ATTACHMENT 3

Conceptual Wetland and Riparian Mitigation Plan Buena Vista Landfill Soil Management Plan Santa Cruz County, California

Prepared for

County of Santa Cruz
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October 1998

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1 .O INTRODUCTION

The County of Santa Cruz proposes to stockpile soil on a 70-acre parcel across Buena Vista Drive from the county-owned and operated Buena Vista Landfill in southern Santa Cruz County. The soil will be excavated from the landfill as part of the permitted expansion, stockpiled on 20 acres of the 70-acre parcel, and ultimately returned to the landfill for use as cover soil. As required by the California Environmental Quality Act (CEQA) of 1970, an Environmental Impact Report (EIR) and Supplemental EIR (SEIR) were prepared to evaluate the potential impacts of the project. The EIR and SEIR concluded that implementation of the project will result in the removal of wetland and riparian plant communities considered sensitive by the California Department of Fish and Game (CDFG), designated as special aquatic sites by the U.S. Army Corps of Engineers (ACOE), and protected under the *Santa Cruz County General Plan and Local Coastal Program* (2994).

The Conservation and Open Space Element of the County General Plan contains policies that regulate impacts to biological resources within the county, including riparian corridors and wetlands. The principal objective of the Plan is "To preserve, protect, and restore all riparian corridors and wetlands for the protection of wildlife and aquatic habitat, water quality, erosion control, open space, aesthetic and recreational values and the conveyance and storage of flood waters." To achieve these objectives, the County has set forth a series of policies that require development activities impacting wetland and riparian habitats to obtain an exemption or exception under the County Riparian Corridor and Wetland Protection Ordinance. As a condition of the riparian exception, the project must obtain approval from ACOE, CDFG, and other federal or state agencies that have regulatory authority over activities within riparian corridors and wetlands.

ACOE administers Section 404 of the federal Clean Water Act, which regulates activities affecting "waters of the United States". Waters of the United States include streams and wetlands. Projects that would discharge dredged or fill material into waters of the United States must obtain a Section 404 permit from ACOE. Prior to issuance of a 404 permit by ACOE, project applicants must obtain water quality certification from the Regional Water Quality Control Board under Section 401 of the Clean Water Act.

CDFG regulates alterations to stream channels under Section 1600 of the Fish and Game Code of California. Projects that would divert, obstruct, or change the natural flow or bed, channel or bank of "waters of the state" must negotiate a Streambed Alteration Agreement with CDFG. Waters of the state include natural lakes, rivers, and streams, and engineered systems designed to convey or hold surface water.

This mitigation plan was prepared to provide for the creation of wetland and riparian habitat on the project site to offset or compensate for identified project impacts. The plan is intended to meet agency requirements for compensatory mitigation and provide sufficient information to facilitate an evaluation of the project under Sections 404 and 401 of the Clean Water Act and Section 1600 of the Fish and Game Code of California.

2.0 PROJECT SUMMARY

2.1 Project Location

The proposed stockpile site is in southern Santa Cruz County, west of State Highway 1 and approximately 3 miles east of the City of Watsonville. The Pacific Ocean lies 2 miles to the west. Buena Vista Drive is situated along the eastern and southern boundaries of the parcel. Buena Vista Landfill is located immediately east and southeast of the site across Buena Vista Drive. Regional and site locations maps are provided in *Draft Environmental Impact Report, Buena Vista Landfill Soil Management Plan, Santa Cruz County, California* (*HLA*, 2996). A project site map is included in this plan on Plate 1.

2.2 Project Description

The County of Santa Cruz, Department of Public Works, currently operates Buena Vista Landfill. To fully utilize the landfill's previously approved capacity, the County will need to excavate and stockpile approximately 1.25 million cubic yards of soil from Modules 4 and 5 of the landfill. The County is investigating the feasibility of acquiring a 70-acre parcel adjacent to Buena Vista Landfill for soil storage. Approximately 20 acres of the parcel (soil management area) are proposed to be filled with excavated soil. Most of the soil will be transported by an overhead conveyor system to the soil management area. The conveyor system will be in place for approximately 24 months, during which time the 1.1 million cubic yards of Module 4 soil [Phase I soils) and 150,000 cubic yards of Module 5 soil (Phase II soils) will be transported by conveyor to the soil management area. The remaining 350,000 cubic yards of Module 5 soil will be stockpiled at the landfill. The conveyor system will be removed when all excavated soil has been deposited in the soil management area. Soil for daily landfill cover needs will primarily be obtained from soil stockpiled on the landfill for the first 6-7 years after completion of all landfill excavation and stockpiling work. When the stockpiled soil on the landfill has been exhausted, daily transfers of cover material from the soil management area to the landfill will commence and continue through the remaining life of the landfill (Phase III). When all stockpiled soils have been removed from the soil management area, the site will be rehabilitated for future agricultural use.

