harmful insects, disease and State noxious weeds from List A and B.  | Weed management strategies shall be discussed during the Site Pre-Vegetation Conference. |
| Hand watering trees | All plant material shown on the plans (excluding seeded areas) shall be watered to ensure successful establishment of the tree. Rate of flow must allow the water to soak into the soil adjacent to the planting. At no time shall watering operations be applied at a rate or intensity that causes surface run off. | Trees shall be watered two times a month at a rate of 10 gallons for each diameter inch of the tree for the months of May through October; One time per month for the months of November through April. |
| Hand watering trees, shrubs, herbaceous plants and unrooted cuttings | All plant material shown on the plans (excluding seeded areas) shall be watered to ensure successful establishment of the plant. Rate of flow must allow the water to soak into the soil adjacent to the planting. At no time shall watering operations be applied at a rate or intensity that causes surface run off. | All plant material shown on the plans (excluding seeded areas) shall be watered to ensure successful establishment of the plant. Rate of flow must allow the water to soak into the soil adjacent to the planting. At no time shall watering operations be applied at a rate or intensity that causes surface run off. |

**214.04 Landscape Establishment.** After all landscaping work in the Contract has been installed and completed, a Substantial Landscape Completion Inspection shall be held including the Contractor, Engineer and the Region Environmental Staff to determine acceptability of the landscaping work. During the inspection, an inventory of rejected material will be made, and corrective and necessary cleanup measures will be determined. The approval of the Notice of Substantial Landscape Completion will take place upon successful removal of rejected material and required cleanup measures.

The beginning of the Landscape Establishment period depends upon the time the receipt from the Engineer of a written Notice of Substantial Landscape Completion is issued. If the Notice of Substantial Landscape Completion is issued between March 20 and June 21, the Landscape Establishment period begins immediately and lasts for a period of 12 months. If the Notice of Substantial Landscape Completion is issued prior to this time (January 1 through March 19), Landscape Establishment begins on March 20 of that year and lasts for the remaining months until March 20 of the following year. If the Notice of Substantial Landscape Completion is issued after this time (June 22 through December 31), the Landscape Establishment period begins on March 20 of the following year and lasts for a period of 12 months. Variations to these dates are permitted, and shall be as directed.

Dead, dying, or rejected material shall be removed each month during the Landscape Establishment period as directed. Nursery stock larger than DRC #10 shall be replaced only one time during the spring calendar dates as shown above. DRCs smaller than DRC #10 will not be included in Landscape Establishment. Nursery Stock replacements shall be planted in accordance with the Contract and shall be subject to all requirements specified for the original material.

The contract performance bond, as required in subsection 103.03, shall include all required work involved during the Landscape Establishment period.

**METHOD OF MEASUREMENT**

**214.05** The quantity of nursery stock to be measured will be the number of plants, of the types and sizes designated in the Contract that are actually planted and accepted.

Unrooted cutting stakes will be measured by the number actually installed and accepted.

Brush Mattress Cuttings will be measured by the actual number of linear feet installed and accepted.

Fascines will be measured by each 5 foot long section of fascine completed per the detail on the plans and accepted.

**BASIS OF PAYMENT**

**214.06** The accepted quantities of nursery stock and unrooted cuttings will be paid for at the contract unit price for each of the various items listed below:

Payment for the total cost of the item will be made at the completion of the installation of each item.

Cost of the performance bond shall be included in the cost of the plant items.

Payment will be made under:

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| --- | --- |
| **Pay Item** | **Pay Unit** |
| \_\_\_\_\_ Tree \_\_\_\_Inch Caliper | Each |
| \_\_\_\_\_ Tree \_\_\_\_Foot  | Each |
| Nursery Stock Container (DRC #\_\_\_) | Each |
| Nursery Stock Container (SNC#\_\_\_\_\_) | Each |
| Unrooted Cutting Stakes | Each |
| Fascine | Each |
| Brush Mattress | Linear Feet |

Landscape Establishment will not be measured and paid for separately, but shall be included in the work. All costs associated with replacing nursery stock larger than DRC#10 shall be at the Contractor’s expense.

