Appendix G. Adaptive Management Plan Reclamation Planting Documentation

2011 Planting Plan ERRG Blue Ledge Mine Project

Updated 11-02-2011 TO DOCUMENT THE MINIMUM REQUIRED PER CONTRACT & ACTUAL PLANTABLE AREA

					WRP1		WRP2		WRP3		WRP4		South Staging		North Stockpile		Repository		Repository Stockpile		Rock Stockpile			2011 Total Plants			
				Actual Acres:	0.08 acres		0.01 acres		0.8 acres		0.4 acres		0.14 acres		1.37 acres		2.78 acres		0.5 acres		0.27 acres						
			Reclamation	Riparian	Riparian		Riparian		Reclamation		Reclamation		Riparian/Wetland		Reclamation		Reclamation		Reclamation		Reclamation						
			Trees & Shrubs		Trees & Shrubs		Trees & Shrubs		Trees & Shrubs		Trees & Shrubs		Trees & Shrubs		Trees & Shrubs		Shrubs Only		Trees & Shrubs		Trees & Shrubs						
Trees	**Species**	**Delivered Quantity**	% Table 713-4	% Table 713-5	Minimum Specified	Actual Installed	Minimum Specified	Actual Installed	Minimum Specified	Actual Installed	Minimum Specified	Actual Installed	Minimum Specified	Actual Installed	Minimum Specified	Actual Installed	Minimum Specified	Actual Installed	Minimum Specified	Actual Installed	Minimum Specified	Actual Installed		Minimum Specified	Delivered Quantity	Actual Installed	Available for 2012
Shasta Red Fir	Abies magnifica - 40 cu"	0	5						17	0	9	0			30	0			11	0	6	0		73	0	0	120
Doug Fir	Pseudosuga menziesii - 40 cu" tube	1,555	25	33	18	56	2	2	87	238	44	186	31	52	149	600			54	300	29	121		415	1,555	1,555	200
Ponderosa Pine	Pinus ponderosa - 40 cu" tube	620	15						52	210	26	150			90	260			33	0	18	0		218	620	620	0
White Pine	Pinus monticola - 40 cu" tube	379	3						10	98	5	101		0	18	166			7	14	4	0		44	379	379	700
White Fir	Abies concolor - 40 cu" tube	0	15						52	0	26	0			90	0			33	0	18	0		218	0	0	30
Mountain Hemlock	Tsuga mertensiana - 40 cu" tube	0	2						7	0	3	0			12	0			4	0	2	0		29	0	0	0
Big Leaf Maple	Acer macrophyllum - - 40 cu" tube	341	5	33	18	62	2	14	17	129	9	33	31	52	30	40			11	11	6	0		124	341	341	20
White Alder	Alunus rhombifolia - 40 cu" tube	260	20	34	19	66	2	2	70	64	35	75	32	53	119	0			44	0	24	0		344	260	260	90
Incense Cedar	Libocedrus decurens - 40 cu" tube	783	10						35	179	17	128			60	300			22	60	12	116		145	783	783	0
Shrubs	**Species**			**Total Trees:**	54	184	7	18	348	918	174	673	95	157	597	1,366	0	0	218	385	118	237	**Total Trees:**	1,611	3,938	3,938	1,160
Scoulers Willow	Salix scouleriana - 40 cu" tube	990	15	25	46	57	6	6	52	149	26	57	61	60	90	0	727	603	33	58	18	0		1,058	990	990	200
Deerbrush	Ceanothus intergerimus - - 40 cu" tube	434	15						52	0	26	0			90	0	727	434	33	0	18	0		945	434	434	0
Greenleaf Manzanita	Arctostaphylos patula- - 40 cu" tube	420	15						52	0	26	0			90	0	727	420	33	0	18	0		945	420	420	100
Oceanspray	Holodiscus discolor - 40 cu" tube	460	25	25	46	0	6	0	87	0	44	0	61	0	149	0	1,211	460	54	0	29	0		1,687	460	460	200
Red-stem Ceanothus	Ceanothus sanguineus-40 cu" tube	1,260	10						35	0	17	0			60	0	484	1,260	22	0	12	0		630	1,260	1,260	60
Snowbrush	Ceanothus velutinus-40 cu" tube	1,853	10						35	0	17	38			60	0	484	1,815	22	0	12	0		630	1,853	1,853	220
Serviceberry	Amelanchier alnifolia - 40 cu" tube	0	10						35	0	17	0			60	0	484	0	22	0	12	0		630	0	0	0
Thin-leaved Alder	Alnus incana - 40 cu" tube	0		25	46	0	6	0					61	0										113	0	0	0
Big-leaved Sedge	Carex amplifolia - 10 cu" tube	273		25	0	0	0	0					61	273										61	273	273	0
	Total Delivered Quantity:	9,628		**Total Shrubs:**	138	57	17	6	348	149	174	95	244	333	597	0	4844	4992	218	58	118	0	**Total Shrubs:**	6,698	5,690	5,690	780
				Extra Plants Installed in 2011:		49		0		370		420		151		172		148		7		2	**Total:**	8,309	9,628	9,628	1,940

Available: 9,628 **Actual for 2011**
1,319 **Excess for 2011**
Total Extra Used 16% **Extra Plants for 2011**
Extra Plants for 2012: 23%

	Priority 3 Riparian		**Priority 4 Riparian**		**Priority 5 Access**		**Priority 6 Access**		**Priority 2 Wetland**		**Priority 7 Stockpile**		**Priority 1 Repository**		**Priority 8 Stockpile**		**Priority 9 Stockpile**			
Extra Plants Used vs Minimum for Plantable Area:		25%		0%		53%		120%		44%		14%		3%		2%		1%		**Total Extra Plants for Total Project:** 39%
Total Plants:	192	241	24	24	697	1067	348	768	339	490	1194	1366	4844	4992	436	443	235	237	1319	