3.0 AFFECTED JURISDICTIONAL AREA

Four watershed areas provide surface water runoff to the project site, which concentrates in three primary drainage channels on the site, the north channel, south channel, and east channel. An eroded drainage ditch upstream of the east channel conveys surface runoff along the northeastern boundary of the project site and outlets to the east channel. Drainage locations are shown on Plate 2, Appendix C of *Draft Environmental Impact Report, Buena Vista Landfill Soil Management Plan, Santa Cruz County, California* (*HLA,* 1996). An estimated 1.18 acres of jurisdictional wetland and other waters of the United States were delineated along the drainages. Wetland areas include approximately 0.52 acre of central coast riparian scrub, 0.5 acre of freshwater seep, and 0.12 acre of emergent wetland habitats. Approximately 0.04 acre of drainage ditch vegetated with ruderal species meets federal criteria as waters of the United States.

Soil excavated from Buena Vista Landfill will be stockpiled in the south ravine on the project site. Implementation of the project will result in the removal of a total of 0.79 acre of habitat subject to agency jurisdiction, including approximately 0.29 acre of central coast riparian scrub, 0.07 acre of freshwater emergent wetland, and 0.5 acre of freshwater seep. Characteristics of these habitats are described in detail in *Draft Environmental Impact Report, Buena Vista Landfill Soil Management Plan, Santa Cruz County, California* (*HLA,* 1996).

4.0 MITIGATION PLAN

4.1 Proposed Mitigation Sites

4.1 .l Locations

East Channel Site. The County of Santa Cruz proposes to expand wetland and riparian habitat associated with the drainage ditch along the eastern boundary of the project site, north of the East Channel. The hydrologic route of the ditch will be relocated farther away from the edge of Buena Vista Drive to correct an existing erosional problem that threatens the roadway. The East Channel and drainage ditch will be hydrologically connected and vegetated to create a continuous riparian corridor. A 50-foot-wide buffer zone along the west sides of the drainages will be planted with native upland species, and an open space corridor that encompasses the drainages and buffer zones will be preserved.

North Channel Site. Habitat along the lower portion of the North Channel (from the confluence with the East Channel upstream to existing riparian vegetation] will be expanded and enhanced. A SO-foot-wide buffer zone

along both sides of the lower portion of the drainage will be planted with native upland species. In addition, an open space corridor extending outward from both buffer zones will be preserved along the drainage from Buena Vista Drive to the northern parcel boundary.

Seasonal Wetland Site. A series of seasonal ponds will be created on a County-owned parcel adjacent to and south of the project site. The parcel slopes up from Buena Vista Drive at a 2-to-1 gradient before leveling out to a 13 percent slope (7.5 to 1). A steep bluff, approximately 30 feet high, rises from the level area along the northern boundary of the parcel. The ponds will be excavated within the relatively level area of the parcel at the base of the steep bluff. The ponds will be 0.11, 0.13, and 0.16 acres in size, with maximum depths of up to 4 feet. The ponds will be vegetated with seasonal wetland species native to the area. The combination of shallow and deeper water habitats will provide breeding, foraging, and escape habitat for amphibians and a variety of aquatic insects.

Water from a natural seep at the head of the South Channel will be conveyed to the ponds by a buried pipe.

Tree and Shrub Upland Corridor. Enhancement plantings will be installed along the east-facing slope at the eastern edge of the parcel between the southern end of the East Channel and the downstream end of the South Channel.

4.1.2 Ownership Status

East and North Channel Sites and Tree and Shrub Upland Corridor. The East and North Channel Sites and the Tree and Shrub Upland Corridor are part of the parcel that will be purchased by the County of Santa Cruz and held in County ownership for the 20-year life of the proposed stockpile project. County responsibility for maintenance and monitoring of the mitigation sites will likely be completed during this time. Following project completion, the County will sell or lease the property, which will be returned to agricultural production. Conditions will be placed on the lease or property title requiring that the mitigation sites remain undisturbed in perpetuity. Conditions will include the following:

- No grading, excavation, vegetation removal, or other physical disturbance will be allowed in the mitigation areas or the upland buffer zone
- Existing drainage patterns will not be altered; runoff from the existing contributing watersheds will continue to be directed to the mitigation sites
- Agricultural operations on areas of the property will be required to control erosion and minimize sedimentation in the mitigation sites.

