YOLO COUNTY CENTRAL LANDFILL PERMIT REVISIONS

Draft Subsequent Environmental Impact Report

SCH No. 1991073040

September 2004

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Prepared for

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TABLE OF CONTENTS

YOLO COUNTY CENTRAL LANDFILL PERMIT REVISIONS EIR

Page

Page

APPENDICES

LIST OF FIGURES

Page

LIST OF FIGURES (Continued)

LIST OF TABLES

EXECUTIVE SUMMARY

S.1 INTRODUCTION

The Yolo County Central Landfill (YCCL) is a municipal solid waste landfill located in unincorporated Yolo County about four miles northeast of Davis, and three miles southeast of Woodland, near the intersection of Roads 28H and 104. The YCCL is owned by Yolo County and operated by the County's Planning and Public Works Department, Division of Integrated Waste Management (DIWM); it has been in operation since 1975. The landfill is open seven days per week, accepting non-hazardous municipal solid waste from both incorporated and unincorporated areas of Yolo County. In recent years, approximately 160,000 tons of waste per year, or about 450 tons per day, have been disposed at the site. YCCL is permitted to accept up to 1,800 tons per day of waste.

The site covers 725 acres and includes several discrete areas, totaling 473 acres, that are permitted for disposal. These include seven Class III landfill areas for disposal of municipal solid waste (designated as Waste Management Units [WMUs] 1 through 7), four Class II surface impoundments for holding liquid wastes, and a full-scale bioreactor demonstration project (bioreactors are explained below). The site also includes a composting facility (permitted to accept 200 tons per day of greenwaste and wood waste), areas for metal, wood, and inert material (concrete, rock, etc.) recovery and recycling, and a temporary household hazardous waste collection facility. Four of the Class III landfills (WMUs 1, 2, 4, and 5) have been inactive since 1992 and WMU 3, also previously inactive, currently is receiving waste to bring it to final grade for closure. The bioreactor demonstration project is located at Module D, one of eight modules at WMU 6. WMU 7, which also consists of eight modules, is approved for future development.

S.2 PURPOSE AND NEED FOR THE PROJECT

The project evaluated in this Environmental Impact Report (EIR) consists of a number of proposed changes to the design and operation of the YCCL. The DIWM is proposing these changes in order to achieve the following objectives:

(1) To decrease the environmental impacts of landfill development, operations, and final closure, and increase the environmental benefits that can be derived from certain aspects of landfill operations;

(2) To increase the County's ability to divert waste from the landfill and continue to meet the state-mandated diversion goals;

(3) To increase efficiency and operate more economically; and

(4) To extend site life.

S.3 PROJECT DESCRIPTION/ELEMENTS

The project consists of several changes to the existing YCCL. These changes would be undertaken to allow the County greater flexibility in developing and implementing processes and operations that would reduce the environmental impacts of landfill operations, increase the recovery of materials and energy from waste, operate more efficiently and economically, and extend the facility's lifespan. Some of these processes and operations, such as operation of bioreactor modules and composting of organic wastes, have already begun on a limited scale, but would be increased under the proposed project, while other elements are new.

The following proposed changes to the design and operation of the YCCL constitute the project evaluated in this EIR:

1) Operation of future landfill modules as bioreactor landfills

Except for its pilot and full-scale bioreactor demonstration projects, YCCL's permitted waste management units are permitted as conventional landfills. In a conventional landfill, waste material is kept as dry as possible. Any free liquid within the fill (leachate) is extracted and treated. The lack of moisture in the landfilled waste inhibits decomposition. The waste remains biologically unstable, and decomposition continues very slowly, for many decades. In a bioreactor landfill, liquids (and sometimes oxygen) are added to the landfilled waste material to accelerate waste decomposition by enhancing conditions for the growth of microorganisms. Leachate from the waste unit is extracted, but circulated back into the waste, and additional liquid is added as necessary to reach optimal conditions to promote the growth of microorganisms. Waste decomposes quickly in a bioreactor; decomposition is completed, and the waste is biologically stable, within 5 to 10 years.

Advantages of bioreactor landfills over conventional landfills include enhanced opportunity to recover landfill gas and lower overall and peak landfill gas emissions; reduced need for the off-site treatment and disposal of leachate; accelerated waste decomposition, which means that the landfill's crucial environmental controls, especially the composite base liner system and the gas collection system, are still relatively new when they are most needed; and greater effective landfill capacity due to the settlement and densification of the waste that results from rapid decomposition.

In 1994, the DIWM constructed two pilot-scale test cells at Module B (about 9,000 tons of waste each) to conduct research into bioreactor landfill technology. Based on the success of these projects, DIWM applied for and in 2001 was granted approval from the U.S. Environmental Protection Agency (U.S. EPA) to developed a full-scale bioreactor demonstration project in two phases at Module D of Waste Management Unit 6. DIWM has completed construction of the three bioreactor cells that constitute phase one: one 6-acre anaerobic cell, one 3.5-acre anaerobic cell, and one 2.5-acre aerobic cell.

2) Increase in the landfill's final elevation from 80 feet above mean sea level to 140 feet

YCCL currently is permitted to fill to a maximum elevation of 80 feet above mean sea level (msl), which is approximately 60 feet above ground level. The County proposes to increase this fill height by 60 feet, to a final maximum elevation of 140 feet msl, (or waste thickness of approximately 120 feet). The proposed height increase would apply to Module D and the remaining undeveloped modules at WMU 6 (i.e., modules E through H) and all modules at WMU 7. Increasing the maximum fill elevation to 140 feet msl would approximately double the remaining site capacity. Increasing the height of the landfill would delay the need for construction of landfill cells and improve the economy of landfilling operations, since the high capital costs of constructing the base liner and final cover for a module would be spread over a greater volume of waste. The currently permitted 80-foot msl maximum final grade has a remaining refuse capacity of about 15.3 million cubic yards. Increasing the maximum height of the landfill to 140-foot msl would increase remaining capacity to about 31.5 million cubic yards.

3) Landfill mining of all waste management units

The DIWM is proposing to revise the facility's permits to allow mining of completed portions of the landfill. If approved, DIWM would give priority to mining the older, unlined landfill units, but would have the flexibility to mine any of the waste modules at the YCCL site. WMUs 1 through 5 were constructed prior to adoption of current federal and state regulations governing landfill design, and therefore are not lined with modern (Subtitle D-compliant), composite liners. Due to the high water table at the site, there are times when the bottom of these older units may be below the elevation of surrounding groundwater. Following complete removal of the landfilled waste from these older units, engineered fill would be placed to meet current requirements for a 5-foot separation between the base of a landfill and groundwater, and new waste units would be constructed with liners meeting current regulatory standards. Mined waste would be processed to separate it into three fractions: 1) metals and other recyclables; 2) an under-size fraction consisting of inert matter and soil suitable for use as daily and intermediate cover material or as the foundation layer for the final landfill cover; and 3) an over-size fraction that would be landfilled in an active, composite-lined cell. To better utilize site geometry in redeveloping the landfill cells, DIWM would relocate the high-pressure underground natural gas pipeline and above-ground power lines that currently cross the site.

Mining and subsequent redevelopment of WMUs 1-5 would increase landfill capacity, thereby helping to extend landfill site life. In addition, landfill mining would generate a considerable amount of fine materials that could be used as landfill cover material, reducing the need to import cover material from off-site. Removal of wastes from the unlined area also would eliminate a potential source of groundwater pollution.

4) Construction and operation of a material recovery facility at the landfill

DIWM is proposing to construct a permanent material recovery facility (MRF) at the YCCL site, to enable the County to process selected self-haul, debris box, and commercial loads to recover marketable materials. The proposed building would be approximately 45,000 square feet, and would probably be located in the area immediately west of the City of Davis's wastewater treatment ponds. Both automated equipment and manual labor would be used to recover materials. The MRF would be designed to handle up to 800 tons per day of materials, with a projected recovery rate of about 50 percent. Unrecoverable residues would be deposited in the active portion of the landfill. Operation of the MRF would not increase the currently permitted daily tonnage of waste received at the landfill; most of the loads that would be directed to the MRF would otherwise be disposed at the landfill. Operation of the MRF would help Yolo County and its communities continue to meet state-mandated waste diversion goals.

5) Expansion of the existing composting facility at the landfill

The YCCL site includes a greenwaste composting facility, which operates under a "Notification Tier" Solid Waste Facility Permit. The facility is permitted to receive and process up to 200 tons per day, and up to 73,000 tons per year, of clean wood and greenwaste. Of the material produced by this facility, some is used for alternative daily cover (ADC) at the landfill and the remainder is sold for mulch or fuel.

DIWM proposes to construct and operate an expanded composting facility that would accept up to 500 tons per day of waste. As with the proposed MRF, waste receipts for the expanded composting operation would fall within the currently permitted maximum of 1,800 tons per day for all wastes entering the facility. Most of the composted material would be from loads diverted from disposal at YCCL.

The composting facility would accept a variety of source-separated materials, including greenwaste, food waste, agricultural crop residues, manure, and biosolids (sewage sludge), which would be composted to create a stable soil amendment. DIWM also proposes to compost mixed municipal solid waste (MSW). Composted MSW has a limited number of applications and therefore would probably be used exclusively as alternative daily cover (ADC) at the landfill. Using composted material as ADC would decrease the need to import soil or other cover material and, under current regulations, would count toward the state mandate to divert 50 percent of the waste stream from disposal.

6) Expanded salvaging operations

The DIWM is proposing to institute salvaging operations to recover re-useable items from the tipping area and active landfill face. Salvaged items would be stored in a designated area for distribution to the public or charitable organizations, such as Goodwill or Salvation Army, or for sale. Targeted materials would include building supplies, lumber, usable furniture, and recyclable materials, such as metals.

7) Conversion of the existing temporary household hazardous waste collection facility to permanent status

DIWM currently operates a household hazardous waste collection facility (HHWCF) at the YCCL under a permit from the state Department of Toxic Substances Control. The County's household hazardous waste (HHW) collection program consists of six collection events per year for Conditionally Exempt Small Quantity Generators and Yolo County residents. The events are housed at the existing facility, which was constructed in 1994. The DIWM is proposing to convert its temporary permit to permanent status. In general, operations at the facility would change little. However, the proposed revisions would allow for 1) additional collection hours and 2) longer waste storage prior to shipment to a permitted hazardous waste disposal facility. Because this project component may require the construction of a new building to meet state requirements for permanent HHW collection facilities, construction of a new HHWCF building is assumed to be part of this project component. Based on the County's preliminary design considerations, the permanent structure would have the capacity to provide HHW collection service to the year 2020, at least. The structure would be an approximately 3,600 square-foot, single story, metal building located near the existing landfill office building. The building currently used for temporary events would be used as an expanded reusable products area and for storage of supplies needed for the permanent facility.

8) Development of a soil borrow area in an as-yet undetermined location

YCCL has a shortage of soil needed for intermediate and final landfill cover material. In the future, DIWM may need to import soil from off-site for these purposes. DIWM is proposing to purchase property to develop a soil borrow area that would supply soil to the facility. The soil borrow area site has not yet been identified, but DIWM estimates that a 640-acre parcel (i.e. one square mile) would be needed. In order to transport soil economically to the YCCL site, the soil borrow area would need to be within about five miles of the landfill. The County has developed siting criteria (described in Chapter 2, Project Description) that would be used in identifying candidate properties, in order to avoid or minimize potential environmental impacts.

Because the soil borrow site has not yet been determined, this project component is described and evaluated in this EIR at a general, programmatic level of detail. Implementation of this project component will require additional, project-level California Environmental Quality Act (CEQA) review after the site has been identified.

9) Expanded landfill gas management and utilization options

The proposed operation of future landfill cells as bioreactors will enhance opportunities to collect landfill gas. Furthermore, the proposed height increase will substantially increase the amount of landfill gas produced at the site. Currently, gas collected by YCCL's gas collection system is combusted at a landfill gas flare or used to fuel five permitted electrical generators. DIWM proposes to expand the existing landfill gas collection and utilization system and to diversify the landfill gas products produced. This might include an increase in electrical generation and transmission capacity, production of steam or alternative fuels such as methanol and liquefied natural gas (LNG), commercial production of CO_2, or other uses.

These project components are described in more detail in Chapter 2, Project Description.

S.4 PROJECT IMPACTS AND MITIGATION MEASURES

The potentially significant adverse effects of the project are described in Chapters 3 and 4. Mitigation measures have been identified that would reduce many of the significant impacts to a level of insignificance. However, even after mitigation, several unavoidable significant effects of the project will remain. Table S-1, at the end of this chapter, presents a summary of potential environmental impacts, their level of significance before mitigation, mitigation measures, and the level of significance after mitigation. As seen in Table S-1, the significant unavoidable impacts associated with the project include impacts to the aesthetic values of the area and impacts to air quality, including an increased health risk for residents living nearby the site.

S.5 ALTERNATIVES TO THE PROJECT

The California Environmental Quality Act (CEQA) requires an EIR to describe and evaluate the comparative merits of a range of reasonable alternatives to the project, or to the location of the project, that would feasibly attain most of the basic project objectives but would avoid or substantially lessen any of the project's significant effects (CEQA Guidelines Section 15126.6). Chapter 5 (Alternatives to the Project) of this EIR provides an analysis of the impacts anticipated from four alternatives to the proposed project. The project alternatives considered in this EIR include (1) No Project Alternative; (2) Reduced Height Alternative; (3) Off-Site Alternative; and (4) Mitigated Alternative. This section provides a summary of each alternative and the EIR conclusions pertaining to it.

No Project Alternative. The No Project alternative analysis is based on the assumption that the Yolo County Central Landfill would continue to operate under the terms of its existing permits. The existing Solid Waste Facility Permit allows acceptance of up to 1,800 tons per day of waste, seven days per week. The YCCL consists of several discrete areas permitted for waste disposal operations. These include six Class III landfills areas for disposal of municipal solid waste; four Class II surface impoundments for holding liquid wastes; and a bioreactor demonstration project. An additional Class III landfill area has been approved for future construction.

Under the No Project alternative, the following elements from the proposed project would be eliminated: development of additional waste management units as bioreactors, increasing the landfill's final elevation, landfill mining operations, construction and operation of a material recovery facility, expansion of the composting facility, expansion of the salvaging operations, conversion of the existing temporary household hazardous waste collection facility to permanent status, purchase of additional land to develop as a soil borrow area, and expansion of landfill gas management and utilization options. This alternative meets none of the County's objectives for the project.

Reduced Height Alternative. The Reduced Height alternative includes all elements of the Project, except the proposed height increase would be reduced so that the final landfill elevation would be 110 feet, instead of 140 (the landfill is currently permitted for a final elevation of 80 feet). As with the project, the reduced height increase proposed for this alternative would apply to Module D and the remaining undeveloped modules of WMU 6 and to WMU 7. The elements included in this alternative are: development of additional waste management units as bioreactors, landfill mining operations, construction and operation of a material recovery facility, construction and operation of a composting facility, expanded salvaging operations, conversion of the existing temporary household hazardous waste collection facility to permanent status, purchase of additional land for the development of a soil borrow area, and expansion of landfill gas management and utilization options. This alternative would reduce impacts on visual quality and air quality, compared with the project, and therefore would better meet the County's objective of decreasing environmental impacts of landfill development than would the project. This alternative would be similar to the project in terms of meeting the County's second goal of increasing waste diversion. It would to some extent meet the County's third and fourth objectives, of increasing economic efficiency and extending site life, but not as much as would the project.

Off-Site Alternative. The Off-Site alternative generally evaluates the environmental impacts of another, unidentified landfill site meeting minimum siting criteria. The analysis assumes that such a site would be located in an agricultural area that does not have prime agricultural soil. The analysis generally describes the types of environmental impacts that could be expected from developing and operating a landfill at such a site, and compares them to the project's impacts. This alternative only meets the County's second objective, to increase the diversion of waste from landfill disposal and continue to meet state-mandated diversion goals. It does not meet the other three objectives. Environmental impacts of this alternative would likely be either more severe than or similar to those of the project.

S.5.4. Mitigated Alternative. The Mitigated Alternative includes all mitigation measures included as part of the proposed Project, all of the mitigation measures identified in the EIR, and eliminates the aspect of the Project that has the greatest potential to harm the environment, namely the increase in the landfill height from 80 to 140 feet. Elimination of this project component would eliminate the adverse aesthetic impacts of the proposed height increase, and reduce or eliminate the air quality impacts projected for the extended years of landfill operation, while allowing the County considerable flexibility, through development of other components of the project, in the management of municipal solid waste receipts and diversion of reusable, recyclable, and compostable materials. This alternative eliminates the adverse impacts on visual quality of the proposed height increase and reduces the air quality impacts projected for the extended years of landfill operation. This alternative would to some extent meet the County's third and fourth objectives, of increasing economic efficiency and extending site life, but not as much as would the project or the reduced height alternative.

