

COUNTY OF SONOMA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC WORKS
575 ADMINISTRATION DRIVE, ROOM 117A
SANTA ROSA, CALIFORNIA 95403
Edward J. Walker, Director



AREA CODE (707)
ROADS 565-2231
TRANSIT 585-7516
REFUSE 565-2231
AIRPORT 524-7243
AIR POLLUTION 433-5911
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CENTRAL DISPOSAL SITE IMPROVEMENT PROJECT

WETLANDS MITIGATION

August 18, 1999

The following materials are presented as part of the Joint Technical Document (JTD) submittal for the Central Disposal Site Improvement Project as required by the Code of Federal Regulation, Title 40—Protection of Environment, Chapter I—Environmental Protection Agency, Subchapter I—Solid Wastes, Part 258—Criteria for Municipal Solid Waste Landfills, Subpart B—Location Restrictions to show compliance with the subject wetlands requirements in Subtitle D:

Sec. 258.12 Wetlands

(a) (1): See attached Alternatives Analysis (PRMD, 8/99).

(a) (2) (i) & (ii): The JTD demonstrates that the disposal site design is intended to prevent violations of any applicable water quality standard. In the event of a release, Title 27 provides a script for evaluation monitoring and corrective action to restore groundwater quality objectives. The implementation of best management practices required under the General Storm Water Permit for Industrial Activities for landfill operations, and, as applicable, under the General Storm Water Permit for Construction Activities, similarly protects surface waters, including Stemple Creek.

This topic is dealt with in many areas of the JTD that discuss site characteristics, which contribute to safe operation of the landfill. These include:

- Section 4 - Geology and Hydrogeology
- Section 8 - East Canyon Area Design
- Section 10 - Preliminary Closure Plan
- Section 11 - Preliminary Post Closure Maintenance Plan

Monitoring is discussed in Section 7 – Monitoring and Control systems and in the Water Quality Protection Report and Evaluation Monitoring and Corrective Action Program (EMCAP) with are both presented in Appendix D-1

This is also dealt with in the Storm Water Pollution Prevention Plan (SWPPP) which is included in Appendix C-2 of the JTD. Revisions to the SWPPP for East Canyon will also be submitted out side of the JTD as part of activities to amend the General storm water Permit to cover East Canyon.

(a) (2) (iii): Surveys for endangered or threatened plant and animal species or their habitat were conducted as described in section 3.7, Biological Resources, of the Central Disposal Site Improvement Program Final Environmental Impact Report, (*certified 12/98*). No endangered or threatened species or their habitat were found thus the project will not jeopardize the continued existence of these. The project would impact habitat of the northern red-legged frog (*Rana aurora auroura*), which is a California Species of Special Concern. The project includes a mitigation measure (as described in the EIR and the Wetland Mitigation and Monitoring Plan) that will reduce the impact to a less than significant level.

(a) (2) (iv): As described in the Central Disposal Site Improvement Program Environmental Impact Report, Response to Comments Document Volume 1 (*November, 1998*), responses HH-16 & HH-19, the Stemple Creek watershed does discharge into Bodega Bay, which is part of a marine sanctuary (Point Reyes/Farallon Islands National Marine Sanctuary). The limits of the Sanctuary lie at the mean high tide line along the coast and does not extend upstream into Stemple Creek's headwaters where the project is located. The project does not discharge any water into surface waters other than noncontact stormwater after it has been detained to remove sediment. As the quality of the stormwater discharged from the project site is required to be in compliance with the North Coast Region Plan (North Coast Regional Water Quality Control Board), the project will not violate any of the requirements under the Marine Protection, Research, and Sanctuaries Act.

(a) (3) (i), (ii), & (iii): The proposed project design, as described in the JTD, meets the waste containment criteria for a Class III landfill under Title 27, minimizing the

potential for a release of solid wastes or leachate which could impact wetlands. The project design includes consideration of slope and seismic stability, drainage controls, and erosion prevention, minimizing the potential for any release of wastes caused by a loss in structural integrity of the WMU, migration of eroded soils or wastes, or migration of waste constituents in drainage.

Information in the JTD includes the following related to specific issues in this portion of the regulation.

Waste Containment

- Section 8.3 Containment System
- Section 8.6 Interim and Final Cover systems

Slope and Seismic Stability

- Section 9.1 Slope Stability
- Section 9.2.1 Foundation Settlement
- Section 9.3 Liquefaction and engineering analyses in Appendix F
- Section 10.5 Slope Stability Analyses (for final closure)

Drainage and Erosion Control

- Section 8.5 Surface Water Management System
- Section 10.3 Description of Final Cover, specifically the drainage and erosion layers
- Section 10.7.3. Surface-Water Management System (final closure)
- Section 11.2.5 Surface-Water Management System (postclosure maintenance)
- Appendix F-8 Surface Water Drainage Analyses

(a) (3) (iv): The collection and off-site disposal of leachate, as described in the JTD in the sections listed below, minimizes the potential for a catastrophic release, which could impact aquatic resources and habitat.

- Section 3.5.2 Leachate
- Section 7.3 Existing Leachate Control and Monitoring Systems
- Section 7.6 Proposed Leachate Management system

Section 8.3.4 Leachate Collection and Removal System (LCRS)
Section 9.4 Leachate Generation
Appendix F-2 Leachate Generation and LCRS Design Analyses

Also, see the project EIR for detailed discussion of project impacts.

(a) (3) (v): The potential for catastrophic release of waste to the wetland is limited by the design of the project, as described in the JTD. Any catastrophic failure of the landfill would be generally limited to the immediate vicinity, which could be rapidly contained and mitigated. In the event of contamination of groundwater, the project includes the means to monitor and detect such contamination before it becomes extensive, allowing for remediation of the problem in a timely manner. The monitoring programs are discussed in detail in the following sections of the JTD.

Section 7 Monitoring and Control systems
Section 10.7 Environmental Monitoring and Control Systems at Closure
Section 11.2.4 Water Quality Monitoring System
Appendix D-1 Water Quality Protection Report and Evaluation Monitoring and Corrective Action Program (EMCAP)

(a) (3) (vi): The project will result in the removal of all of the wetlands within the east canyon landfill expansion area, thus no additional factors are included or needed to protect the ecological resources in the wetland features in this canyon.

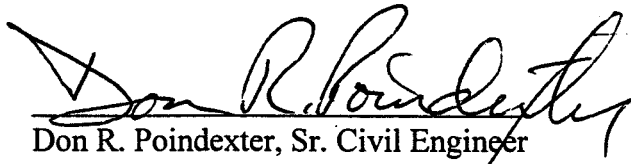
(a) (4): As described in item (a) (1), it is not practicable to avoid impacts to the wetlands in the east canyon landfill expansion area. In order to mitigate for the loss of the wetland feature, the County will implement the Wetland Mitigation and Monitoring Plan (*August, 1999*). This Plan will create an equal or greater area of seasonal wetland, will replace habitat of the northern red-legged frog, and will enhance degraded upland conditions on the site to provide for additional habitat for plants and animals. For more details, refer to the Mitigation Plan.

(a) (5): With the referenced attachments, adequate information is available to make a reasonable demonstration with respect to these demonstrations.

Central Disposal Site
Wetlands Mitigation
August 18, 1999

Prepared by:

County of Sonoma
Department of Transportation and Public Works
Integrated Waste Division



Don R. Poindexter, Sr. Civil Engineer

Attachments:

Central Disposal Site Improvement Program, Alternatives Analysis, August 18, 1999,
by Sonoma County Permit and Resource Management Department, Environmental
Review Division (PRMD).

Wetland Mitigation and Monitoring Plan, August 1999, by PRMD.



COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT
Environmental Review Division

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SONOMA COUNTY
CENTRAL DISPOSAL SITE
IMPROVEMENT PROGRAM

ALTERNATIVES ANALYSIS

August 18, 1999

Introduction

The Central Disposal Site is a 392-acre parcel located about 3 miles southwest of the City of Cotati. The surrounding land uses are agricultural (mainly dairy) and rural residential. The existing landfill on the site has been in operation over 25 years, and occupies approximately 130 acres of the site. The existing landfill has sufficient capacity to remain in service at least until the year 2006. In addition to the landfill, the site also contains a wood chipping facility, a green waste compost facility, a 6 megawatt power plant that burns landfill gas, a recycle/reuse facility, an equipment maintenance building, and an administration building.

Sonoma County proposes to construct improvements to the Central Disposal Site. The project has five components: (1) an expansion of the existing landfill; (2) a household hazardous waste collection facility; (3) a landfill gas fuel facility; (4) a contaminated soil bioremediation facility; and (5) operational improvements. Two of the components (landfill expansion and operational improvements would result in fill in waters of the U.S. and adjacent wetlands). The landfill expansion fill in wetlands is not regulated by the COE but, in California, by the Regional Water Quality Control Boards. The fill in wetlands for the operational improvements outside of the proposed landfill expansion areas will require a fill permit from the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act.

This alternatives analysis has been prepared to determine whether there is a practicable alternative to the proposed fill in the east canyon that would have less adverse impact on the aquatic ecosystem. An alternative is considered practicable if it is available and capable of being implemented after considering cost, technology, and logistics in light of overall project objectives. Information for this analysis was taken from the Final EIR for the Central Disposal Site Improvement Program (certified by Sonoma County Dec. 8, 1998), and the Final EIR for the County Wide Integrated Waste Management Plan (certified by Sonoma County June 28, 1994).

Project Description

Only two of the project components would have any effect on aquatic ecosystems. They are the landfill expansion and the operational improvements. The landfill expansion will occupy an adjacent canyon to the east (the East Canyon Landfill Expansion).

East Canyon Landfill Expansion: The County will begin filling the East Canyon in 1999 or 2000, depending on the status of permit from the Regional Water Quality Control Board. Fill will begin at the bottom (south end) of the East Canyon and progress toward the north in stages over a period of several years. Each phase will begin by clearing the vegetation and excavating the area to remove rock and soil to establish the appropriate subgrade for the landfill. Maximum excavation depths will be 50 to 60 feet below existing grade.

When the subgrade has been established, a capillary break and leachate control and removal system (LCRS) will be installed. The capillary break will consist of a layer of permeable material (crushed rock) approximately one foot thick, which will serve to intercept ground water and keep it from contacting the landfill liner. The base of the LCRS will be a low permeability layer of compacted clay, covered by an impermeable synthetic liner. Above this will be a system of leachate collector pipes in a permeable layer of crushed rock. The top layer will be approximately two feet of clean soil, which will serve to protect the LCRS from equipment used to spread and compact the refuse.

Refuse will be placed and compacted in the new landfill area. Each day the exposed refuse will be covered by clean soil or by an approved alternate cover (such as a thin plastic sheet). When the refuse has reached the design capacity, approximately in the year 2014, a cover of clean soil will be placed over the landfill and a grass cover established. The County is responsible for monitoring and maintaining the closed landfill indefinitely, and has established a separate fund to accomplish this.

Operational Improvements: The operational improvements are intended to provide safer and more convenient waste disposal and recycling service to the public. These improvements consist of a new covered public dumping area, a new recycle/reuse facility, and the associated access roads.

The covered public dumping area will be constructed in the northern part of the landfill parcel. It will consist of a steel frame structure about 225 long and 120 feet wide, with a paved tipping floor and a trailer loading area at a lower elevation. The structure will be enclosed on three sides, with the fourth side open for public vehicle access. The public will dump refuse on the paved floor, and landfill workers will move the refuse with a rubber tired loader to a bay where it will fall into a transfer trailer. The transfer trailer will be moved to the active landfill area when full.

