

TRPA Revegetation Plan Example

Soil restoration and revegetation activities required as part of a Project's permitted conditions must submit a completed TRPA Revegetation Plan:

A. SITE DESCRIPTION

Project Address: ABC 123 Lane, South Lake Tahoe, El Dorado County, CA

Assessor's Parcel Number (APN): APN: 123-45-678

NRCS Soil Map Unit: 7444 Max depth of Install: 24 inches Ksat (in/hr): 12.8

Land Capability: 1b and 4

TRPA Permit Number: BMPP0000-0000

Detailed Site Description:

The site comprises of an eroding slope from which runoff and sediment are transported across a compacted dirt area into SEZ. All areas are located in full sun. Existing vegetation on site ranges from dry shrubland species on the slope, to forbes and grasses at the base of the slope, to wetland species such as willow on the edge of and in the SEZ.

B. PROJECT DESCRIPTION, GOALS AND OBJECTIVES

Revegetation goals for this project are for the purpose of erosion control. The project intends to revegetate and stabilize the toe of the eroding slope, revegetate the flat compacted dirt area, and install a shallow vegetated infiltration basin upslope of the SEZ to capture and infiltrate surface water runoff originating from the site before it reaches the SEZ. Revegetation and erosion control treatments are installed to the lines and grade indicated on the Plans for BMPP0000-0000, as prescribed herein, and as directed by the engineer. Without revegetation of disturbed areas, erosion and sediment transport to the SEZ will continue.

C. PROJECT SCHEDULE

Dates	Action
August 10-15	Call before you dig 811 and contractor submittals (equipment cleaner receipts, seed labels and planting materials orders)
August 15	Install temporary BMPs
August 18	Pre-grade inspection
August 20	Topsoil salvage and hand removal of weeds using Pulaski
August 21-29	Grading, soil loosening, and soil amendments
August 29	48 hour notice to Engineer for plant delivery
September 1	Delivery and approval of plant and seed material
September 1-3	Seeding
September 4	Hole excavation and pre-wetting for plantings
September 5-10	Plant installation, native plant salvage and transplant, and soil stabilization
September 10-15	Hand watering and install temporary irrigation
September 15	Written Guarantee
September 15 to September 30 and June 1 to September 30 of the following year	Irrigation
September 15 to October	Weed maintenance

Dates	Action
15 and May 1 to October 15 of the following year	
August 15 of the following year	Final inspection
September 30 of the following year	Remove and recycle irrigation system

D. SELECTION OF PLANT MATERIALS

PLANT MATERIALS						
Species (Botanical Name)	Species (Common name)	Transplant	Container Size	Quantity	Planting Density / Spacing	Seed - PLS pounds per acre
<i>Achillea millefolium</i>	Yarrow					1
<i>Arctostaphylos nevadensis</i>	Pinemat manzanita		1 gallon	6	Cluster 2-3 plants 5-ft on center.	
<i>Arctostaphylos patula</i>	Greenleaf manzanita		1 gallon	6	Cluster 2-3 plants 5-ft on center.	
<i>Artemesia tridentate</i>	Mountain sagebrush					1
<i>Festuca rubra</i>	California native Red Fescue					3
<i>Leymus triticoides</i>	Creeping Wildrye					3
<i>Lupinus argenteus</i>	Silver Lupine					1
<i>Populus tremuloides</i>	Quaking aspen		5 gallon	3	Clustered 5-ft on center.	
<i>Salix spp</i>	Willow	X		4		
<i>Ribes cereum</i>	Wax currant		1 gallon	6	Cluster 2-3 plants 5-ft on center.	
<i>Wyethia mollis</i>	Mountain mule ears					1
Total Pounds of Pure Live Seed Per Acre						10

E. PROJECT INSTALLATION

1. Contractor Requirements

The Contractor must possess a C-27 specialty license and have 5 years, minimum, experience in the installation and establishment of California native plant materials for revegetation erosion control projects. Experience must include temporary irrigation systems, seeding, and a plant establishment and maintenance period. The Contractor must also provide at least three references for past successful revegetation projects.