			Materials										**Total Material**	
Additional material needed for grass seed areas		acres	Flexterra	0.08	0	0	0	0.14	1.37	2.78	0.5	0.27	5.14	acres
Additional material needed for grass seed areas		acres	Wood fiber	0	0	0	0.2	0	0	0	0	0	0.2	acres
Additional material needed for grass seed areas	3500	#	Straw	0	35	2800	700	0	0	0	0	0	3535	pounds
	2.25	CF	Bark Mulch	0	54	0	0	763	2685	10899	980	529	15911	589 CY
	0.25	CF	Compost	0	0	174	87	0	0	0	0	0	261	10 CY
	1	#	Limestone	0	0	1742	348	0	0	0	0	0	2091	pounds
	3'X3'	EA	Sheet Mulch	48	0	0	0	0	0	0	0	0	48	each
Additional material needed for grass seed areas	1000	gal	Tackifier/acre	80	0 crimp	0 crimp	0 crimp	140	1370	2780	500	270	5140	gallon
	1	gal	BGR/400 plants	0.5	0.1	1.7	0.9	0.8	3.0	12.1	1.1	0.6	21	gallon
	1	ea	Plant Fertilizer Granular	192	24	697	348	339	1194	4844	436	235	8309	tablet
Additional material needed for grass seed areas	1	#	endo ectom Micronized	1.6	0.0	0.0	0.0	2.8	27.4	55.6	10.0	5.4	102.8	pounds
Additional material needed for grass seed areas	1	#	endo ectom	0.8	0.1	8.0	4.0	1.4	13.7	0.0	5.0	2.7	35.7	pounds

Notes:

Based on Planting Plan review meeting on August 25, 2011 with David Steinfeld and Pete Jones, ERRG modified the planting plan to accommodate the actual field conditions and David's recommendations. Refer to the Planting Plan meeting minutes for details.
Mycorrhizae (Endo ectom in powdered form) was recommended to be added with all grass seeding, and soak the plants in water with endo ectom prior to planting. The USFS will provide this product along with the grass seed. Granular Ecto endum is to be added to hydroseed mix.
The plant list was modified to accommodate the actual plants available to plant, the restrictions for only shrubs on the repository, the restrictions for certain plants in riparian and wetland areas, and accessibility restrictions. The priority of plant use is defined on the planting plan.
Overall, given the actual acreage 8,309 plants need to be installed. 9,268 plants were installed in 2011 (16% extra). 1,940 plants are available for 2012. This is 39% total extra over the minimum number of plants.

WRP1 The access road to this area was scheduled to be closed for the winter prior to planting due to project sequence and logistics and the need for rain prior to planting. Therefore, sheet mulch is used instead of bark mulch. Sheet mulch is commercial grade weed barrier that exceeds the 10 year life specified.
WRP1 is an area that was cleared to bedrock and soil was added at the request of the COR to 'take advantage of the location' and as an 'experiment' to create a riparian area. WRP1 soil is imported fill from the repository excavation. Therefore, no compost was used in the planting.
Because of the work sequencing with installing the reinforced fabric on WRP4, the hydroseeding at WRP1 and WRP4 must be completed prior to fabric installation. Therefore, the WRP1 area was hydroseeded with Flexterra prior to planting and before the access road was closed.
Pete Jones agreed to plant WRP1 after hydroseeding because this area is not as steep and is confined by log wattles and rip rap. Pete and David defined WRP1 as a riparian planting area. Pete later requested additional straw, and ERRG strawed the entire disturbed area.
Based on the takeoffs from the drawings, the estimated area of WRP1 was 0.1 acres and required 241 plants as a riparian area. The actual field measurements of the plantable area is 0.08 acres and should require 192 plants. Therfore there are 49 extra plants (25% extra) installed on WRP1.2
The plants are approximately 3.5 feet x 3.5 feet spacing. Therefore, with a 3x3 sheet mulch there is very little space between the sheet mulch edges. The sheet mulch edge is pinned at each corner and the edges buried in the soil.
Grass seed and fertilizer and endo ecto was added to the hydroseed/Flexterra mix. Grass seed is native seed as supplied by the USFS. Grass should not be able to penetrate the sheet mulch.

WRP2 The access road to this area was scheduled to be closed for the winter prior to planting due to project sequence and logistics and the need for rain prior to planting. Therefore,hydroseeding was not possible and no bark mulch was installed. Straw was spread around the plants.
WRP2 soil is the native soil along the edge of the gully as it crosses the Haul Road 1 at sediment basin 2A. This area was not excavated for waste rock. This area is defined as riparian by Pete and David.
The WRP2 area is very small, the plants were spaced on 3.5 feet spacing. The area was strawed after planting. No grass seed was sown between the plants.
Based on the takeoffs from the drawings, the estimated area of WRP2 was 0.01 acres and required 24 plants as a riparian area. Therefore 24 plants were installed on WRP2.

WRP3 The access road to this area was scheduled to be closed for the winter prior to planting due to project sequence logistics and the need for rain prior to planting. Therefore,hydroseeding was not possible.
WRP3 soil is native soil that has a low pH due to the waste rock. This area is defined as reclamation. Because of the low pH, David recommended adding compost and agricultural limestone to the planting hole in lieu of bark mulch at the surface. Avoiding grass competition is not as important as providing a good planting medium for the plants.
David performed tests on the WRP3 soil and determined that the upper half should have 3.5 pounds or 3.5 cups of agricultural lime added to each plant hole, along with 0.25 CF of compost (approximately 33% in a 12"x12"x10 deep hole.
The lower half should have 1.5 pounds or 1.5 cups of agricultural lime added to each plant hole, along with 0.25 CF of compost.
No bark mulch was required at the surface to agree on a no-cost Work Order to add compost and agricultural limestone at WRP3.
Based on the takeoffs from the drawings, the estimated area of WRP3 was 1.28 acres and required 1,115 plants. The actual field measurements of the plantable area is 0.8 acres and should require 697 plants. 1,067 plants were actualy installed. Therfore there are 370 extra plants (53% extra) installed on WRP3.
Grass seed and endo ecto were spread between the plants, 18 inches away. The entire area was covered by straw.
Because the pH of the remaining soil is very low at WRP3 and WRP4, the USFS provided an acid tolerant grass seed for installation on WRP3 and WRP4 instead of the native grass seed as previously supplied by the USFS.