In Chapter 5, each alternative is described and analyzed for its environmental effects compared to the project. The Mitigated Alternative is considered the Environmentally Superior Alternative because of the alternative's ability to avoid or reduce the significant unavoidable impacts of the project, while still meeting or at least partly meeting the project objectives.

S.6 EIR PROCESS AND SCOPE

EIR PROCESS

The Yolo County DIWM, the principal public agency for carrying out the project, is the Lead Agency conducting the CEQA environmental review. Based on a preliminary review of potential project impacts, the DIWM determined that an Environmental Impact Report (EIR) would be the appropriate level of environmental review for the proposed YCCL project. In March 2002, the DIWM prepared and circulated a Notice of Preparation (NOP) for this EIR, in accordance with CEQA Guidelines Section 15082, to seek comments from affected agencies and the public about the scope of the EIR (Appendix A). As part of the NOP, DIWM issued a review of probable environmental effects of the proposed project. The County held two public scoping meetings in March 2002, one at the Department of Public Works office on West Beamer Street and one at the Yolo County Central Landfill. Oral comments were received at the scoping meetings; transcripts of one of the meetings is included in Appendix B.

The DIWM will circulate this DEIR for review by public agencies and interested parties and organizations for a 45-day public review period, in accordance with CEQA Guidelines Section 15105. At the close of the public review period, the County will evaluate comments received on the environmental issues and prepare written responses, as required by CEQA Guidelines Section 15088. The comments and responses will be included in the Final EIR as a separate chapter, along with the revised EIR text necessitated by the response to comments.

SCOPE

The EIR analysis focuses on the elements of the proposed structural and operational modifications at YCCL that emerged from the County's preliminary review of the project as having the potential for adverse environmental impacts.

While the project described and analyzed in this EIR is distinct from the project that was the subject of the certified 1992 EIR, much of the information in that earlier document is germane to this EIR. The analysis in this EIR therefore relies to a considerable extent on the background and analysis contained in the 1992 EIR. This EIR merely summarizes information that is contained in that previous EIR where that information is still valid and applicable to the current project. This EIR focuses only on the potential environmental impacts of the various elements that make up the current project, and not on the overall impacts of the operation of YCCL or of already-approved past projects. This EIR is considered a Subsequent EIR, as per Section 15162 of the CEQA Guidelines.

APPROACH TO ANALYSIS

In accordance with recent case law that provides guidance as to the appropriate baseline for environmental analysis of existing, permitted facilities, the design, operations, and environmental controls described in YCCL's existing Solid Waste Facility Permit and other current permits, based on the 1992 FEIR, as well as other applicable permits that have undergone separate environmental review, constitute the baseline against which potential impacts of the project are evaluated in this EIR.

S.7 AREAS OF CONTROVERSY

At public scoping meetings held on March 21 and March 26, 2002, several issues were raised by members of the public. These include concerns regarding the project's impact on extending the life expectancy of the landfill, the aesthetic impacts of building the landfill to a higher elevation, and noise and odors from the site. Concerns were also raised about whether the project would aid the County in achieving, in an economical fashion, the state-mandated diversion of at least 50 percent of generated waste from landfill disposal. A transcript of the March 21 meeting, and comments on the Notice of Preparation from representatives of several government agencies, are included in the appendices.

S.8 ISSUES TO BE RESOLVED

As described in the project description, the project would provide the DIWM with the increased flexibility to manage disposed waste, implement strategies to divert waste from landfill disposal, enhance the use of landfill gas as an energy source, and extend the landfill site life to approximately the end of the century. The EIR analysis identifies several significant and unavoidable environmental impacts of the project. These are adverse impacts on visual quality due to the proposed height extension, and adverse impacts on air quality due primarily to the extended life of the landfill. The alternatives analysis finds that eliminating the proposed height increase would substantially reduce or eliminate most or all of the significant unavoidable impacts associated with the project. Merely reducing the height increase would reduce the severity of these impacts, but it is likely that they would remain significant.

In considering approval of the proposed project or an alternative to the project, decision makers will have to consider whether the merits of the project outweigh the project's environmental impacts. This consideration will be complicated by the fact that selection of an alternative that shortens the life expectancy of the landfill will result eventually in the need for the County to develop a new disposal site, which would likely carry impacts that are comparable or more severe than those associated with this project.

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
Aesthetics		
3.1.1: The project is inconsistent with several goals and policies contained in the Yolo County General Plan. (Significant)	**3.1.1:** Prior to final project approval the County Department of Planning and Public Works shall prepare a landscaping plan that includes strategic plantings of tall, native trees to screen views of the landfill from public vantage points and rights of way, consistent with the other mitigation measures identified in this section.	Less than Significant
3.1.2: Vantage point 1, view from Wildhorse Golf Course, on the outskirts of the City of Davis, approximately two miles southwest of the southern edge of the Landfill site, looking northeast. (Significant)	**3.1.2:** Trees could be used to screen views of the landfill from the vicinity of Vantage Point 1. However, this view is not unique, but rather typical of the area. Therefore, plantings would have to be extensive, and might interrupt the broad, open nature of the views from this area; this mitigation measure may therefore create a new, substantial impact, and is therefore not considered feasible.	Significant and Unavoidable
3.1.3: Vantage Point 4, View from Road 103, one mile west of the western edge of the landfill site, looking east. (Significant)	**3.1.3:** As with the previous impact, trees could be used to screen views of the landfill from the vicinity of Vantage Point 2, but, like the previous impact, plantings would have to be extensive, and might interrupt the broad, open nature of the views from this area. This mitigation measure may therefore create a new, substantial impact, and is therefore not considered feasible.	Significant and Unavoidable
3.1.4: Vantage Point 5, View from south of Willow Slough Bypass, about 1,500 feet south of the southern edge of the landfill site, looking north. (Significant)	**3.1.4a:** The massing and exterior treatment of the proposed MRF structure should be designed to mimic a typical large agricultural structure.	Less than Significant

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	3.1.4b: Planting of appropriate native trees along the southern boundary of the landfill would help to screen the landfill from this vantage point, and would serve to break-up the dominance of the mass of the landfill on the landscape. Trees should be selected for mature height and screening characteristics, and compatibility with natural stands in the area.	
3.1.5: Vantage Point 6, view from Road 104A, about one mile south of the southern boundary of the landfill site, looking north. (Significant)	**3.1.5:** As with other distant views of the landfill, planting of trees to screen the view would require extensive planting (on land not controlled by the County), and might interrupt the broad, open nature of the views from this area. This mitigation measure may therefore create a new, substantial impact, and is therefore not considered feasible.	Significant and Unavoidable
3.1.6: Proposed new activities at the landfill, including composting, landfill mining, increased salvaging operations, and MRF operations, could result in creation of increased amounts of windblown litter leaving the site. (Less than Significant)	None required.	
3.1.7: Prior to landfill closure, the proposed changes in landfill contours (in conjunction with the revised fill sequencing plan) and new activities could increase the visibility of landfill activities as seen from public roadways and nearby residences. (Less than Significant)	None required.	
3.1.8: Construction of future landfills cells as anaerobic bioreactors could introduce a new source of glare. (Significant)	**3.1.8:** When developing anaerobic bioreactor cells, the County shall use a cover that has low reflective properties.	Less than Significant

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
3.1.9: Development of an off-site borrow area could degrade the visual character of the site and its surroundings by introducing physical features that are substantially out of character with adjacent land uses; alter the natural landscape characteristics of the site to such a scale or degree that the change appears as a substantial, obvious, and disharmonious modification of the overall scene; or conflict with adopted plans or policies regarding visual resources. (Significant)	**3.1.9a:** The soil borrow area shall be located outside of the viewshed of any designated or candidate scenic highway, as stated in the siting criteria to be used in identifying a suitable soil borrow area.	Less than Significant
	3.1.9b: Consistent with Yolo County General Plan Policies CON 27 and SH 7, development of the soil borrow area will include a **setback** from roadways, and to the extent possible will retain existing trees and vegetation. The site will be landscaped, including use of screen trees.	
	3.1.9c: After completion of soil borrow activities, the site will be restored to an appropriate use, such as open space or wildlife refuge. This will include landscaping to produce a natural and harmonious character.	
Air Quality		
3.2.l: Project-related traffic would not increase air quality emissions from on-road mobile sources. (Less than Significant)	None required.	
3.2.2: Landfill mining could release odors, methane, hydrogen sulfide, and other gases. (Significant)	**3.2.2a:** A *Specific Health and Safety Plan for Landfill Mining at the Yolo County Central Landfill* was prepared for the County in 2001. The Health and Safety Plan (HASP) as drafted shall provide the guidance necessary to initiate the work and allow monitoring of site conditions to determine the required protection. Continual updating of the HASP is emphasized in the HASP. The updates shall be based upon consistent monitoring and implementation of the HASP.	Less than Significant

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	3.2.2b: One month prior to initiation of landfill mining activities, the HASP shall be forwarded to the Local Enforcement Agency (LEA) and YSAQMD for comments and suggestions. Appropriate suggestions shall be incorporated into the HASP and new features of the HASP shall be communicated to the workers. If additional gas monitoring equipment is needed, the equipment shall be purchased and tested prior to commencing landfill mining operations.	
3.2.3: Landfill changes could result in the temporary generation of odors that could affect adjacent residences. (Significant)	**3.2.3a:** The project applicant shall formulate an Odor Impact Minimization Plan in accordance with the recently revised State composting regulations (Title 14 CCR § 17863.4.) This plan will be submitted to the LEA as part of the application for a solid waste facilities permit for the compost facility.	Less than Significant
3.2.4: The project could increase the annual emissions of criteria air pollutants and would extend the years of landfilling and composting at the site until the year 2100. (Significant)	**3.2.4a:** Yolo County is seeking to revise its permits to allow the future landfill modules to be operated as bioreactor landfills. This would allow leachate recirculation, the addition of supplementary liquid (such as groundwater), and acceptance of wet wastes. This will result in a significant increase in the rate of production of landfill gas. Due to accelerated decomposition LFG would be produced sooner and overall capture rates of LFG are expected to rise to as much as 98 percent, reducing the fugitive air emissions that escape from the landfill cover.	Significant and Unavoidable

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	3.2.4b: Various aspects of the proposed project, including future development of bioreactor modules and increasing the final height of the landfill, will result in a significant increase in the rate of production of landfill gas. Currently, YCCL has a landfill gas collection system, and the collected gas fuels on-site electric generators. The project proposes to expand the existing landfill gas collection and utilization system and to diversify the landfill gas products. This might include an increase in electrical generation and transmission capacity, production of steam or alternative fuels such as methanol and LNG, commercial production of CO_2, or other uses. The addition of new stationary source control equipment would be subject to permitting by the YSAQMD.	
	3.2.4c: When replacing older vehicles at the landfill, the County shall commit to replacing them with diesel-powered vehicles (with proven technologies) that generate less NO_x and PM-10 than the older vehicles.	
	3.2.4d: The County shall conduct periodic reviews to identify feasible retrofit equipment, or fuels that could lower vehicle emissions at the landfill.	
3.2.5: The project would increase the amount of ROG and PM-10 emissions from expanded composting activities. (Significant)	**3.2.5a:** Water composted or cured materials during final windrow tear down and before loading the finished compost onto vehicles, taking care not to over wet the material, which could produce leachate or run-off. This would ensure that potential impacts from PM-10 are mitigated. In addition, the following measures shall also be implemented to reduce PM-10 emissions.	Less than Significant

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	3.2.5b: The project applicant shall maintain records of all materials composted (either in terms of volume or weight by material type) and shall comply with all applicable rules, regulations and permit conditions. This would enable the DIWM and the YSAQMD to track ROG emissions from the composting operation so that emissions reductions can be claimed if specific controls are implemented in the future.	
3.2.6: Emissions of toxic air contaminants could pose a risk to human health. (Significant)	**3.2.6a:** The LFG collection system (and destruction via electrical generation or flaring) in combination with the bioreactor technology should substantially reduce the rate of fugitive emissions of LFG from the landfill.	Significant and Unavoidable
	3.2.6b: The County shall retrofit diesel-fueled engines and vehicles to reduce DPM emissions where it is determined to be technically feasible and cost-effective.	
	3.2.6c: The County shall use reduced sulfur fuel for existing on-road, off-road, and stationary diesel-fueled engines as soon as it is available, compatible with diesel-fueled engines on-site, and economically feasible.	
	3.2.6d: The County shall maintain the existing residential buffer areas surrounding the landfill and expand the buffer areas when opportunities arise in the future.	
3.2.7: The project would not require a General Plan Amendment or rezoning and therefore would not have a significant cumulative air quality impact. (Less than Significant)	None required.	

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
Biological Resources		
3.3.1: The proposed project may have significant adverse impacts, either directly or through habitat modifications, to special status bird species as defined in this section. This would be a significant impact. (Significant)	**3.3.1a:** There will be a "rolling replacement" of lost grasslands as landfill modules are completed, covered with soil, and re-seeded.	Less than Significant
	3.3.1b: For construction of any facilities that will occur between March 15 and September 15 of any given year, the DIWM shall conduct preconstruction surveys in suitable nesting habitat within 0.5 mile of the project site for Swainson's hawk and within 1,000 feet of the project site for tree-nesting raptors. Surveys shall be conducted by a qualified biologist and will conform to the Swainson's Hawk Technical Advisory Committee (2000) guidelines (Appendix G). If nesting raptors are recorded within their respective buffers, the applicant will consult with CDFG regarding suitable measures to avoid impacting breeding effort.	

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	3.3.1c: In order to protect wildlife habitat and existing open space as described in the conservation and open space policies of the Yolo County General Plan (1983), and the pending Yolo County NCCP/HCP, the applicant shall purchase shares in an appropriate mitigation bank or purchase comparable raptor foraging area in consultation with the CDFG at an appropriate ratio (1:1) to maintain no net loss of wildlife habitat in the region from the proposed landfill expansion. This ratio shall be applied to on-site grassland and agricultural land that will be permanently altered from natural to developed state. This ratio also shall be applied to off-site agricultural lands if such lands are acquired for use as a soil borrow area. The applicant shall consult with CDFG to fulfill appropriate mitigation acreage and/or ratio requirements in consideration of the anticipated "rolling replacement" of upland grasslands within the landfill site.	
3.3.2: The proposed project may have significant adverse impacts, either directly or through habitat modifications, on western burrowing owl. This would be a significant impact. (Significant)	**3.3.2a:** See Mitigation Measure 3.3.1a.	Less than Significant
	3.3.2b: For any construction that will occur between March 15 and September 15 of any given year, the applicant shall conduct preconstruction surveys in suitable nesting habitat within the project site and within 500 feet of the project site, for burrowing owls prior to construction. Surveys shall be conducted by a qualified biologist and will conform to the CDFG burrowing owl recommendations (Appendix H). Burrowing owl surveys shall be conducted in both the breeding and non-breeding season.	

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	3.3.2c: If nesting burrowing owls are detected within the project area, mitigation to avoid active nest sites or compensate for the loss of nest sites shall be developed in coordination with CDFG. Mitigation may include, but is not restricted to, precluding entry into buffer zones around nests, creating new burrows for every nest site lost at a 2:1 ratio, the passive relocation of resident owls, if necessary, and retention of a qualified wildlife biologist to monitor active nests during construction; this biologist would have the authority to halt construction if construction activities would result in the abandonment of a nest.	
3.3.3: The proposed project may have significant adverse impacts, either directly or through habitat modifications, on giant garter snake. This would be a significant impact. (Significant)	**3.3.3a:** The applicant will ensure that construction either within potential aquatic habitat for giant garter snake, and/or upland habitat within 200 feet of potential aquatic habitat (i.e., the unlined irrigation canals and ditches), shall conform to USFWS guidelines for procedures and timing of activities in giant garter snake habitat (Appendix I).	Less than Significant
	3.3.3b: In accordance with USFWS guidelines (Appendix I), no grading, excavating, or filling may take place in or within 30 feet of potential aquatic habitat for giant garter snake between October 1 and May 1 (the active period for the giant garter snake) unless authorized by the USFWS and CDFG.	
	3.3.3c: Prior to construction, all construction workers shall take part in an environmental awareness program conducted by a qualified biologist (i.e., a biologist who has had prior experience with giant garter snake monitoring through USFWS-approved biological opinions and/or implemented HCPs). This training shall include, at a minimum, a description of giant garter snake, its habitat requirements, and a photograph or illustration of the species so that workers can recognize the species.	