Currently, the public uses an open tipping apron that is immediately adjacent to and about 10 feet above the active landfill area. People back their vehicles to the edge of the apron, and simply throw the refuse into the landfill. There are several problems associated with this practice. The active landfill area moves every few months, and this requires constant reconstruction of the tipping apron. In addition, customers can be injured by falling into the landfill or backing their vehicle into the landfill. Also, because the tipping apron is open, windborne litter is a constant problem. The proposed covered dumping area will address all these problems.

The Recycle/Reuse facility currently consists of a paved area where people park their vehicles and unload recyclable and reusable materials. Recyclables are put into bins, which are periodically hauled off-site to appropriate recycling facilities. Reusable materials are stored on-site and sold to the public. This facility is inconvenient to use because of the limited space, and it is difficult to service the recycling bins. The proposed new facility would be operated in the same manner, but would be larger and more convenient to use.

The proposed layout of the landfill facilities is specifically designed to encourage a key objective of the County's integrated waste management plan: to emphasize the solid waste management hierarchy of waste prevention, reuse, recycling, composting, and disposal.

With the proposed layout, the public users will enter the landfill property and first pass by a Household Hazardous Waste Collection facility, where they will drop off any hazardous materials. These materials will be packed by trained staff for shipment to appropriate off-site disposal or recycling facilities. This will reduce the potential that hazardous materials will be improperly disposed in the landfill, which is prohibited from accepting hazardous materials for disposal. After passing the Household Hazardous Waste Collection Facility, the public will come to the recycle/reuse facility, where they will drop off any recyclable or reusable materials. This will encourage them to recycle and reuse, thereby reduce the amount of waste that goes into the landfill. After passing the recycle/reuse area, the public will finally reach the dumping area, where they will dump the remainder of their refuse.

Project Objectives

State law requires that each county and the incorporated cities within that county adopt a County-wide Integrated Solid Waste Management Plan (CoIWMP). Sonoma County and the nine incorporated cities jointly prepared and adopted a CoIWMP in 1994. The overall objective of this project is to improve, expand, and offer new solid waste disposal services in a manner consistent with the CoIWMP. The objectives listed below are taken from the adopted plan.

- Improve the municipal solid waste management system through emphasis on the

solid waste management hierarchy of waste prevention, reuse, recycling, composting, and disposal

- Achieve a 50 percent diversion of wastes being disposed of in County landfills by the year 2000
- Plan and operate the solid waste management system in a manner to protect public health, safety, and the environment
- Eliminate prohibited wastes, including household hazardous wastes, from municipal solid waste
- Provide cost-effective waste management services to all community residents
- Promote access to waste management services
- Site and operate solid waste disposal facilities in a manner to maximize energy efficiency
- Site and operate solid waste disposal facilities in a manner to conserve natural resources
- Site and operate solid waste disposal facilities in a manner to protect prime agricultural lands and other environmentally sensitive or culturally sensitive areas.

The specific objectives of the landfill expansion components are:

1. To provide landfill capacity at least through the year 2009, as required by State law.
2. To provide the County time to secure a replacement landfill site.
3. To provide the capacity in a manner consistent with the adopted CoIWMP.
4. To provide the capacity in an environmentally safe and economically efficient manner.

The specific objectives of the operational improvements are:

1. To improve the safety and efficiency of the public dumping area.

2. Arrange the layout of the recycle/reuse facility and the traffic pattern in the Central Disposal Site so that the facility is more convenient to use and landfill customers are encouraged to use the recycle/reuse facility before using the public dumping area.
3. To remove the need to repeatedly construct temporary public dumping areas at the landfill.

Alternatives That Would Avoid the Wetland Impact

A range of alternatives were considered. The discussion below focuses on the alternatives that could avoid filling wetlands.

1. Landfill Expansion Alternatives

Other Technologies: During preparation of the CoIWMP, alternatives to landfilling that would dispose of solid waste in some other manner were considered by the County and the nine incorporated cities within the County. Landfilling was determined to be the preferred method, and this is now the adopted public policy for solid waste management in Sonoma County.

On-Site Alternatives: No on-site alternatives exist. The East and West Canyons are the only unused areas remaining on the site that are suitable for landfilling. The West Canyon also has wetland features similar to the east canyon and is proposed for filling at a later time.

Off-Site Alternatives: In 1989 a siting study for a new landfill was conducted by the County. The list of potential sites was narrowed to four sites thought to have the best combination of features for a new landfill. Detailed geological investigations were undertaken at each site to determine whether any had fatal geologic flaws that would prevent construction of a landfill. It was concluded that each of the four has geological characteristics that make it suitable for a landfill.

A preliminary biological evaluation was also performed at each site to determine the potential for sensitive species or any important biological resources. Each of the four sites contains wetlands similar to those that would be impacted by the proposed project (i.e., streams and hillside seeps). In each case, the total wetland impact would be greater at the alternative site than at the proposed site.

Based on the above, it is concluded that there is not a practicable alternative to the proposed landfill expansions that would avoid or reduce the impact to aquatic resources.

2. Operational Improvements Alternatives

On-Site Alternatives: By reducing the proposed size of the East Canyon expansion, it would be possible to create an alternate layout of the recycle/reuse area and public dumping area that would reduce the area of wetlands that would be impacted. However, the wetland impact would only be reduced by 0.2 acres. This alternative was rejected because there are overriding public benefits that would result from the proposed project.

The alternate layout would result a smaller landfill capacity, which would mean that the Central Disposal Site and all its infrastructure improvements would not be used as efficiently. This would increase the landfilling costs to the public, and would require the development of a new landfill at an earlier date.

In addition, the alternate layout would result in an undesirable traffic pattern on the site.

The proposed site layout was designed to create a traffic pattern that will help achieve two important objectives: to eliminate household hazardous wastes from the wastes being disposed of in the landfill; and to divert materials from the waste stream by encouraging recycling and reuse. The proposed project would require people to first pass by the household hazardous waste collection facility, where they could easily drop off any hazardous materials. This would make it less likely that they will dispose of hazardous materials improperly with the rest of their refuse. After passing the household hazardous waste facility, the user would pass by the recycle/reuse area. This would encourage people to drop off materials that can be recycled or reused, thereby diverting these materials from the waste stream. In contrast, the alternate layout would make it awkward for people to use the household hazardous waste facility or recycle facility prior to using the public dumping area. This would not encourage proper disposal of hazardous waste or recycling.

Off-Site Alternatives: Locating the public dumping areas off-site could reduce the wetland impact by approximately 0.3 acres. However, this alternative would have adverse impacts that would more than offset any benefit to aquatic habitats. Locating these improvements off-site would require developing a site in primarily agricultural and rural residential land.

In addition to unknown impacts on biotic resources from site development, this alternative would inevitably cause additional traffic impacts and land use incompatibilities that will not occur with the proposed project.

Conclusion

No practicable alternatives to the proposed landfill expansion that would avoid the impacts to aquatic habitats exist. No suitable on or off-site area has been identified where a landfill could be constructed with a smaller impact. Alternatives that would use a different method

of solid waste disposal than landfilling would not be consistent with the adopted County-wide Integrated Waste Management Plan.

No practicable alternative to the proposed public dumping area and recycle/reuse facility exist. An on-site alternative would create an undesirable traffic pattern, and would only reduce the wetland impact by about 0.3 acres. The same reduction could be attained by constructing these improvements off-site, but this would result in traffic and land use incompatibility impacts that would more than offset the slight reduction in wetland impact.

Prepared by:

Sonoma County Permit and Resource Management Department
Environmental Review Division



COUNTY OF SONOMA

PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue, Santa Rosa, CA 95403
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March 14, 2000

RE: Resubmittal of New Wetland Mitigation and Monitoring
Plan and Response to Jan 7 Letter on 401 Application
for the Central Disposal Site Improvement Program

Terri Kinney
Ca. State Water Resources Control Board
North Coast Region
5550 Skylane Blvd. Suite A
Santa Rosa, CA 95403

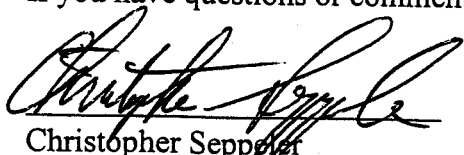
Several months ago, the Department of Fish and Game and the RWQCB expressed concern that the water quality in the creek channel through the Landfill Expansion Project wetland mitigation site is likely to have high ammonia and nitrate concentrations from the dairy upstream. These high concentrations are apparently known to adversely affect frogs, thereby, the habitat we create may not be suitable unless something is done upstream to improve the water quality.

A meeting was held with DTPW, staff from the RWQCB, Allan Buckmann (CDFG), Dr. Phil Northen (SSU Biology professor), and myself to discuss the feasibility of a revision to the plan that would avoid this potential water quality problem. At this meeting, the concept of seasonal wetlands adjacent to the creek, and frog habitat in the spring area met approval.

Since that meeting, a new Wetland Mitigation and Monitoring Plan (March 2000) has been prepared including a grading plan prepared by the DTPW. I met with Allan Buckmann last week to show him the grading plan and discuss the details of the project. Allan agreed with the plan and no changes were recommended.

Attached are two copies of the new Wetland Mitigation and Monitoring Plan (March 2000) as part of the submittal for the 401 Water Quality Certification. Also attached are responses to comments from your letter dated 1/7/00 to the 401 application submittal. Note that I will be resubmitting a 1601 Streambed Alteration Application to CDFG soon and I will send you a copy at that time.

If you have questions or comments, please call me at 565-3589.


Christopher Seppeler
Senior Environmental Specialist

cc: Don Pointdexter, Sonoma County Department of Transportation and Public Works - Refuse
Division (two copies of the Plan)
Bob Swift, Sonoma County Department of Health Services - Environmental Health

attachments

Responses to 1/7/00 Letter From the NCRWQCB on the 401 Application

For the Central Landfill Improvement Project

3/14/00

Response to Comment 1.

Below is a table to clarify the type of impact from the project the proposed mitigation for that impact, and additional enhancements to ensure there will be no net loss of habitat value. Not only is there no net loss of habitat, it is clear there will be a significant gain in habitat value when all of the components of the mitigation project are implemented.

Impact on Seasonal Wetland

The project and future development of the West Canyon would cause the loss of a total of 1.69 acres of seasonal wetland.

East Canyon	0.97
Tipping Facility	0.31
West Canyon (future project)	0.41

Mitigation: The Mitigation Plan includes creation of seven seasonal wetland features for a total of 2.6 acres. These seasonal wetland features will replace the 1.69 acres of seasonal wetland.

Impact on Non-wetland Waters

The project and future development of the West Canyon would cause the loss of a total of 0.12 acres of stream channel.

East Canyon	0.08
Tipping Facility	0.03
West Canyon (future project)	0.01

Mitigation: The value of non-wetland waters lost by the project will be replaced by the enhancement, restoration, and stabilization of approximately 1,000 feet of stream channel (approximately 1.4 acres).

Impact on Riparian Scrub

The East Canyon expansion will cause the loss of 0.5 acres of riparian scrub vegetation.

East Canyon	0.5
Tipping Facility	0
West Canyon (future project)	0

Mitigation: The mitigation plan includes restoration and enhancement of approximately 1,000 feet

of degraded stream by removing non-native trees and replanting native riparian species, installing check dams, bank restoration, and by excluding cattle from the stream. The restored area will be approximately 1.4 acres.

Impact on Frog Habitat

The East Canyon expansion will cause the loss of a pond containing 0.33 acre of habitat for the red-legged frog.

East Canyon	0.33
Tipping Facility	0
West Canyon (future project)	0

Mitigation: The wetland feature described above will include 0.5 acres of deep water pond by creating three pools in the hillside spring area of the site. This will exceed the area of the lost habitat.

Additional Enhancements

The mitigation plan includes additional enhancements that are not required as mitigation for any specific impact of the landfill project. They are intended to increase the function and value of the habitat created at the mitigation site.