2011 Planting Plan ERRG Blue Ledge Mine Project

WRP4

The access road to this area was scheduled to be closed for the winter prior to planting due to project sequence logistics and the need for rain prior to planting. Therefore,hydroseeding was not possible.
WRP4 soil is native soil that has a low pH due to the waste rock. This area is defined as reclamation. Because of the low pH, David recommended adding compost and agricultural limestone to the planting hole in lieu of bark mulch at the surface. Avoiding grass competition is not as important as providing a good planting medium for the plants.
David performed tests on the WRP4 soil and determined that it should have 1 pound or 1 cup of agricultural lime added to each plant hole, along with 0.25 CF of compost (approximately 33% in a 12"x12"x10 deep hole.
No bark mulch was required at the surface to agree on a no-cost Work Order to add compost and agricultural limestone at WRP3.
Based on the takeoffs from the drawings, the estimated area of WRP4 was 0.88 acres and required 768 plants. The actual field measurements of the plantable area is 0.4 acres and should require 348 plants. Therfore there are 419 extra plants (120% extra) installed on WRP4.
Grass seed and endo ecto was spread between the plants, 18 inches away. The entire area was covered by straw.
Because the pH of the remaining soil is very low at WRP3 and WRP4, the USFS provided an acid tolerant grass seed for installation on WRP3 and WRP4 instead of the native grass seed as previously supplied by the USFS.

Rock Stockpile/Log Deck

The rock stockpile/log deck was planted per the specifications. The disturbed area was regraded after rocks and logs removed, and some native soil from the repository excavation added to provide a planting surface.
endo ectom was added to the plant soaking water, and to the grass seed.
Plants were installed into native soil with a fertilizer tablet at 10 foot spacing, 3 feet of bark placed around the plant, and the area between the plants and bark mulch was hydroseeded with Flexterra/grass seed.
Based on the takeoffs from the drawings, the estimated area of the Rock Stockpile/Log Deck was 0.27 acres and required 235 plants. The actual field measurements of the plantable area found no measureable difference. Therfore there are 237 plants installed on the rock stockpile/log deck to use up available plants.
The road through this area was strawed and not seeded with grass. The east edge of the road was strawed and seeded with grass.

South Staging Area

The south staging area was planted per the specifications. The disturbed area was regraded after rocks were removed, and some native soil from the repository excavation added to provide a planting surface.
endo ectom was added to the plant soaking water. The area was designated as wetland by Pete and David.
Plants were installed into native soil with a fertilizer tablet at 3 to 5 foot spacing, with 3 feet of bark placed around the plant. Because the area between the plants and bark mulch is less than 1 foot, no grass seed and Flexterra was applied. The entire area is covered with 3" of bark mulch.
It is not practical to properly apply Flexterra in a 1 foot wide strip between bark mulch and plants. It must be applied from 2 directions, and trying to control it into a 1 foot strip without getting it all over the bark and plants is not practical.
The south staging area is flat and is not susceptible to excessive erosion that the bark mulch cannot adequately handle.
Based on the takeoffs from the drawings, the estimated area of the South Staging Area was 0.23 acres and required 557 plants. The actual field measurements of the disturbed and plantable area is 0.14 acres and should require 339 plants. 490 plants were actually installed and there are 151 extra plants (44% extra) installed on the south staging area.

North Stockpile

The North Stockpile area was planted in clusters to be able to properly apply Flexterra in larger strips between the clusters. The disturbed area was regraded after the stockpile was removed, and some residual native soil from the repository excavation was regraded to provide a planting surface.
Approximately 25,000 SF of flat area at the end of the spur road was covered with Grass and Flexterra to allow for future disturbance by maintenance activities if needed. Excess riprap rock and excess logs are stored at this area.
The remaining 37,500 SF was planted and Flexterra applied.
endo ectom was added to the plant soaking water. The area is designated as Reclamation planting.
Plants were installed into native soil with a fertilizer tablet in clusters of 4 each at 3 foot spacing, 3 feet of bark placed around the plants to form a 6'x6' bark area. The area between the edge of bark at the plant clusters was approximately 9 feet wide of Flexterra and grass seed.
Based on the takeoffs from the drawings, the estimated area of the North Stockpile was 1.37 acres and required 784 plants. The actual field measurements of the disturbed and plantable area is 1.55 acres and requires 1,194 plants. ERRG planted 1366 plants (14% extra) on the North Stockpile area to exceed the required number of plants.

Repository Stockpile

The Repository Stockpile area was planted per the specifications. The disturbed area was regraded after the stockpile was removed, and some residual native soil from the repository excavation was regraded to provide a planting surface.
endo ectom was added to the plant soaking water. The area is designated as Reclamation planting.
Plants were installed into native soil with a fertilizer tablet at 10 foot spacing, and 3 feet of bark placed around the plant. The area between the plants was covered with Flexterra and grass seed.
Based on the takeoffs from the drawings, the estimated area of the Repository Stockpile was 0.5 acres and required 436 plants. The actual field measurements of the disturbed and plantable area showed no measureable difference. Therfore ERRG planted 443 plants (2% extra) on the Repository Stockpile area.