Seasonal Wetland Site. The Seasonal Wetland Site is on a County-owned parcel. The County will place conditions on the deed to the property to require that the mitigation site remain undisturbed in perpetuity. The conditions will include the following:

- No grading, excavation, vegetation removal, or other physical disturbance will be allowed in the mitigation area or surrounding buffer zones
- Drainage patterns affecting the seasonal wetland area will not be altered; runoff from contributing watersheds will continue to be directed to the mitigation site in perpetuity.

4.1.3 Existing Jurisdictional Area

Mitigation at the East and North Channel Sites will expand and enhance wetland and riparian habitat along drainages subject to jurisdiction by ACOE and CDFG. Most of the drainage channels will be disturbed to create a series of level terraces confined by check dams. Total area of existing jurisdictional area that will be impacted by implementation of the mitigation plan includes 0.04 acre of drainage ditch and 0.12 acre of emergent wetland. Implementation of the mitigation plan at the Seasonal Wetland Site will not impact existing habitat subject to ACOE or CDFG jurisdiction.

4.2 Mitigation Design

The mitigation proposal provides for creation of a structurally diverse habitat with wildlife

cover and forage. Elements of the plan include:

North *and East Channel Sites (Plates* 2, 3, *and 4)*

- Creating wetland and riparian habitat along the relocated drainage ditch and North Channel by lessening the channel gradient and increasing the area of surface inundation (Plates 2 and 3)

- Creating a continuous corridor of wetland and riparian habitat from the northeast corner of the project site to the downstream terminus of the east channel along Buena Vista Drive

- Enhancing wetland/riparian habitat along the North Channel by planting with native emergent wetland and riparian shrub and tree species

- Enhancing habitat value along the relocated drainage ditch and North Channel by creating an upland buffer zone, vegetated with native trees and shrubs, along both sides of the channels.

- Preserving an open space corridor of more than 10 acres in size that encompasses the restored drainage ditch, the East Channel (Plate **4),** and the North Channel from Buena Vista Drive to the northern parcel boundary.

Seasonal Wetland Site (Plate 5)

- Creating three seasonally ponded areas, 0.11, 0.13, and 0.16 acre in size and 2 to 4 feet deep

- Directing surface flow from the South Channel seep to the 0.16-acre pond

- Grading back the eroding bluff to the northwest of the ponds to a 3 to 1 slope to reduce erosion and minimize sedimentation in the ponds

- Vegetating the graded bluff with native upland species to reduce erosion and enhance upland habitat around the perimeter of the ponds.

Tree and Shrub Upland Corridor (Plate 4)

- Enhancing existing upland habitat with native tree and shrub plantings.

The mitigation plan provides for a combination of "in-kind" replacement of central coast riparian scrub and emergent wetland habitats at the North and East Channel Sites'and "out-of-kind, onsite" creation of seasonal wetland at the Seasonal Wetland and Tree and Shrub Upland Corridor Sites. Upland buffer zones will be enhanced by planting with native species upslope of the created riparian habitat'and around the perimeter of the seasonal ponds. Conceptual grading and planting plans are shown on Plates 2, 3, 4, and 5.

The area of jurisdictional wetland (ACOE and CDFG jurisdiction) to be created at the North and East Channel Sites was calculated by measuring the area of channel bottom up to the toe of slope. Riparian habitat to be created (CDFG jurisdiction) was calculated by measuring the area from the toe of slope to the elevation anticipated to be planted with riparian species (approximately 4 to 6 feet above the channel bottom). As installed shrubs and trees mature, the canopy cover will increase the width of the riparian zone along the channel. Acreage under CDFG jurisdiction to be impacted/created was determined by combining wetland and riparian habitat areas.

Area of seasonal wetland to be created at the Seasonal Wetland Site was calculated by measuring the area of the ponds to their maximum elevations (ACOE and CDFG jurisdiction). The area of riparian habitat be created around the perimeter of the ponds was calculated by measuring area from the maximum elevation of the ponds to the elevation proposed to be planted with riparian-species (CDFG jurisdiction). Table 1 estimates acres of jurisdictional area (by agency) that will be impacted by the project, impacted by the mitigation plan, and created by the mitigation plan.

Implementation of the wetland and riparian mitigation plan will result in a total of 2.29 acres of native wetland and riparian habitat at

the North and East Channel and Seasonal Wetland sites. Approximately 0.04 acre of jurisdictional waters along the drainage ditch and 0.12 acre of emergent wetland along the North Channel will be temporarily impacted by recontouring the channels. Consequently, the net area of created habitat will be approximately 2.13 acres. The area of created habitat will be 2.7 times greater than the area impacted by the project. In addition, approximately 5 acres adjacent to the wetland mitigation sites will be enhanced by planting with native upland species. Mitigation at the North and East Channel Sites was designed to maximize habitat value by varying contours within the channel. Overall habitat creation by plant community type will be comparable to area by community type proposed to be impacted. Further, it is judged that habitat value will be enhanced by increasing topographic variation along the channels.