Additional slow-release organic fertilizer for nursery stock shall be used as specified in the plans will not be measured and paid for separately, but shall be included in the work.

Compost required for backfill of nursery stock will not be paid for separately, but shall be included in the work.

All water required for nursery stock and unrooted cuttings in projects without 623 pay items will be measured and paid for in accordance with Section 209 under Pay Item Water (Landscaping), up to the Notice of Substantial Completion.

Water required after the acceptance of the Notice of Substantial Completion will not be measured and paid for separately but shall be included in the work.

Standard waterproof tree wrap and flex pipe bark protector for nursery stock will not be measured and paid for separately, but shall be included in the work.

Cleaning or repair of site conditions effected by equipment used by the Contractor for planting operations will not be measured and paid for separately by shall be included in the work.

Wood mulch, stakes, guy wire, PVC protector, safety caps, wrapping, and all other materials required to install a tree will not be measured and paid for separately but shall be included in the work.

Wood stakes and other materials required to secure brush mattresses and fascines will not be measured and paid for separately but shall be included in the work.

Seeding will be measured and paid for in accordance with Section 212 and Topsoil will be measured and paid for in accordance with Section 207.

Maintenance of Landscaping during construction will not be measured and paid for separately but shall be included in the work.

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REVISION OF SECTION 214

ONE-YEAR LANDSCAPE PRESERVATION

Section 214 of the Standard Special Provision, Revision of Section 214, Nursery Stock Container and Unrooted Cuttings, is hereby revised for this project as follows:

Subsection 214.01 shall include the following:

This work consists of maintaining all plant material and seeded areas in a healthy and vigorous growing condition, and ensuring vigorous vegetation. This includes performing nursery stock replacement work and landscape preservation work.

Subsection 214.03 shall include the following:

1. *Record Keeping*. The contractor shall keep a preservation binder containing the following information. The binder shall be brought to each of the inspections and copies of the information shall be provided to the Engineer upon request.
2. Approved preservation plan prepared by the contractor.
3. Product information and Safety Data Sheets (SDS) for all fertilizers, herbicides and pesticides.
4. A diary documenting all landscape preservation activities including work locations and time spent.
5. Licensing documentation from the Colorado Department of Agriculture for all commercial pesticide applicators working on the project.

Delete subsection 214.04 and replace with the following:

**214.04 One-Year Landscape Preservation.** After all nursery stock and unrooted cuttings on the project are installed, a plant inspection shall be held including the Contractor, Engineer and the Region Environmental Staff to determine acceptability of nursery stock. During the inspection, an inventory of rejected material will be made, and corrective and necessary cleanup measures will be determined. A Notice of Substantial Landscape Completion will be issued by the Engineer when all nursery stock in the Contract have been planted and all work under Sections 212, 213, 214 and 623, except One-Year Landscape Preservation, has been performed and accepted.

The Contractor shall perform landscape preservation work in accordance with Table 214-1 for a period of 12 months starting immediately after receiving acceptance of the Notice of Substantial Landscape Completion. . The site shall be maintained in a similar condition to what the landscape improvements were in when the project received the acceptance of the Notice of Substantial Landscape Completion from the Engineer.

1. *Submittals.* Within the first two weeks of the One-Year Landscape Preservation period the Contractor shall provide the following to the Engineer until written acceptance is provided:
2. A Landscape Preservation plan, which includes details and suggested changes to the requirements of Table 214-1 to the Engineer for approval. At a minimum the plan shall provide a schedule showing the number of hours or days personnel will be present, the type of work to be performed, supervision, and equipment to be used. The plan shall provide the person to contact for emergency work and the inspection schedule.
3. Product submittals and Safety Data Sheets (SDS) for all fertilizers, herbicides and pesticides.
4. A plan for safe access into and route though the site during the preservation period to the Engineer for approval. The plan shall include permits or permissions for access to and from public roads or adjacent properties. Access and route shall avoid areas protected during construction (i.e., Wetlands, riparian zones, threatened and endangered species, etc.).
5. *Contractor Qualifications.* The work shall be performed by a landscaping subcontractor having at least 5-years of experience with maintaining a project of similar size and scope.