Repository

The Repository will be planted with an adjustment to the specifications. The plants will be clustered and a continuous bark mulch layer placed around the shrubs, and the Flexterra and grass seed will be placed in a continous layer. This will avoid a checkerboard pattern that may cause the Flexterra to fail and allow erosion on the cap.
endo ectom will be added to the plant soaking water. The area is designated as Reclamation planting.
Plants will be installed into native soil with a fertilizer tablet at 3.5 foot spacing, and 3 feet of bark placed around the plant. The area between the plants will be covered with bark mulch to form a continuous bark area.
Scoulers Willow was determined by the Forest Service to have the potential for deep roots. Therefore, Pete Jones directed the willows will be planted on the west slope below the repository access road and outside of the repository cap and drainage system.
As many willows were substituted with other planting area shrubs as possible. 65 snowbrush from WRP3 were substituted for willows, and the 65 willows planted on WRP 3.
135 snowbrush from the North Stockpile were substituted for willows, and the 135 willows planted on the North Stockpile. 43 snowbrush from the Repository Stockpile were substituted for willows, and the 43 willows planted on the Repository Stockpile.
A total of 243 willows were substituted from the Repository to other areas, leaving 652 Scouler's Willows on the repository. All willows were planted on the exterior slopes, outside of the geomembrane footprint.
The design engineer determined that shrubs should not be planted within 50 feet of the hinge point, where the top deck geocomposite drainage layer connects to the side slope pea gravel drainage layer. The area will be covered with Flexterra and grass seed.
Because the cover soil gets thicker near the bottom of the slope, the shrubs were preferentially planted within 50 feet of the west side perimeter road. As these shrubs mature they will also create a barrier to ATV access. This leaves approximately 75 feet of slope up to the hinge point to be covered by Flexterra.
Because the cover soil on the top deck is minimum 3 feet thick up to 7 feet thick, the shrubs were planted within 50 feet of the east side perimeter road. This is the uphill side of the slopes and the geocomposite drainage system is not as critical to function if roots penetrate it.
This leaves approximately 50 feet from the edge of shrubs to the hinge point to be covered by Flexterra.
Shrubs were planted on the outside edge of the perimeter road on the north and south ends of the repository. Shrubs were also planted on the adjacent disturbed slopes around the Repository as locations are available.
Based on the takeoffs from the drawings, the estimated area of the Repository was 2.78 acres and required 4,844 plants. The actual field measurements of the plantable area minus roads and riprap ditches is 2.28 acres and requires 3,970 plants. 4,992 plants were actually installed. Therfore there are 1,022 extra plants (26% extra) on the Repository area.

Plant survival

O&M Plan Section 8.1 states that plants will be inspected on a monthly basis, starting in the spring after the snow melts. Assume site is accessible April to October, 6 site visits per year.
Specification section 626.13 states that plants will be inspected at the end of 1 year. Section 626.14 states an inspection of the plants will be 15 days before the end of the plant establishment period to identify plants for replacement. A final inspection of all plants within 15 days after completion of all replacement planting will be final acceptance.
Plants that do not survive and must be replaced will be inspected 15 days after replanting.
Given the plantable area for each site and the actual numbers of plants installed usually being more than required, if after one year there are adequate live plants for the given surface area, plants may not be replaced.
Planting began on 10-10-2011. 15 days before end of 1 year plant establishment period = September 25, 2012. Final plant inspection 15 days after replanting, if needed.

Grass Coverage

Specification section 713 is the grass establishment section. There is no inspection period or minimum coverage specified grass.

Haul Roads

Straw, grass seed, mychorizae, and fertilizer were applied at the specified rates.
Haul road 4 from the WPR3 sediment basin to WRP3 was decommissioned by outsloping the road bed, compacting the fill slope, installing water bars, seeding, fertilizing, straw, and slash.
Haul road 2 from the Miners Trail parking area to WRP1 was decommissioned by outsloping the road bed, compacting the fill slope, installing water bars, seeding, fertilizing, straw, and slash.
The remaining Haul roads were winterized by outsloping the road bed, grading down exterior berms at the road edge, compacting the fill slope, installing water bars, straw and slash. (no seed or fertilizer)
Creek crossing culverts were removed and the creek bed and slopes armored with geotextile and rip rap. Silt fence was installed on each side of the creek disturbed area.
The 1060 road was winterized by adding 4 inches of gravel surfacing. Ditches and culvert inlets were cleaned out as needed.
The 400 road was winterized by adding 4 inches of gravel surfacing. Rolling water bars were installed. The disturbed edges of the road were hydroseeded with Flexterra and grass seed.
The 1060 road from the 400 road to the Joe Creek bridge was graded and rolled with a smooth drum roller. Ditches and culvert inlets were cleaned out as needed.
The 1050 road potholed areas were graded and rolled with a smooth drum roller.

WRP1 and WRP4 Sediment Basins and Gully

The perimeter slopes of the gully below WRP1 and WRP4 were reclaimed by applying hydroseed containing Flexterra, grass seed, mychorizae, and fertilizer. The Flexterra was applied at 4,500 lb/acre.

Planting Material Sources:	Source	Product
Plants	Silver Springs Nursery, Ruch 541-899-1065	plants
Mycorrhizae	US Forest Service, Pete Jones 541-951-142!	powdered for grass seed and plant root soaking, granular for hydroseeding
Compost	Grange Co-op, Medford (541) 772-4730	Gardner & Bloome Soil Building Compost (3 cubic feet bags) and if you run out, use Grange Co-op Rogue Natural and Organic Planting Compost (1.5 cubic feet bags).
Fertilizer Tablets	Forestry Suppliers 800-647-5368	Tablets, Planting 20-10-5, 5G
Agricultural Limestone	Knife River Materials 541-621-1683	Joe Coffman, Sales Manager
Bark Mulch	Hilton Landscape Supply, 541-664-3374	Multibark
Sheet Mulch	Home Depot, (541)512-1458	Easy Gardener WeedBlock 3 ft. x 50 ft. Polypropylene Landscape Fabric, 10 year life, plus fabric staples
Fertilizer	Ewing, Medford, 541-535-8230	Biosol organic fertilizer 7-2-1
Straw	United Rentals, Medford 541-773-7323	Weed free straw bales
Flexterra	Ewing, Medford, 541-535-8230	Flexterra HP-FGM
Grass Seed	US Forest Service, Pete Jones 541-951-142!	native grass seed
Big Game Repellant	Forestry Suppliers 800-647-5368	Animal Repellant, PLANTSKYDD/BK

Material Application Rates:

Straw: 3,200#/acre = 1 bale per 33 ft x 33 ft area
Bark Mulch at surface: 3'x3'x3" = 2.25 CF = 17 gallons per plant
Compost at WRP3 & 4 only: 0.25 CF/plant = 0.25 CF = 2 gallons per plant, 1 compost bale = 3 CF = 12 plants/bale
Limestone at WRP3 & 4 only: upper half #3 = 3.5 cups/plant; lower half #3 = 1.5 cups/plant; and WRP 4 = 1 cup/plant
Big Game Repellant= Mix and apply per label, apply when plant is dry
Grass fertilizer: 1,000#/acre = 1 - 30# bag = 35 ft x 35 ft area
micronized endo ecto flour: 10 #/acre = 2.5 # per 1/4 acre seed bag
micronized endo plant soaking: 1#/100 gallons = 0.05# = 1 oz/5 gallon bucket = 2 tablespoons/5 gallon bucket
plant fertilizer tablets: 1 - 5 gram tablet per plant, 3 inches from the root ball (corner of hole)
3 inch berm at each plant
soak plants for 1 hour minimum per plant
Grass Seed for WRP3 & 4: 13.63 #/acre = 1/3 lb per 1,000 SF (30' x 30' area)
Flexterra: 4,500 #/acre

Grass Seeding Plan

ERRG Blue Ledge Mine Project
2011 Seeding Plan
11-Oct-11

Cool = 27 #/acre
Warm = 36 #/acre

Location	Type	Acres	Hand Straw Application	Seed acres	Seed Mix	Seed # provided by USFS	Total Materials for Plants and Seeding: Straw #	Bark Mulch CF	Compost CF	Limestone	BGR gallons	Grass Fertilizer 1000 #/Ac 7-2-3	Plant Fertilizer	Micronized endo ectom
WRP1	riparian	0.08		0.08	Cool	2	0	0			0	80	192	0.8
WRP2	riparian	0.01	0.01	0.01	Cool	0.3	35	54			0	10	24	0.1
WRP3	reclamation	0.8	0.8	0.8	USFS	11	2,800	0	174	1742	2	800	697	8.0
WRP4	reclamation	0.4	0.4	0.4	USFS	5	700	0	87	348	1	400	348	4.0
South Stockpile	riparian/wetland	0.14		0.14	Cool	4	0	763			1	140	339	1.4
North Stockpile	reclamation	1.37		1.37	Warm	49	0	2,685			3	1,370	1,194	13.7
Repository	reclamation	2.78		2.78	Warm	100	0	10,899			12	2,780	4,844	0.0
Repository Stockpile	reclamation	0.5		0.5	Warm	18	0	980			1	500	436	5.0
Rock Stockpile	reclamation	0.27		0.27	Cool	7	0	529			1	270	235	2.7
Miners Trail road decommission	seed	0.11	0.11	0.11	Cool	3	352	0			0	110	0	1.1
WRP3 road decommission	seed	0.32	0.32	0.32	Cool	9	1,024	0			0	320	0	3.2
Haul Truck Site	seed	0.1	0.1	0.1	Cool	3	320	0			0	100	0	1.0
WRP 1 landslide	seed	0.1	0.1	0.1	Cool	3	320	0			0	100	0	1.0
WRP 3 lower road fill	seed	2.44	0.61	2.44	Cool	66	7,808	0			0	2,440	0	6.1
WRP 2 road fill	seed	0	0.61	0	Cool		0	0			0	0	0	6.1
WRP 1 road fill	seed	0		0	Cool		0	0			0	0	0	0.0
1060 Road slopes	seed	0		0	Cool		0	0			0	0	0	0.0
log deck	seed	0.09	0.09	0.09	Cool	2	288	0			0	90	0	0.9
WRP2 bypass road	seed	0.06	0.06	0.06	Cool	2	192	0	0	0	0	60	0	0.6
	Total:	9.57 acres	3.21 acres	9.57 acres		284 #	13,839 pounds	15,911 CF	261 CF	2,091 pounds	21 gallons	9,570 pounds	8,309 tablets	55.7 pounds
		4.92	Cool acres =			117 #	6.9	589	10			4.8		10 #/acre
		4.65	Warm acres =			167 #	tons	CY	CY			tons		mix w/seed

Material Application Rates:

Straw: 3,200#/acre = 1 bale per 33 ft x 33 ft area
Bark Mulch at surface: 3'x3'x3" = 2.25 CF = 17 gallons per plant
Compost at WRP3 & 4 only: 0.25 CF/plant = 0.25 CF = 2 gallons per plant, 1 compost bale = 3 CF = 12 plants/bale
Limestone at WRP3 & 4 only: upper half #3 = 3.5 cups/plant; lower half #3 = 1.5 cups/plant; and WRP 4 = 1 cup/plant
Big Game Repellant= Mix and apply per label, apply when plant is dry
Grass fertilizer: 1,000#/acre = 1 - 30# bag = 35 ft x 35 ft area
micronized endo ecto flour: 10 #/acre = 2.5 # per 1/4 acre seed bag
micronized endo plant soaking: 1#/100 gallons = 0.05# = 1 oz/5 gallon bucket = 2 tablespoons/5 gallon bucket
plant fertilizer tablets: 1 - 5 gram tablet per plant, 3 inches from the root ball (corner of hole)
3 inch berm at each plant
soak plants for 1 hour minimum per plant
Grass Seed for WRP3 & 4: 13.63 #/acre = 1/3 lb per 1,000 SF (30' x 30'
Flexterra: 4,500 #/acre