Hydrology/Topography

North and East Channel Sites. The existing drainages will be graded to create a series of level to nearly-level terraces confined by 2-foot-high check dams (Plate 2). The dams will be constructed of a cobble core below soil and willow wattles. Sediment will collect upstream of each check dam, and the channel flowline slopes will be significantly reduced by the formation of the terraces. The check dams may degrade over time but will serve the purpose of stabilizing the grade of the channel and allowing for the development of natural meanders.

Flow velocities will vary across the mitigation sites depending upon the channel configuration. Initial flow velocities after construction will be relatively high as a result of the lack of established vegetation and higher flowline gradients. Velocities will be reduced once vegetation is established and sedimentation behind the check dams and terrace formation occurs. Localized areas of potential scour and erosion will be protected by the placement of cobble and a dense cover of willow wattles. A degradable erosion control fabric may be placed along the channel bottom and lower banks to reduce erosion prior to plant establishment. A monitoring program will be initiated during the first several wet seasons after plan construction to identify areas that require implementation of additional erosion control measures.

***Seasonal** Wetland Site.* A series of three shallow ponds will be excavated into the existing slope at the base of the steep bluff (Plate 4). The intent of the mitigation will be to create seasonal wetlands or ponds that maintain surface water for only part of the year. The presence of surface water year-round is considered undesirable because of the potential for providing suitable habitat for the non-native bullfrog (*Rana catesbeiana*). Bullfrog is a highly predaceous species that could eliminate or prevent the establishment of native amphibian species in the ponds.

Two of the ponds will have maximum excavated side slopes of 3:1 down to a uniform bottom elevation. The largest pond will have 4:1 side slopes and level benches located two feet above the pond bottom. The bluff to the northwest of the ponds will be graded to a 3:1 slope and revegetated to reduce erosion and prevent sedimentation problems for the ponds.

The bottoms of the two smaller seasonal ponds will be lined with an impermeable clay layer (e.g. bentonite clay) to minimize loss of water through infiltration. Plant materials will be installed immediately following pond construction. It is believed that natural seepage and/or a high groundwater table may contribute water to the third pond. Therefore, the bottom of this pond will remain natural (i.e., no impermeable clay layer will be installed), and hydrologic conditions will be observed throughout the first year following construction. If the pond appears to retain water for sufficient periods of time to support wetland and riparian vegetation, no further modification of the pond will occur, and plant materials will be installed. If water does not appear to be retained long enough to support wetland and riparian vegetation, an impermeable clay layer will be installed, followed by planting.

A hydrologic analysis was conducted to calculate the storm water runoff volume that will discharge into each seasonal pond on a daily basis and evaluate the duration of ponding during an average water year. This analysis utilized local precipitation for an

average water year (1980; measured at the Watsonville Waterworks station) to compute the direct runoff that will be generated by drainage areas upgradient of the two ponds. Losses due to evapotranspiration and infiltration were also calculated. Daily evaporation losses from each pond surface area were calculated using average pan evaporation from the Alamitos station. Evaporation losses to the retained volume of the ponds were calculated on a daily basis for the average water year to determine how long the ponds will retain water.

The upper [southwestern) pond will have a maximum ponding elevation at 46 feet above mean sea level (amsl) and a maximum storage volume of 0.16 acre-feet (7,270 cubic feet). During an average water year, the pond will remain near the maximum pond volume from mid-December through the end of March. The storm water runoff volume captured by the upper pond will be depleted by late May, and the pond will not typically receive any additional inflow of storm water runoff until the initiation of the following wet season.

The lower (southeastern) pond will have a maximum ponding elevation of 38 feet amsl and a total storage volume of 0.18 acre-feet (8,262 cubic feet). The pond will retain storm water runoff volume from mid-December to the middle of May and will receive enough runoff volume to fill approximately 70 percent of the total design volume of the pond during an average water year.

The largest pond (northern pond) will have a maximum ponding elevation of 46 feet amsl and a total storage volume of 0.36 acre-feet (16,125 cubic feet). The pond will retain storm water runoff from mid-December to the middle of March. The pond will receive enough runoff volume to reach a maximum of approximately 23 percent of the total design volume during an average water year. Depending upon subsurface conditions at the site, natural seepage or a high groundwater table may contribute additional water to this pond. Subsequent to conducting the hydrologic analysis, it was determined that surface runoff from the seep at the headwaters of the South Channel will be directed to this pond. Although the rate of flow from the seep has not been quantified, it is anticipated that the flow will not be sufficient to result in the presence of surface water year-round. As described above, the pond will be monitored periodically throughout the year to evaluate hydrologic conditions. If the pond appears to be maintaining surface water longer than is desirable, the County, in consultation with resource agencies, may redirect all or a portion of the drainage from the South Channel seep. Surface water could be directed to the other ponds or to the small drainage channel that lies on the County-owned parcel, directly adjacent to and north of the ponds. The ponds will be monitored to ensure that surface water is not retained year-round.