2. Measures to Avoid or Minimize Project Impacts

- Before project installation, the contractor shall call 811 "Call Before You Dig" to identify all utility lines on the project site.
- All machinery must be clean before arrival on site and tools sterilized to prevent introduction and spread of weeds. Contractor to submit up-to-date cleaner receipts as proof of sterilization.
- Install vegetation protection fencing in accordance with BMP 4.5-e - Vegetation Protection, around all existing vegetation not to be disturbed as on the Plans. Fencing shall extend at a minimum to

the extent of the vegetative dripline, with metal stakes located outside of the dripline. See the attached schedule for specific timing of this treatment.

- *Install temporary erosion and sediment control BMPs in accordance with the Plans for BMPP0000-0000 and with BMP 4.5-r – Silt Fence and BMP 4.5-q - Fiber Roll. Install BMPs along the downhill edge of the area of disturbance to prevent any sediment from being transported off site and into the SEZ during disturbance and until vegetation becomes established. See the attached schedule for specific timing of this treatment.*
- *At no time will any soil rehabilitation operations be conducted if soil is saturated.*
- *The Contractor must have a copy of this Revegetation Plan and its attachments on site at all times throughout the duration of the project.*

3. Site Preparation

(a) SALVAGE EXISTING NATIVE PLANT FOR TRANSPLANTING

Plants identified on the Plans to be salvaged and transplanted shall be extracted taking as much of the root ball as possible and relocated to the receiving site locations indicated on the Plans. Plants shall be relocated to new locations within 4 hours of being extracted. If the site receiving the transplant does not have adequate soil moisture, the Contractor shall pre-wet the soil a day or two before transplanting. The receiving planting hole shall be twice the width and depth of the root ball. The rootball shall be planted in the excavated planting hole so that the root crown is 2-inches above existing grade. Use excavated soil to fill in the hole and gently compact soil to avoid settlement. Immediately following the transplant, water the hole to completely saturate each transplant root ball. See the attached schedule for specific timing of this treatment.

(b) REMOVAL AND STORAGE OF TOPSOIL AND DUFF

Following BMP 4.5-l – Topsoil Salvage, the Contractor shall salvage existing vegetative litter, duff and upper 3-inches of top soil from areas to be graded or disturbed on the project site before disturbance and store until such time it can be incorporated back into the revegetation project. Vegetative litter (e.g. pine needles, leaves) and duff can be stockpiled together, but away from topsoil in piles that are shallow and narrow as practicable. Protect stockpiles from precipitation according to BMP 4.5-n – Stockpile Management and at no time shall materials be stockpiled for more than 3 months without approval of the Engineer. See the attached schedule for specific timing of this treatment.

(c) GRADING AND SLOPE SHAPING

Areas to be graded or excavated and revegetated include the base of slope to accommodate a retaining wall and installation of the shallow infiltration basin as permitted through BMP Retrofit Permit BMPP0000-0000. For planting areas, scarify the top 6 inches of subgrade before fill placement. Subgrade depths plus specified depth of topsoil should equal finished grade. Contractor shall establish finished grades to blend with existing grades and eliminate uneven areas resulting from rough-grading operations. See the attached schedule for specific timing of these treatments.

(d) SOIL LOOSENING

To reduce soil compaction, loosen subgrade of compacted soil areas to an average depth of 12-inches. Soil loosening may be performed with hand tools (such as a pick mattock or Pulaski) or a mini excavator equipped with backhoe bucket. Soil shall be loosened but not turned or inverted. Soil loosening shall be uneven in depth by at least 1-2 inches to reduce the chance of soil slumping. Avoid existing plants and tree roots wherever loosening takes place. See the attached schedule for specific timing of this treatment.

(e) SOIL AMENDMENTS/FERTILIZER

Apply aged wood chips to a depth of 1 inch on the surface of soil loosened areas.

Incorporate compost to a depth of 3-4 inches and organic phosphorous free fertilizer at a rate of 270 lbs per acre into areas where topsoil is to be replaced and into areas compacted during construction activities. Evenly spread compost and fertilizer on top soil and incorporate it within using hand tools or mini excavator. After fertilizer application, water area slowly to help incorporate fertilizer into the soil. Only water until soil is moist to avoid runoff as excess water will transport fertilizer away. See the attached schedule for specific timing of these treatments.