JOE CREEK
UNNAMED TRIBUTARY OF JOE CREEK
HR-1
SEDIMENT/pH TREATMENT BASIN 2A
ROCK STOCKPILE AREA
APPROXIMATE PROPERTY BOUNDARY
WRP-2 RECLAMATION AREA
FR500
FR600
HR-1
HR-3
HR-4
SEDIMENT/pH TREATMENT BASIN 3
PROJECT TRAILER AND PARKING AREA
HISTORIC PRESERVATION SITE
BYPASS ROAD
SEDIMENT/pH TREATMENT BASIN 2B
SEDIMENT/pH TREATMENT BASIN 1A
FOREST SERVICE ROAD 1060
SEDIMENT/pH TREATMENT BASIN 1B
SOUTH STORAGE AREA
FOREST SERVICE ROAD 1060
SEDIMENT/pH TREATMENT BASIN 1C
HR-2
HR-3
WASTE ROCK PILE 2
SEDIMENT/pH TREATMENT BASIN 1D
MINER'S TRAIL PARKING AREA
ENTRANCE/EXIT ROAD
JOE CREEK
SEDIMENT/pH TREATMENT BASIN 1E
WRP-4 RECLAMATION AREA (SEE NOTE)
SEDIMENT/pH TREATMENT BASIN 1F
A5
A6
WRP-3 RECLAMATION AREA (SEE NOTE)
WASTE ROCK PILE 3
A3
A1S4
A1S2
A1S3
A2S
A1S
A2
WASTE ROCK PILE 1
MINE SHAFT
A1N
WRP-1 RECLAMATION AREA
WASTE ROCK PILE 4
A1N2
HISTORIC PRESERVATION SITE
A4N
A4S
REPOSITORY SITE
REPOSITORY STOCKPILE AREA
ENTRANCE/ EXIT ROAD
FOREST SERVICE ROAD 400
FOREST SERVICE ROAD 400
ENTRANCE/ EXIT ROAD
FOREST SERVICE ROAD 1060
NORTH STORAGE AREA

N
0' 300'
INSET SCALE: 1"=300'

SOURCE: URS BLUE LEDGE MINE REMOVAL ACTION, DRAWING NO. 101, SHEET 7 OF 60, CAD FILE NO. 101, DATED: 2/2010.

LEGEND:
- FOREST SERVICE/HAUL ROAD
- DECOMMISSIONED HAUL ROAD
- PROPERTY BOUNDARY
- RECLAMATION AREA
- STREAM
- WASTE ROCK BOUNDARY REMOVAL LIMIT
- APPROXIMATE LOCATION OF ADIT
- APPROXIMATE LOCATION OF MINE SHAFT

NOTES:

WRP–3 AND WRP–4 RECLAMATION AREAS ARE ALSO THE WASTE ROCK BOUNDARY REMOVAL LIMITS.

FR = FOREST SERVICE ROAD
HR = HAUL ROAD

N
0' 200'
SCALE: 1"=200'

ERRG Engineering/Remediation Resources Group, Inc.
4585 Pacheco Blvd, Suite 200
Martinez, California 94553
(925) 969-0750

CLIENT: USDA FOREST SERVICE		OVERALL SITE PLAN			
LOCATION: BLUE LEDGE MINE REMOVAL ACTION	DRAWN BY: RDB 11/18/11	CHECKED BY: JGS 11/21/11	PROJECT NO. 2010-084	FIG NO. G-1

FILE NAME: N:\graphics\2010\2010-084 USFS Blueledge Mine\N_Maps and Drawings\Final Report\Overall Site Plan.dwg LAYOUT NAME: 1 PLOTTED: Tuesday, February 07, 2012 – 4:52pm

REPOSITORY ACCESS ROAD

REPOSITORY STORMWATER DRAIN DITCH

LIMIT OF COVER

REPOSITORY STOCKPILE AREA

GROUNDWATER SEEP LOCATION

3940

3930

3920

3910

3900

3890

RIPRAP APRON

RIPRAP APRON

LEACHATE SUMP TANK

REPOSITORY ENTRANCE RAMP

USDA FOREST SERVICE PROPERTY BOUNDARY

ANCHOR TRENCH DRAINAGE PIPES

FOREST SERVICE ROAD 400

REPOSITORY UNDER DRAIN

RIPRAP APRON AT PIPE OUTLET

LEGEND:

- ACCESS ROAD
- EXISTING CONTOUR OUTSIDE OF COVER
- EXISTING FINAL GRADING COVER
- REPOSITORY STOCKPILE AREA
- STORMWATER DRAIN DITCH

SOURCES:
1. TOPOGRAPHY PROVIDED BY URS, 2010
2. PROPERTY BOUNDARY SURVEY DATA PROVIDED BY GEOMATRIX NORTHWEST, INC.
3. REPOSITORY TOPOGRAPHIC SURVEY DATA PROVIDED BY GRANITE CONSTRUCTION, INC.

N

0' 40'

SCALE: 1"=40'

ERRG Engineering/Remediation Resources Group, Inc.
4585 Pacheco Blvd, Suite 200
Martinez, California 94553
(925) 989-0750

CLIENT:	USDA FOREST SERVICE	REPOSITORY SITE PLAN			
LOCATION:	BLUE LEDGE MINE REMOVAL ACTION	DRAWN BY: RDB 11/18/11	CHECKED BY: JGS 11/21/11	PROJECT NO. 2010-084	FIG. NO. G-2

FILE NAME: H:\graphics\2010\2010-084 USFS Blueledge Mine\ML Maps and Drawings\O and M Plan\Repository Site Plan.dwg LAYOUT NAME: 2 PLOTTED: Friday, February 03, 2012 - 2:04pm

Total Plant Count

Plant Name	Repository (2.78 Acres)	Repository Stockpile (0.27 Acres)
Douglas Fir	0	300
White Pine	0	14
Big Leaf Maple	0	11
Incense Cedar	0	60
Scoulers Willow	603	58
Snowbrush	1,815	0
Deerbrush	434	0
Red-stem Ceanothus	1,260	0
Greenleaf Manzanita	420	0
Oceanspray	460	0
Total:	**4,992**	**443**