Vegetation

The mitigation sites will be hydroseeded and planted with herbs and forbs native to the region of the project site. Tree and shrub species from a local source will be planted in zones according to their hydrological and elevational requirements. Emergent wetland species will be hand sown or planted along the bottom of the North and East Channel Sites, and in the seasonal ponds at the Seasonal Wetland Site. Riparian species such as willows will be planted along the toe and lower banks of the North and East Channel Sites and around the margins of the seasonal ponds. Deeper rooted species and those with lower soil moisture requirements (upland plantings) will be installed along the upper banks and buffer zones of the North Channel, restored drainage ditch, East Channel, Tree and Shrub Upland Corridor, and along the slope to be graded back at the Seasonal Wetland Site. Planting specifications are provided in Tables 2 and 3. Conceptual planting plans are provided on Plates 3, 4, and 5.

Plant propagules will be obtained from onsite and local sources. Advanced notice will be given to the supplier/grower to ensure that the required species are available prior to implementation of the mitigation plan. Plant installation will be supervised by a biologist or other qualified professional with knowledge and experience in native plant revegetation. Planting will be initiated in the spring of 1999.

4.3 Mitigation Site Maintenance

The County of Santa Cruz will be responsible for maintenance necessary to promote establishment of the mitigation sites. Maintenance may include removal of trash and debris, weeding to eradicate non-native species, inspection and maintenance of the irrigation system, replacement of dead or dying trees or shrubs, and monitoring to identify the need for remedial action. If excessive erosion is observed, maintenance in the form of reapplication of hydroseed mulch and/or other erosion control measures will be implemented.

Exotic plant species may invade the mitigation site after project implementation. Potentially invasive plants should be removed before they set seed in the spring [generally March through June). Invasive plants should be hand-pulled or mowed, bagged, and removed from the site.

A temporary irrigation system will be installed at the mitigation sites to water trees and shrubs. The system will be designed to deliver periodic deep irrigation (versus frequent light irrigation customarily provided for ornamental landscapes) to promote deep root growth. Delivery of 2 gallons of water per plant, 3 times per week is recommended for the first 3 to 5 months following planting. Time and duration of watering will be reduced at the direction of the monitoring biologist as plants become established.

Unsuccessful plantings will be replaced as needed to bring the mitigation site into compliance with the minimum success criteria (see below). Replanting should be conducted in the late fall (mid-October through mid-December) or early spring (early March through mid-April).

4.4 **Performance** Criteria

The mitigation sites will be considered successful when they provide functions and values comparable to those currently existing on the project site. The success of the mitigation plan will be measured in terms of percent survival of trees and shrubs, cover of native emergent and herbaceous vegetation, and overall condition and function of the created habitat.

The performance goal for installed shrubs and trees will be 80 percent survival 5 years after the initial planting date. The performance standard for native emergent and herbaceous species will be 70 percent cover 5 years after the initial planting date. Maintenance and/or replacement planting will be performed as necessary to achieve target goals. Replacement plants will be monitored with the same performance goals for 5 years after replacement planting.

It is expected that overall performance criteria will be achieved within 5 growing seasons following implementation of the mitigation plan. Herbaceous vegetation and some faster growing species, such as willows, may mature within 2 to 3 years. Establishment of slower growing shrubs and trees may not occur for several years.

5.0 MONITORING AND REPORTING

5.1 Monitoring

The mitigation sites will be surveyed by a qualified biologist immediately following implementation of the mitigation plan to ensure compliance with the plan. Any modifications to the plan will be recorded to provide a baseline of information with which to evaluate progress at the sites. Ongoing monitoring of the mitigation sites will be conducted to track the progress of the mitigation plan. Data will be gathered on standardized data forms to ensure consistency and allow for comparison of results.

The following information will be gathered during monitoring visits:

- General site conditions
- Percent survival of all trees and shrubs planted
- Percent cover by species of herbs and grasses
- Mortality and other problems such as insect damage; observations will be noted and documented with photographs

- General health and vigor of mitigation plantings
- Evidence of sedimentation and/or erosion along the mitigation sites.