(f) WEED CONTROL

The Contractor is to conduct bi-weekly weed control practices to maintain a 3-foot diameter weed free area around each plant. Weeds shall be removed before reaching 4-inches in height and before the weeds produce viable seeds. Weed removal shall not cause disruption to the root systems and aboveground structure of the installed plants. Vegetation control shall be conducted using hand-pulling - at no time shall herbicide be used. The Contractor must be familiar with identification of the following expected noxious and invasive weed species that may occur in or near the project area:

Common Name	Scientific Name
Russian knapweed	<i>Acroptilon repens</i>
Cheat grass	<i>Bromus tectorum</i>
Hoary cress	<i>Cardaria draba</i>
Musk thistle	<i>Carduus nutans</i>
Purple starthistle	<i>Centaurea calcitrapa</i>
Diffuse knapweed	<i>Centaurea diffusa</i>
Spotted knapweed	<i>Centaurea maculosa</i>
Russian knapweed	<i>Centaurea repens</i>
Yellow starthistle	<i>Centaurea solstitialis</i>
Squarrose knapweed	<i>Centaurea squarrosa</i>
Rush skeleton	<i>Chondrilla juncea</i>
Canada thistle	<i>Cirsium arvense</i>
Bull thistle	<i>Cirsium vulgare</i>
Field Bindweed	<i>Convolvulus arvensis</i>
Scotchbroom	<i>Cytisus scoparius</i>
Teasel	<i>Dipsacus fullonum</i>
St. John's wort / Klamath weed	<i>Hypericum perforatum</i>
Tall whitetop / Perennial pepperweed	<i>Lepidium latifolium</i>
Ox eye daisy	<i>Leucanthemum vulgare</i>
Dalmatian toadflax	<i>Linaria genistifolia spp. dalmatica</i>
Yellow toadflax	<i>Linaria vulgaris</i>
Sweetclover	<i>Melilotus alba, Melilotus officinalis</i>
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Scotch thistle	<i>Onoropordum acanthium</i>
Curlyleaf pondweed	<i>Potamogeton crispus</i>
Sulfur cinquefoil	<i>Potentilla recta</i>
Perennial sowthistle	<i>Sonchus arvensis l.</i>
Medusahead grass	<i>Taeniatherum caputmedusae</i>

Common Name	Scientific Name
Woolly mullein	<i>Verbascum thapsus</i>

4. Installation of Plant Materials

The Contractor is responsible for providing healthy plants for installation that are free of disease and insect infestation, are robust, and have vigorous foliage and wood. Prior to delivery, the Contractor shall submit copies of all planting material orders and any seed bag labels showing percent germination and purity for each species for approval. Labels shall show seed vendor's certification for required seed mixtures, and indicate percentage by weight and percentages of purity, germination, and weed seed for each species, as well as the date of testing. Seed mixes shall conform to the prescribed pure live seed rate of 90% purity and 80% germination. At all times, seed mixes shall be 100% weed free.

The Contractor shall provide the Engineer 48 hour advanced notice prior to delivery of plant materials and seed. Plant materials shall be delivered and stored at staging areas approved by the Engineer. At the time of delivery, the Engineer shall inspect the container plants for injury, disease, and insect infestation. Seed shall be delivered in unopened containers with the seed tag attached and is subject to observation and approval by the Engineer prior to installation. Plant and seed not approved by the Engineer shall be removed and disposed of according to State and local regulations and replaced within 24 hours at the Contractor's expense.

All plants materials shall be maintained in optimal health and protected from animal damage, vandalism, sun, wind, frost or any other conditions that would damage or reduce the viability of plant materials. Store all plant materials under a covering that allows air circulation and minimizes heat entrapment. Maintain moisture of plant materials at all times before planting.

The Contractor shall coordinate the placement of materials and equipment when necessary to complete the work as quickly and efficiently as possible. See the attached schedule for specific timing of installation activities.

Seeding operations in revegetation areas indicated on the Plan shall be conducted following site preparation procedures between September 1 and September 30, before any snow accumulation, ground freeze, and prior to container plant installation. The Contractor shall uniformly broadcast seed using hand-held seeders and lightly raked to incorporate to a depth of 1/4-to 1/2-inches. Seed shall not be left uncovered for more than 24 hours, unless otherwise approved by the Engineer. Seeding shall not occur when wind speeds exceed 5 miles per hour.

