

APPENDIX D

EXAMPLE CONTRACT SPECIFICATIONS

The following information is an example of the written specifications that should be included with construction drawings provided to a project contractor. These specifications will vary with contracts, projects, time of year, and site conditions.

PART 1: GENERAL

1.01 SCOPE OF WORK

Provide all materials and perform all work necessary and required to furnish and install all plantings as indicated on the Drawings and specified herein, including initial maintenance of the same. The work shall include, but not necessarily be limited to, the following:

- A. Protection and maintenance of existing vegetation.
- B. Amendment, fertilizers, and soil preparation.
- C. Tree stakes and braces.
- D. Planting of trees and shrubs, 1 gallon can size and larger.
- E. Planting of rooted stock; liners.
- F. Planting of live stakes.
- G. Installation of fascines.
- H. Hydroseeding.
- J. Runoff diversion berms.
- K. Erosion control matting.
- L. Initial maintenance and watering of all plantings.

1.02 INSPECTIONS AND MAINTENANCE

A. Final inspection:

Prior to the final inspection by Owner, the Contractor shall thoroughly clean all planting areas of excess soil, rubbish and debris, and clean paved and riprap areas.

The final inspection will be made upon request with five working days advance notice.

B. Replanting and repairs:

The Contractor shall monitor the site weekly for the first month after installation and within 48 hours after major storms that have ____-inch precipitation within any 24-hour period, and report to the Owner any rilling, gullyng, soil movement, failures, or plant dieback so that prompt repair action can be taken.

C. Watering:

Water will be supplied on site by the _____. It is the Contractor's responsibility to provide a pump truck, hoses or other equipment necessary for manual watering until the irrigation system is in service. Use only clean, fresh water.

All installed plants including live stakes, fascines and rooted stock shall be thoroughly watered within four hours of planting.

Initial watering shall gently and thoroughly soak the new planting and flood the root zones without washing soil particles down the slope.

Subsequent manual waterings shall be: 24 hours after planting of each plant, then every third day. Quantity to be ____-inches of water over the site per watering. Duration: Watering to continue until *[Enter date]*. *[NOTE: this will vary to reflect site conditions and season.]*

Water shall be applied slowly enough to avoid runoff or soil movement.

1.03 GENERAL

A. It is the intent of the design that no soil be imported or exported from the site.

B. Drawings show the extent of the work and the locations of erosion control work by designated areas:

Area A: Fascines, rooted stock, hydroseed.

Area B: Fascines, rooted stock, hydroseed.

Area C: Fascines, live stakes, rooted stock, hydroseed.

Area D: Runoff diversion berms, erosion control matting, live stakes, rooted stock, hydroseed.

Area E: Hydroseed.

Area F: Container planting, ground cover from flats, amendments, mulch.

PART 2: PRODUCTS

2.01 PLANT MATERIALS

A. Live Non-rooted Cuttings for Fascines and Live stakes:

Live cuttings shall be shoots from Salix (willow) species shrubs from the within a ____-mile radius, and shall be free of disease. Use a minimum of two species grown in site conditions similar to the project site. Shoots shall be cut cleanly as by shears or saw, not as by hatchet. Cuttings shall be brought to the site bundled and tagged with the day of harvest. The diameter shall be as specified under “Live stakes” or “Fascines”.

1. Live stakes:

Shoots cut from live Salix species shrubs, cut from healthy wood. The shoots are to be straight, ____-inch minimum length, ____-inch minimum diameter, ____-inch maximum diameter, cut from the lower 2/3 of the branch, not the tip.

Cuttings shall be cut cleanly on a diagonal with a saw or pruning shears, not a hatchet. The top of each cutting shall be 1 inch above a leaf bud, the bottom cut 1 inch below a leaf bud. Strip off all leaves and twigs.

2. Fascines:

Fascines bundles shall be prepared from live, shrubby material; Salix species. Up to 30 percent of the bundle may be non-rooting wood shrub material with prior approval of the County. Diameter shall be ____-inch to ____-inch maximum. Twigs and leaves are to remain on the shoots. Cutting length shall be six to 10 feet.