**TABLE 214-1
WORK TO BE PERFORMED DURING ONE-YEAR LANDSCAPE PRESERVATION♦**

| Work Item | FUNCTION | FUNCTION BY MONTH | NOTES |
| --- | --- | --- | --- |
|  |  |  JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |  |
| Inspections | Inspections: The Engineer or a designated representative, and a representative from the contractor will be required to attend each inspection.  | X | X | X | XX | XX | X X | X X | X X | X X | X X | X | X | Inspections shall be twice monthly, April through October, and once monthly, November through March. ■Before each inspection is to occur, the Contractor shall notify the Engineer at least 72 hours in advance. |
| Mowing, weeding, and trimming of seeded lawn or sodded lawn areas | Area shall be kept free of harmful insects, disease and noxious weeds. Chemical applications may be required.Areas shall be mowed when the grasses reach a height of 10" and mowed no shorter than 4”.  |  |  | XX | XXXX | XXXX | XXXX | XXXX | XXX | XX | X |  |  | Areas shall be mowed when grasses have reached a height of 6" or as directed by the Engineer. Grasses shall be maintained at a height of 3" to 4". |
| Fertilizing seeded lawn or sodded lawn areas |  In spring and summer application, slow release turf fertilizer with a nutrient analysis not exceeding 8-8-8- (organic fertilizer) shall be applied at an application rate of 1lb/1,000 sq. ft. |  |  |  | X |  | X |  |  | X |  |  |  |  |
| Weed control in seeded lawn or sodded lawn areas.● | Areas shall be kept free of harmful insects, disease and all weed species (species not included in the original seed mix). Chemical applications are anticipated in the following months. |  |  |  |  |  |  |  |  |  |  |  |  | Weed management strategies shall be discussed during inspections All chemical applications must be approved by the Engineer. |
| Mowing of areas having native seed | Can be mowed as a weed management plan to control re-seeding of noxious weeds. Mowing shall only be recommended when the grasses reach a height of 18" and mowed no shorter than 6”.  |  |  |  |  |  |  |  |  |  |  |  |  | All mowing must be approved by the Engineer. |
| Weed control of areas having native seed● | Areas shall be kept free of harmful insects, disease and State noxious weeds from List A and B. Chemical applications are anticipated in the following months. |  |  | X | X | X |  |  |  | X | X |  |  | Weed management strategies shall be discussed during inspections All chemical applications will require approval by the Engineer. |
| Hand watering of areas having native seed | All areas that received native seeding shall be watered to insure the successful germination and maintain the grasses in a healthy vigorous growing condition. Watering shall be adjusted based on weather and infiltration rates of the soil. At no time shall watering operations be applied at a rate or intensity that causes surface run off. |  |  |  | XXXX | XXXX | XXXX | XX | XX | XX | XX |  |  | Areas shall be watered one time per week during the first three months and one time every other week after the first three months. If temperatures exceed 80 degrees the frequency for the first three months should be increased to two times per week. During each watering apply at least a ¼ inch of water over the entire area (converts to 6,789 gallons/acre). To get moisture into the soil repeated passes will probably be required. |
| Reseeding of areas having native seed♠ | All areas that have been eroded or damaged based on conditions outside of the control of the Contractor shall be assessed during the monthly inspection for soil conditioning, seeding and mulching applications. | X | X | X | X | X | X |  |  |  | X | X | X | Areas should be evaluated during each of the inspections and if reseeding is determined necessary the Contractor shall provide an estimate to the Engineer. No repair work shall take place until written approval is provided. |
| Weeding and mulching of perennial planting beds● |  Area shall be kept free of harmful insects, disease and noxious weeds. Weed removal by hand or by “touch, wand or sponge” method of chemical application. |  |  |  | X | X | X | X | X | X | X |  |  | Perennial beds shall be kept completely free of weeds and grasses at all times.  |
| Removal of dead perennials | Hand removal of dead perennials, top foliage and pruning of dead branches, etc. Removal of any other debris present. |  |  | X |  |  |  |  |  |  |  | X |  | Perennial beds shall be kept completely clean and clear of debris at all times during the winter season. |