Eucalyptus Removal: The two hillside groves of eucalyptus trees will be removed, in addition to some trees along Hammel Road.

Tree Planting: The mitigation plan includes approximately 3.75 acres of hillside tree planting, including at least 150 native plants.

Cattle Exclusion: Cattle will be excluded from the entire site by a perimeter fence. If grazing is deemed to be beneficial for the future management of the site, a Grazing Management Plan will be prepared and be subject to review and approval from CDFG and the NCRWQCB.

Response to Comment 2.

The following is a summary of where the required Biological Resource Mitigation Measures from the FEIR are included in the project. The ***Wetland Mitigation and Monitoring Plan*** (March 2000) will hereafter be referred to as the Plan.

Biological Resource Mitigation Measure No. 1: This mitigation measure requires creation and enhancement of wetlands so there will be no net loss of function or value, which the Plan accomplishes. All of the features on the landfill will be replaced by creation or enhancement on the wetland site (see response to comment 1). In addition to creating new wetlands, the Plan includes the creation of red-legged frog habitat, stream habitat restoration, an stream enhancement and stabilization component, and an oak savannah planting. This will create a site with a wide range of habitat types separate from the landfill site and human activities.

The mitigation measure does not require an acre-for-acre wetland replacement, however, the Plan provides for the creation of 2.6 acres of seasonal wetland for the 1.69 acres filled by the project.

In addition, the Plan provides for the creation of 0.5 acre of frog habitat for the 0.33 acre impacted by the project.

The grading plan and site details have been presented to Allan Buckmann of CDFG. Mr. Buckmann had no comments on the proposed plan. In addition, Dr. Phil Northen (SSU Biology professor) assisted in the development of the Plan for the site.

Biological Resource Mitigation Measure No. 2: The Plan describes the riparian planting component of the project (see page 9). This includes the restoration (removal of non native eucalyptus and other species) and revegetation with native riparian plant species along approximately 1,000 feet of stream channel. Since the existing eucalyptus trees extend at least 30 feet on either side of the stream, the riparian planting will result in the restoration of approximately 1.4 acres of riparian vegetation which exceeds the minimum 0.5 acre as specified in this mitigation measure.

The planting plan has been reviewed by Allan Buckmann of CDFG and Dr. Phil Northen, and their recommendations incorporated into the Plan.

Biological Resource Mitigation Measure No. 3: The Plan includes the creation of red-legged frog habitat (see page 8). The various components to create the frog habitat have been designed in consultation with the Department of Fish and Game and Dr. Phil Northen. This includes designing the three pond features to hold water for the appropriate amount of time, and the enhancement of the area with logs to provide refuge for frogs. The Department of Fish and Game has reviewed and concurred with the design.

As described in the Plan, the new frog habitat will be created one year prior to disturbing the existing habitat in the east canyon landfill area. Monitoring of the success of the habitat will occur for five years, as described in the Plan (see page 18).

Biological Resource Mitigation Measure No. 4: The language of this mitigation measure is included in the Plan (see page 9).

Biological Resource Mitigation Measure No. 5: The eucalyptus trees in the east canyon have been removed consistent with this measure. The eucalyptus trees on the mitigation site were removed prior to the nesting season.

Response to Comment 3.

The dam is no longer a component of this project.

Response to Comment 4.

Page 10 and Plate 1 of the Plan describe and show the work to occur in the vicinity of the failed dam at the southern end of the site.

Response to Comment 5.

Plate 1 in the Plan is the grading plan for the site. This Plate, in addition to information in the Plan, describe erosion control measures for all aspects of the project.

Response to Comment 6.

The disturbed acreage of the mitigation project will be approximately 3.5 acres, thus, no General Construction Stormwater permit will be required.

Response to Comment 7.

Plate 1 of the Plan has a detail for the rock check dams.

Response to Comment 8.

Cattle will be excluded from the entire site by a perimeter fence. If grazing is deemed to be beneficial for the future management of the site, a Grazing Management Plan will be prepared and be subject to review and approval from CDFG and the NCRWQCB, as described in the Plan (page 12).

If cattle use the site in the future, they would be able to cross the creek at the proposed permanent creek crossing at the northern end of the site (see page 11 of the Plan and Plate 1).

Response to Comment 9.

As it is very difficult to permanently remove blackberries, and because blackberries have wildlife habitat value, blackberries will be controlled rather than permanently removed. The blackberries in the hillside spring area will likely be graded out during construction of the three frog habitat features. As described on page 9 of the Plan, the blackberries in the riparian planting area will be controlled by hand until the planted vegetation is established enough to not be overgrown by blackberries.

Response to Comment 10.

Page 10 and 11 of the Plan describe respectively the species mix to be planted in the riparian and oak savannah planting areas. The riparian planting areas will be from the channel bottom to beyond the top of the bank to establish a typical riparian plant community. Figure 4 and Plate 1 of the Plan shows approximate areas for the two oak savannah planting areas.

Response to Comment 11.

The sediment pond outfall into the creek channel at the southern end of the site is no longer a component of the project.

INTRODUCTION AND SUMMARY

Sonoma County proposes to expand the solid waste landfill and construct other improvements to the existing Central Disposal Site. Construction is planned to begin in 2000 and will occur in stages until the year 2015. Some of these improvements will require placing fill in waters of the U.S. and/or jurisdictional wetlands. If all of the improvements are built, 1.7 acres of seasonal wetland and 0.1 acre of stream channel will have been filled. The Environmental Impact Report (*Central Disposal Site Improvement Program, Final EIR, Sonoma County Department of Transportation and Public Works, certified, 12/8/98*) for this project identified the fill as an impact requiring mitigation. This Wetland Mitigation and Monitoring Plan was prepared to implement those mitigations in the EIR for the entire project impact occurring in wetlands. The County proposes to create 2.6 acres of new seasonal wetlands and enhance existing habitat values on an existing portion of the landfill property to mitigate this loss, with the goal at the end of five years to have a minimum of 1.7 acres of jurisdictional wetlands (wetlands meeting the U.S. Army Corps of Engineers definition).

Of the 1.7 acres of wetlands to be filled, approximately 0.41 acres will only be filled if the west canyon landfill expansion is constructed. It is expected that it will be approximately 10 years before that portion of the project is implemented. The mitigation project described in this plan is designed to replace all of the wetlands that will be filled, including those from the future west canyon project.

The proposed mitigation site, immediately south of and adjacent to the landfill parcel, consists of a heavily grazed 38-acre parcel with a creek through the center. The mitigation proposes to restore the existing degraded condition of the site in addition to creating new seasonal wetlands. Some wetland areas associated with hillside seeps show that the site has the ideal soil conditions for creating seasonal wetlands.

The project will create seven seasonal wetland features by excavating soil and making small cuts to create 2.6 acres of seasonal wetland similar to those that will be impacted by the landfill project. These features will be graded to have a maximum depth of approximately one foot which will allow for the establishment of populations of typical seasonal wetland plant species. The seven seasonal wetland feature will replace the functions and value of the wetlands that will be filled by the landfill expansion project.

In addition to the seasonal wetland creation, the project also includes the creation of red-legged frog habitat. This will be accomplished by excavating three small pond features in the vicinity of existing hillside springs on the site. This frog habitat will replace the functions and values of the landfill sediment pond that is now providing some frog habitat that will be filled by the landfill expansion project.

The mid-section of the creek is presently lined with large eucalyptus trees that will be removed and native riparian vegetation planted to create increased habitat value over the existing eucalyptus grove.

These features and others enhancements on this site as described following will likely result in mitigation wetlands that have greater value than the wetlands being impacted.

This Wetland Mitigation and Monitoring Plan describes the project that requires mitigation, the proposed mitigation, its target function and value, performance criteria, and a five-year monitoring and reporting plan. This plan was prepared by Chris Seppeler and Tim Mayer, employees of the Sonoma County Permit and Resource Management Department, with assistance from staff of the Department of Transportation and Public Works, consulting wetland biologist Charles Patterson, Dr. Phil Northen, professor of Biology

at Sonoma State University, and Allan Buckmann, wildlife biologist from the California Department of Fish and Game.

PROJECT REQUIRING MITIGATION

Site Description

The Central Disposal Site is a 389-acre parcel located about 3 miles southwest of the City of Cotati (Figure 1). The surrounding land uses are agricultural (mainly dairy) and rural residential. The existing landfill on the site has been in operation over 25 years, and occupies approximately 130 acres of the site. In addition to the landfill, the site also contains a wood chipping facility, a green waste compost facility, a 6-megawatt power plant that burns landfill gas, a recycle/reuse facility, an equipment maintenance building, and an administration building. Some portions of the site are graded to obtain cover soil for use in the landfill. Some unused portions of the parcel are rented to adjacent dairies for cattle grazing.

The site contains two drainages, one immediately to the east of the existing landfill, and one immediately to the west. These are called the East Canyon and the West Canyon, respectively (Figures 2 & 3). The drainages are headwaters of intermittent creeks, which are tributary to Stemple Creek, which joins San Antonio Creek and empties into the Pacific Ocean. The East Canyon has some riparian vegetation, consisting of willow and blackberries and a few live oaks and non-native trees. The West Canyon has no trees, and has been regularly grazed by cattle.

The site contains many small constructed ponds and ditches that are part of the NPDES-required sediment control system or leachate control system. Most are devoid of vegetation, and are dry most of the year. One sediment pond (located near the administration building) retains water most of the year and has a fringe of bull rushes.

Project Description and Purpose

The project consists of five components: a landfill expansion, a new household hazardous waste collection facility, a new gas fuel facility, a new soil bio-remediation facility, and improvements to the public dumping area and recycle/reuse facility. These are described below.

Landfill Expansion: The landfill will be expanded into the East and West Canyons. The purpose of the expansion is to provide future solid waste disposal capacity for the residents of Sonoma County. Without the expansion, the existing landfill has capacity only through the year 2004. State law requires that cities and counties be able to demonstrate disposal capacity farther into the future. Sonoma County is required to demonstrate sufficient capacity to last through the year 2009. The proposed expansion would provide capacity approximately through the year 2014 or 2015.

The expansion into the East Canyon is expected to begin in 2000 at the bottom of the canyon, and will progress in several stages toward the top (north) of the canyon. Disposal will alternate between the existing landfill and the East Canyon landfill until approximately the year 2012 or 2013. At that time both the East Canyon and existing landfill will be filled to the design maximum elevations. Filling in the West Canyon landfill is expected to begin in the year 2012, and will be completed in approximately the year 2014 or 2015.

The landfill expansion areas will be constructed as follows: Topsoil and underlying rock will be excavated as needed to create a smooth surface. A layer of drain rock will be spread over the site, and an impermeable synthetic liner will be installed over that. A leachate collection system will be installed over the liner, and two feet of clean soil will be placed over the leachate collection system and exposed portions of the liner to create a working surface. Refuse will be placed on the working surface and will be covered each day with six inches of clean soil, biodegradable plastic membrane, or other approved daily cover. The canyons will be gradually filled in this manner. When the maximum design elevations have been reached, the landfill will be capped with clean soil and a permanent grass cover established.

Household Hazardous Waste Collection Facility: This will be a new building constructed just north of the existing northern property line, on pasture land to be acquired from the adjacent dairy. This facility will collect, sort, and package hazardous wastes from the public and small businesses. After packaging, the wastes will be transported by licensed haulers to off-site facilities for recycling, reuse, or disposal. The purpose of this facility is to provide a safe and convenient means for the public and small businesses to dispose of household hazardous wastes that cannot be disposed of with other household refuse. This will reduce the potential for improper disposal of these materials, thereby reducing the potential for adverse impacts to the environment.