Following all site preparation procedures and seeding operations listed above, install container plant materials according to the Plans and following layout and density specifications on the Plant Materials Table. Plant layout shall occur somewhat irregularly to avoid existing vegetation and to mimic a natural layout. Plants shall not be laid out for more than one hour before planting. Planting holes shall be excavated by hand, pry bar, hydraulic bar with spade or chisel point or auger to the dimensions detailed on the Plans. The inside surfaces of all planting holes shall be scarified before backfilling with soil. Any large rocks, sticks or material greater 2-inches shall be removed from the backfill materials and discarded before backfilling holes. Remove plants from containers with the rootball intact and scarify to prevent the plant from becoming rootbound. Plants shall not be held by the stem, branch or in any way that damages the plant. Matted roots on sides shall be longitudinally sliced 1/8- to 1/4- inches deep at least once per side. Matted roots on the bottom of the rootball shall be sliced off to 1/4-inch deep. Insert plant into the hole without bending or damaging roots and hold in place until backfilled and soil tamped solidly around rootball. The rootball shall be placed so the top is placed 1/4-inch above the finish grade after settling. At no time shall backfill be placed over the top of the rootball. Plants should be thoroughly hand watered immediately after installation and continue to irrigate to maintain plants in a healthy condition until the end of the revegetation maintenance period. Check plants within 24 hours of installation for settling and correct as needed. If roots become exposed, place additional soil around the root crown.

All planting areas to be fine graded within 1-1/2 inches of paved areas, utility boxes, paving and curbs. Within 5 days of completing the plant installation work, the Contractor shall submit a written guaranty against defects resulting from poor installation or related materials to the Engineer for a period of 1 full growing season after the Engineer's acceptance of plant installation. For the purposes of this contract, a full growing season shall commence on October 16 of the plant installation year and end on October 15 of the next calendar year.

5. Irrigation

The Contractor bears full responsibility for watering plants to ensure plant health and vigor and promote plant establishment and growth. Watering and irrigation operations shall conform to local water conservation provisions for the duration of the irrigation period (e.g. STPUD only allows irrigation on Mondays, Wednesdays, and Fridays). The irrigation system shall be operated at a minimum for a period beginning on June 1 and ending on September 30, unless otherwise determined by the Engineer. Planting areas to be watered using spray irrigation systems as noted on the Plans shall be watered at a rate of 3-inches per week. Planting areas to be watered using bubbler irrigation systems as noted on the Plans shall be watered at a rate of 12-gallons per week. In order to "wean" plants off of irrigation by the end of the maintenance period, irrigation will become deeper and less frequent to help develop deeper and stronger roots.

6. Soil Stabilization

Replace topsoil in disturbed areas (from which top soil was removed before construction), spread to a uniform depth of 3 inches and gently compact into place. Top soil shall be dry and replaced during dry weather. All debris, roots, weeds, and other materials in excess of 1 inch in diameter shall be removed while topsoil is being spread.

Place wood chips to a 1-inch depth on the surface of loosened areas and incorporate during soil loosening.

After seeding, salvaged duff and wood chips shall be evenly applied to the soil surface to a 1 inch depth. Then apply pine needles to increase depth to 2-inches.

After duff replacement and wood chip and pine needle application, apply tackifier according to BMP 4.5-t – Hydromulch, Tackifier and Soil Binder and manufacturer's specifications in said area on same working day.

See the attached schedule for specific timing of these soil stabilization treatments.

F. REVEGETATION MAINTENANCE

Revegetation maintenance shall begin the first day following the plant installation phase and continue for a period of one full growing season after planting is completed. For the purposes of this contract, a full growing season shall commence on October 16 of the plant installation year and end on October 15 of the next calendar year.

During the revegetation maintenance period and until vegetation becomes established, the Contractor shall inspect and maintain temporary erosion and sediment control BMPs in accordance with BMP 4.5-r – Silt Fence and BMP 4.5-q - Fiber Roll.

The Contractor shall be responsible for weed control as previously described in all revegetation areas throughout the project site for the duration of the revegetation maintenance period. Weed control operations shall not damage installed plants or any native volunteers on the project site.