PERIMETER LOGS
REPOSITORY ACCESS ROAD
LIMIT OF COVER
REPOSITORY STOCKPILE AREA
REPOSITORY STORMWATER DRAIN DITCH
GROUNDWATER SEEP LOCATION
RIPRAP APRON
RIPRAP APRON
LEACHATE SUMP TANK
RIPRAP APRON
REPOSITORY ENTRANCE RAMP
USDA FOREST SERVICE PROPERTY BOUNDARY
FOREST SERVICE ROAD 400
ANCHOR TRENCH DRAINAGE PIPES
REPOSITORY UNDER DRAIN
RIPRAP APRON AT PIPE OUTLET

3940 3930 3920 3910 3900 3890 3880 3875 3895 3905 3885 3970 3965 3960 3955 3945 3950

LEGEND:
- ACCESS ROAD
- EXISTING CONTOUR OUTSIDE OF COVER
- EXISTING FINAL GRADING COVER
- STORMWATER DRAIN DITCH
- FLEXTERRA AND GRASS SEED
- SHRUBS
- SHRUBS AND TREES

SOURCES:
1. TOPOGRAPHY PROVIDED BY URS, 2010
2. PROPERTY BOUNDARY SURVEY DATA PROVIDED BY GEOMATRIX NORTHWEST, INC.
3. REPOSITORY TOPOGRAPHIC SURVEY DATA PROVIDED BY GRANITE CONSTRUCTION, INC.

N

0' 40'
SCALE: 1"=40'

ERRG
Engineering/Remediation Resources Group, Inc.
4585 Pacheco Blvd, Suite 200
Martinez, California 94553
(925) 969-0750

CLIENT: USDA FOREST SERVICE	REPOSITORY PLANTING AREAS			
LOCATION: BLUE LEDGE MINE REMOVAL ACTION	DRAWN BY: RDB 11/23/11	CHECKED BY: JGS 11/28/11	PROJECT NO. 2010-084	FIG. NO. G-3

FILE NAME: N:\graphics\2010\2010-084 USFS Blueledge Mine\N_Maps and Drawings\O and M Plan\Repository Planting Areas.dwg LAYOUT NAME: 3 PLOTTED: Friday, February 03, 2012 - 2:05pm

Total Plant Count	
Plant Name	North Storage Area (1.37 Acres)
Douglas Fir	600
Ponderosa Pine	260
White Pine	166
Big Leaf Maple	40
Incense Cedar	300
Total:	**1,366**

NORTH STORAGE AREA

LOG PILE

APPROXIMATELY 150 LOGS PLACED

ROCK STOCKPILE

FOREST SERVICE ROAD 400

LEGEND:

- TREES
- FLEXTERRA AND GRASS SEED
- ACCESS ROAD

SOURCE: TOPOGRAPHY PROVIDED BY URS, 2010

N

0' 40'

SCALE: 1"=40'

Engineering/Remediation Resources Group, Inc.
4585 Pacheco Blvd, Suite 200
Martinez, California 94553
(925) 969-0750

CLIENT:	USDA FOREST SERVICE	NORTH STORAGE PLANTING AREA			
LOCATION:	BLUE LEDGE MINE REMOVAL ACTION	DRAWN BY: RDB 11/21/11	CHECKED BY: JGS 11/22/11	PROJECT NO. 2010-084	FIG. NO. G-4

FILE NAME: H:\graphics\2010\2010-084 USFS Blueledge Mine\Maps and Drawings\O and M Plan\North Storage Planting Area.dwg LAYOUT NAME: Layout1 PLOTTED: Friday, February 03, 2012 - 2:09pm

Total Plant Count	
Plant Name	South Storage Area (0.14 Acres)
Douglas Fir	52
Big Leaf Maple	52
White Alder	53
Scoulers Willow	60
Big-leaved Sedge	273
Total:	**490**

FOREST SERVICE ROAD 500

FOREST SERVICE ROAD 600

FORMER PROJECT TRAILER AND PARKING AREA

APPROXIMATE PROPERTY BOUNDARY

SOUTH STORAGE AREA

FOREST SERVICE ROAD 1060

JOE CREEK

LEGEND:

- FLEXTERRA AND GRASS SEED
- FOREST SERVICE ROAD
- PROPERTY BOUNDARY
- STREAM
- TREES AND SHRUBS

SOURCES:
1. TOPOGRAPHY PROVIDED BY URS, 2010.
2. PROPERTY BOUNDARY SURVEY DATA PROVIDED BY URS, 2010.

N

0' 40'

SCALE: 1"=40'

Engineering/Remediation Resources Group, Inc.
4585 Pacheco Blvd, Suite 200
Martinez, California 94553
(925) 969-0750
ERRG

CLIENT: USDA FOREST SERVICE	SOUTH STORAGE PLANTING AREA			
LOCATION: BLUE LEDGE MINE REMOVAL ACTION	DRAWN BY: RDB 11/21/11	CHECKED BY: JGS 11/22/11	PROJECT NO. 2010-084	FIG. NO. G-5

FILE NAME: N:\graphics\2010\2010-084 USFS Blueledge Mine\X_Maps and Drawings\O and M Plan\South Storage Planting Area.dwg LAYOUT NAME: Layout1 PLOTTED: Friday, February 03, 2012 - 1:59pm

Total Plant Count	
Plant Name	Rock Stockpile Area (0.27 Acres)
Douglas Fir	121
Incense Cedar	116
Total:	**237**

JOE CREEK

UNNAMED TRIBUTARY OF JOE CREEK

ROCK STOCKPILE

HR-1

HR-3

HR-1

HR-2

ACCESS ROAD 1060

HISTORIC PRESERVATION SITE

UNNAMED TRIBUTARY OF JOE CREEK

LEGEND:

- HAUL ROAD/ACCESS ROAD
- STREAM
- TREES

SOURCE: TOPOGRAPHY PROVIDED BY URS, 2010.