Gas Fuel Facility: The landfill creates methane as a natural by-product of the decomposition of buried refuse. The County is required to destroy this gas by burning, because it would have adverse air quality impacts if allowed to escape into the atmosphere. The purpose of this facility is to convert landfill gas, which might otherwise be wasted by burning in a flare, to a clean-burning vehicle fuel. This will be done by constructing an automated facility that will clean and compress the gas. The gas will be hauled off-site in special compressed gas trailers, or used on-site to fuel refuse hauling trucks or landfill equipment.

Soil Bio-remediation Facility: This facility will consist of lined treatment cells constructed on top of the existing landfill. Soil that has been contaminated with hydrocarbons (gasoline, diesel fuel, oil, grease) will be placed in the cells for natural bio-remediation in which the hydrocarbons will be consumed by soil micro organisms. After bio-remediation the soil will be used in the landfill for daily cover. The purpose of the facility is to provide a place where people may bring contaminated soil for treatment when it is not practical for them to treat it in place.

Operational Improvements: A new covered public dumping area will be constructed on the northern part of the landfill parcel. The existing recycle/reuse facility will be relocated and reconstructed to make it easier to use. The purpose of the covered dumping area is to provide a safer place for the public to dump refuse (currently, people back their vehicles up to a pit and throw the refuse over the edge), and also to provide greater control over the materials being dumped. The purpose of the improvements to the recycle/reuse facility is to allow more convenient traffic circulation to encourage more of the landfill customers to use the facility.

Fill in Jurisdictional Wetlands

As used in this plan, "jurisdictional wetlands" are those areas that satisfy the Corps of Engineers criteria for wetlands under their regulation. These jurisdictional wetlands are shown on Figure 2. Wetland mapping was done by qualified wetland biologists (Steve Leach from Woodward Clyde Associates and Charles Patterson) and submitted to the Army for concurrence in March 1997. Corps staff (Dan Martel) inspected the site with the biologists and applicant in June 1997 and requested several minor changes to

the wetland mapping, which have been made.

The intermittent streams in both canyons are non-wetland jurisdictional waters of the U.S. In addition, there are several seeps that have created permanently wet areas that meet the criteria for jurisdictional wetlands. The constructed ponds are not jurisdictional wetlands, because they are part of the sediment control and leachate control systems that are required by the existing Waste Discharge Requirements for the landfill.

All jurisdictional wetlands on the site are above the headwaters, as the average annual flow in both of the intermittent creeks is well below 1 cfs. This was determined by considering the size of the watersheds, the average annual rainfall at the site, and an assumed runoff coefficient of 0.7. The watershed area of the East Canyon, including all the area upstream from the southern boundary of the site, is approximately 175 acres. The average annual flow in the creek in the East Canyon is approximately 0.35 cfs. The watershed of the West Canyon is smaller, and the average annual flow is therefore less than 0.35 cfs.

The total impact of the project will be the filling of 0.12 acres of waters of the U.S. (non-wetland area within the bed and banks of the two creeks below ordinary high water) and 1.69 acres of seasonal wetlands adjacent to the creeks. The East and West Canyon landfill expansions and the construction of the roadways associated with the new covered public tipping area and the recycle/reuse facility will place fill in wetlands. None of the other project components will place fill in jurisdictional wetlands. The impact from each project component is described below.

East Canyon Landfill Expansion: The East Canyon expansion will fill the intermittent stream in that canyon, as well as some adjacent wetlands near the stream (Figures 2, 3). The area of stream channel filled (below ordinary high water) will be 0.08 acres. The fill will also remove 0.97 acres of seasonal wetland adjacent to the stream.

The lower (southernmost) portion of the intermittent stream is deeply incised and does not support extensive riparian or wetland vegetation immediately adjacent to the channel. Toward the central part of the project site are scattered willows, a few small coast live oaks, Himalayan blackberry and several ornamental trees. The upper (northern) portion of the stream does not have a well-defined channel, but is a relatively level area that supports a dense stand of Himalayan blackberry and wild rose.

The seasonal wetland associated with the stream is in the upper portion of the stream where there is no well-defined channel and in an area of seeps located to the west of the stream. In addition to the blackberries and rose, vegetation consists of pricklyseed buttercup, umbrella sedge, pennyroyal, and iris-leaved rush.

Before the fill is placed, soil and rock will be excavated from the canyon. The fill will consist of clean crushed rock. This will be overlain with an impermeable synthetic landfill liner that will prevent any refuse or leachate from entering the surface waters. Surface water runoff will be intercepted by a ditch immediately upstream from the landfill and routed to the site's stormwater system. This system of ditches and pipes will route the surface water around the landfill to prevent any contamination from refuse, and will discharge the surface water into the East Canyon tributary of Stemple Creek immediately downstream from the landfill.

The East Canyon landfill expansion will fill the sediment pond nearest the administration building, which

will remove habitat for Northern red-legged frogs (see Sensitive Plant and Animal Species section). This pond is not considered jurisdictional because it is part of the sediment control system constructed to comply with the Waste Discharge Requirements for the landfill.

West Canyon Landfill Expansion: The West Canyon expansion will fill the intermittent stream in that canyon, as well as some adjacent wetlands near the stream (Figures 2, 3). The area of stream channel filled (below ordinary high water) will be 0.01 acres. There are no trees along this portion of the stream. The upper portion of the stream contains seeps and springs that have created seasonal wetlands adjacent to the stream. The vegetation consists of introduced grass species and sparse cover of rushes. The fill will remove 0.41 acres of this seasonal wetland.

The fill will be constructed in the same manner as the East Canyon landfill expansion. Surface water runoff will be routed around the landfill by the site's stormwater system and discharged to the West Canyon tributary of Stemple Creek immediately downstream from the landfill.

Other Project Components: The roadways to be constructed for the new public dumping area and Recycle/reuse facility will fill approximately 0.31 acre of the northernmost reach of the East Canyon drainage seasonal wetland. This portion of the creek is in a pasture. There is no riparian vegetation along the creek. The upper portion includes a spring that has been developed for cattle watering. Because of use by cattle, the vegetation is primarily non-native grasses.

The fill will consist of clean soil, which will be overlain with asphalt-concrete paving. A culvert will be installed to convey surface runoff beneath the fill and discharge it into the site's stormdrain system. This system will return the runoff to the East Canyon tributary of Stemple Creek just downstream from the landfill.

Sensitive Plant and Animal Species

The entire undisturbed area of the Central Disposal Site has been inspected by qualified plant and wildlife biologists to determine whether threatened or endangered species are present. The first field surveys were done in 1993 by biologists from Resource Management International, Inc (RMI). No State or Federally listed species were found.

In 1995 RMI biologists assembled a list of potential sensitive species for the vicinity of the project area, based on consultation with the U.S. Fish and Wildlife Service and the California Native Plant Society, and a records search of the California Natural Diversity Database. Sensitive species included any species listed or proposed for listing under the Federal Endangered Species Act or the California Endangered Species Act, species that were (at that time) Category 1 or 2 Candidates for possible future Federal listing, plants apparently eligible for State listing by virtue of information in the CNPS Rare Plant Inventory, and animals designated as California species of special concern.

The botanical field surveys were repeated in May and June of 1995, following California Department of Fish and Game guidelines. No sensitive plants species were found. Wildlife biologists conducted supplemental field surveys in April, May, and June 1995, conducting surveys for special status amphibians, birds, and bats. No sensitive animal species were found. The intermittent drainages and adjacent wetlands in the East and West Canyons were determined by the biologists to be unsuitable habitats for several species listed by the FWS as potential occurring in the project area, including: California freshwater

shrimp, Ricksecker's water scavenger beetle, California red-legged frog, foothill yellow-legged frog, western spadefoot toad, western pond turtle, California linderiella, California tiger salamander, Sonoma arctic skipper, northern spotted owl, California horned lizard, Russian River tule perch, and the Pacific lamprey.

In 1996 records searches were made of the California Natural Diversity Database and the CNPS Inventory of Rare, Threatened and Endangered Vascular plants to update the list of potential sensitive species. Field surveys were conducted in March and May of 1996 in the East and West Canyon drainages and on two areas not included in previous surveys. These new areas were approximately 13 acres of pasture land immediately north of the landfill proposed for acquisition and a 38-acre parcel immediately south of the landfill proposed for wetland mitigation. The sediment pond near the administration building was surveyed as well. No sensitive species were observed, however, a biologist identified the call of a red-legged frog in the sediment pond.

During the spring of 1997 biologists from Sonoma State University (Dr. Phil Northen and Dave Cook) inspected the sediment pond to determine whether the red-legged frog was present. Three red-legged frogs were observed in the cattails on the margins of the pond. No egg masses were observed.

A sub species of red-legged frog (*rana aurora draytonii*) has been listed under the Endangered Species Act as Threatened. The range of this subspecies, as published by the U.S. Fish and Wildlife Service, does not include the project site. The project is within the Stemple Creek drainage, which is separate from the nearest drainages that are within the range of the protected species. Because of the location, the subspecies of red-legged frog on the project site is taken to be the northern red-legged frog (*rana aurora aurora*), which is a California species of special concern.

In summary, the field surveys have discovered the presence of one sensitive species (red-legged frog) in the sediment pond nearest the administration building, and have failed to discover any sensitive species or habitat for sensitive species elsewhere on the project site. Consequently, it is concluded that the project will not jeopardize the continued existence of a threatened or endangered species or species proposed for such listing, and will not modify or destroy critical habitat of such species. The red-legged frog present on the site is still considered to be a California species of special concern. A plan to protect the frog has been included in the project, and is described below.

PROPOSED WETLAND MITIGATION

Concept

Restoration of wetlands on the Landfill site may be possible, as the Central Disposal Site will probably always have an erosion and sediment control system that includes sediment ponds which could provide some wetland and wildlife habitat. However, because it will be necessary to maintain these ponds by removing accumulated sediment from time to time, it would be difficult to manage them in a way that would be optimal for wildlife habitat.

For this reason, the County proposes to compensate for the loss of wetlands and associated habitats by restoring existing degraded habitat and creating new habitat on a County-owned 38-acre parcel located immediately south of and adjacent to the landfill parcel. The parcel has been used for grazing for many

years, and was purchased by the County to provide a buffer area between the landfill and neighbors to the south. The location of this parcel and the existing jurisdictional wetlands are shown on Figures 2 & 3.

The parcel is downstream from the West Canyon landfill expansion area, and is bisected by the same intermittent stream that has its source in the West Canyon. In the central part of the site, the stream banks have a dense growth of large bluegum eucalyptus and other non-natives. Near the southern boundary of the site, there was a small stock pond created by a dam on the creek that washed out in a storm several years ago. The dam failure caused the stream to cut a new, deep channel for a short distance adjacent to the natural channel. This channel has continued to erode, and has become deeply incised (Figure 6), and sparsely vegetated.

The hillside on the western part of the parcel has several groves of eucalyptus and also has several seeps and springs, including spring boxes, which were developed for cattle watering. The seeps have created an area of seasonal wetlands, but years of cattle trampling have left the habitat in a very degraded condition (Figure 5). The remainder of the parcel consists of grassland (also degraded due to heavy grazing pressure) and the sites of former farm buildings, all but one of which have been removed.

The mitigation site was surveyed in 1995 and 1996 for jurisdictional wetlands and for special status plant and animal species (letter report to Tim Mayer from RMI, *Central Landfill Expansion Supplemental Biological Final Constraints Analysis*, July 25, 1996) and in 1996 (letter report to Tim Mayer, to Charlie Patterson *Jurisdictional Determination for the County Landfill Site, Supplemental Areas*, January 5, 1997). No sensitive plant or animal species or their habitat were found on the mitigation site during these surveys.