B. Rooted Stock, Liners:

1. The live transplants consisting of woody shrubs and tree shall be container grown. Quality and size shall conform to the American Standard for Nursery Stock. Nursery-grown stock only shall be used except where otherwise noted. Plant labels shall identify each species and variety. Agricultural inspections of plant materials as required by City, County, or State shall be the responsibility of the Contractor. Furnish certificates of inspection on request. The Owner reserves the right to final inspection and rejection.
2. Containers shall have a minimum size of 9 cubic inches in volume and a depth of 8 inches. It is preferable that container size shall not exceed a one-quart milk carton, one-gallon can size maximum.
3. Substitutions of plant variety or size shall be allowed only with specific approval which will be given only if the specified size or variety is unavailable.
4. The growing medium shall be any medium which will produce good quality plants. The plants specified usually grow best in a well-drained, well-aerated medium.

5. Root Systems: The growing medium shall be well filled with roots so that roots and medium form a cohesive unit when removed from the container. Roots shall be in good condition and actively growing with white tips.
6. Top Growth: Top growth shall be commensurate with root growth, free from dead wood or foliar diseases, and be a minimum of 5-inches high. Shrub species shall be pruned during production if necessary to stimulate branching and avoid “legginess”, i.e. bare lower stems and inability to stand upright.

C. Hydroseed Mix:

1. Seed: The hydroseed mix is to be the “non-irrigated mix” [*List mix in terms of lbs./acre by species.*] specified below:

All seed shall be delivered to the site tagged and labeled in accordance with the State Agricultural Code. Seed shall have a minimum pure live seed (PLS) content of 80 percent (percent purity ___ percent germination) and weed seed shall not exceed 0.5 percent of pure live seed.

2. Virgin Wood Fiber: Fiber mulch shall be 2,000 lbs/acre. The fiber shall be cellulose fiber that contains no germination or growth-inhibiting factors. It shall have the property of even dispersion and suspension when agitated in water. It shall be colored with a nontoxic, water-soluble green dye to provide a means of metering for even distribution.
3. Tackifier: Tackifier shall consist of Plantago seed husks (Psyllium) such as Ecology Control, M-Binder, Sentinel, or equal. When combined with fiber and water it shall have the property of even dispersion and suspension. Tackifier rate shall be at ___ lbs/acre [*NOTE: varies according to site conditions*].
4. Fertilizer for hydroseed mix: Fertilizer to be _____.
[*Sample:*] 16-16-16 @ 250 lbs/acre.

2.02 MATERIALS

A. Erosion Control Matting:

Erosion control matting for Area D shall be _____.

B. Fertilizer:

[*Fertilizer needs will vary site by site. Requires agricultural soil analysis tests, at a minimum of two tests per acre and at changes of soil types and condition. The testing laboratory will indicate quantities of necessary nutrients for optimum growth.*]

[*A sample fertilizer specification:*]

Fertilizer for rooted stock shall be a slow release, inorganic nitrogen source such as MagAmp 7-40-7, coarse grade, or Osmocote, nine-month release, applied at the rate of 0.15 ounce of nitrogen for tublings, or 0.30 ounce of nitrogen for one-gallon size containers; equalling 1 ounce of Osmocote per tubling or two ounces per one-gallon container.

C. Straw:

Straw shall be new, derived from cereal grains and free from mold and noxious weed seed. Straw shall be furnished in air-dried bales. Straw shall be "long straw" having a minimum straw length of 15 inches.

D. Topsoil:

No topsoil is to be added to areas A, B, C, or D. See Specifications for topsoil and tilling at Areas E and F.

E. Organic Soil Amendment

If it is determined that site soils are low in organic content, sufficient amendment shall be added to provide an optimum growth habitat, following recommendations of the agricultural testing laboratory. The goal is to achieve 33 percent organic material in the top one foot of soil, minimum.