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	3.3.3d: A qualified biologist shall be present on site during the excavation or filling of giant garter snake habitat, including uplands within 200 feet of aquatic habitat. If a giant garter snake is found in the work area, all work shall cease, and the applicant shall retain a qualified biologist holding necessary permits to remove the snake(s) from the construction area.	
3.3.4: The proposed project may have significant adverse impacts to special-status plants. This would be a significant impact. (Significant)	**3.3.4a:** Prior to construction or development of landfill cells in the undeveloped eastern portions of the YCCL site, grassland, and seasonal wetland habitats and any vegetated portions of the proposed off-site soil borrow area on adjacent or nearby agricultural lands shall be surveyed by a qualified botanist for special-status plants using established CNPS protocols at the appropriate flowering period (March-June).	Less than Significant
	3.3.4b: If special-status plants are detected within the project area, soil borrow area or the immediate vicinity, the applicant shall identify and protect their locations with orange fencing, avoid all specimens, and notify CDFG. If sensitive plants cannot be avoided by the project, additional minimization and mitigation measures will be developed by the applicant in consultation with CDFG, prior to construction.	

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
3.3.5: The proposed project may have adverse impacts on potential jurisdictional wetlands in the project area, that may be filled due to landfill expansion activities and construction. This would be a significant impact. (Significant)	**3.3.5:** Prior to construction, the applicant shall submit a formal wetland delineation report for the project area for verification through the ACOE. Any fill of wetlands or other waters of the U.S. would require a permit from the ACOE. If impacts to jurisdictional wetlands are proposed, the applicant shall be required to obtain a Section 404 (Clean Water Act) permit from the ACOE and/or a Section 401 permit from the RWQCB. In association with either or both permits, compensatory mitigation for impacts to jurisdictional wetlands may be required. Should mitigation be required, there may be potential on-site opportunity for wetland enhancement and/or creation. This may also be done in combination with upland habitat enhancement (e.g., upland special status plant habitat). ACOE mitigation guidelines emphasize on-site mitigation preference, but in the potential case that on-site mitigation is not available, the applicant shall purchase wetland mitigation credits from an ACOE-approved mitigation bank that services the area containing the proposed project.	Less than Significant
3.3.6: The proposed project will result in impacts to non-sensitive natural communities. This would be a less-than-significant impact. (Less than Significant)	None required.	
3.3.7: The proposed project may conflict with policies contained in the Yolo County General Plan, and/or other plans or ordinances operating at the local level. This would be a less-than-significant impact. (Less than Significant)	None required.	

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
3.3.8: Changing biological conditions on the project site over the life of the project could result in future disturbance of biological resources. (Significant)	**3.3.8.** Prior to construction of new developments at the YCCL, the County shall conduct a biological resource survey of the area to be disturbed and nearby areas (e.g., including a 100 ft. buffer surrounding proposed new construction, and/or enlarged buffer sufficient to comply with survey protocols for, for example, nesting raptors) that may be affected by the construction. For the purpose of this mitigation measure, new developments include construction of new landfill modules; grading, disking, plowing, or other site preparation for permanent or temporary facilities or for agricultural uses; alteration of existing drainage channels; and other activities that will result in the disturbance of portions of the landfill that have not been disturbed for at least two years, have vegetative cover, or are considered a water of the state or the U.S. The biological resource survey shall be consistent with the other mitigation measures detailed in this section and consistent with the prevailing regulatory environment at the time the survey is conducted.	Less than Significant
Geology, Soils, and Seismicity		
3.4.1: Increasing landfill loads as a result of the project could change the amount of anticipated total and differential settlement of underlying materials, resulting in altering the flow of leachate and interfering with the proper drainage and function of the leachate collection and removal system (LCRS). (Significant)	**3.4.1a:** The DIWM's conceptual design and preliminary studies for the base liner and LCRS for the bioreactor cells take into account the added weight of the proposed landfill. The final engineering design has not been completed.	Less than Significant

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	3.4.1b: The final engineering design for the proposed bioreactor landfill shall include calculation of foundation settlements assuming refuse unit weights that are representative of refuse within a bioreactor environment and assuming the proposed landfill thickness. In addition, the analysis of differential settlement within the landfill footprint shall calculate the effects of landfill side slopes on differential settlement and the potential effects of differential settlement on LCRS drainage. Prior to the beginning of construction of the proposed landfill, the DIWM shall submit the Final Design Report to the RWQCB for review and approval. Construction shall not commence prior to RWQCB approval of the design report.	
3.4.2: Settlement of the refuse materials and the landfill surface could adversely affect drainage or disrupt the liner or final cover, or damage leachate collection and landfill gas collection structures. (Significant)	**3.4.2:** Operation of the bioreactor will accelerate settlement, and the landfill components, including the liner and LFG and leachate collection systems are designed and engineered to accommodate the anticipated settlement. In addition, the landfill design is required to comply with Title 27 requirements for final cover design, final surface grades, and continuing monitoring and maintenance to reduce potential impacts due to settlement.	Less than Significant
3.4.3: If not properly designed, landfill slopes could fail as a result of seismic or static forces. (Significant)	**3.4.3a:** The DIWM's conceptual design and preliminary studies for the slopes for the bioreactor cells take into account the added weight from the increased height and bioreactor operation. Final engineering design has not been completed.	Less than Significant
	3.4.3b: Prior to project construction, engineering analyses shall be performed to evaluate static stability as well as seismic stability and/or deformations for the proposed final bioreactor refuse height.	
3.4.4: Ground shaking due to a major earthquake in the region could potentially cause ground failure due to liquefaction (Less than Significant)	None required.	

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
3.4.5: The expansion and contraction of expansive soils underlying the proposed MRF and HHWCF, in response to cycles of wetting and drying, could damage building foundations and concrete slabs. (Significant)	**3.4.5a:** Foundation preparation and construction for the MRF and HHWCF buildings shall comply with all engineering design recommendations provided by the project geotechnical engineer. Mitigation shall include one or more of the following: a) moisture conditioning the expansive soil below foundation and slabs, b) providing select, non-expansive fill below slabs, c) supporting foundations below the zone of severe moisture change, and/or d) designing foundations to resist the movements associated with the volume change.	Less than Significant
	3.4.5b: The project shall comply with all engineering design recommendations provided by the project geotechnical engineer to reduce the settlement potential of surficial soils underlying the proposed buildings. Mitigation shall include either: (a) over-excavation and recompaction of existing fill and the use of spread footings for building support, or (b) support of the building on spread footings founded on compacted aggregate piers or cast-in-place concrete piers extending through poorly compacted site soils.	
Hydrology and Water Quality		
3.5.1: Pressure from collected leachate on the bioreactor liner, especially in the collection trenches and sump areas, could result in leakage and the potential contamination of nearby groundwater. (Significant)	**3.5.1a:** The DIWM will design and construct future bioreactor cells with the same containment features included in the Project XL bioreactor at Module D (modified as necessary to accommodate the increased anticipated settlement of the proposed project). Monitoring instruments and sensors will be placed to ensure safe and efficient recirculation of leachate, as was done for the Project XL bioreactor, and a comparable monitoring program will be implemented.	Less than Significant

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	3.5.1b: The Maintenance and Operations Plan developed by the DIWM for the Module D Full Scale Bioreactor Project, pursuant to requirements in the facility's previous WDR, Order No. 5-00-134, or comparable plan approved by the RWQCB, shall be implemented for the proposed future bioreactor units. The Maintenance and Operations Plan will apply to the development and operation of the proposed future bioreactor cells and will be revised as warranted, pursuant to the applicable WDR order.	
	3.5.1c: The DWIM will maintain a response plan to address the contingency of leachate production level exceeding expected levels, as described under item (e) of the Maintenance and Operations Plan for the Module D bioreactor project or a comparable plan.	
	3.51d: The final engineering design plans for the proposed bioreactors will incorporate the containment features and recommendations for leachate collection trench and sump areas described in Golder's Liner Performance Demonstration for Module D (Golder 2002). The engineering plans and drawings shall be submitted to RWQCB for approval prior to project construction.	
3.5.2: Operation of the landfill as a bioreactor will entail the use of extracted groundwater. If increased extraction rates were required, this could have adverse impacts on regional groundwater quality, quantity, and the underlying groundwater basin. (Less than Significant)	None required.	

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
3.5.3: Liquids added to the bioreactor cell, including collected leachate, landfill gas condensate and other liquids as needed, could exceed the capacity of the LCRS and result in the discharge of leachate to groundwater or the surrounding environment if the LCRS capacity requirements are not adequately assessed. (Significant)	**3.5.3a:** The DIWM's conceptual design and preliminary studies pertaining to LCRS capacity requirements utilize the most current data garnered from the existing bioreactor demonstration project and provide capacity to accommodate twice the anticipated peak rate, consistent with Title 27 requirements. The final engineering design for the LCRS has not been completed. **3.5.3b:** The final engineering design for the LCRS for the proposed bioreactor landfill units will utilize all relevant, current data from the Module D project to calculate LCRS capacity requirements and provide the capacity to accommodate twice the anticipated peak rate, as required in Title 27. The LCRS design will be submitted to the RWQCB for review and approval prior to LCRS construction.	Less than Significant
3.5.4: Mining and redevelopment of the older landfill cells could impact groundwater quality. (Significant)	**3.5.4a:** Prior to excavating units the DIWM will research the history of the particular landfill unit and perform preliminary site investigations to determine, to the extent feasible, the types of materials that will be encountered. **3.5.4b:** The DIWM will test soils in excavated cells to ensure all wastes have been removed before placement of backfill. The soils will be tested at intervals determined in consultation with the RWQCB and as specified in YCCL's revised WDRs. (For example, a testing interval in the range of one test per acre has been acceptable to the RWQCB in similar situations, according to EMCOM/OWT [1999]). **3.5.4c:** DIWM's reclamation plan will include monitoring and incorporate the flexibility to address concerns as they arise once the program begins.	Less than Significant

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	3.5.4d: In reclaimed areas, approximately three to five feet of clean earthfill will be placed to reestablish the regulation-mandated five feet of separation between wastes and the groundwater table, prior to construction of the base liner for the landfill units. **3.5.4e:** If required by the RWQCB, saturated wastes that cannot be sorted will be dewatered as specified in the YCCL's revised WDRs, prior to disposal in an active, permitted landfill cell at the site. It is not expected that any wastes disposed of in a bioreactor would require dewatering. **3.5.4f:** Landfill mining work shall be conducted during the season of the year when the water table is low relative to other seasons. **3.5.4g:** The analysis of the settlement of foundation soils due to landfill operation conducted pursuant to Mitigation Measures 3.4.1a and 3.4.1b (in Section 3.4., Geology, Soils and Seismicity) shall be incorporated into the design of the reconstructed WMUs 1 through 5, including the determination of subgrade fill depth and the design of the future composite liner to meet the five feet of separation requirement.	

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
3.5.5: Future mining of the stabilized bioreactor landfill units could result in the remobilization of metals and other contaminants that were precipitated and sequestered in the soil/waste matrix during leachate recirculation, resulting in the contamination of water contacting mined materials. (Significant)	**3.5.5:** Because experience regarding the behavior of materials mined from bioreactor landfills is extremely limited or non-existent and soil materials from bioreactor units have not been approved by the CIWMB for use as ADC, prior to mining stabilized material from a bioreactor landfill unit, the DIWM shall, in consultation with the LEA, conduct tests on samples taken from the bioreactor cell to be mined. In consultation with the LEA and the RWQCB, the DIWM shall develop an appropriate site specific demonstration to evaluate the suitability of mined bioreactor landfill materials for daily, intermediate, or final materials. The demonstration project should address the potential remobilization of metals and other toxic constituents that typically are sequestered and stabilized within the waste matrix during leachate recirculation, when the materials are exposed to atmospheric conditions at the landfill surface, and other parameters as determined appropriate in consultation with the LEA and RWQCB. Testing may include TCLP parameters and other test(s) as specified by the LEA and/or RWQCB.	Less than Significant
3.5.6: Expansion of composting or salvaging operations could degrade underlying groundwater. (Significant)	**3.5.6:** Composting operations and public salvage area operations shall be conducted on pads that are designed and constructed to limit infiltration and to control run-off. The pads shall be designed and constructed to promote surface drainage and prevent ponding. Runoff will be directed to a properly designed sump and pumped into a truck for disposal into the leachate ponds or into a sewage line to the WWTP.	Less than Significant
3.5.7: Stormwater runoff from landfill, composting facility, and other facility surfaces, if not properly controlled, could contribute to peak flows downstream or degrade surface receiving waters. (Significant)	**3.5.7a:** The DIWM will update YCCL's Storm Water Pollution Prevention Plan (SWPPP), required under the NPDES General Industrial Storm Water Permit, to address pollution controls and the containment and control runoff at non-erosive velocities from new and expanded site operations. The updated SWPPP will address composting facility operations.	Less than Significant

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	3.5.7b: Prior to project implementation the DIWM shall update its maintenance and operations plan (MOP) for YCCL. The revised MOP shall include calculations as to the amount of leachate expected to be generated as a result of precipitation contacting compost feedstock and composting materials, as well as any runoff from application of quench water applied to the composting materials. The MOP will outline strategies for managing the collected leachate to ensure that adequate capacity is maintained. The updated MOP shall be submitted to the RWQCB prior to implementation of the composting component of the project.	
3.5.8: Construction activities associated with construction of a MRF, a permanent HHW Collection Facility, composting pads and receiving area for the expanded composting operation, and pad for the salvaging operation, could increase soil erosion and result in the transport of sediments and other contaminants to off-site surface waters. Excavation undertaken during construction activities also could impact groundwater quality. (Significant)	**3.5.8a:** Due to the high groundwater beneath the site, the design of the proposed permanent HHW facility will not include a sub-floor. The facility will be designed to incorporate a double containment system to contain spills and water used for any fire control activities above ground. Excavation for the HHWCF and MRF will be limited to surface grading and preparation needed to meet building construction standards.	Less than Significant
	3.5.8b: Prior to the start of grading or construction, the DIWM will prepare a Construction Storm Water Pollution Prevention Plan (SWPPP) that incorporates best management practices to minimize erosion and the off-site transport of soil and sediment, and minimize potential adverse impacts to water quality impacts associated with project construction. The objectives of the SWPPP are to identify pollutant sources that could affect the quality of storm water discharge, to implement control practices to reduce pollutants in storm water discharges, and to protect receiving water quality. The DIWM shall incorporate into contract specifications the requirement that the contractor comply with and implements the provisions of the SWPPP.	