Although no sensitive animal species were found on the mitigation site, raptors are known to nest in large eucalyptus trees. For this project, it is assumed that the trees on the site are being used as nesting sites for raptors. In order to not impact any potential nesting raptors, the eucalyptus trees to be removed as part of this project will be cut during the period of August 15 to March 1 or a qualified biologist will survey the trees to determine if any of the tree removal would affect active raptor nests. This is the recognized appropriate time to remove these trees without affecting nesting raptors (*pers. comm., Betty Burridge, Audubon Society, recognized bird expert and editor of the Sonoma County Breeding Bird Atlas, 1/21/98*).

The site contains 2.09 acres of jurisdictional area, in the form of 1.06 acres of wetland (hillside seep areas), 0.2 acre of riparian thicket (the area at the southern end of the project below the dam that has failed), and 0.83 acre of intermittent streambed (Figure 2).

The site soils consist primarily of Los Osos clay loam, and Sebastopol sandy loam. These soil types are generally moderate to well drained with surface clay subsoil over fractured sandstone.

In 1996 the County retained RMI to evaluate the site for restoration potential and to recommend a restoration plan that would mitigate project impacts. Since then, several meetings and discussions, including site visits with County staff, have occurred with Charlie Patterson (consulting biologist), Dr. Phil Northen (professor of Biology, Sonoma State University), Richard Flynn (Corps of Engineers), Allan Buckmann (California Department of Fish and Game), Terri Kinney and Scott Gergus (North Coast Regional Water Quality Control Board). The proposed mitigation reflects the input from all present at these meetings.

The goals of the mitigation are to create new wetland habitat and to enhance existing habitat to mitigate wetland loss caused by the Landfill Expansion Project. Figure 4 is a conceptual site plan. The mitigation project will consist of seven components: 1) the creation of approximately 2.6 acres of seasonal wetland to replace those filled by the project; 2) creation of ponded water in the vicinity of the hillside springs that will provide habitat similar to the landfill sediment pond that now contains the red-legged frog; 3) restoration of the existing degraded stream to a natural intermittent stream habitat, including native riparian vegetation and placement of downed woody debris; 4) creek channel stabilization; 5) upland oak savannah planting; 6) a stream crossing; and 7) the fencing of sensitive areas. Below is a discussion of each component of the mitigation.

1) Seasonal Wetland Creation

The project will create approximately 2.6 acres of seasonal wetland, all at the northern end of the mitigation site, except for one feature (Figures 4, Plate 1). These seven features will be created by excavating shallow depressions with a maximum depth of one foot with a undulating bottom (not flat) with small cut slopes on the up slope side of each feature. The features will be constructed to spill by sheet flow through a 50 - 100 foot long outlet in order to reduce the chance of erosion from concentrated flow. The outflow area on each feature will be covered with an erosion control fabric to reduce the potential for erosion. The cut slopes of each feature will be seeded with an appropriate seed mix and an erosion control blanket will be installed over the seed.

Eucalyptus trees are known to contain oils in their leaves and bark that prevents vegetation from growing. Although none of the seasonal wetland features are proposed directly under any eucalyptus trees, runoff from the watershed that includes the eucalyptus trees is included in the seasonal wetland watershed. In order to reduce the risk of impact on the wetlands, the eucalyptus grove in the northwest corner of the site will be removed, in addition to the eucalyptus trees along Hammel Road that are within the watershed of the two wetland features on the northeast side of the creek. As with all of the eucalyptus tree removal, all of the stumps will be cut near grade and the stumps treated to prevent resprouting. See item 3 below for a discussion of the eucalyptus removal in the creek channel.

2) Red-Legged Frog Habitat Creation in the Hillside Spring Area

The existing spring boxes on the hillside in the western portion of the site provide a source of permanent water (Figure 5). By excavating three small pool features in this area, for a total area of approximately 0.5 acre, marsh habitat desirable to the red-legged frog can be created (Figure 4). The depth of the uppermost pool will be approximately four feet, the second pool will be approximately three feet deep, and the lowermost pool will be approximately two feet deep (Plate 1). As with the seasonal wetland features, each of the frog habitat features will be constructed to spill by sheet flow through a 50 - 100 foot long outlet in order to reduce the chance of erosion from concentrated flow. The outflow area on each feature will be covered with an erosion control fabric to reduce the potential for erosion. The cut slopes of each frog habitat feature will be seeded with an appropriate seed mix and an erosion control blanket will be installed over the seed. These features are designed such that they will remain hydrated through the summer due to the spring source, with no standing water remaining in late summer (likely just moist soil). This design will allow for the development of marsh type vegetation suitable for the frog in addition to hydrologically favorable conditions for the breeding of the red-legged frog, and will discourage successful reproduction by the non-native bullfrog. Note that this excavation will likely remove the existing non-native Himalayan blackberries present at the spring boxes. If the blackberries are not completely removed, they will be left

as they are very difficult to remove and they do have wildlife habitat value. This new habitat for the red-legged frog will be created at least one year prior to disturbing the existing habitat (sediment pond) in the east canyon landfill area.

Prior to filling the sediment pond in the east canyon where the red-legged frog was found (as described in **Sensitive Plant and Animal Species** above), the pond will be examined by a qualified biologist to determine if egg masses, larvae, juveniles, or adults are present. If egg masses or larvae are present, the pond will not be disturbed until late summer or early fall to avoid their destruction. If juveniles or adult frogs are present, they will be trapped and released into the new habitat on the mitigation site. The California Department of Fish and Game will be consulted prior to trapping for the approval of the trapping methods and the location for release.

As described above, eucalyptus trees are also thought to be toxic to wildlife, including frogs. The grove located in the southwest corner of the property above the frog habitat creation area will also be removed. See item 3 below for a discussion of the timing for the eucalyptus removal.

In addition to creating the pond features for frog habitat, five to ten sections of eucalyptus logs (approx. 5 - 10 feet long) will be placed in several locations in the ponds (deep water, shallow water, and margins) to provide varying habitat types throughout the season, including dry season habitat for the aestivation of frogs. As eucalyptus are known to contain oils that can kill plants, eucalyptus logs will be aged for one year or until determined to not be a risk to wildlife or vegetation (bark is peeling and dried or has fallen off). Other logs may be used in place of eucalyptus without aging. See item 3 below for a discussion of the eucalyptus removal.

3) Stream Habitat Restoration and Enhancement

Within the mitigation parcel, riparian woodland and scrub habitat along the creek has been degraded or lost by the removal of native trees and shrubs, by plantings of eucalyptus and white poplar, invasion by non-native Himalayan blackberry, and by livestock grazing. Livestock have broken down some of the stream banks, increasing sediments entering the channel. Simple removal of livestock from the creek and riparian corridor will significantly enhance wildlife values by allowing the development of better understory cover and by reducing bank erosion.

Mature eucalyptus trees are known to transpire 1,500 gallons of water per day. All of the streamside eucalyptus on the mitigation site in the central part of the parcel will be removed, which should result in an increase in the volume and duration of springtime flows in the creek and make more water available for native vegetation and wildlife. In addition to the streamside tree removal, the eucalyptus trees on the property in the northwest and southwest corner of the site will be removed, as will approximately 7 trees along Hammel Road in the northwest corner of the site (Figure 4, Plate 1). All of these trees will be cut near ground level, with the stumps treated to prevent resprouting. As eucalyptus trees are noted for providing nesting habitat for nesting raptors, the removal of the trees at the wrong time could affect nesting birds. In order to prevent affecting nesting raptors, either the trees will be removed outside of the nesting window, or a qualified biologist will survey the trees to be removed to determine if any of the tree removal would affect active raptor nests.

Non-native Himalayan blackberries are present along the banks of the creek. As it is very difficult to permanently remove blackberries, and because blackberries have wildlife habitat value, blackberries will

be controlled rather than permanently removed. The blackberries will be controlled by hand until the planted vegetation is established enough to not be overgrown by blackberries.

After removal of non-native trees and shrubs, native species will be planted along the creek for approximately 1,000 feet. Plant materials for this planting shall be native riparian species propagated from seed or cuttings obtained within a 10-mile radius of the site. The following list of plant species has been developed with Allan Buckmann (CDFG) and Dr. Phil Northen (Sonoma State Biology professor). The planting in the stream habitat restoration area will result in the planting of a minimum of 225 plants. Liner size plants will be planted, watered, and maintained for a period of five years following planting. The exact planting locations will be determined in the field, and the exact species mix will be subject to availability.

<u>Riparian Planting</u>	60	Arroyo willow
	60	red willow
	15	coast live oak
	15	California buckeye
	15	white alder
	15	cottonwood
	20	California rose
	10	California blackberry
	5	box elder
	5	Oregon ash
	5	California bay

4) Channel Stabilization on the Entire Site

The existing stream channel on the site is in a degraded condition primarily at the southern end of the site, whereas in the northern section some down cutting has occurred, in addition to a cattle crossing that has created bank stability problems. This component of the project is to reduce stream channel velocities, allow for natural deposition of bedload, and allow for the reestablishment of native vegetation. The goal will be to accomplish this task while disturbing the area as little as possible.

At the existing cattle crossing, in the vicinity of seasonal wetland feature 2 (Plate 1, labeled SW - 2), a small amount of fill in two spots will be required to reestablish the bank. These fill areas will be protected with erosion control fabric and/or other erosion control methods such as brush mattresses.

The entire reach of stream on the project site will have up to 10 rock check dams installed to reduce channel velocities, stream down cutting, and accumulation of bedload. The exact location of the rock check dams will be determined during project construction.

At the southern end of the site, in the vicinity of the washed out dam, significant down cutting and bank erosion has occurred. When the dam failed, the natural channel of the creek was shifted, causing channel constriction at the failed portion, which has increased channel velocities and caused subsequent down cutting and bank erosion in the vicinity. See Figure 6 and Plate 1 for a clarification of the following discussion.

A portion of the failed dam will be removed to increase the channel width. The channel will be filled in up and downstream of the dam to match the natural channel gradient as found upstream above the portion

that is down cut, restoring the creek to its original grade prior to the dam failure. In the area of the dam, a rock check dam will be constructed. Downstream of the dam, the east bank is near vertical. This bank will be laid back, and have seed and erosion control fabric placed on the slope. This will also function to reduce creek velocities and subsequent erosion of the channel.

Upstream of the dam the creek makes a sharp turn and is directed towards the opposite bank, causing erosion and undercutting, creating a vertical bank and erosion problem. In order to reduce this, the area upstream of the dam will be regraded and the creek straightened, and also filled in to the point that the creek matches the channel gradient upstream. This will create a wider and broader creek channel through this area. A rock check dam will be installed upstream of the dam to stabilize the channel. The eroded west bank in this area will be laid back and will include a low bench. The graded portion of this bank will be seeded and erosion control fabric and possibly willow wattles and brush mattresses may be placed on the bank where feasible to reduce further erosion (the area is wet year round from the seeps above).

The channel upstream of the failed dam appears to be stable and is showing little signs of degradation. In order to enhance this area and increase wildlife habitat by providing downed woody debris, five to ten sections of eucalyptus logs (approx. 5 - 10 feet long) will be placed on the banks in various locations. This will reduce channel velocities and will diversify the habitat of the enhanced stream channel.

5) Oak Savannah Planting

The north hillside of the mitigation site is devoid of trees and represents an opportunity to establish oak savannah typical of these hillsides prior to grazing. Two areas will be planted, representing a total area of approximately 3.75 acres (see Figure 4, Plate 1), allowing for the planting of a minimum of 150 plants. Within each of these two areas, the trees will be planted in a random fashion in several groupings to establish an oak savannah which will provide additional wildlife habitat on the mitigation site.

The following list of plant species has been developed with Allan Buckmann (CDFG) and Dr. Phil Northen (Sonoma State Biology professor). Liner size plants will be planted, watered, and maintained for a period of five years following planting. The exact planting locations will be determined in the field, and the exact species mix will be subject to availability.