Organic soil amendment shall be 100 percent organic material that is porous and nitrogen stabilized. Rotted or composted manures, vegetable matter, and sawdust are examples. The Contractor shall submit 2, one-quart size, samples with attached current agricultural nutrient analysis to the Owner prior to installation.

PART 3: EXECUTION

3.01 PLANTING

A. General requirements:

1. All physical erosion control improvements, such as fencing of sensitive areas and existing vegetation, water diversion berms and buried irrigation, shall be installed prior to planting.
2. On Areas A, B and C plant rooted stock at 3 feet on center.
3. On Areas A, B and C plant live stakes on a 3 feet triangular spacing interspersed with live rooted stock also at 3 feet apart, resulting in plants at 18 inches apart.
4. On Area D, plant live stakes on a 2 feet triangular spacing interspersed with live rooted stock also at 2 feet apart, resulting in plants at 12 inches apart. Plant additional live stakes in two rows, 6 inches apart both ways, directly adjacent to the channel edge.

5. Planting on Slopes: Planting on slopes shall proceed from the top to the bottom of the slope, except that installation of fascines shall proceed from the bottom to the top.

B. Handling and storage of live cuttings:

Cuttings for live stakes and for fascines shall be planted the same day as cut. If not planted the same day, cuttings shall not be stored longer than 24 hours. They shall be cut locally. During cutting, maintain orientation of the stems with all tops together. If stored overnight or more than eight hours the lower half shall be kept submerged in fresh, clean water that is changed daily.

C. Live stakes:

Live stakes shall be planted at 90 degrees to the slope, and buried a minimum of 20 inches, leaving a minimum of two lateral leaf buds exposed. Ensure complete soil contact with the buried portion of the cutting. Do not split or crack cuttings, or strip bark when planting. Plant cuttings right side up.

D. Rooted stock:

1. Handling and Storage: Plants shall continue to receive regular irrigation when moved from the nursery to the job site. All plants shall be watered immediately after planting so that moisture around the rootball is at or near field capacity. Handling during planting shall be such that overheating or excessive drying is avoided.

The Contractor shall adequately protect plants from damage due to sun, wind, or physical abuse. Plants may be rejected at any time before or after planting if, in the opinion of the County, they have suffered damage which affects either their appearance or health.

Rooted stock shall be delivered to the job site a minimum of one week prior to planting if temperatures at the nursery and the job site are significantly different.

The Contractor shall reject all plants showing cracked or damaged rootballs, root binding, or latent defects or disease. The Owner's inspector may further reject plants he or she considers unhealthy, badly formed, or inappropriate to the intent. All rejected plants shall immediately be removed from the site.

2. Planting Pattern and Densities for Rooted stock: Plantings of rooted stock shall be spaced in a triangular configuration 36 inches apart or as otherwise indicated. Plants of different species shall be mixed so as to be evenly distributed throughout the project. *[NOTE: species distribution will vary for each project.]*

All repair areas will have rooted stock throughout, except Areas E and F.

3. Planting Rooted stock: Actual planting shall follow the digging of holes as rapidly as possible so that the excavated soil does not dry out. The planting shall take place no longer than two to three minutes following digging. Fertilizer shall be placed in bottom of pit and covered with at least two inches of soil. Irrigated plants shall be set at the level they were grown in the nursery and mulched to one inch to provide a soil cover over the root system. Non-

irrigated plants shall have a 1.5-inch soil cover over the root system. Care shall be used to use only the moist soil excavated for the backfill. Backfill shall be tamped firmly to eliminate all voids and to obtain intimate contact but not overcompaction between the root systems and the native soils. Excess soil shall be smoothed and firmed around the plants leaving a slight depression to collect rainfall.

Rooted stock shall be removed carefully after containers have been cut on two sides with cutter. Do not lift or handle container plants by tops, stems, or trunks at any time.