Permanent transects and photographic points will be established at the mitigation sites and marked in the field. Representative photographs will be taken from permanent locations during each monitoring visit to illustrate year-to-year progress of the overall project.

Quantitative monitoring will involve counting survival of all planted trees and shrubs and measuring percent cover using the line-intercept method. Transect locations will be chosen for their ability to represent the site. Permanent transects will be installed at appropriate intervals within each planting zone.

Monitoring will be conducted for a minimum of five years or until performance criteria are attained. Four monitoring visits will be conducted during the first year following plan implementation. A baseline survey will be conducted immediately following implementation to ensure that grading and planting were conducted according to the plan. One survey will be conducted after the first significant storm event following plan implementation to observe hydrologic conditions in the mitigation site and identify the need for any corrective action. Two additional surveys will be conducted at two to three month intervals to observe hydrologic conditions, ensure the irrigation system is functioning properly, and document any plant loss.

Monitoring will be continued on a biannual basis for the remaining four years of the monitoring period. Quantitative sampling will be conducted in the spring of each year to document tree and shrub survival and measure plant cover. A second monitoring survey will be conducted in the early fall of each year to perform a qualitative evaluation of progress of the plan, observe water elevations in the seasonal ponds, and identify the need for any remedial action.

5.2 Reporting

5.2.1 As-Built Conditions

If any significant deviations from the approved mitigation plan occur during project implementation (including any changes in site topography or the design or location of erosion control structures), an as-built report describing these changes shall be prepared within six weeks of completion of site preparation and planting. If no significant changes have been made, no as-built report will be necessary unless specifically requested during the permitting or compliance process. However, the County of Santa Cruz will issue a letter to permitting agencies stating that the project has been implemented as planned.

5.2.2 Annual Reports

Annual reports will be prepared that describe methods and results of the monitoring surveys, summarize the overall progress of the mitigation plan, and make recommendations for remedial actions. The reports will include the following information:

- An analysis of all quantitative and qualitative monitoring data, with appropriate figures, graphs, and/or tables
- A discussion of the significance of that year's results
- Maps identifying monitoring areas, sampling/transect locations, planting zones, etc., as appropriate
- Prints or color reproductions of monitoring photographs.

Annual monitoring reports will be completed by July 30 each year for five years following implementation of the mitigation plan.

Table 1. Area of Wetland Impact and Mitigation
Wetland and Riparian Mitigation Plan
Buena Vista Landfill Soil Management Plan

	ACOE		CDFG
	Wetland	Other Waters	
Impacts			
Impacted by Project (South Channel)	0.79		0.79
Temporarily Impacted by Mitigation (Drainage ditch and North Channel)	**0.12**	**0.04**	**0.16**
Total Impact	**0.91**	**0.04**	**0.95**
Mitigation			
Area to be Created (North and East Channel Sites)	0.92		**1.73**
Area to be Created (Seasonal Wetland Site)	**0.40**		**0.56**
Total Wetland Mitigation	**1.32**		**2.29**

Table 2. Planting Specifications
North and East Channel Sites, Tree & Shrub Upland Corridor
Wetland and Riparian Mitigation Plan
Buena Vista Landfill Soil Management Plan

Species	Number	Size	Spacing/Pattern
Central Coast Riparian Scrub Plantings			
spreading wood fern (*Dryopteris expansa)*	100/acre	l-gallon	scattered in groups of 5 under willows and oaks, 5 ft. on center
creeping snowberry (*Symphoricarpos mollis)*	100/acre	l-gallon	scattered, 8 ft. on center
California blackberry (*Rubus ursinus*)	200/acre	l-gallon	in clusters of 3 to 5, 10 ft. on center
wild rose *(Rosa californica*)	80/acre	1 -gallon	scattered, 8 ft. on center
California figwort (*Scroph ularia californica)*	80/acre	l-gallon	scattered, 6 ft. on center
red willow (*Salix laevigata*)	ZOO/acre	cutting	scattered, 10 ft. on center
arroyo willow *(Salix lasiolepis*)	ZOO/acre	cutting	scattered, 10 ft. on center
shining willow (*Salix lucida Jasiandra)*	200/acre	cutting	scattered, 10 ft. on center
coast live oak (*Quercus agrifolia*)	100/acre	l-gallon	scattered, 20-30 ft. on center
Emergent Wetland Plantings			
common horsetail (*Equisetum arvense)*	ZOO/acre	l-gallon or divisions	scattered
small-fruited bulrush (*Scirpus microcarpus)*	400/acre	l-gallon or divisions	scattered, 6 ft on center
iris-leaved rush (*Juncus xiphioides*)	400lacre 2 lbs/acre	l-gallon or divisions seed	scattered, 6 ft. on center hand sow
Pacific rush (*Juncus effusus pacificus*)	400/acre	l-gallon or divisions	scattered, 6 ft. on center