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
3.5.9: Use of an off-site parcel as a soil borrow area could degrade groundwater or surface water quality on or near the borrow area site. (Significant)	**3.5.9a:** Prior to commencement of any quarrying or excavation at a new borrow area, the DIWM will produce a stormwater pollution prevention plan for the quarry site, or if the site is adjacent, update YCCL's existing SWPPP to include the borrow area. The SWPPP will describe activities and potential pollution sources at the site and best management practices to limit soil erosion and prevent the sedimentation of nearby surface drainage channels and other surface waters. Control measures may include, but are not limited to, placement of hay bales, sediment fences, and other structures to limit erosion and the transport of sediments, and limiting the size of the area being cleared and excavated to the minimum needed for the operation. The revised SWPPP will provide for reseeding exposed areas when they are no longer actively being quarried, and include a monitoring program. Pursuant to NPDES General Permit requirements, the revised SWPPP will be implemented, and a copy of the SWPPP will be retained at the YCCL site and available for RWQCB review upon request. **3.5.9b:** Before quarrying activities commence, the DIWM shall obtain a permit if required by the Surface Mining and Reclamation Act (SMARA). Permit approval requires submission of a plan for returning the land to a usable condition (known as a "reclamation plan"), and financial assurances to guarantee costs for reclamation. New mining operations must also file an initial report with the Office of Mine Reclamation, pursuant to PRC §2207(d)(6). **3.5.9c:** Drainage structures at the site will be designed and constructed to prevent the off-site discharge of surface run-off.	Less than Significant

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
Land Use		
3.6.1: Development of an off-site borrow area could result in conflicts with agricultural uses. (Significant)	**3.6.1a:** The off-site soil borrow area should be sited in the "possible future expansion" areas identified in the General Plan, located directly east and north of Yolo County Central Landfill. Although these areas are currently designated as A-P, the intent of the general plan is to allow future landfill expansion in the adjacent northern and eastern parcels; therefore, the use of theses parcels as a borrow area should not conflict with the General Plan's intent to preserve agricultural land. Also, the Yolo County Zoning Regulations, Title 8, Chapter 2 Zoning, Sec. 8-2.404 states that upon review and approval, conditional uses such as the operation of a solid waste disposal site shall be authorized by a Minor Use Permit. **3.6.1b:** The County could site the off-site borrow area in a location that is not zoned or designated as agricultural land. **3.6.1c:** The County can re-zone and re-designate the borrow area site so the use of the site would not conflict with the land use designation. However, re-designating the site could conflict with other land use policies. **3.6.1d:** The County can use alternative sources of daily cover (e.g. fines from the landfill mining operations, the compost generated from the compost operations), which would reduce the need to develop an off-site borrow area.	Less than Significant
3.6.2: Development of an off-site borrow area could result in the inappropriate use of prime agricultural soils. (Significant)	**3.6.2:** The County should not locate the borrow area or areas on prime agricultural land where prime soils may be found. The California Department of Conservation's "important farmlands" designation may be used to identify the areas of prime agricultural soils.	Less than Significant

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
3.6.3: Implementation of the proposed project may conflict with the County's goal to adhere to the disposal hierarchy of (1) source reduction; (2) recycling and composting; and (3) transformation and land disposal. (Significant)	**3.6.3a:** Yolo County charges differential rates depending on the type of load dropped off. Separated materials such as green waste and recyclables have a lower tipping fee than landfilled materials. This provides an incentive to deliver clean loads of material for recovery, rather than disposal. **3.6.3b:** Yolo County uses tipping fees from the YCCL to subsidize or pay for the costs associated with most of the County's recycling, reuse and waste reduction programs. This keeps recycling fees down as compared with disposal fees. **3.6.3c**: The current configuration of the landfill entrance allows customers to drop-off source separated recyclables prior to entering the paid area of the landfill. This arrangement will be maintained under the project. **3.6.3d:** The landfill entrance should be configured to allow customers access to the proposed salvage area without entering the paid area of the landfill	Less than Significant
Noise		
3.7.1: New on-site project activities that are proposed (including landfill mining, construction and operation of a MRF, salvaging operations and a public buy-back area, construction and operation of a compost facility, construction and operation of a permanent household hazardous waste collection facility, and expanded landfill gas management and utilization options) or design changes (raising the height from 80 to 140 feet MSL) could increase noise levels at sensitive off-site residential receptors. (Less than Significant)	**3.7.1a:** Construction activities for new facilities shall be limited to 6:00 a.m. to 5:00 p.m., Monday through Saturday, and 7:00 a.m. to 6:00 p.m. on Sunday.	Less than Significant

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	3.7.1b: Stationary noise sources that emit noise levels greater than 80 dBA at 50 feet shall be oriented to contain the noise within the YCCL boundary to the extent possible. Noise levels from continuous stationary sources (ones that may operate 24 hours per day) shall not exceed 70 dBA at the YCCL property line.	
	3.7.1c: Operating hours for the landfill shall not be expanded from current limits: 6 a.m. to 5 p.m. Monday through Saturday and 7 a.m. to 6 p.m. on Sunday.	
3.7.2: Noise from activities at the "soil-borrow" area could affect sensitive receptors. (Significant)	**3.7.2a:** As stated in the siting criteria for the soil borrow operation in Chapter 2, Project Description, "Soil-borrow" activities shall be located in areas with a buffer zone of 2,000 feet to the nearest sensitive receptors.	Less than Significant
	3.7.2b: Soil borrow activities will be limited to achieve an hourly average noise level that does not exceed 65 dBA at the nearest sensitive receptor.	
	3.7.2c: If haul routes pass sensitive noise receptors that are within approximately 50 feet of the roadway, hourly heavy truck trips should be limited to no more than 25 passbys of the sensitive receptor per hour.	
	3.7.2d: To avoid noise effects of nighttime operations, haul trips leaving the soil-borrow area shall be limited to 7 a.m. to 5 p.m.	
3.7.3: Truck trips to YCCL would not increase noise levels at sensitive noise receptors. (Less than Significant)	None required.	
3.7.4: The project would not have a cumulative impact on noise levels in the project area. (Less than Significant)	None required.	

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
Public Health and Safety		
3.8.1: Increased LFG generation could potentially result in the accumulation of methane at explosive concentrations either off-site or within the waste mass. (Significant)	**3.8.1a**: YCCL will meet current state and federal requirements for LFG management.	Less than Significant
	3.8.1b: YCCL will continue quarterly monitoring and reporting.	
	3.8.1c: If monitoring indicates levels of gas above state requirements at the boundaries of the site, the perimeter monitoring system shall be expanded and modified to include extraction and collection and/or additional extraction wells can be installed in the landfill units nearest the problem area.	
3.8.2: Excavation of hazardous waste encountered in the process of mining the older landfill units could result in exposure of workers and the environment to harmful substances resulting in adverse health impacts. (Significant)	**3.8.2:** Yolo County has developed a site-specific Health and Safety Plan (HASP) for landfill mining at YCCL. The plan provides guidelines and establishes procedures for the protection of personnel performing the scope of activities involved in landfill mining against hazardous or toxic wastes that may have been deposited within the landfill (EMCON/OWT, 2001). The HASP provides guidance to initiate the work and calls for monitoring of site conditions to determine the required protection. It is intended to be continually updated, based on consistent monitoring and implementation of the HASP adjustments.	Less than Significant
3.8.3: Operation of a materials recovery facility and expanded salvaging operations could pose health and safety threats to workers. (Significant)	**3.8.3a:** Current Yolo County Illness and Injury Prevention Plan practices and policies would be implemented as applicable at the new MRF and Salvaging Operations.	Less than Significant

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	3.8.3b: DIWM (or its contractor) shall prepare a Health and Safety Plan (HASP) for MRF Operations and a HASP for salvaging operations, and submit the plan for approval to the LEA prior to commencement of MRF or salvaging operations, respectively. Each HASP shall include staff training requirements, emergency procedures and equipment, personal protective equipment for facility staff, communications equipment, and emergency contacts, hearing loss prevention, equipment maintenance, and other policies to ensure the protection of worker and public health and safety.	
	3.8.3c: Prior to MRF construction the DIWM shall submit drawings showing the final facility layout to the LEA for approval.	
3.8.4: Expanding the composting operations could increase the health threat to workers from exposure to *Aspergillus fumigatus* and endotoxins. (Significant)	**3.8.4a:** The County will operate the expanded composting facility in conformance with current state and federal regulations.	Less than Significant
	3.8.4b: The project applicant shall follow sound composting management practices, including maintaining moisture, temperature and pH levels, and properly aerating, turning and mixing the composting materials. Specifically, the following practices will help minimize the generation and dispersal of dust and fungus spores during composting operations and thus limit exposure:	
3.8.5: Composting of mixed municipal solid waste (MSW) could result in a contaminated compost product, which could pose a public health and safety risk. (Significant)	**3.8.5a:** MSW composting would have to comply with state regulations regarding operation of composting facilities and testing of final product for pathogenic and chemical contaminants.	Less than Significant

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	3.8.5b: The existing load checking program would reduce or remove many hazardous substances that may be contained in MSW loads. **3.8.5c:** The design for the MSW processing system will include another level of visual screening of incoming materials to ensure that hazardous substances are removed prior to the composting operation. **3.8.5d:** DIWM will periodically test compost produced from MSW for a wide range of hazardous substances regulated under Title 22, but not required under the state regulations for composting facilities. If the material exceeds concentrations for any regulated substance, the load will be directed to a hazardous waste disposal site, and the DIWM will examine its waste acceptance and screening procedures for the MSW composting facility.	
3.8.6: Operation of a permanent Household Hazardous Waste Collection Facility (HHWCF) could increase risk of exposure of site workers and visitors to hazardous or toxic materials collected by the facility. (Less than Significant)	None required.	
3.8.7: Implementation of a composting operation at YCCL could result in increases in gulls and other scavenging birds at the site, thus increasing the risk of bird strikes for aircraft approaching or departing from the Sacramento International Airport in Sacramento or the University Airport in Davis. (Less than Significant)	None required.	

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
Public Services, Utilities, and Energy		
3.9.1: The expanded composting facility could increase the risk of fire occurring at the landfill site. (Significant)	**3.9.1a:** Consistent with the currently permitted composting operations, for the expanded composting operation YCCL will continue to comply with the State minimum standards for composting operations as specified in Title 14, California Code of Regulations (CCR).	Less than Significant
	3.9.1b: Consistent with the currently permitted composting operation, YCCL will continue to adhere to composting management practices established by the Yolo County Environmental Health Department.	
	3.9.1c: Consistent with current operations, the County will continue to implement standard composting facility management practices.	
3.9.2: The proposed height increase could increase the risk of fire occurring at the landfill site. (Significant)	**3.9.2a:** YCCL will continue to reduce the impact associated with surface fires through green waste related procedures.	Less than Significant
	3.9.2b: YCCL will continue to follow existing operational policies.	
3.9.3: The proposed landfill mining operations could increase the risk of fire occurring at the landfill site. (Significant)	**3.9.3a:** YCCL will continue to follow existing operational policies	Less than Significant
	Measure 3.9.3b: The temperature of the excavation face will be monitored and the excavation face will be sprayed with water as needed to control temperatures and prevent the excessive buildup of heat.	
3.9.4: The proposed aerobic bioreactor cells could increase the risk of fire occurring at the landfill site. (Significant)	**3.9.4a:** YCCL will continue to follow existing operational policies	Less than Significant

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	3.9.4b: Liquid will be introduced to the waste mass after the cell is filled, and before air extraction is begun to keep the waste moist and control temperature.	
	3.9.4c: Consistent with current operation of the aerobic bioreactor cell, YCCL will monitor and control the temperature of the waste mass. The optimum temperature has been reported to be between 55 and 65 degrees Celsius for aerobic bioreactors.	
	3.9.4d: Consistent with current bioreactor operations at Module D, YCCL will monitor and control moisture content of the waste mass. Recommended moisture content ranges from a minimum of 25 percent to optimum levels of 40-70 percent.	
	3.9.4e: Consistent with current bioreactor operations at Module D, YCCL will Monitor and control oxygen and methane levels within the landfill.	
3.9.5: The proposed anaerobic bioreactor cells would result in an increased production of flammable landfill gas at the site, which could increase the risk of fire. (Less than Significant)	None required.	
3.9.6: Relocation of the high-pressure underground natural gas pipeline and above ground power lines to implement the landfill mining operation may temporarily disrupt utility service to the landfill site or to PG&E customers in the vicinity. (Less Than Significant)	None required.	
3.9.7: The proposed landfill mining, composting, and bioreactor cell operations could place burdensome demands on water supplies. (Less than significant)	None required.	
3.9.8: The project may increase the amount of wastewater produced at the site. (Less than Significant)	None required.	

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
3.9.9: The increased use of equipment for landfill, material recovery facility, and composting operations would increase electricity consumption. (Less than significant)	None required.	
3.9.10: The operation of the anaerobic bioreactor cells will generate substantial electricity. (Beneficial)	None required.	
Transportation and Traffic		
3.10.l: Traffic generated by the project would affect traffic levels of service on roadways in the project area. (Less than Significant)	None required.	
3.10.2: Operations of the proposed project would increase wear and tear on area roadways. (Significant)	**3.10.2:** Conduct periodic Pavement Studies of County Road 28H, County Road 105, County Road 102, and County Road 29, and maintain on an as-needed basis to reduce damage from increased truck traffic.	Less than Significant
3.10.3: Traffic generated by the project would affect traffic safety on roadways in the project area. (Less than Significant)	None required.	

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
Cultural Resources		
3.11.1: Impacts to cultural resources may result either directly or indirectly during the pre-construction, construction, and operational phases of the project. (Significant)	**3.11.1a:** Although no cultural resources were observed during the focused pedestrian survey conducted on January 22, 2003, sites and objects may yet exist in the project area, but may be obscured by vegetation or buried by fill or natural sediments. If cultural resources are encountered during project implementation, construction (or project actions) shall, in accordance with CEQA Section 15064.5, be halted or diverted to allow an archaeologist an opportunity to assess the resource. Prehistoric archaeological site indicators include chipped chert and obsidian tools and tool manufacturing waste flakes, grinding implements such as mortars and pestles, and darkened soil that contains dietary debris such as bone fragments and shellfish remains. Historic site indicators include, but are not limited to, ceramics, glass, wood, bone, and metal remains. **3.11.1b:** Since prehistoric burials (as evidenced by site CA-YOL-171) and associated isolates have been recorded in the immediate vicinity of the project site, there is a likelihood that cultural resources may be encountered during project-related site clearance and excavation. The presence of a qualified archaeological monitor during construction would permit excavated soils to be examined for the presence of archaeological site components. A monitor be present whenever subsurface construction excavation occurs within 100 meters (300 feet) of site CA-YOL-171, and on an intermittent basis (as determined by the archaeological Principal Investigator) during all other subsurface construction excavation associated with the project. **3.11.1c:** Section 7050.5(b) of the California Health and Safety code should be implemented in the event that human remains, or possible human remains are located.	Less than Significant

TABLE S-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
3.11.2: Excavation of the off-site borrow area could disturb previously unknown archeological resources or interred human remains. (Significant)	**3.11.2a:** A cultural resources survey of the site selected for the soil borrow area, including a site survey and records search, will be conducted by a registered archeologist prior to commencement of soil borrow activities. Any potential disturbance of identified cultural resources on the site will be properly mitigated on-site or through proper recording and removal of the artifacts. **3.11.2b:** If cultural resources are encountered during project implementation, construction (or project actions) shall, in accordance with CEQA Section 15064.5, be halted or diverted to allow an archaeologist an opportunity to assess the resource. **3.11.2c:** Section 7050.5(b) of the California Health and Safety code should be implemented in the event that human remains, or possible human remains are located.	Less than Significant
Cumulative Impact – Aesthetics		
CU-1: The project would contribute to the cumulative degradation of the visual character of the surrounding area. (Significant)	As discussed in Section 3.1 of Chapter 3, the impacts of the proposed landfill height increase of 60 feet and the accompanying increased slope and mass of the landfill itself would have a significant project impact on the visual character of the area. The original permitted height of the landfill was 80 feet. The original permitted height in conjunction with the 60 feet increase may be considered a significant and unavoidable cumulative impact on the aesthetics of the area. In addition, if the Covell Village project is approved, more residents live in the viewshed of the landfill, which would tend to exacerbate this impact.	Significant and Unavoidable

CHAPTER 1
INTRODUCTION

1.1 PROJECT OVERVIEW AND BACKGROUND

1.1.1 PROJECT OVERVIEW

The Yolo County Central Landfill (YCCL) is a municipal solid waste landfill located in an unincorporated part of Yolo County about four miles northeast of Davis, and three miles southeast of Woodland, near the intersection of Roads 28H and 104. The site covers 725 acres. The landfill has been in operation since 1975, receiving waste from both incorporated and unincorporated areas of Yolo County. The landfill accepts solid wastes classified as "inert" and "nonhazardous" under Sections 20220 and 20230, Title 27, of the California Code of Regulations. In recent years, approximately 160,000 tons per year of waste have been disposed at the site, or about 450 tons per day. The site's Solid Waste Facility Permit allows acceptance of up to 1,800 tons per day of waste, seven days per week. (The landfill is closed on six major holidays per year.)

The YCCL is owned by the County of Yolo and operated by the Planning and Public Works Department, Division of Integrated Waste Management (DIWM). DIWM is proposing several major changes to the design and operation of the YCCL. Several of these changes will require revisions to the facility's existing permits, including the Solid Waste Facility Permit, the Waste Discharge Requirements, and the Permit to Operate. One aspect of the project, development of an off-site borrow area, may also require a mining permit under the state Surface Mining and Reclamation Act (SMARA). Because approval of these permits requires discretionary actions by public bodies, the project is subject to the California Environmental Quality Act (CEQA). The DIWM, which is the CEQA Lead Agency for environmental review, has determined that some of the proposed changes have the potential to cause a significant environmental impact. For this reason, the DIWM has concluded that an Environmental Impact Report (EIR) is the appropriate level of environmental review for this project.