<u>Northwest Oak Savannah Planting</u>	65	coast live oak
	10	California buckeye
<u>South Oak Savannah Planting</u>	50	coast live oak
	10	California buckeye
	15	cottonwood

6) Stream Crossing

In order to facilitate access to the entire site and to reduce erosion from creek crossings, one permanent creek crossing will be constructed. This will likely only be needed for plant maintenance and watering or implementation of contingency measures. The crossing will be installed at the northern end of the site at the property line, and will consist of a 48" culvert with rock slope protection at the outfall and on the inlet and outlet end slopes (see Plate 1). The surface of the crossing will likely be dirt or possibly rock. The fill slopes will be seeded with an appropriate seed mix and have an erosion control blanket placed over the

seed.

7) Site Fencing

In the future, if it is determined that limited grazing would be a beneficial management tool for any portion of the site (including the wetland features), a Grazing Management Plan would be prepared. The Plan would be subject to review and approval by the Department of Fish and Game and the North Coast Regional Water Quality Control Board prior to implementation.

LONG-TERM MITIGATION SITE PROTECTION

The wetlands, frog habitat creation area, oak savannah, and riparian areas will be included in a wetland preserve that will be set aside by the County for permanent protection of wetland and wildlife habitat. The preserve will be shown on Central Disposal Site planning documents. Only uses that are consistent with the preservation of the wetland habitats will be permitted. Portions of the parcel that are outside the wetland preserve may be used for other purposes, however, any such uses will include measures to protect the adjacent wetland preserve.

IMPLEMENTATION PLAN

Reasons for Expecting Success

Soils

The success of the proposed mitigation will depend upon the ability of the soils in the seasonal wetland to pond water at full depth for the winter and spring months sufficient to create 2.6 acres of seasonal wetland. The mitigation site has several soil types that are favorable to wetland creation, as mapped and classified by the USDA (*Soil Survey, Sonoma County, California; USDA; 1972*). The soil types and their descriptions are as follows:

Sebastopol sandy loam is the primary soil type found on the project site. This loam soil has a moderately slow permeability, a medium runoff rate, and a moderate hazard of erosion. The soil consist of sandy loams that have a clay subsoil formed from soft sandstone. At approximately eight inches, the soil has a higher clay content which increases with depth. The water holding capacity of this soil from 18 to 62 inches is approximately 0.15 inches, with a permeability of 0.2 to 0.63 inches/hour.

The other primary soil type on the project site is the Los Osos clay loam which are well-drained clay loam soils with a clay subsoil. At a depth of 15 - 50" the soils are underlain by weathered, fractured sandstone and shale. Erosion hazard on these soils is high and runoff is rapid. The water holding capacity of this soil from 16 to 34 inches is approximately 0.15 inches, with a permeability of 0.06 to 0.2 inches/hour.

Based on these soil types, observations during the winter and spring months (the flatter portions of the site have standing water in cattle prints in the fall and spring), and the presence of ponded water in the seep areas, the ponding of water on the mitigation site is expected to occur readily. In addition, the many farm ponds in the vicinity hold water the entire year. This analysis is also true for the frog habitat creation area.

Hydrology

The created seasonal wetlands will fill from direct rainfall and from the small watersheds they are located within. The frog habitat will fill in the same manner, in addition to input from the springs. The ponding of water in these features will occur in two ways: 1) when the rainfall intensity exceeds the permeability of the soil, all water will not infiltrate and will pond water in confined areas; or 2) when the clay in the subsoil becomes hydrated and swells, and the soil above reaches its water holding capacity, the permeability is greatly reduced and the ponding of water occurs. In order to assure ponding, the bottom of the wetland and frog habitat features will be compacted. If permeable soil lenses are encountered during excavation, clay soil will be placed over these areas.

Inoculation

The above discussion indicates that the hydrologic and soil type component necessary for ponding of water is very likely present on the site. Native and non-native flora will likely colonize the site rapidly following development of the habitat. In order to assist in the process of establishing native flora on the site, topsoil inoculation is proposed.

The upper four inches of topsoil to be excavated for the creation of each of the seasonal wetland features will be stockpiled on site. In addition, the upper four inches of topsoil from the seasonal wetland fill site in the east canyon will also be stockpiled on the mitigation site. This material will be mixed thoroughly with the topsoil stockpiled from the mitigation site. When the grading of each of the seasonal wetland feature is complete, this stockpiled topsoil material will be spread in each of the seasonal wetland features and regraded.

In the frog habitat creation area, four inches of topsoil will be excavated and stockpiled. Following grading of these features, the stockpiled topsoil will be spread evenly in all three features. As in the seasonal wetland features, this will provide a seed bank for the long term establishment of vegetation. In addition, the plants and marsh type vegetation suitable for frog habitat will readily invade on their own and will become dominant quickly (*pers. comm., Dr. Phil Northen, SSU Biology professor*).

This inoculant effort is expected to produce an adequate first year cover that should quickly build a seed bank for the long term establishment of native species on the site, in addition to providing quality topsoil for plant growth. The control of invasive weedy species through selective hand management will minimize competition. In addition, local seed will likely be introduced to the site from other locations in the vicinity of the site by wind and by birds.

Construction

Plate 1 (inside back cover) shows the grading plan for the mitigation site. This grading plan also has a typical cross section of a seasonal wetland and the frog habitat. It is proposed to construct the wetland mitigation site concurrently with the filling of various portions of the east canyon that are part of the Landfill Expansion Project, during the summer of 2000 (the west canon landfill expansion will occur at a later date). Note that the filling of the sediment pond in the east canyon where the red-legged frog was found will not occur until one year after the creation of the new habitat on the mitigation site. The construction sequence will be similar to the following (note that several of these tasks can occur concurrently):

1. All of the eucalyptus trees to be removed as part of the project will be cut down (cut at ground level) between August 15 and March 1 to avoid impacting nesting raptors or, if the trees are removed outside of this period, a qualified biologist will survey the trees to be removed to determine if any of the tree removal would affect active raptor nests. Following cutting of the trees, the stumps will be treated to prevent resprouting.
2. Approximately four inches of topsoil from each of the seasonal wetland features will be stripped and stockpiled on the site. The topsoil will be used as an inoculant for the new seasonal wetlands following grading.
3. Approximately four inches of topsoil from the east canyon seasonal wetlands will be stripped and stockpiled at the mitigation site. This soil will be mixed thoroughly with the stockpiled topsoil from the mitigation site.
4. Approximately four inches of topsoil from each of the three frog habitat creation features will be stripped and stockpiled on the site. The topsoil will be used as an inoculant for the new frog habitat features following grading.
5. Grading of the site will occur. This will include grading the wetland features, the frog habitat grading in the hillside spring area, constructing of the road crossing at the northern end of the site, the check dam installation, and the bank stabilization work at the southern end of the site. For the check dam installation, minimal disturbance to the creek banks will occur. All of the seasonal wetland features and frog habitat features will be over-excavated so that the subgrade will be about four inches lower than final grade shown on the mitigation plan. The bottom of each of the seasonal wetland features and the three frog habitat features will then be compacted. This will allow space to replace the topsoil and inoculant during final grading. The surplus soil will be removed from the site and will likely be taken to the landfill site to be used as cover.
5. The mixed stockpiled topsoil from the east canyon and the seven wetland features will be spread evenly over the bottoms of all of the wetland features. Soil compaction of the topsoil will be at least 85%, but not greater than 90% relative compaction to create a condition similar to native soil.
6. The stockpiled topsoil from the three frog habitat features will be spread evenly over their bottoms. Soil compaction of the topsoil will be at least 85%, but not greater than 90% relative compaction to create a condition similar to native soil.
7. Five to ten sections of eucalyptus logs (approx. 5 - 10 feet long), from the trees cut as part of the project, will be placed on the banks in various locations. Minimal bank disturbance will occur to access the creek to place the logs.
8. Five to ten sections of eucalyptus logs (approx. 5 - 10 feet long) will be placed in several locations in the ponds (deep water, shallow water, and margins) to provide varying habitat types throughout the season, including dry season habitat for the aestivation of frogs. As eucalyptus are known to contain oils that can kill plants, eucalyptus logs will be aged for one year or until determined to not be a risk to wildlife or vegetation (bark is peeling and dried or has fallen off). Other logs may be used in place of eucalyptus without aging.

9. An as-built plan will be prepared showing finish grades and any changes made during project construction.

Erosion Control

1. Erosion control blankets (coconut fiber mesh or similar) and seed will be placed on the cut slopes of the seasonal wetland and frog habitat features. In addition, at the outlets of each feature erosion control blankets will also be installed.

2. Erosion control blankets (coconut fiber mesh or similar) will be placed over seed installed on the disturbed banks of the creek at the southern end of the site, the bank fill in the vicinity of wetland feature 2 (SW-2), and the fill for the road crossing at the northern end of the site. In addition, where appropriate, willow wattles or brush matting will be used in the area up and downstream of the failed dam.

3. All other disturbed areas (such as topsoil stockpile areas) will be regraded to match existing topography and seeded as needed.

Revegetation

1. Upland planting of the oak savannah and the riparian planting along the stream channel will occur in the fall following construction of the project.

TARGET FUNCTIONS AND VALUES

The mitigation effort will be successful if the new wetland habitat has equal or greater value, and similar functions and size as the wetlands that will be filled. The 1.7 acres of seasonal wetland to be filled as a result of the Central Disposal Site Improvement Program are primarily wetlands adjacent to the intermittent stream channels in the east and west canyons. These wetlands to be filled are of limited value because of their abundance of non-native vegetation. In addition, the wetlands filled are in close proximity to the active landfill and associated disturbances, which limit their value for wildlife usage. Because of their more remote location, the mitigation site wetlands would be more isolated from landfill activities and disturbance. Because the created wetlands would be in a protected area and adjacent to a stream and to upland habitats, the created wetlands would be of greater value than the wetlands at the landfill site. In addition to the creation of new seasonal wetland, all of the other proposed enhancements on the mitigation site as described previously would create a site with very diverse habitat for wildlife and plants that would have much greater value than those wetland features that are to be filled as a result of the Landfill Expansion Project.

Vegetation

Seasonal wetland vegetation is targeted for the entire 2.6 acres, but the stipulated performance criterion for total vegetation cover is 80%, allowing for scattered bare areas that may occur in the deeper portion of the seasonal wetland features. The 80% total cover may be calculated either for each feature independently, or in total for the entire created acreage.

Hydrology

The goal will be to establish a hydrologic regime that will pond water for a sufficient duration to allow for the establishment of typical wetland/vernal pool plant species in the 2.6 acres of created seasonal wetlands. As the ponding of water in shallow seasonal wetlands is tied directly to rainfall events that are highly variable, the length of ponding is difficult to predict.

The created wetlands will receive water through direct rainfall and the small watershed above each feature. During heavy rainfall, the features are expected to fill to their design elevations and spill as sheet flow into the feature below and ultimately out at the lowest feature adjacent to the top of bank. The outlet area of the features will be an approximately 50 - 100 foot wide, and will be almost flat to avoid concentrating the flow and causing erosion. The outlet areas of all seasonal wetland features will be protected with an erosion control blanket (coconut fiber mesh or similar).

When all features are at their maximum design elevation, the seasonal wetland ponded area will be approximately 2.6 acres. Between rain storms, the ponded area will gradually decrease.

Red-legged Frog Habitat

The goal of the pond area will be to create hydrologic conditions favorable for red-legged frogs. The three features are designed to fill from direct rainfall, the watershed above, and most importantly, during the dry months, by the springs themselves. The features are designed to pond water at to a depth of approximately four, three, and two feet in order to have water for the appropriate depth to provide year round habitat in addition to the hydrologic regime will also be favorable to the establishment of vegetation ideal for frog habitat. The plants that will be dominant in this zone will readily invade on their own, provided that the hydrologic regime is created.