Table 2. Planting Specifications
North and East Channel Sites, Tree & Shrub Upland Corridor
Wetland and Riparian Mitigation Plan
Buena Vista Landfill Soil Management Plan

Species	Number	Size	Spacing/Pattern
watercress (*Rorippa nasturtium-aquaticurn)*	5 lbs/acre	seed	hand sow
common monkeyflower *(Mimulus guttatus)*	2 lbs/acre	seed	hand sow
Upland Plantings			
coyote brush *(Baccharis pilularis)*	220/acre	l-gallon	scattered, 10 ft. on center
California coffeeberry (*Rhamnus c. californica*)	110/acre	l-gallon	scattered, 10 ft. on center
toyorl *(Heteromeles arbutifolia)*	110/acre	l-gallon	scattered, 10 ft. on center
sticky monkey flower *(Mimulus auranticus)*	110/acre	1 -gallon	scattered, 8 ft. on center
California sagebrush (*Artemisia californica*)	110/acre	l-gallon	scattered, 10 ft. on center
coast live oak *(Quercus agrifolia)*	50/acre	l-gallon	scattered, 20-30 ft. on center
Hydroseed Mix			
bicolored lupine (*Lupinus bicolor*)	2 lbs/acre	seed	hydroseed
tomcat clover *(Trifolium willdenovii)*	2 lbs/acre	seed	hydroseed
suncups *(Camissonia ovata)*	2 lbslacre	seed	hydroseed
California poppy *(Eschscholzia cahfornica)*	1 lb/acre	seed	hydroseed
rigid hedge nettle *(Stachys ajugoides rigida)*	3 lbs/acre	seed	hydroseed
California oatgrass *(Danfhonia c. californica)*	4 lbs/acre	seed	hydroseed

Table 2. Planting Specifications
North and East Channel Sites, Tree & Shrub Upland Corridor
Wetland and Riparian Mitigation Plan
Buena Vista Landfill Soil Management Plan

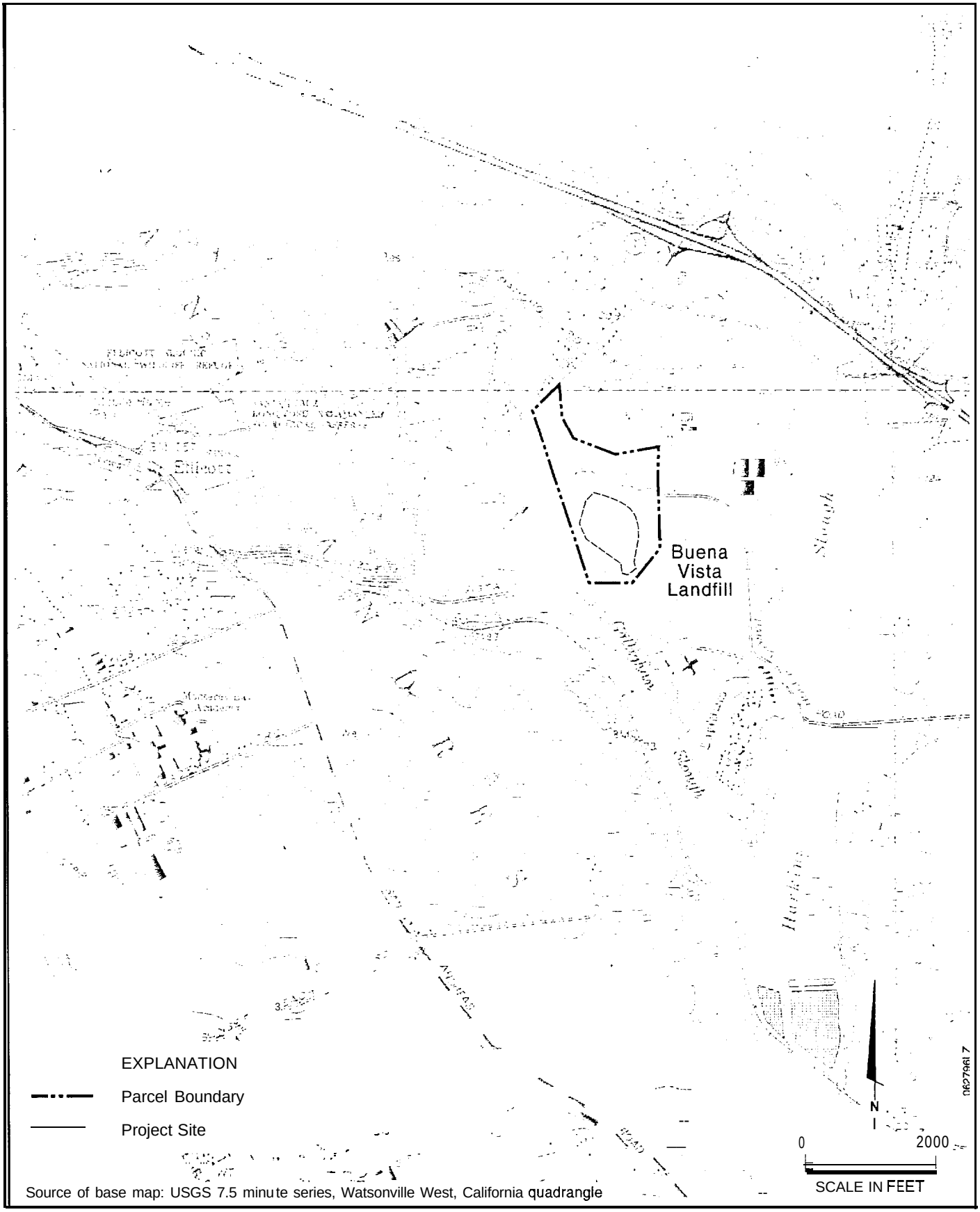
Species	Number	Size	Spacing/Pattern
willow weed *(Polygonum lapathifolilum)*	3 lbs/acre	seed	hydroseed
American brookline *(Veronica americana)*	2 lbs/acre	seed	hydroseed
red fescue *(Festuca rubra)*	2 lbs/acre	seed	hydroseed
purple needlegrass *(Nassella pulchra)*	4 lbs/acre	seed	hydroseed
California brome *(Bromus c. carinatus)*	5 lbs/acre	seed	hydroseed