The project includes several changes to the permits that govern the allowable design and operation of the YCCL. Some changes constitute new activities or operations, while others involve revisions or fine-tuning of existing activities. The proposed changes fall into four categories, in terms of their purpose and intended effect: (1) to increase landfill capacity and extend facility life; (2) to improve economic and environmental performance and to reduce the impact of operations on the surrounding environment while minimizing capital and operating costs; (3) to increase recovery of materials and energy from waste; and (4) to allow greater flexibility in operations, including greater latitude to experiment with promising technologies for improving landfill performance and waste materials recovery and use.

While some of the project elements, such as construction and operation of a materials recovery facility, are entirely new, many of the project elements are revisions or improvements to existing designs and operations. Proposed changes to the design and operation of the YCCL that constitute the project, and which are analyzed in the EIR, include the following:

1) Operation of future landfill modules as bioreactor landfills,
2) Increase in the landfill's final elevation from 80 feet above mean sea level to 140 feet,
3) Landfill mining of all waste management units,
4) Construction and operation of a material recovery facility at the landfill,
5) Expansion of the existing composting facility at the landfill,
6) Expanded salvaging operations,
7) Conversion of the existing temporary household hazardous waste collection facility to permanent status,
8) Purchase of additional land for the development of a soil borrow area, and
9) Expanded landfill gas management and utilization options.

Each of these project elements is described in greater detail in Chapter 2.

1.1.2 HISTORY AND BACKGROUND OF THE PROJECT

The YCCL consists of several discrete areas permitted for waste disposal operations. These include six Class III landfill areas for disposal of municipal solid waste; four Class II surface impoundments for holding liquid wastes; and a bioreactor demonstration project. An additional Class III landfill area has been approved for future construction. The six existing landfill areas are designated Waste Management Units (WMUs) 1 through 6. Of these, WMUs 1, 2, 4, and 5 have been inactive since 1992, but have not yet been brought to final grade for closure. DIWM has recently resumed disposing waste in WMU 3 (which also had been inactive), in order to bring it to final grade for closure. WMUs 1 through 5 were constructed prior to the enactment of current federal and state regulations regarding landfill design and construction. Consequently, these older units are unlined or lined with compacted clay instead of a composite liner; composite liners provide greater protection to the groundwater below from transmission of liquid from the fill.

WMU 6, an active landfill area, is a fully composite-lined unit, and was designed and constructed in accordance with federal and state regulations that went into effect in the early 1990s. WMU 6 consists of four developed waste disposal modules (A, B, C, and D) each covering about 22 acres. Of these modules, A through C are at or near capacity, while Module D is relatively new. There is also a small-scale bioreactor demonstration project at Module B. At build-out, four additional modules will be constructed at WMU 6 (E through H) and eight additional modules (I through P) at WMU 7. A new module will be constructed about every four to six years, depending on waste disposal needs.

The Class II surface impoundments are WMUs G and H. WMU G was constructed in 1995 and has a capacity of 1.5 million gallons. WMU H, completed in 1999, consists of three Class II surface impoundments (Hl, H2, and H3). H3, the largest of the three, covers five acres and has a capacity of 10 million gallons. Hl and H2 each cover 2.5 acres and have a capacity of 3 million gallons each. All three surface impoundments at WMU H are hydraulically connected by overflow weirs and piping to form one WMU. WMU F, another surface impoundment, was clean closed and converted into a geosynthetic-lined water storage pond.

BIOREACTOR LANDFILLS

In a conventional landfill, waste material is kept as dry as possible. Any free liquid within the fill is extracted and treated. The lack of moisture in landfilled waste limits the ability of microorganisms to decompose the waste. Decomposition therefore occurs very slowly, and the waste remains biologically unstable for many decades.

In a bioreactor landfill, liquid (and sometimes oxygen) is added to the landfilled waste material in order to enhance conditions for the growth of microorganisms. Liquid (leachate) is extracted, but recirculated back into the waste, and additional liquid is added as necessary to promote the growth of microorganisms. In a bioreactor, the waste decomposes quickly; within 5-10 years decomposition is completed, and the waste is biologically stable. Most bioreactor landfills have composite base liner systems to protect groundwater quality, and leachate is collected and recirculated in order to provide a reusable source of moisture for the waste mass.

Advantages of bioreactor landfills over conventional landfills include the following:[1]

- Landfill gas production quickly reaches a peak, which persists for a relatively short period of time before declining rapidly to low levels. If the bioreactor landfill is developed sequentially in cells, gas production is much steadier than in conventional dry landfills, and never reaches a large post-closure peak, as is typical with conventional dry landfills. This allows for more economical recovery of landfill gas for energy production and lower overall and peak landfill gas emissions.
- In bioreactor landfills, there is a reduced need for off-site treatment of leachate. Instead, most or all leachate is circulated back into the bioreactor cell. In addition, the levels of contaminants in the leachate are reduced by recirculation through the waste.
- The most active biological degradation of wastes takes place soon after construction of the cell. Therefore, the landfill's crucial environmental controls, especially the composite base liner system and the gas collection system, are still relatively new when they are most needed. Conventional landfills do not stabilize for many decades.
- Rapid decomposition of wastes causes settlement and densification. This allows for increased efficiency in the use of landfill airspace. New waste can be placed on top of old cells in which the waste has already decomposed and settled. The overall capacity of bioreactor landfills, on a tonnage basis, is greater than for a comparably-sized conventional landfill.

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[1] Based on a review of Augenstein, 1997; Gambelin et al., 1998; Reinhart and Townsend, 1998; Reinhart and Al-Yousfi, 1996; and Yazdani et al., 1998.

- Existing landfills that meet current federal regulatory standards can be converted to bioreactors relatively easily, since they can use the same composite base liner design, leachate collection system, and gas collection system, if these were designed and constructed for the increased liquid volume and weight.

While few full-scale bioreactor landfills have been constructed in the United States, there have been numerous pilot-scale demonstrations, and the technology is more commonly used in Europe. During the summer of 1994, the DIWM began construction of two pilot-scale test cells at Module B (about 9,000 tons of waste each) to conduct research into bioreactor landfill technology. The favorable results of this pilot-scale project (which is still operational) led DIWM to seek regulatory approval to expand the use of bioreactor technology at YCCL.

Yolo County applied for, and was selected as a participant in, the United States Environmental Protection Agency's (U.S. EPA's) Project XL program,[2] to construct and operate full-scale bioreactor cells at YCCL. The terms of the project are defined in a Final Project Agreement, dated September 14, 2000 and signed by Yolo County, the RWQCB, Yolo-Solano Air Quality Management District, the Solid Waste Association of North America's Institute for Environmental Management, and the U.S. EPA. This project was also the subject of an environmental initial study conducted by the County (Yolo County, 2000). Through Project XL, DIWM received in 2001 site-specific regulatory flexibility from the prohibition on addition of supplemental liquid (other than leachate and gas condensate) to landfills contained in the federal regulations governing the operation of landfills (Code of Federal Regulations Title 40, Subpart 258 [40 CFR 258]) (U.S. EPA, 2001). This site-specific regulatory flexibility allows DIWM to add supplemental liquid only to landfilled waste within Module D of WMU 6, where the full-scale bioreactor cells have been constructed, but not to any other areas of the landfill. Module D is being developed in two phases. DIWM has now completed construction of three bioreactor cells (one six-acre anaerobic cell, one 3.5-acre anaerobic cell, and one 2.5-acre aerobic cell), which constitute the first phase of Module D.

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[2] Project XL is coordinated by EPA's Office of Policy, Economics, and Innovation. Project XL, which stands for "eXcellence and Leadership," is a national pilot program that allows state and local governments, businesses and federal facilities to develop with EPA innovative strategies to test better or more cost-effective ways of achieving environmental and public health protection. In exchange, EPA will issue regulatory, program, policy, or procedural flexibilities to conduct the experiment. To date, under Project XL, private businesses, federal facilities, business sectors, and state and local governments are conducting experiments that address the eight Project XL selection criteria:

1) produce superior environmental results beyond those that would have been achieved under current and reasonably anticipated future regulations or policies;
2) produce benefits such as cost savings, paperwork reduction, regulatory flexibility or other types of flexibility that serve as an incentive to both project sponsors and regulators;
3) supported by stakeholders;
4) achieve innovation/pollution prevention;
5) produce lessons or data that are transferable to other facilities;
6) demonstrate feasibility;
7) establish accountability through agreed upon methods of monitoring, reporting, and evaluations; and
8) avoid shifting the risk burden, i.e., do not create worker safety or environmental justice problems as a result of the experiment.

Additionally, if the applicant is a Project XL for Communities project, it should develop strategies that:

1) present economic opportunity; and
2) incorporate community planning.

(U.S. EPA, 2002)

1.2 PURPOSE AND NEED FOR THE PROJECT

The DIWM has stated the following objectives for the project:

1) Decrease the environmental impacts of landfill development, operations, and final closure, and increase the environmental benefits that can be derived from certain aspects of landfill operations:
    - address the issue of potential groundwater contamination by mining unlined waste management units, and reconstructing them as composite-lined cells in compliance with current regulatory requirements;
    - develop future units as bioreactors, to speed stabilization of landfilled waste, maximize economical production of useful by-products (especially landfill gas collection for power generation);
    - use mined materials and materials generated on site for alternative daily cover material, to decrease need for importing soil cover material from off-site;
    - develop additional capacity to recover, rather than dispose of, materials. This will have the benefit of re-introducing these materials into circulation, perhaps substituting for virgin, extracted materials and related energy use associated with primary production.
2) Increase the ability to divert waste from the landfill, and to continue to meet state-mandated diversion goals:
    - Increase capacity to compost source-separated materials and mixed waste;
    - develop capacity to recover other materials, through MRF development and salvage operations;
    - develop capacity to convert wastes into alternative daily cover material, rather than landfilling them directly.
3) Increase efficiency, operate more economically:
    - Maximize use of costly liner systems, by use of bioreactor technology, landfill mining, and increased maximum height of the landfill.
4) Extend site life:
    - Increase landfill capacity through height extension;
    - Use bioreactor technology to achieve greater volume reduction while the landfill is active, allowing for more waste placement in the same airspace;
    - Increase diversion;
    - Mine completed waste management units and re-use air space.

1.3 REGULATORY PERMIT REQUIREMENTS AND STATUS

The primary permits related to the operation of the YCCL are two Solid Waste Facility Permits (SWFP), one for the disposal activities, the other for composting activities, issued by the Yolo County Health Department, Environmental Health Services (EHS), with the concurrence of the California Integrated Waste Management Board (CIWMB); Waste Discharge Requirements (WDRs) issued by the Regional Water Quality Control Board, Central Valley Region (RWQCB); Permits to Operate (PTOs), issued by the Yolo-Solano Air Quality Management District (YSAQMD); and a Conditional Use Permit from Yolo County. In addition, as stated above, the

County has received a variance from federal solid waste regulations (referred to as RCRA Subtitle D regulations), enabling operation of a portion of the site (Module D) as a bioreactor. A complete listing of the current permits for the landfill and permits or permit revisions potentially required for the proposed project is presented in Table 1-1 at the end of this chapter.

The U.S. EPA issued a final rule March 22, 2004 to allow Research, Development, and Demonstration (RD&D) Permits for Municipal Solid Waste Landfills (MSW landfills) under 40 CFR Subpart 258 (RCRA Subtitle D regulations). The rule took effect April 21, 2004 (U.S. EPA, 2004; CIWMB, 2004).

The intent of the rule is to provide for site-specific variances from certain Subtitle D criteria necessary to implement innovative MSW landfill technologies, including bioreactors, provided that the owner/operator demonstrates that compliance with the variance will not increase risk to human health and the environment over the standard requirements. RD&D Permits would allow approved state Subtitle D programs to issue such variances under specified conditions and controls. California's approved Subtitle D program is implemented by the CIWMB and the State Water Resources Control Board (SWRCB) and is contained in Title 27, California Code of Regulations (27 CCR). The CIWMB and SWRCB act jointly as State Director to implement the Subtitle D program.

Specific criteria for which RD&D variance would be allowed are restricted to the following:

- Run-on control systems in 40 CFR 258.26(a)(1)
- Liquids restrictions in 40 CFR 258.28(a)
- Final cover criteria of 40 CFR 258.60(a)(1), (a)(2), and (b)(1)

Liquids restrictions in 40 CFR 258.28(a) refer to the prohibition on adding to the unit bulk liquids (except for recirculated leachate and landfill gas condensate in units that have composite liners and leachate collections systems prescribed in 40 CFR 258.40[a][2]); this is the regulation that currently prevents the use of supplementary liquids for bioreactor technology (except for site-specific variances such as that granted for Module D of the YCCL). Variances for run-on control systems and liquid restrictions require that the MSW landfill have a leachate collection system designed and constructed to maintain less than a 30-centimeter depth of leachate on the liner.

RD&D variances are not allowed for any other MSW landfill criteria not specifically identified in the U.S. EPA RD&D Rule, such as location restrictions, procedures for excluding hazardous waste, explosive gas control, postclosure care, and financial assurances.

General RD&D requirements are summarized as follows:

- Any RD&D permit must include terms and conditions at least as protective as the criteria for MSW landfills to assure protection of human health and the environment.
- RD&D permits are limited to a period of three years with option for three renewals (12-year maximum duration).

- Annual reports are required in addition to monitoring and testing requirements as determined by the State Director, to show whether and to what extent the site is progressing in attaining project goals.
- Only those municipal solid waste and other non-hazardous wastes that the State Director deems appropriate for the purposes of determining the efficacy and performance capabilities of the technology or process are allowed.
- The State Director may order an immediate termination of the project if goals are not being attained, including protection of human health or the environment.

The CIWMB and SWRCB have proposed draft regulations to incorporate RD&D flexibility in the California Subtitle D program (CIWMB and SWRCB, 2004). Proposed new 27 CCR Section 20070 would be a combined CIWMB and SWRCB regulation, allowing both agencies to adopt the regulation to use as authority to issue RD&D Permits, pursuant to 27 CCR Sections 20012 and 20014. The proposed approach is to minimize, to the extent possible, additional regulatory language and processes in 27 CCR other than the existing U.S. EPA RD&D language.

The proposed regulations would provide aspects of independent authority over RD&D projects to the Local Enforcement Agency (LEA), CIWMB, and SWRCB. The RD&D Permit would be defined as the issued Solid Waste Facility Permit (SWFP) and Waste Discharge Requirements (WDRs), or if applicable, the approved Final Closure and Postclosure Maintenance Plans.

Issuance of any RD&D variances would not relieve the landfill operator from complying with all other applicable standards of 27 CCR. For example, an RD&D variance issued for liquids restriction from 40 CFR 258.28 would not relieve the owner/operator from complying with the more stringent SWRCB liquid management and leachate collection and removal system requirements of 27 CCR 20200(d) and 20340. Owner/operators would still retain potential overall flexibility from SWRCB for allowance of engineered alternatives pursuant to 27 CCR 20080(b), subject to any restrictions under 40 CFR 258.

The U.S. EPA's new RD&D ruling gives the CIWMB and the SWRCB authority to approve the use of bioreactor technology at YCCL, without further need for federal rulemaking. First, however, the CIWMB and SWRCB must adopt new regulations that incorporate the RD&D rule into the State's Subtitle D program, which is codified in Title 27 of the California Code of Regulations. The State's rulemaking process is itself subject to environmental review under CEQA (CIWMB, 2004); therefore, even if Yolo County, as lead agency for this EIR, approves the proposed project, the CIWMB and SWRCB will be unable to issue new permits for operation of YCCL as a bioreactor involving the addition of supplemental liquids until the rulemaking process, including environmental review, is complete.

The Solid Waste Facility Permit for the composting operation was issued in January, 2004 after publication of the Notice of Preparation for this EIR. Prior to issuance of this permit, the organic materials processing facility at the landfill consisted only of grinding woodwaste and greenwaste, but not composting. Because of the scale of the facility and the types of feedstocks allowable (the facility is limited to receiving 200 ton of greenwaste and woodwaste per day), the current permit is a "Notification Tier" permit, meaning that issuance of the permit requires only non-discretionary ministerial approval by the LEA (and concurrence by the CIWMB), and so is not subject to environmental review under CEQA. The project would include issuance of a full Solid Waste Facility Permit to allow expansion of the scale and range of acceptable materials for the composting facility; full permits require discretionary approvals and are subject to review under CEQA.