| Cultivating, Weeding and Mulching●♠ | Guying material shall be repaired or replaced. Mulched beds shall be kept at a depth as stated originally in the plans. Area shall be kept free of harmful insects, disease and noxious weeds. Chemical applications may be required. |  |  |  | X | X | X | X | X | X | X | X | X | Tree and shrub areas shall be kept completely free of weeds, noxious weeds and grasses at all times. The contractor shall repair guying, reshape plant saucers and and replace wood mulch material as needed or as directed by the Engineer.  |
| Fertilization of trees and shrubs | Root inject slow release fertilizer with a nutrient analysis of 10-10-10. |  |  |  | X |  |  |  |  | X |  |  |  | Root feeding of trees and shrubs shall be done in spring and fall or as directed by the Engineer. |
| Pruning of trees and shrubs | Prune any diseased, dead or broken limbs or branches as soon as identified, following accepted and approved methods. Any equipment or hand tools used on trees and shrubs shall be cleaned by a sterilizing solution after use on each tree or shrub. No pruning of trees and shrubs shall be done to change the natural appearance or growth of the plant. |  |  |  |  | X |  |  |  | X |  |  |  | Base sucker growth is to be removed as needed or directed by the Engineer. Prune flowering trees and shrubs after flowering period. |
| Chemical application to trees and shrubs | Plants, trees and shrubs shall be kept free of harmful insects and disease. |  |  |  | X |  |  |  |  | X |  |  |  | Only as needed, or as directed by the Engineer. |
| Hand watering trees | All plant material shown on the plans (excluding seeded areas) shall be watered to ensure successful establishment of the tree. Rate of flow must allow the water to soak into the soil adjacent to the planting. At no time shall watering operations be applied at a rate or intensity that causes surface run off. | X | X | X | X | XX | XX | XX | XX | XX | XX | X | X | Trees shall be watered two times a month at a rate of 10 gallons for each diameter inch of the tree for the months of May through October. One time per month for the months of November through April.  |
| Hand watering trees, shrubs, herbaceous plants and unrooted cuttings | All plant material shown on the plans (excluding seeded areas) shall be watered to ensure successful establishment of the plant. Rate of flow must allow the water to soak into the soil adjacent to the planting. At no time shall watering operations be applied at a rate or intensity that causes surface run off. | X | X | X | X | XX | XX | XX | XX | XX | XX | X | X | All plant material shown on the plans (excluding seeded areas) shall be watered to ensure successful establishment of the plant. Rate of flow must allow the water to soak into the soil adjacent to the planting. At no time shall watering operations be applied at a rate or intensity that causes surface run off. Trees shall be watered two times a month at a rate of 10 gallons per planting for the months of May through October. One time per month for the months of November through April.  |
| Maintaining and repairing sprinkler system | Shall include a visual inspection of irrigated areas: sprinkler heads (head placement, direction, operation, broken or missing) irrigation line breaks or leaks, wires and power from controllers to valves, all water lines from the manifold boxes out to the fields (including the valves and lines located inside the manifold boxes), valve leaks and controller status.  |  |  | X | X | X | X | X | X | X | X |  |  | Inspections of irrigation system shall be done on a weekly basis and after each mowing. Repair of system shall begin upon discovery. |
| Spring startup and winterization of sprinkler system | The Contractor shall be responsible for Spring start up (pressurization) and Fall winterization. Winterization. Work shall include, as a minimum, draining all of the equipment and pipe networks, purging water from the system with compressed air, opening manual drain valves. Power shall remain on to clocks during the winter. |  |  |  | X |  |  |  |  |  | X |  |  | Spring start-up shall be April 1 or the first working day after (or as directed by the Engineer). Fall start-up shall be October 15 or the first working day after or as directed by the Engineer. |
| Litter Control | Weekly trash pickup | X | X | X | X | X | X | X | X | X | X | X | X | Litter removal a minimum of 1 hour per acre, per month. |
| Removal of tree staking material | The Engineer or a designated representative at the end of the preservation period will determine which staking material should be removed |  |  |  |  |  |  |  |  |  |  |  |  | Contractor shall coordinate at the end of the establishment period. |
| Removal of temporary sediment and erosion BMPs | The Engineer or a designated representative at the end of the preservation period will determine which BMPs should be removed |  |  |  |  |  |  |  |  |  |  |  |  | Contractor shall coordinate at the end of the establishment period. |