N

0' 40'

SCALE: 1"=40'

ERRG Engineering/Remediation Resources Group, Inc.
4585 Pacheco Blvd, Suite 200
Martinez, California 94553
(925) 969-0750

CLIENT: USDA FOREST SERVICE	ROCK STOCKPILE PLANTING AREA			
LOCATION: BLUE LEDGE MINE REMOVAL ACTION	DRAWN BY: RDB 11/21/11	CHECKED BY: JGS 11/22/11	PROJECT NO. 2010-084	FIG. NO. G-6

FILE NAME: N:\graphics\2010\2010-084 USFS Blueledge Mine\N_Maps and Drawings\O and M Plan\Rock Stockpile Planting Area.dwg LAYOUT NAME: Layout1 PLOTTED: Friday, February 03, 2012 - 2:09pm

ER600

FOREST SERVICE ROAD 1060

JOE CREEK

FORMER TRAILER AND PARKING AREA

HISTORIC PRESERVATION SITE

SEDIMENT/pH TREATMENT BASIN 1A

SEDIMENT/pH TREATMENT BASIN 1B

SEDIMENT/pH TREATMENT BASIN 1C

SEDIMENT/pH TREATMENT BASIN 1D

SEDIMENT/pH TREATMENT BASIN 1E

SEDIMENT/pH TREATMENT BASIN 1F

REINFORCED SLOPE STABILITY FABRIC AREA

WRP-4 RECLAMATION AREA (SEE NOTE)

HR1

HR2

HR3

HR4

SEDIMENT/pH TREATMENT BASIN 2B

WASTE ROCK PILE 2

MINER'S TRAIL PARKING AREA

A5

WRP-1 RECLAMATION AREA

WASTE ROCK PILE 1

A1S4

A1S2

A1S3

A1S

A2S

A2

A1N

MINE SHAFT

A1N2

HISTORIC PRESERVATION SITE

WASTE ROCK PILE 4

A4N

A4S

Total Plant Count

Plant Name	WRP-1 (0.08 Acres)	WRP-4 (0.4 Acres)
Douglas Fir	56	186
Ponderosa Pine	0	150
White Pine	0	101
Big Leaf Maple	62	33
White Alder	66	75
Incense Cedar	0	128
Scoulers Willow	57	57
Snowbrush	0	38
Total:	**241**	**768**

LEGEND:

- ADIT
- FLEXTERRA AND GRASS SEED
- FOREST SERVICE ROAD/HAUL ROAD
- DECOMMISSIONED HAUL ROAD
- MINE SHAFT
- RECLAMATION AREA
- TREES AND SHRUBS
- REINFORCED SLOPE STABILITY FABRIC AREA
- WASTE ROCK BOUNDARY REMOVAL LIMITS

SOURCE: URS BLUE LEDGE MINE REMOVAL ACTION, DRAWING 101, SHEET 7 OF 60, CAD FILE NO. 101, 2/2010.

NOTE: WRP-4 RECLAMATION AREA IS ALSO THE WASTE ROCK BOUNDARY REMOVAL LIMITS.

N

0' 100'

SCALE: 1"=100'

ERRG Engineering/Remediation Resources Group, Inc.
4585 Pacheco Blvd, Suite 200
Martinez, California 94553
(925) 969-0750

CLIENT: USDA FOREST SERVICE	WASTE ROCK PILES 1 AND 4 PLANTING AREAS			
LOCATION: BLUE LEDGE MINE REMOVAL ACTION	DRAWN BY: RDB 11/21/11	CHECKED BY: JGS 11/22/11	PROJECT NO. 2010-084	FIG. NO. G-7

FILE NAME: N:\graphics\2010\2010-084 USFS Blueledge Mine\N_Maps and Drawings\O and M Plan\Waste Rock Piles 1 and 4 Planting Areas.dwg LAYOUT NAME: 7 PLOTTED: Friday, February 03, 2012 - 2:09pm

Total Plant Count		
Plant Name	WRP-2 (0.01 Acres)	WRP-3 (0.8 Acres)
Douglas Fir	2	238
Ponderosa Pine	0	210
White Pine	0	98
Big Leaf Maple	14	129
White Alder	2	64
Incense Cedar	0	179
Scoulers Willow	6	149
Total:	**24**	**1,067**

PROPERTY BOUNDARY

SEDIMENT/pH TREATMENT BASIN 2A

WRP-2 RECLAMATION AREA

SEDIMENT/pH TREATMENT BASIN 2B

SEDIMENT/pH TREATMENT BASIN 3

HR1

HR2

HR4

WASTE ROCK PILE 2

WASTE ROCK PILE 1

WASTE ROCK PILE 3

MINER'S TRAIL PARKING AREA

WRP-3 RECLAMATION AREA (SEE NOTE)

HISTORIC PRESERVATION SITE

A1N

A1S2

A1S3

A1S4

A2

A2S

A3

A5

A6

MINE SHAFT

LEGEND:

- ADIT
- FOREST SERVICE ROAD/HAUL ROAD
- DECOMMISSIONED HAUL ROAD
- MINE SHAFT
- RECLAMATION AREA
- TREES AND SHRUBS
- WASTE ROCK BOUNDARY REMOVAL LIMITS

SOURCE: URS BLUE LEDGE MINE REMOVAL ACTION, DRAWING 101, SHEET 7 OF 60, CAD FILE NO. 101, 2/2010.

NOTE: WRP-3 RECLAMATION AREA IS ALSO THE WASTE ROCK BOUNDARY REMOVAL LIMITS.

0' 100'

SCALE: 1"=100'

ERRG Engineering/Remediation Resources Group, Inc.
4585 Pacheco Blvd, Suite 200
Martinez, California 94553
(925) 969-0750

CLIENT: USDA FOREST SERVICE

LOCATION: BLUE LEDGE MINE REMOVAL ACTION

WASTE ROCK PILES 2 AND 3 PLANTING AREAS

DRAWN BY:	CHECKED BY:	PROJECT NO.	FIG. NO.
RDB 11/21/11	JGS 11/22/11	2010-084	G-8

FILE NAME: N:\graphics\2010\2010-084 USFS Blueledge Mine\N_Maps and Drawings\O and M Plan\Waste Rock Piles 2 and 3 Planting Area.dwg LAYOUT NAME: 8 PLOTTED: Friday, February 03, 2012 - 2:12pm