The two current WDR orders for the site were adopted March 22, 2002, and June 7, 2002, by the RWQCB. The WDRs establish design, operation, and monitoring requirements to protect the quality of surface water and groundwater in the State of California. One WDR order governs the Class III landfills and Class II surface impoundments and the other governs operation of the groundwater extraction and treatment system, storage reservoir, and land application area at the site. The 2002 WDRs update the earlier respective WDRs, issued in 2000, to incorporate requirements and information relative to operation of a part of the site as a bioreactor landfill, to delete information regarding off-site discharge of the treated groundwater, and to add information regarding the land application area.

1.4 SCOPE OF THE EIR

In March 2002, DIWM issued a review of probable environmental effects of the project, as part of the Notice of Preparation (DIWM, 2002a). The EIR analysis focuses on the elements of the proposed modifications that emerged from this earlier review as having the potential for adverse environmental impacts.

While the project described and analyzed in this EIR is distinct from the project that was the subject of the certified 1992 EIR, much of the information in that earlier document is germane to this EIR. The analysis in this EIR therefore relies to a considerable extent on the background and analysis contained in the 1992 EIR. This EIR merely summarizes information that is contained in that previous EIR where that information is still valid and applicable to the current project. This EIR focuses only on the potential environmental impacts of the various elements that make up the current project, and not on the overall impacts of the operation of YCCL or of already-approved past projects. This EIR is considered a Subsequent EIR, as per Section 15162 of the CEQA Guidelines.

1.4.1 APPROACH TO ANALYSIS

Section 15125(a) of the CEQA Guidelines addresses how a lead agency should establish the baseline conditions against which potential environmental impacts of a project are measured, as follows:

> An EIR must include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published, or, if no notice of preparation is published, at the time environmental analysis is commenced, from both a local and regional perspective. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant.

Recent case law provides guidance as to the appropriate baseline for existing, permitted, facilities seeking modifications to permitted operations or activities. In *Fairview Neighbors v. County of*

Ventura ([2d Dist. 1999] 70 Cal. App. 4th 238 [82 Cal. Rptr.2d 436]) the Court ruled that for an existing, permitted facility that was seeking a permit for a new or revised aspect of its operation, where the facility's previously permitted operations had previously undergone environmental review, the appropriate baseline should be the existing permitted operations, rather than the level of operations actually occurring at the time of the Notice of Preparation.

In accordance with this decision, the design, operations, and environmental controls described in the existing Solid Waste Facility Permit and other current permits, based on the 1992 FEIR, as well as other applicable permits that have undergone separate environmental review, constitute the baseline against which potential impacts of the project are measured in this EIR.

One project component, the development of a soil borrow area at an as-yet undetermined location, is described and evaluated in this EIR in a general, programmatic manner. Implementation of this project component would occur after a specific site for the borrow area has been identified, and after completion of any required subsequent project-level environmental documentation.

1.5 THE EIR PROCESS

Based on a preliminary review of potential project impacts, the DIWM determined that an Environmental Impact Report (EIR) would be the appropriate level of environmental review for the proposed YCCL project. In March 2002, the DIWM prepared and circulated a Notice of Preparation (NOP) for this EIR (Appendix B), in accordance with CEQA Guidelines Section 15082, to seek comments from affected agencies and the public about the scope of the EIR. As part of the NOP, DIWM issued a review of probable environmental effects of the proposed project. The County held two public scoping meetings in March 2002, one at the Department of Public Works office on West Beamer Street and one at the Yolo County Central Landfill.

Oral comments were received at the scoping meetings and several comment letters were received during the scoping period from interested governmental agencies and interested members of the public (see Appendix A and Appendix B).

The DIWM will circulate this DEIR for review by public agencies and interested persons and organizations for a 45 day public review period, in accordance with CEQA Guidelines Section 15105. Written comments will be accepted at the Yolo County Department of Public Works Division of Integrated Waste Management until 4 p.m. on the closing day of the review period. Oral and written comments will be accepted at a hearing on the Draft EIR prior to the close of the review period.

Written comments should be submitted to: Linda Sinderson, Division of Integrated Waste Management, Yolo County Planning and Public Works Department, 292 West Beamer Street, Woodland, California, 95695-2598.

At the close of the public review period, the DIWM will evaluate the comments received on the environmental issues and prepare written responses, as required by CEQA Guidelines §15088.

The comments and responses will be included in the Final EIR as a separate chapter, along with the revised EIR text necessitated by the response to comments.

REFERENCES – Introduction

Augenstein, Don. *Economics, "Externalities," and Landfill Gas Energy*. Presented at the Sixth International Landfill Symposium, Sardinia, Italy, October 13-17, 1997.

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TABLE 1-1
CURRENT PERMIT AND APPROVAL STATUS – YOLO COUNTY CENTRAL LANDFILL

Permit Type	Permitting Agency	Permit Authority	Date of Permit / Approval	Revision
WATER QUALITY				
Waste Discharge Requirements, Order No. R5-2002-0078 (for the Groundwater Extraction and Treatment System, Storage Reservoir, and Land Application Area)	CRWQCB, Central Valley Region	SWRCB Resolution No. 93-62 implementing Parts 257 and 258 of Title 40 CFR (Subtitle D)	22 March 2002	May require revision if project elements are found to be not in accordance with current permit conditions.
Waste Discharge Requirements, Order No. R5-2002-0118 (for the Class III Landfills and Class II Surface Impoundments)	CRWQCB, Central Valley Region	SWRCB Resolution No. 93-62 implementing Parts 257 and 258 of Title 40 CFR (Subtitle D)	7 June 2002	Would require revision to address proposed development of future landfill cells as bioreactors, landfill mining of waste management units, and construction and operation of the proposed MRF and the proposed composting facility.
NPDES General Industrial Activities Storm Water Discharge Permit (Waste Discharger Identification [WDID] No. 5S57S001398)	CRWQCB	Clean Water Act and U.S. EPA Regulation	1992; SWPPP and monitoring program revised 2000 and updated 2002	May require revision, since the applicant is proposing changes that would affect the storm water management system, including the increased height of the landfill.
Solid Waste Assessment Test Approval—Water Quality	CRWQCB	California Water Code §13273	26 September 1988	No further requirements at present; additional hydrogeologic and/or waste characterization may be required in the future.
AIR QUALITY				
Permit To Operate for Neo Yolo LLC	YSAQMD	YSAQMD Permit To Operate enclosed flare and landfill gas collection system according to YSAQMD Rules and Regulations	7/13/2004	Renewed annually.
Permit To Operate for MM Yolo Power LLC, for five (5) energy recovery generators operated in conjunction with energy recovery facility.	YSAQMD	Regulation II, Rule 2.34 – Stationary Gas Turbines	11/10/03	Renewed annually.

TABLE 1-1 (continued)
CURRENT PERMIT AND APPROVAL STATUS – YOLO COUNTY CENTRAL LANDFILL

Permit Type	Permitting Agency	Permit Authority	Date of Permit / Approval	Revision
Permit To Operate for Recycle America Alliance.	YSAQMD	YSAQMD Permit To Operate two internal combustion engines	5/15/2004	Renewed annually.
CEQA				
EIR Certification	Yolo County Planning and Public Works Department, Division of Integrated Waste Management	CEQA, §2100 et seq., of Public Resource Code	27 October 1992	Subsequent EIR required to address changes in operations and proposed modifications relative to elements evaluated in 1992 EIR.
LAND USE AND PLANNING				
Conditional Use Permit Z.F. 4035	Yolo County Board of Supervisors	Yolo County General Plan	27 October 1992	No revision required or requested.
County Integrated Waste Management Plan Consistency, Siting Element and Non-Disposal Facility Element	Yolo County Planning and Public Works Department, Division of Integrated Waste Management	Public Resources Code § 41700 et seq.	Five-year review completed in May 2002; no changes were made at the time.	Next periodic revision of Countywide Siting Element would need to be revised to reflect proposed changes in capacity at YCCL NDFE would need revision to reflect changes in composting operations and addition of MRF.
Mining Permit	Yolo County Planning and Public Works Department	California Surface Mining and Reclamation Act (SMARA)	No existing permit	Permit may be required for development of off-site borrow area.
PUBLIC AND ENVIRONMENTAL HEALTH				
SWFP 57-AA-0001	LEA with concurrence from the CIWMB	Chapter 3 of Title 14 CCR—Minimum Standards for the Handling and Disposal of Solid Waste	Five-year review completed in 2000; no changes were made at the time.	Revised permit required to incorporate proposed physical and operational change.
SWFP 57-AA-0033 (Notification Level for Composting Operation)	LEA with concurrence from the CIWMB	Chapter 3.1 of Title 14 CCR Compostable Materials Handling Operations and Facilities Regulatory Requirements	23 January 2004	Would require a full SWFP in order to increase volume and range of feedstocks pursuant to §17854 of Title 14 compostable materials regulations, promulgated 4 April 2003, and Title 27.

TABLE 1-1 (continued)
CURRENT PERMIT AND APPROVAL STATUS – YOLO COUNTY CENTRAL LANDFILL

Permit Type	Permitting Agency	Permit Authority	Date of Permit / Approval	Revision
SWFP for Large Volume Transfer/Processing Facility (Materials Recovery Facility)	LEA with concurrence from the CIWMB	CCR Title 14, Chapter 3. Minimum Standards for Solid Waste Handling and Disposal, Article 6.0. Transfer/Processing Operations and Facilities Regulatory Requirements, section 17400 et seq.	No existing permit	Would require a full Solid Waste Facility Permit for the proposed 800 ton per day materials recovery facility.
Variance from or Revision to federal Subtitle D regulations governing liquid addition to landfills	U.S. EPA	40 CFR Part 258		Currently 40 CFR Part 258 allows addition of bulk or non-containerized liquid only in Module D of the YCCL; operation of other YCCL modules as bioreactors involving the addition of supplemental liquids would require adoption of State regulations (CCR Title 27) to implement newly-granted federal authority (RD&D rule).
Temporary Household Hazardous Waste Facility Permit (Permit by Rule)	California Department of Toxic Substances Control	Health and Safety Code §25218	January 2004	Renewed annually. Project would require a permit for a Permanent Household Hazardous Waste Facility.
Final Closure and Post Closure Maintenance Plan for WMU 1-5	LEA with concurrence from the CIWMB	CCR Title 27	9 September 1994	The Plan has been revised as required by the most recent WDRs and submitted to the LEA and CIWMB for approval. Will require further revision in order to proceed with proposed landfill mining operations.
Preliminary Closure and Post-Closure Maintenance Plan for WMU 6 & 7	LEA with concurrence from the CIWMB	CCR Title 27	9 September 1994	Would require revisions to accommodate proposed changes in final landfill grades.

CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CIWMB	California Integrated Waste Management Board
CRWQCB	California Regional Water Quality Control Board
EIR	Environmental Impact Report
LEA	Yolo County Health Department, Environmental Health Services Division, is the designated Local Enforcement Agency
NPDES	National Pollutant Discharge Elimination System
SWFP	Solid Waste Facilities Permit
SWRCB	California State Water Resources Control Board
YSAQMD	Yolo-Solano Air Quality Management District

CHAPTER 2

PROJECT DESCRIPTION

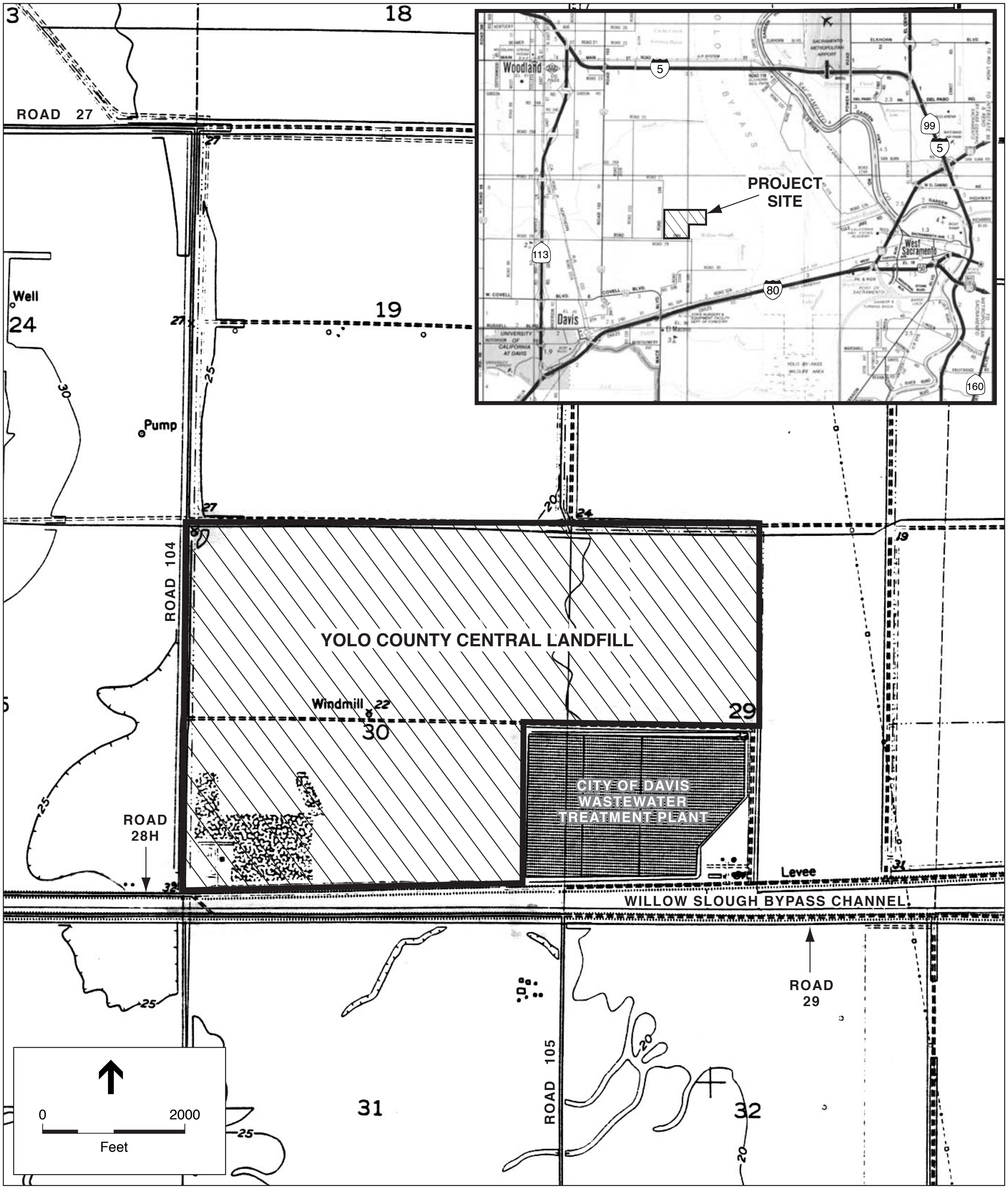
2.1 BACKGROUND

The Yolo County Central Landfill (YCCL) is a municipal solid waste landfill located in an unincorporated part of Yolo County about four miles northeast of Davis, and three miles southeast of Woodland, near the intersection of Roads 28H and 104 (see Figure 2-1). The site covers 725 acres in Sections 29 and 30, T9N, R3E, MDB&M, corresponding to Assessor's Parcel Numbers 042-004-001, 042-004-002, and 042-014-006. The current layout of the landfill is shown in Figure 2-2. The landfill has been in operation since 1975, receiving waste from both incorporated and unincorporated areas of Yolo County. The landfill accepts solid wastes classified as "inert" and "nonhazardous" under Sections 20220 and 20230, Title 27, of the California Code of Regulations. Approximately 160,000 tons per year is disposed at the site (about 450 tons per day). The site's Solid Waste Facility Permit allows acceptance of up to 1,800 tons per day of waste.

The project includes several changes to the permits that govern the allowable design and operation of the YCCL. Some changes constitute new activities or operations, while others involve revisions or fine-tuning of existing activities. The proposed changes fall into four categories, in terms of their purpose and intended effect: (1) to increase landfill capacity and extend facility life; (2) to improve economic and environmental performance and to reduce the impact of operations on the surrounding environment while minimizing capital and operating costs; (3) to increase recovery of materials and energy from waste; and (4) to allow greater flexibility in operations, including greater latitude to experiment with promising technologies for improving landfill performance and waste materials recovery and use.