Cut or remove containers only when ready to plant, complete planting of each plant promptly, and water immediately after plantings. Plants shall not be out of their containers for more than 30 minutes before being planted and watered.

Rooted stock shall be protected from deer and rodent browsing with wire mesh baskets, fencing or other protection.

E. Fascines:

1. **Bundle Size:** Fascine bundles may vary in length, depending on materials available. Bundles shall taper at the ends and shall be 1 to 1-1/2 feet longer than the average length of stems, to achieve this taper. When compressed firmly and tied, each bundle shall be 8 inches in diameter.
2. **Bundle Construction:** Stems shall be placed alternately (randomly) in each bundle so that approximately one-half the live butt ends are at each end of the bundle.
3. **Bundle Tying:** Bundles shall be tied on not more than 15-inch centers with a minimum of two wraps of binder twine or heavier tying materials with a non-slipping knot. Tying may be done with strapping machines as long as the bundles are compressed tightly.
4. **Timing of Preparation:** Bundles shall be prepared not more than one day in advance of placement. They shall be kept covered, in fresh water and in the shade for up to 8 hours. See 3.01.B "Handling and Storage."
5. **Grade:** Grade for fascines trenches shall be staked with an Abney level or similar device, and shall follow slope contours (i.e. they shall be horizontal and level).
6. **Spacing:** *[Sample:]* Fascines shall be spaced at 5-ft. vertical spacing. *[Varies according to slope conditions.]*
7. **Installation:** Bundles shall be laid in trenches dug to approximately two-thirds of the diameter of the bundles. Bundles shall be placed with ends overlapping at least 12 inches. The overlap must be sufficient to allow the last tie on each bundle to overlap.
8. **Staking:** Bundles shall be staked firmly in place with vertical stakes on the downhill side of the fascines not more than 24 inches on center and with stakes through the bundles at not more than 36 inches on center. When bundles overlap between two previously set guide or bottom stakes, an additional bottom stake shall be used at the midpoint of the overlap. The overlap

shall be secured with a stake through the ends of both bundles and inside the end tie of each bundle.

9. Stake Materials: Stakes to be construction stakes 2 in. x 4 in. x 36 in., cut diagonally.
10. Backfilling: Fascines shall be covered immediately and tamped. Ensure that there is complete soil contact with buried portions. Workers are encouraged to walk on the fascines as work progresses to further work the soil into the bundles. Ten to twenty percent of the top of each bundle shall be left exposed when all construction is completed.
11. Staking: All stakes shall be driven to a firm hold and a minimum of 18-inches deep.
12. Progression of Work: Work shall progress from the bottom of the slope to the top and each row shall be covered with soil, leaving 2 inches exposed, and the soil shall be packed firmly behind and into the bundle by tamping or walking on the bundles or by both these methods.
13. Prevention of Drying Damage: Exposure of the fascines to sun and wind shall be minimized throughout the operation. Trenches shall be dug only as rapidly as the fascines is being placed and covered to minimize drying of the soil in the trench and of the backfill.

F. Hydroseeding:

1. Seed shall be broadcast by hydroseeding. Care shall be exercised to avoid damaging the transplants and cuttings.
2. Time of Seeding: Grading, gully or rill repairs, biotechnical construction and planting of transplants and live stakes shall be completed before seeding. Graded slopes shall be left in a roughened condition.

G. Mulch Application:

[Sample:] Areas A and B shall be mulched with straw within two working days following seeding unless prevented by weather and approved by the Project Designer. Straw shall be uniformly distributed at the rate of not less than two nor more than three tons per acre in Areas A and B only; no straw shall be placed over geogrid Area D.

Straw may be applied in two ways, either as whole straw applied by hand or with a straw blower.

Whole Straw Application—Spreading shall be by hand. Straw shall be crimped into the ground using digging or tile spades to avoid damaging transplants. Straw Blower Application—Application by blower will only be done when wind velocities are low enough to prevent blowing of the straw off the slope.

H. Erosion Control Matting:

See manufacturer's overlap and stapling specifications.