Table 3. Planting Specifications
Seasonal Wetland Site
Wetland and Riparian Mitigation Plan
Buena Vista Landfill Soil Management Plan

Species	Number	Size	Spacing/Pattern
Emergent Wetland Plantings			
common horsetail (*Equisetum arvense*)	ZOO/acre	l-gallon or divisions	scattered
brown-headed rush *(Juncus phaeocephalus)*	800/acre	divisions	scattered, 5 ft. on center
Pacific rush *(Juncus effusus pacificus)*	400/acre	l-gallon or divisions	scattered, 10 ft. on center
pale spikerush (*Eleocharis macrostachya)*	400/acre	divisions	scattered, 10 ft. on center
common monkeyflower *(Mimulus guttatus)*	2 lbs/acre	seed	hand sow
meadow barley (*Hordeum brachyanfherum)*	200 lbs/acre	seed	hand sow
red fescue (*Festuca rubra*)	2 lbs/acre	seed	hydroseed
Riparian Plantings			
arroyo willow *(Salix lasiolepis)*	ZOO/acre	cutting	scattered, 10 ft. on center
creeping snowberry *(Salix lucida lasiandra)*	100/acre	l-gallon	scattered, 8 ft. on center
wild rose *(Rosa californica)*	80/acre	l-gallon	scattered, 8 ft. on center
California figwort *(Scrophularia californica)*	80/acre	l-gallon	scattered, 6 ft. on center
Upland Plantings			
coyote mint *(Monardella villosa)*	110/acre	l-gallon	scattered, 10 ft. on center
California coffeeberry (*Rhamnus c. californica*)	110/acre	l-gallon	scattered, 10 ft. on center

Table 3. Planting Specifications
Seasonal Wetland Slte
Wetland and Riparlan Mitlgatlon Plan
Buena Vista Landfill Soil Management Plan

Species	Number	Size	Spacing/Pattern
toyon (*Heteromeles arbutifolia*)	110/acre	l-gallon	scattered, 10 ft. on center
Hydroseed Mix			
bicolored lupine *(Lupinus bicolor)*	2 lbs/acre	seed	hydroseed
elegant clarkia (*Clarkia unguiculata*)	2 lbs/acre	s e e d	hydmseed
suncups *(Camissonia ovata)*	2 lbs/acre	seed	hydroseed
California poppy *(Eschscholzia californica)*	1 lb/acre	seed	hydmseed
California oatgrass *(Danthonia c. californica)*	4 lbs/acre	seed	hydroseed
purple needlegrass (*Nassella pulchra*)	4 lbs/acre	seed	hydroseed
California bmme (*Bromus c. carinatus)*	5 lbs/acre	seed	hydroseed



Harding Lawson Associates
Engineering and
Environmental Services

Site Location Map
Buena Vista Landfill
Soil Management Plan
Santa Cruz County, California

PLATE
1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LZc	34720 013		6/96	