While some of the project elements, such as construction and operation of a materials recovery facility, are entirely new, many of the project elements are revisions or improvements to existing designs and operations. Proposed changes to the design and operation of the YCCL that constitute the project, and which are analyzed in this EIR, include the following:

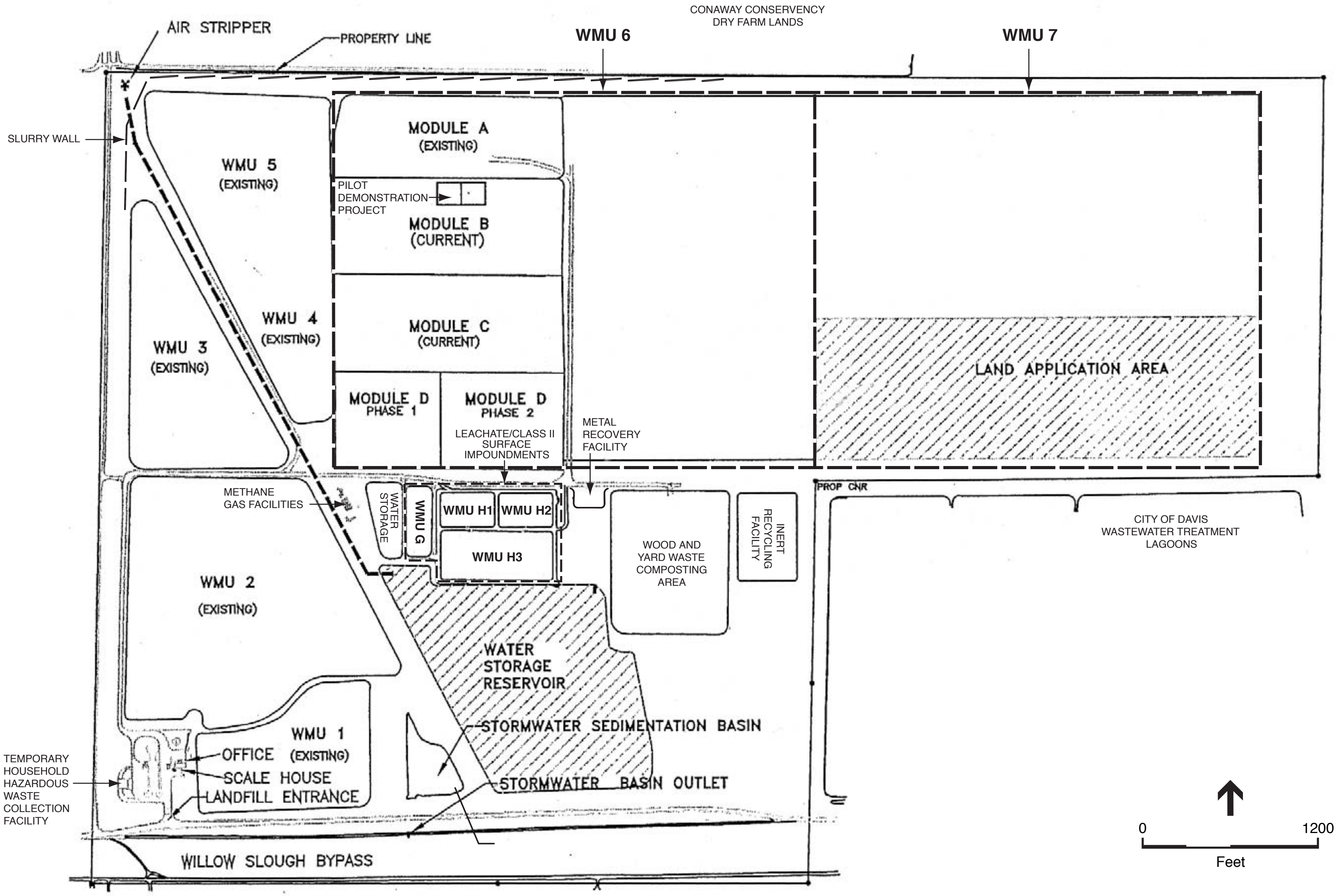
1) Operation of future landfill modules as bioreactor landfills,
2) Increase in the landfill's final elevation from 80 feet above mean sea level to 140 feet,
3) Landfill mining of all waste management units,
4) Construction and operation of a material recovery facility at the landfill,
5) Expansion of the existing composting facility at the landfill,
6) Expanded salvaging operations,



SOURCE: Environmental Science Associates; USGS

Yolo County Central Landfill Permit Revisions SEIR / 202102 ■

Figure 2-1
Project Site Location



SOURCE: County of Yolo Department of Planning and Public Works Division of Integrated Waste Management

Figure 2-2
Existing Site Plan

7) Conversion of the existing temporary household hazardous waste collection facility to permanent status,
8) Purchase of additional land for the development of a soil borrow area, and
9) Expanded landfill gas management and utilization options.

Each of these project elements is described in greater detail below. A proposed site layout is shown in Figure 2-3.

2.2 PROJECT ELEMENTS

2.2.1 OPERATION OF FUTURE LANDFILL MODULES AS BIOREACTOR LANDFILLS

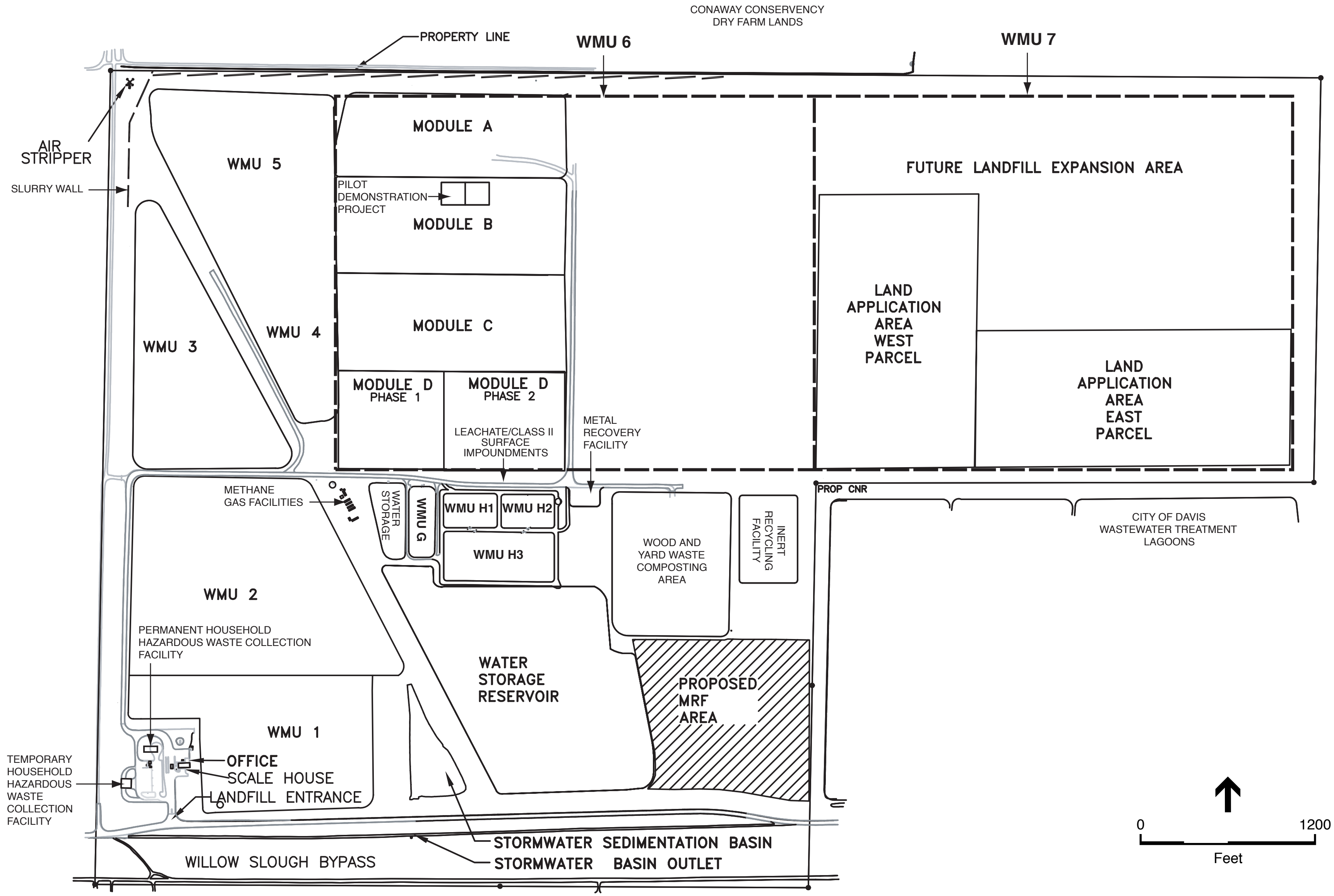
Yolo County is seeking to revise its permits to allow the future landfill modules to be operated as bioreactor landfills. This would allow leachate recirculation, the addition of supplementary liquid (such as groundwater), and acceptance of wet wastes. Due to accelerated decomposition and stabilization of the waste, up to 33 percent of additional waste could be placed over the same lined area. This could increase the remaining capacity for the current permitted height of the landfill from 16.6 million to 20.9 million cubic yards.

Yolo County is a participant in the U.S. EPA's Project XL Program. Under Project XL, the County has received site-specific flexibility from the federal regulations governing landfills (40 CFR 258.28 Liquid Restriction), permitting the addition of bulk or non-containerized liquid amendments that would otherwise be prohibited. This has enabled the County to develop full-scale bioreactor cells. Three bioreactor cells have now been constructed. This regulatory flexibility, however, applies only to Module D of WMU 6; under current permits and regulations, all other modules must be developed as conventional landfills.

The proposed project would involve developing any and all future landfill modules using bioreactor technology. New modules would be developed at the rate of one module about every 4-6 years, depending on the rate of fill, and would use the same or a similar design as the existing full-scale aerobic and anaerobic cells at Module D. Design and operation of bioreactor modules is described in the Maintenance and Operation Plan for the Module D Full-Scale Bioreactor Project, which serves as a basis for this project element.

SUMMARY OF BIOREACTOR DEVELOPMENT

Yolo County would operate future landfill modules with both or either anaerobic and aerobic bioreactor modes. Modules would be designed and constructed to optimize landfill space and to maintain good drainage for the collection system. The leachate collection and removal system (LCRS) would be designed and constructed to be free-draining throughout the life of the module and to maintain less head over the primary liner system than prescribed by Title 27 and Subtitle D regulations. The LCRS system would be constructed with a geocomposite layer and/or gravel drainage layer, which will have over 10 times the required capacity and would maintain the head



SOURCE: County of Yolo Department of Planning and Public Works Division of Integrated Waste Management

Figure 2-3
Proposed Site Plan

over the liner system to less than 0.3 inches during liquid application periods. In addition, a layer of chipped tires or similar permeable material used as the operations layer would provide a level of redundancy in the event that the drainage layer becomes clogged or otherwise nonfunctional.

Leachate Recirculation Strategies and Methods

Leachate injection and recirculation would be performed using a series of horizontal or vertical injection lateral pipes with perforated sub-lateral lines. This system is similar to that used for an agricultural drip irrigation system. Main lateral pipes with perforated sub-lateral lines would be spaced at intervals of approximately 50-100 feet apart horizontally and 15-30 feet apart vertically to distribute leachate uniformly throughout the waste. Each header line would be equipped with valves so that the total volume of liquid could be adjusted to each lateral. In addition, leachate flow measurements would be taken to determine the total volume of leachate added for each area of the landfill. The main line would be connected to pumps to pressurize the system and deliver the amount of liquid needed for the addition of moisture to waste. Liquid may also be added at the time waste is place, using a water truck or other delivery method.

Supplemental Liquid Injection

Other liquids would be added to the bioreactor cells to maintain optimal moisture levels for biodegradation of organic matter in the waste mass. These liquids potentially could include groundwater, gray-water from a waste water treatment plant, septic waste, and food-processing wastes that are currently land-applied. Liquid wastes such as these, that normally have no beneficial use, may instead beneficially enhance the biodegradation of solid waste in a landfill for this project. The County intends to use leachate and groundwater first, but if not enough liquid is available then other liquids would be used. (The landfill's current Waste Discharge Requirements [Order R5-2002-0118] permit the use of the following supplemental liquids in the currently operating bioreactors: leachate from other YCCL waste management units, leachate from the leachate impoundments, other non-hazardous liquids from YCCL impoundments, LFG condensate, extracted groundwater, and supply water.)

Achieving Moisture Holding Capacity

The pilot scale demonstration project at Module B provided a working demonstration as to the feasibility of the proposed bioreactor project. Through monitoring, instrumentation, and testing, it was demonstrated that liquid could be added in such a way that the moisture-holding capacity (also called "field capacity") of the refuse is not exceeded. The same equipment and procedures have been used for the Module D full-scale bioreactor project, and would likely be utilized for future bioreactor modules. The liquid would continually be introduced (as needed) to raise the moisture content within the waste to slightly above its equilibrated field capacity (estimated to be about 40 percent to 45 percent by wet weight basis). The liquid application system would be constructed such that liquid additions can be applied or discontinued at designated locations to control the moisture conditions within the waste.

Moisture content would be monitored throughout the life of each module through the use of a network of moisture sensors to be installed during waste placement, or through tracking the moisture mass balance (liquid in and liquid out). Using either of these methods, or a combination of the two, the County can determine where liquid application should be increased or decreased to optimize the effectiveness of the system and to prevent build-up of head over the liner.

The quantity of leachate and other liquids added and collected would be measured throughout the life of the landfill. Once leachate is produced, it would be re-circulated. Flow sensors installed on the leachate discharge line, re-circulation line, and liquid application line would enable the DIWM to quantify the use of liquid in the system. These sensors would provide direct flow readout for determining flow rates in the pipelines and flow totaling to quantify all of the liquid used and leachate produced.

Calculation Regarding Expected Leachate Production Levels

For the anaerobic operation, it is estimated that peak liquid addition – up to 10 gallons per minute (gpm) of liquid per 10,000 square feet of disposal area (44 gpm per acre) – typically would be delivered to the waste once the module has reached its design height. Based on the demonstration cell performance, the amount of liquid added would be in the range of 30 to 50 gallons per ton of waste. According to results of the YCCL bioreactor demonstration project reported by Moore et al. (1997), the average leachate generated during liquid introduction peaked at about 47 percent of the liquid delivery rate, which would equate to approximately 20 gpm per acre for the proposed program. Given a 6-acre drainage area, the maximum anticipated flow into any given sump would be approximately 120 gpm (173,000 gallons per day).

For the aerobic operation, liquid would be added to waste at an increased rate since higher temperatures of the aerobic reaction evaporate much of the added liquid. It is estimated that the total water evaporated would range between 200 to 400 gallons of water per ton of waste.

Based on the estimated leachate production, drainage into the leachate collection layer would be about 4.6×10^{-4} gpm per square foot of disposal area. Assuming a distance of 200 feet between the top ridge of the landfill and the collection trench, using these values, the peak flow through the collection layer would be about 0.09 gpm per linear foot of trench (Yolo County, 2000). (The flow rate would be approximately 0.055 gpm per linear foot of trench assuming the proposed height increase totaling 120 feet of refuse overlying the collection layer.) The collection layer for Module D has a measured capacity of 1.0 gpm per foot Golder Associates, 1999). Therefore, the collection layer has over 10 times the capacity required under peak flow conditions.

Response Plan in the Event Leachate Production Level Exceeds Expected Levels

The head over the liner would also be monitored shortly after the first lift of waste has been placed using a network of pressure transducers and bubbler gages. These devices would be installed on the primary liner immediately before waste placement, and within the waste mass, to provide measurements of the leachate depth.

In the event that the transducers and bubbler gages indicate that the leachate head over the primary liner system is going to exceed the average allowable value of four inches, the system would automatically start additional pumps to reduce the liquid level and shut-off valves to reduce the liquid application rate. A computerized control and monitoring system would be used to accomplish this task. This system, which originated in the utility and petroleum industries, is often referred to as Supervisory Control and Data Acquisition (SCADA). Such systems are now widely used in many different applications such as wastewater treatment systems. These measures would be used to either reduce the liquid application rate across the entire module or specifically in the area of head build-up. In an event of a pump failure, in which the average head over the liner continues to exceed the allowable value of four inches, the SCADA system would notify the operator so that an emergency pump could be installed to reduce the head over the liner below ten inches. The Regional Water Quality Control Board shall be notified in case the head over the liner reaches an average of ten inches of head over the primary liner system.