PERFORMANCE CRITERIA

Hydrology

To demonstrate the appropriate hydrologic regime, the new wetland features must pond water during the winter season. During a normal rainfall year, the feature must contain water to the design elevation for sufficient time to allow for the establishment of wetland plant species. The development of the hydrologic regime is expected to occur during the early portion of the first winter.

Vegetation

Establishment of the wetland vegetation will probably take several years. Because of the possibility of drought years, it is difficult to predict year by year performance standards. Assuming normal weather, the criterion for hydrophytic cover is as follows: By the end of the 5-year monitoring period, a minimum of 1.7 acres shall exhibit at least 60% relative cover by clearly hydrophytic vegetation (i.e., Facultative-Wet and Obligate species). Also, by the end of the monitoring period, the created wetlands shall contain at least five native wetland species. Table 2 below shows the vegetation performance criteria.

TABLE 1: SITE VEGETATION PERFORMANCE CRITERIA

Criteria	Year 1	Year 2	Year 3	Year 4	Year 5
Absolute cover	20%	30%	50%	70%	80%
Relative % Hydrophytic	40%	50%	50%	60%	60% +
Number of Native Species	2	3	4	5	5 +

Red-legged Frog Habitat Performance Criteria

To demonstrate the creation of red-legged frog habitat, the deeper water of the features needs to be hydrated through the summer months, and the entire habitat, with the exclusion of the deepest portion, should dry up by mid-fall. This hydrologic regime will allow for the development of marsh plants available for frog refuge during the summer months. By the end of the five-year monitoring period, the hydrologic regime will be sufficient for frog habitat as determined by a qualified biologist.

The establishment of marsh vegetation may take several years. Because of the possibility of dry years, it is difficult to predict year-to-year performance standards. By the end of the five-year monitoring period, the three features will contain sufficient vegetation for the red-legged frog as determined by a qualified biologist.

MONITORING

Sonoma County will implement a site monitoring plan to determine success of the mitigation site. Monitoring will begin immediately following the construction of the site, with preparation of the as-built plan and photo documentation.

The County will continue a regular monitoring program using qualified biologists to assess both vegetative and hydrologic characteristics during the next five years following construction.

Photographic Monitoring

Photographs will be taken from permanent photo points for the seasonal wetland and frog habitat features monthly October to June the first year following construction. During the next four years of monitoring, photos will be taken three times per year.

Hydrologic Monitoring

During the first year following construction, site hydrology will be monitored once each month from October to June. This monthly monitoring will allow assessment of the hydrologic regime. During the next four years, site hydrology will be monitored in December, February, and April. Two permanent monitoring stakes will be installed around the rim of each wetland feature. Hydrologic monitoring will be done by measuring the perpendicular distance between each monitoring stake and the edge of the

ponded area. Since the stakes will be at known coordinates around the rim of each feature, estimates of the size of the ponded area can be easily made. The results of the monitoring will be recorded on field forms similar to the sample in Figure 7.

Vegetative Monitoring

The monitoring of vegetation on the site will be done by a qualified botanist. The vegetative monitoring will have two components. The first will be periodic general observations to determine percent cover, the presence of undesirable weedy species, and any problems such as soil erosion. This monitoring will be done at the same time as the hydrologic monitoring.

The second component of the monitoring will consist of transect sampling. This sampling will be done once a year during the months of April - June (the exact time will be weather dependent). This monitoring will consist of collecting and analyzing both quantitative and qualitative data from a set of permanent transects (point intersect sampling method) established the first year of the vegetative monitoring.

The transect locations will be selected to encompass the various habitat types found within the seasonal wetland feature. The two permanent monitoring stakes will be used to set the transect locations, with the transect locations noted on a plan sheet. A cloth tape will be laid down between the two stakes for each transect, and species present will be noted at a set interval (typically every 0.5 - 1-foot) along each of the transects. Data will be recorded in the field on forms similar to that shown in Figure 8.

The data will be used to determine estimates for absolute cover, relative hydrophytic, and native cover. The transect data will be used to generate species presence and frequency, as well as percent cover by species. The use of the permanent transect locations will allow for the direct comparison of results from year to year during the monitoring period.

Red-legged Frog Habitat Monitoring

The monitoring of the frog habitat will be done by a qualified wildlife biologist. The monitoring will be accomplished by visiting the site at various times of the year (minimum of two times/year) to assess if the hydrologic regime and vegetation is suitable for red-legged frogs. This will be accomplished by visual observations, and the time of year the observations occur will vary. Results of the monitoring will consist of a letter report by the biologist.

Reporting

Baseline Report: By December 31 following construction of the mitigation wetlands, a baseline ("as-built") report will be prepared and submitted to the California Department of Fish and Game (CDFG), with a copy also sent to the North Coast Regional Water Quality Control Board (NCRWQCB). The report will include photos of the site, an as-built grading plan, and descriptions of any changes from the proposed design or construction techniques.

Annual Reports: The annual reports will present the results of monitoring done during the preceding year, and will include photos of the wetland features, and a summary of the hydrologic, vegetative, and red-legged frog habitat monitoring. The annual reports will assess the performance of the wetland mitigation in relation to the target success criteria, and will discuss any shortcomings and remedial actions needed.

The annual reports will be submitted to the CDFG, with a copy to the NCRWQCB by December 31 of each of the five years following site construction.

The fifth (final) monitoring report will document any deficiencies and recommend remedial actions if any are necessary to meet the final success criteria. This report will include a wetland delineation indicating the areas of the mitigation site that meet Corps wetland criteria.