The Contractor shall provide all tools, labor, materials, equipment and incidentals necessary to water all plantings and to operate and maintain irrigation systems in a fully operational condition for the duration of

the maintenance period. The contractor shall evaluate the site weekly to determine if watering applications are appropriate. For transplants and container plants, evaluations shall include inspections for signs of water stress (Caused by overwatering or underwatering) and stunted growth. Irrigation maintenance shall include, but is not limited to, routine examination of the irrigation system during the irrigation period to ensure spray nozzles and bubblers are operational, that pipes do not leak, and that no lines are blocked. If determined by the Engineer that the irrigation system is to remain in place over the winter, the Contractor shall winterize the system by closing off the shut off valve at the water service point, removing sprinkler risers with nozzles, and draining water from all irrigation pipes. The contractor shall make any repairs to the irrigation system as needed. Upon conclusion of the plant maintenance period, the Contractor shall completely remove and recycle the spray and bubbler irrigation systems off site according to State and local regulations.

As part of the maintenance period, the Contractor shall be responsible for any replacement planting if needed. Replacement planting and seeding shall be of the same species and size as originally specified on the Plant Materials Table and Plans, unless the Engineer determines in writing that substitutions of another species or size will be made. At no times will plants of larger size or seed mixes of greater pounds per acre than those originally planted be required. Tree and shrub material that has no easily observable, viable, above ground living material will be considered dead and shall be replaced at no additional cost. Herbaceous plants that fail to show new growth from its root system after one dormant period and within the first 9 months after planting will be considered dead and shall be replaced at no additional cost.

All trash and debris shall be removed from the site and disposed of following State and local regulations on an ongoing basis as needed.

Long term soil and vegetation maintenance and monitoring provisions extending beyond the 1 year maintenance period are included in the BMP Inspection and Maintenance Log and Monitoring Plan for TRPA permit BMPP0000-0000.

G. SUCCESS CRITERIA AND PROJECT CONCLUSION

The intent of the revegetation actions in this project are to have healthy and vigorous, persistent plants at the end of the plant maintenance period that can survive without irrigation or other maintenance actions. In addition to The Contractor shall be responsible for meeting or exceeding the following performance standards for the revegetation areas:

- **Erosion** – No visible signs of on-going erosion such as rills exists on site.
- **Plant Survivorship** – For each revegetation area, container plants shall have a minimum of 90% survivorship at the end of the maintenance period. At the final inspection, the contractor shall reveal which of the final plantings consist of the original plant materials installed during the installation phase. If it is determined by the Engineer that 75% of the original plantings did not survive through the maintenance period because of Contractor negligence, the Contractor shall provide additional plantings to achieve 90% of the original plantings and provide a second year of vegetation maintenance as no additional cost. There are no plant survivorship requirements for transplants; however, the Contractor shall make every effort to establish healthy, vigorous and persistent transplanted plants.
- **Soil Surface and Vegetative Cover** – Areas of disturbance on the site shall maintain at least 90% cover of mulch during and at the end of the maintenance period. Revegetation areas shall maintain 25% vegetative cover at the end of the maintenance period. 25% vegetative cover is consistent with undisturbed areas of native vegetation on similar aspects and slopes adjacent to the project site used as reference plant communities. Cover will be visually estimated by the Inspector. If deemed necessary by the Engineer, measurements of cover points along transects will be used to verify percent vegetative cover.

Prior to final inspection, the Contractor shall clean-up the site to maintain a neat and orderly condition and be free and clear from debris and discarded material. Clean-up provisions may include but are not limited to

disposal of all debris and recycling of all plant containers and other plastics according to State and local regulations, as well as hand-sweeping the access road to prevent vehicle tracking of sediment. Once the final inspection is passed and vegetation is established, temporary BMPs can be removed. The Contractor shall prepare as-built record drawings to document the completed revegetation work if substantially different than the permitted plans. Revegetation signage shall remain after the project is complete to ensure adequate protection of revegetation areas.

Attachment A. BMPs

- *BMP 4.5-e Vegetation Protection*
- *BMP 4.5-r Silt Fence*
- *BMP 4.5-q Fiber Roll*
- *BMP 4.5-l Topsoil Salvage*
- *BMP 4.5-n Stockpile Management*
- *BMP 4.5-t Hydromulch, Tackifier and Soil Binder*