Variations to Table 214-1 shall be included in the Landscape Preservation Plan for approval.

1. *Final acceptance.* Upon completion of 12 months of Landscape Preservation, the Contractor shall request a walkthrough of the project site. The walkthrough shall include the Engineer, the designated representative of the Contractor, and Region Environmental staff. During the inspection any repairs or replacements found to be necessary will be identified on a punch list. Repairs or replacements shall be made at the Contractor’s expense.

All plants shall be healthy and in flourishing condition, free of dying branches and branch tips. During the growing season plants must bear foliage of normal density, size and color. At the end of the preservation period the seeded areas as shown in the plans shall contain no ‘A’ list noxious weeds and no more than 10% (by individual plant density) ‘B’ list noxious weeds growing on the project. All temporary access and route shall be reclaimed and seeded in accordance with applicable seeding and planting requirements. Upon completion and re-inspection of full repairs or replacements necessary the Engineer will issue a notice of final acceptance of the landscape preservation period. The contract performance bond, as required in subsection 103.03, shall include all required work involved during the Landscape Establishment period.

Subsection 214.05 shall include the following:

The following items will not be included in Extended Landscape Preservation:

1. Herbicide
2. Seeding
3. Mulching

One-Year Extended Landscape Preservation will not be measured but will be paid as a lump sum in installments as follows:

1. 10 percent of the lump sum amount will be paid for each of the eight growing season months, from March through October.
2. Two and a half percent of the lump sum amount will be paid for each of the winter months, November through February.
3. The remaining 10 percent will be paid upon completion of the work.

In subsection 214.06, delete the fifth paragraph and replace with the following:

All costs associated with replacing nursery stock and unrooted cuttings, shall be at the Contractor’s expense.

Replacement of nursery stock and unrooted cuttings may occur more than once during the One-Year Landscape Preservation period, as directed.

Subsection 214.06 shall include the following:

**Pay Item Pay Unit**

One-Year Landscape Preservation Lump Sum

Water used for One-Year Landscape Preservation will not be measured and paid for separately, but shall be included in the work.

Additional slow-release organic fertilizer for One-Year Landscape Preservation will not be measured and paid for separately, but shall be included in the work.

Herbicide will be measured and paid for in accordance with Section 217.

Seeding will be measured and paid for in accordance with Section 212.

Mulching will be measured and paid for in accordance with Section 213.

Required replacement BMPs along with maintenance of BMPS (sediment removal and disposal) shall be measured and paid for in accordance with Section 208.

Mobilization required for One-Year Landscape Preservation will not be measured and paid for separately, but shall be included in the work.

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**INSTRUCTIONS TO DESIGNERS:** (Please delete these instructions and associated symbols before including in the project.

♦ Include only items from this list deemed appropriate by the Regional Environmental Staff. Consider work from this list that that should be included for the contractor based on the site improvements included in the project.

■ Applies only to projects with irrigated treatments in urban areas.

● Herbicide will be measured and paid for in accordance with Section 217. Make sure to include a pay item for this.

♠ Seeding, mulching and 216 pay items, when required, should be checked for pay items under these Sections for additional quantities to cover the work in the One-Year Landscape Preservation.