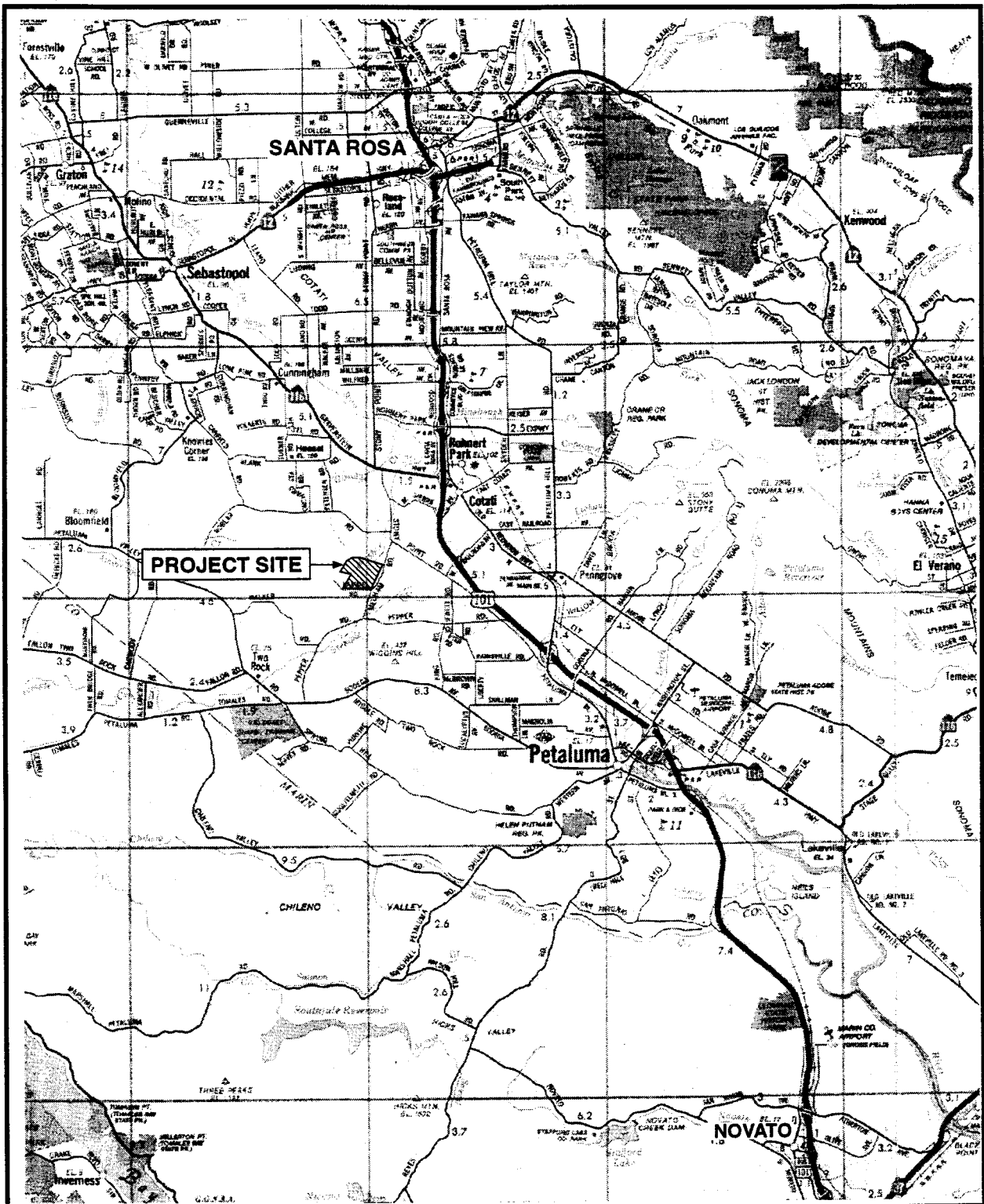
Monitoring Schedule

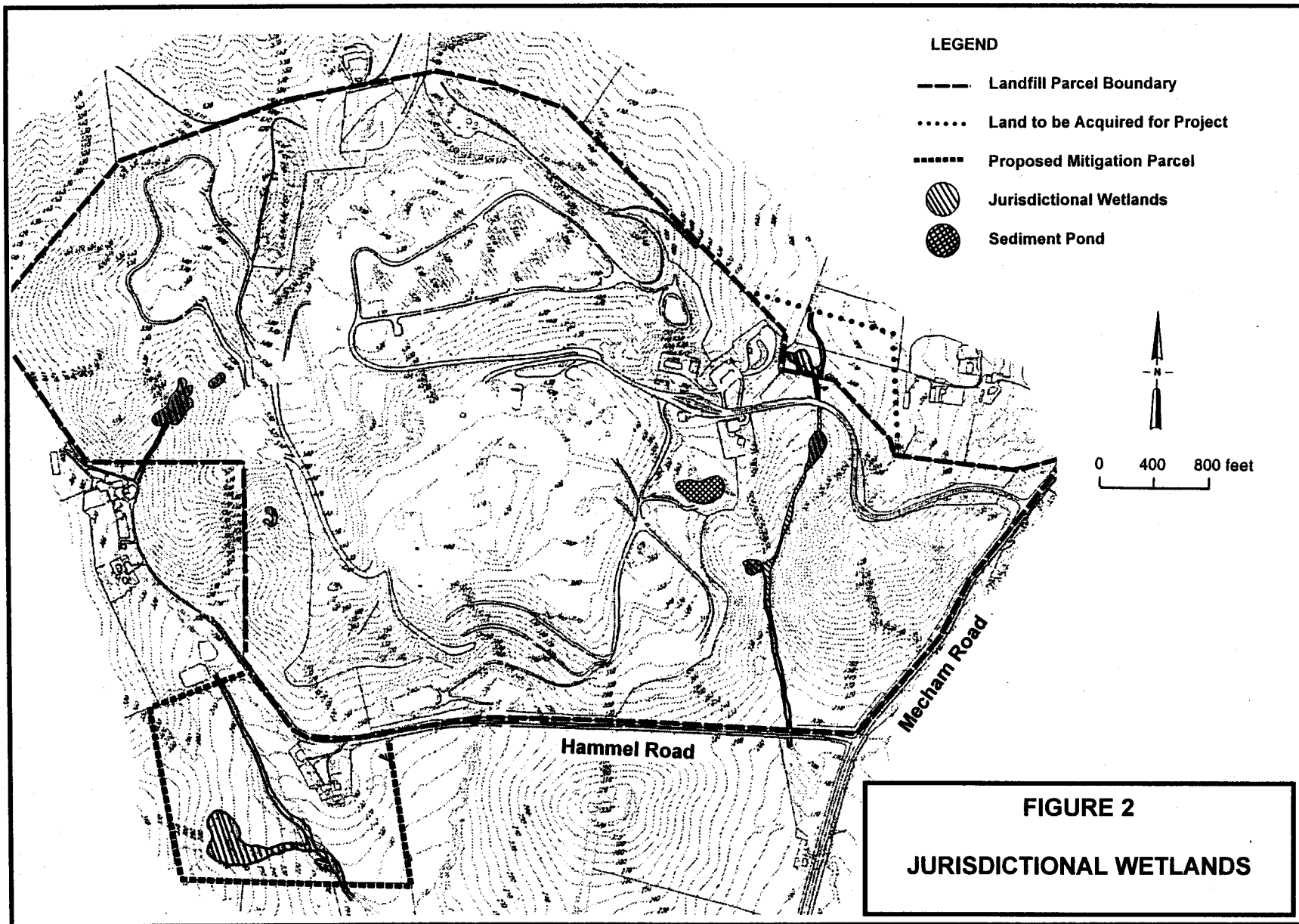
TABLE 2: MONITORING SCHEDULE

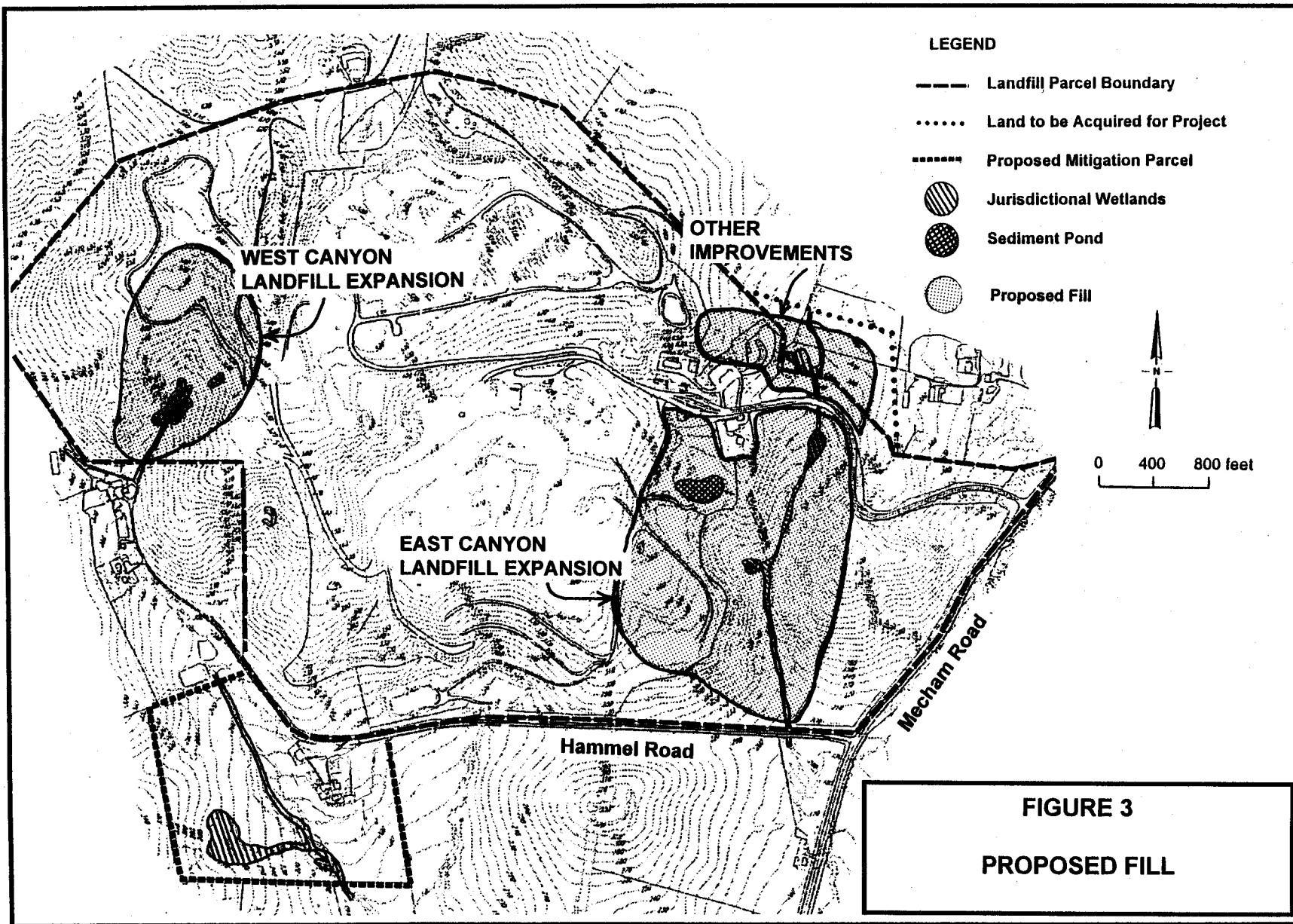
Year	Hydrology & General Vegetation	Photographs	Transect Sampling	Red-legged Frog Habitat Observations
1	Monthly, October - June	Monthly, Oct - June	Once/Year (April, May, or June)	Twice/Year
2	Dec, Feb, April	Three times/year	Once/Year (April, May, or June)	Twice/Year
3	Dec, Feb, April	Three times/year	Once/Year (April, May, or June)	Twice/Year
4	Dec, Feb, April	Three times/year	Once/Year (April, May, or June)	Twice/Year
5	Dec, Feb, April	Three times/year	Once/Year (April, May, or June)	Twice/Year

MAINTENANCE AND CONTINGENCY MEASURES

During monitoring visits, staff will note any failures or problems related to plant establishment, erosion, invasion by weedy species or establishment of the hydrologic regime. If the created wetland features or the frog habitat features fail to satisfy the performance criteria during any year of the monitoring period, the Sonoma County Department of Transportation and Public Works will consult with the California Department of Fish and Game, resource agencies, and others as needed to determine the cause of the problem and the most effective remedy. The DTPW will take remedial actions needed to satisfy the final success criteria.







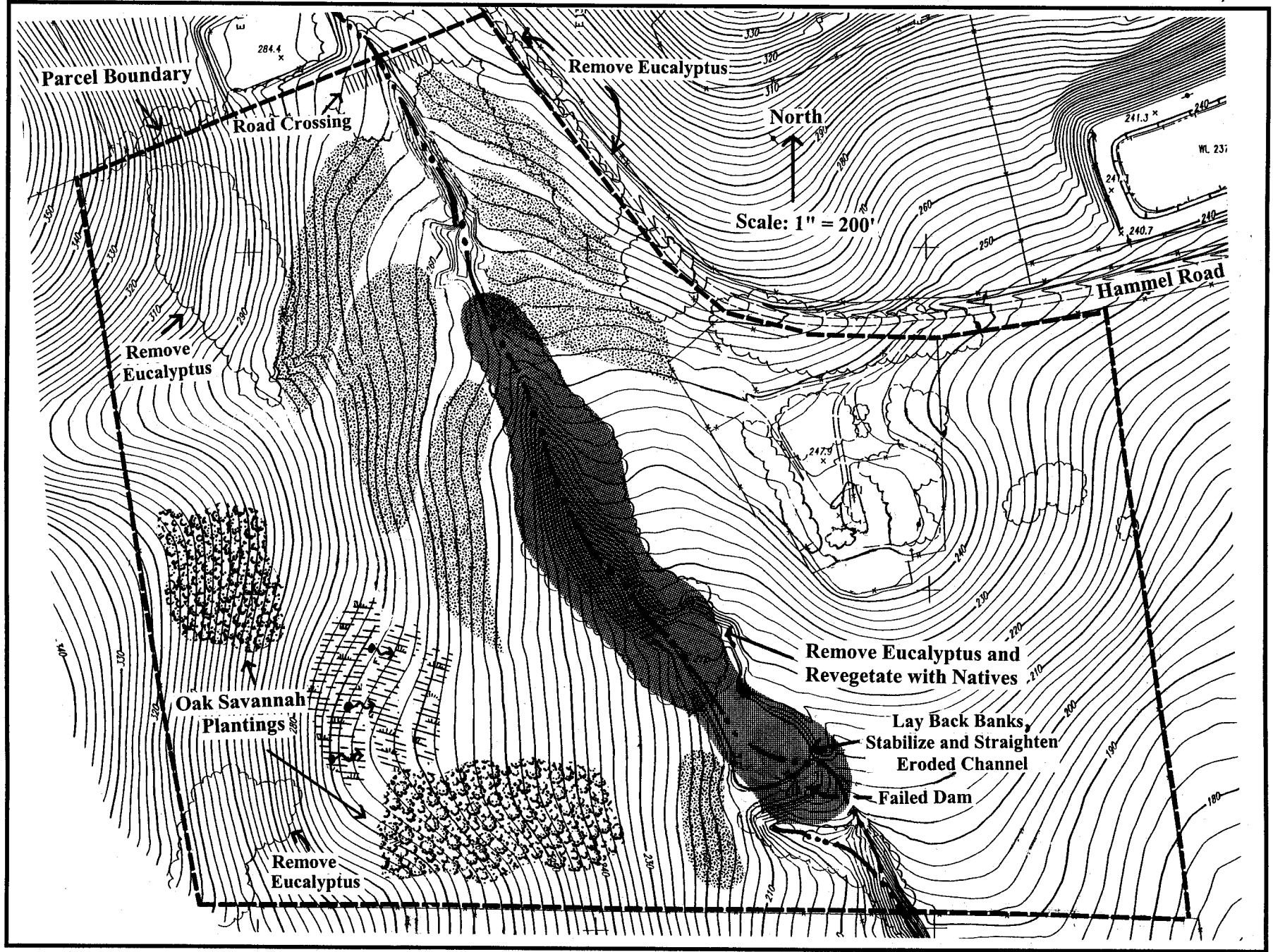


FIGURE 4

CONCEPTUAL MITIGATION PLAN

Note: See Plate 1 for exact locations and dimensions of site features and for additional detail.



Photo 1. From east side of site looking northwest. This is the area of seasonal wetland features.



Photo 2. From west side of site looking northeast. Note spring boxes and blackberries - this is the location of the frog habitat features and to the north the seasonal wetland features. Hammel Road in background of photo.

FIGURE 5

PHOTOS OF MITIGATION SITE



Photo 3. Looking upstream from the failed dam.



Photo 4. Looking downstream at the failed dam. Note the deeply incised channel.

FIGURE 6

PHOTOS OF MITIGATION SITE

FIGURE 7 - SAMPLE MONITORING FORM

SONOMA COUNTY LANDFILL EXPANSION PROJECT WETLAND MITIGATION MONITORING

Observer _____ Date _____

Wetland Feature No. _____

Total Rainfall in Current Water Year (July 1 through June 30) _____ inches

Rainfall During Last Seven Days _____ inches

		WETLAND FEATURE NO.
Distance from monitoring point to standing water	A	
	B	
Evidence of recent higher water level?		
Emergent vegetation present in ponded area (%)		
Algae visible in water?		
Evidence of damage from erosion?		
General observations (continue notes on back of sheet)		

FIGURE 8 - SAMPLE TRANSECT MONITORING FORM

**SONOMA COUNTY LANDFILL EXPANSION PROJECT
WETLAND MITIGATION MONITORING**

Observer _____ Date _____

Wetland Feature No. _____ Transect # _____

PLANT SPECIES

[illegible]