In addition to liquid delivery to the waste, air would be delivered to the aerobic portion of the bioreactor cell area. The aerobic decomposition of the waste and gas generation also requires the moisture condition be maintained slightly above equilibrated field capacity. However, the aerobic process is accomplished at a higher temperature and is more aggressive in the biodegradation activity. This requires a significant increase in the quantity of water necessary to achieve optimum biodegradation, as compared with the anaerobic process.

2.2.2 INCREASE IN FINAL FILL ELEVATION FROM 80 FEET MEAN SEA LEVEL TO 140 FEET

YCCL currently is permitted to fill to an elevation of 80 feet above msl, approximately 55 to 60 feet above the existing ground level. The proposed plan is to increase the fill height of future landfill cells by 60 feet to a final maximum elevation of 140 feet mean sea level (msl). The proposed height increase would apply to Module D and the currently undeveloped modules of WMU 6 (Modules E through H) and all WMU 7 modules (I through P).

The proposed increase of the maximum fill elevation of the YCCL to 140 feet msl would approximately double the remaining site capacity. In addition, because increasing the height of the landfill would delay the need for construction of new base liners, this part of the project would result in more cost efficient design, since the high capital costs of constructing the base liner and final cover for a module would be spread over a greater volume of waste.

A geotechnical assessment completed in December 1997 demonstrates the feasibility of a 140-foot msl final grade elevation (Yolo County, 2001). The currently permitted 80-foot msl maximum final grade has a remaining refuse capacity of about 15.3 million cubic yards. Increasing the maximum height of the landfill to 140-foot msl would increase remaining capacity to about 31.5 million cubic yards. The currently permitted final grades for WMUs 6 and 7 include a top deck with a minimum 3 percent slope for adequate drainage and perimeter slopes no steeper than 3:1 (horizontal to vertical), with 15-foot wide benches placed at least every 50 vertical feet (as required by Title 27). No change is proposed to these permitted final grades.

2.2.3 LANDFILL MINING

The DIWM is proposing to revise the facility's permits to allow mining of completed portions of the landfill. If approved, DIWM would give priority to mining the older, unlined landfill units, but the County would like the flexibility to practice landfill mining on any waste modules at the YCCL site. Waste Management Units (WMUs) 1 through 5 were constructed prior to adoption of federal and state regulations governing landfill design, and so are not lined with a modern (Subtitle D-compliant[1] composite liner. Due to the high water table, there are times when the bottom of these older units may be below the elevation of surrounding groundwater. DIWM proposes permit revisions that allow for mining of these old landfill units to protect groundwater from leachate or landfill gas contamination.

Mined waste would be processed with a trommel screen to separate it into three fractions: (1) metals and other recyclables; (2) an under-size fraction consisting of inert matter and soil suitable for use as daily and intermediate cover material or foundation layer for final cover for the landfill; and (3) an over-size fraction that would be landfilled. Waste would initially be excavated from a 10-acre area in an appropriate older unlined waste management unit. The waste would be sorted and the fraction that is not useable in any way would be hauled to the active lined waste management unit. Once the initial 10 acres is reclaimed, the area would be graded and a composite base liner system constructed in this area. Excavation would be needed to an elevation at least two feet below estimated bottom of refuse (approximately elevation 13.5 feet msl). Engineered fill would then be installed to increase the elevation of the base to about 21 feet msl. This would place the base liner at a sufficient height for meeting the required 5 feet of separation between waste and groundwater.

Mining and subsequent redevelopment of WMUs 1-5, in combination with the proposed height increase to elevation 140 feet msl and the proposed operation of new bioreactors, would significantly increase the capacity of the landfill, to about 66 million cubic yards. This would extend the active life of the YCCL to almost the year 2100. In addition, landfill mining would generate a considerable amount of fine materials suitable for use as cover material for the landfill that may otherwise have to be brought in from off-site. Removal of wastes from the unlined area would also eliminate a source of potential groundwater pollution. In order to better utilize site geometry, DIWM would relocate the existing high-pressure underground natural gas pipeline and above ground power lines that currently cross the site. DIWM also is proposing to extend the paved access road around the north and east perimeter of the site.

2.2.4 MATERIAL RECOVERY FACILITY

DIWM is proposing to develop a permanent material recovery facility (MRF) building of approximately 45,000 square feet, constructed within the landfill's property boundaries. The most likely location for the MRF is in the area immediately to the west of the City of Davis wastewater treatment ponds. The MRF would process selected self-haul, debris box, and

[1] Subtitle D, the solid waste program of the federal Resource Conservation and Recovery Act (RCRA), establishes requirements for the design of municipal solid waste landfills; Subtitle D requirements are codified in Title 40, Subparts 257 and 258, of the Code of Federal Regulations.

commercial loads to recover marketable materials. These include greenwaste for mulch or compost, clean lumber, concrete and other inert materials, soil, metal, cardboard, and other recyclable or reusable materials. The recovery process would use both automated equipment and manual labor. Unrecoverable residues would be deposited in the active portion of the landfill.

The proposal to construct and operate a MRF would not increase the maximum daily allowable waste volume received at the landfill. Most of the loads that would be directed to the MRF would otherwise be disposed at the landfill. The MRF would be designed to handle up to 800 tons per day of materials, with a projected recovery rate of about 50 percent. This would contribute to the state-mandated requirement for Yolo County communities to divert 50 percent of all solid waste from landfilling.

2.2.5 EXPANSION OF THE EXISTING COMPOSTING FACILITY

YCCL has a permitted greenwaste compost facility. The existing facility, which operates under a Notification Tier Solid Waste Facility Permit, receives and processes up to 200 tons per day and up to 73,000 tons per year of clean wood and greenwaste. Some of the finer material is used for alternative daily cover (ADC) on the landfill. The remaining material is sold for mulch or fuel.

DIWM is proposing to construct and operate an expanded composting facility that would accept up to 500 tons per day of waste. The composting facility would accept a variety of materials that were separated from other wastes at their source, including greenwaste, food waste, agricultural crop residues, manure, and biosolids (sewage sludge). Through composting, which is a controlled aerobic process, these organic materials would convert into a stable soil amendment. DIWM also proposes to accept mixed MSW for composting. Composted MSW has a limited number of applications and therefore would probably be used exclusively as ADC. Using composted material as ADC would decrease the need to import soil or other cover material and, under current regulations, would count toward the state mandate to divert 50 percent of the waste stream from disposal.

Composting facility design and operations would be consistent with state and federal regulations. The expanded composting facility would be located at the site of the current facility, or elsewhere within the landfill's property boundary. Like the MRF, the composting facility's incoming waste would fall within the currently permitted maximum daily tonnage of 1,800 tons per day for all wastes entering the facility; most of the material that would be composted would be from loads diverted from landfilling at YCCL.

2.2.6 EXPANDED SALVAGING OPERATIONS

The DIWM is proposing a revision of its permit to allow for salvaging of waste at the landfill. The proposal is to institute salvaging operations for re-useable items from the tipping area and active landfill face. Salvaged items would be stored in a designated area for distribution to the public or charitable organizations, such as Goodwill or Salvation Army, or for sale. Targeted materials would include building supplies, lumber, usable furniture, and recyclable materials, such as metals.

2.2.7 PERMANENT HOUSEHOLD HAZARDOUS WASTE COLLECTION FACILITY

DIWM currently operates a household hazardous waste collection facility at the YCCL under a temporary permit from the state Department of Toxic Substances Control. DIWM is proposing to convert the permit to permanent status. Operations at the facility would change little, except that DIWM is requesting that the revised permit would allow for (1) additional collection hours (currently events are held bimonthly), and (2) longer waste storage prior to shipment to a permitted hazardous waste disposal facility. Because this may also require the construction of a new building to meet state requirements for permanent HHW facilities, construction of a new HHWCF building is assumed to be part of this project component. Based on the County's preliminary design considerations (Yolo County, 2004), the permanent structure would have the capacity to provide HHW collection service to the year 2020, at least. The structure would be an approximately 3,600 square-foot, single story, metal building. Design and construction would take into account the year-round high winds at the site and seasonal heavy rainfall. The building would have a canopied unloading area, a dock for loading and unloading of materials, five bays for waste storage and waste segregation, a separate room for bulking of flammable materials, spill containment, a fire suppression system, a ventilation system and safety provision. The building would be located in close proximity to the existing landfill office building, to allow for the use of existing restrooms, showers, and lockers in that building. The anticipated building location is shown in Figure 2-3.

The building currently used for temporary events would be used as an expanded reusable products area and for storage of supplies needed for the permanent facility.

2.2.8 PURCHASE OF LAND AND DEVELOPMENT OF AN OFF-SITE SOIL BORROW AREA

YCCL has a shortage of soil for intermediate and final cover material. In the future, DIWM intends to import soil from off-site for these purposes. DIWM is proposing to purchase property for development of an off-site soil borrow area that would supply soil to the facility. No parcel of land has yet been identified for this purpose, but DIWM estimates that a 640-acre parcel would be needed and that it would have to be within about five miles of the landfill. Candidate properties would be surveyed for any important biological, archeological, or historical resources and appropriate mitigation measures would be developed and employed prior to commencement of borrow operations.

The parcel or parcels purchased for a soil borrow area would be located in an area that meets the following criteria. The selected site:

1) Would not be located within the viewshed of a designated or candidate scenic highway;

2) Would not contain jurisdictional wetlands or other sensitive habitat or biological resources that would be disturbed or destroyed by soil borrow activities, unless such disturbance could be appropriately mitigated;

3) Would not support special status species that would be disturbed by soil borrow activities, unless appropriately mitigated;

4) Would have no sensitive receptors (such as residences, schools, hospitals, or parks) within 2,000 feet of areas where soil borrow activities would take place;

5) Would be in a location where haul trucks would not create a significant unavoidable impact to traffic or traffic safety;

6) Would not be located in an area that contains prehistoric or historic cultural resources that would be disturbed by soil borrow activities, unless the disturbance of such resources could be mitigated effectively.

7) Would not include significant geologic features that would be disturbed or destroyed by project activities.

8) Would not be located in an identified mineral resources area.

9) Would not be located in an area that would adversely impact nearby recreation areas or recreational land uses.

2.2.9 EXPANDED LANDFILL GAS MANAGEMENT AND UTILIZATION

Various aspects of the proposed project, including future development of bioreactor modules and increasing the final height of the landfill, will result in a significant increase in the rate of production of landfill gas. Currently, YCCL has a landfill gas collection system, and the collected gas fuels on-site electric generators. DIWM proposes to expand the existing landfill gas collection and utilization system and to diversify the landfill gas products. This might include an increase in electrical generation and transmission capacity, production of steam or alternative fuels such as methanol and liquefied natural gas (LNG), commercial production of CO_2, or other uses.

2.2.10 FUTURE OPERATION OF THE LANDFILL

The project involves several components that address the same waste stream, or that have the same intent. Landfill mining, composting (especially composting of mixed municipal solid waste), and development of an off-site borrow area all would produce cover material for the landfill. The proposed height extension, landfill mining, and development of future modules as bioreactors would all result in increased landfill capacity and extension of landfill life. Development of a composting operation, materials recovery facility, and expanded salvage options would all result in a decrease in the amount of waste being landfilled, and an increase in the amount being diverted. Both composting and use of bioreactor technology are methods of achieving rapid decomposition and stabilization of the biodegradable portion of the waste stream.

The County desires to revise the permits governing operation of the landfill to enable a high level of flexibility in its future operations. It is possible that not all project elements would be developed immediately, and some might not be developed at all. This flexibility would also give the County the opportunity to experiment with different methods of handling and recovering wastes, to respond to changing market conditions, and to find an optimal balance between economy of operation and conservation of resources.

Because of the flexibility that the project proposes, it is not possible to predict with much accuracy how the landfill will be operated in the future. One scenario, which involves a likely mix of the proposed project elements, follows:

The year is 2012. Waste loads arriving at the landfill are examined at the scalehouse by landfill personnel and directed to the appropriate part of the facility: mixed loads to the working face of the landfill (a bioreactor module), clean greenwaste and wood to the composting facility, loads of construction and demolition debris and those with a significant fraction of recoverable paper, metal, wood, and other materials to the salvage area or the materials recovery facility. Several bioreactor modules will have been completed, and gas production from these modules is at a steady, high level. Additional electrical generation capacity has been added, and the site is contributing a relatively large amount of power to the power grid. The County has also developed a facility for purifying and containerizing several gasses or gas products for sale, including carbon dioxide, methanol, and LNG.

WMUs 1-5, which were constructed without liners now required by state and federal regulations, have been entirely mined. This has resulted in the accumulation of a large stockpile of cover material, negating the need, for the moment, to import cover material from off-site. The gas line and electric line that used to run through the site have been moved to the perimeter of the site. WMU 1 is now being prepared for re-filling: the grade is being raised and a liner and LCRS will be installed. Testing of groundwater reveals that contamination levels have fallen below threshold values, so the treatment of pumped groundwater from beneath the site is no longer necessary. Groundwater continues to be pumped to maintain separation between the water table and the base liner of the landfill, and to supply water for operations, including liquid addition to the active bioreactor modules.

The County has purchased property for a future soil borrow area, but as yet has not begun soil quarrying operations. A Reclamation Plan has been drafted for the site, and the County is preparing to issue a mining permit in accordance with the state Surface Mining and Reclamation Act (SMARA).

The first full-scale bioreactor modules, developed under Project XL, have now stabilized, and the County is preparing to mine them. Once mined, they will be re-filled with the unusable, inert fraction of excavated material. In the future, another module will be constructed on top of these completed cells.

REFERENCES – Project Description

EMCON. 1997. Landfill Subgrade Settlement Analysis Using New Information from Two Deep Geotechnical Borings, Project 20121-003.004, dated 31 December 1997.

Golder Associates. 1999. "Final Report, Construction Quality Assurance, Yolo County Central Landfill, WMU 6, Module D, Phase 1 Expansion." December 1999.

Moore et al., "Hydraulic Characteristics of Municipal Solid Waste Findings of the Yolo County Bioreactor Landfill Project", Thirteenth International Conference on Solid Waste Technology and Management, Philadelphia, PA, November 1997. Cited in *Maintenance and Operations Plan: Module D Full Scale Bioreactor Project*, Yolo County Central Landfill, November 24, 2000.

Yolo County Planning and Public Works Department (Yolo County). 2000. *Maintenance and Operations Plan: Module D Full-Scale Bioreactor Project, Yolo County Central Landfill*. November 24, 2000.

Yolo County Planning and Public Works Department. 2001. Exhibit 1: Detailed Project Description, Request for Proposals for the Preparation of a Subsequent Environmental Impact Report for the Yolo County Central Landfill. November 2001.

Yolo County Planning and Public Works Department, Division of Integrated Waste Management (Yolo County). 2004. Application for Local Government Household Hazardous Waste Grant (13th Cycle) Fiscal Year 2004/5, Submitted to the California Integrated Waste Management Board. April 9, 2004.

CHAPTER 3

ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

3.1 AESTHETICS

3.1.1 SETTING

This section analyzes the potential impacts the proposed project would have on visual quality in the project vicinity. The aesthetics evaluation focuses on physical changes in the landfill's form associated with the proposed height increase and the addition of several proposed facilities, including a materials recovery facility, composting facility, and structures or equipment associated with the proposed expansion options for landfill gas utilization. In addition, this evaluation considers whether temporary aesthetic impacts may be associated with landfill mining, and, at a programmatic or general level of analysis, the potential aesthetic impacts of development of an off-site borrow area.

VISUAL CHARACTER OF THE REGION AND PROJECT VICINITY

The Yolo County Central Landfill is located in a rural landscape. The visual character of the project vicinity is shaped by predominantly agricultural land uses, and the broad, nearly flat expanse of the Sacramento Valley. This landscape is punctuated by isolated farm buildings and houses, clusters of trees, waterways, roads, power lines and other utilities. Rising from the valley floor, and visible from some distance, is the existing landfill, which appears above the treetops as a broad mound. On clear days, the Coast Ranges are visible to the west, and to the east the Sacramento skyline and the peaks of the Sierra Nevada.

The landfill itself, apart from its extraordinary height (compared to the surrounding landscape) appears, at a distance, to be a natural feature. Upon closer approach, however, its engineered contours and the nature of its use become apparent, and the site has a distinctly unnatural and industrial appearance.

SCENIC VISTAS, PUBLIC VIEWS, AND SIGNIFICANT FEATURES

Currently, few scenic vistas or public vantage points include views of the landfill. The predominant views of the landfill are from the roads in the landfill's immediate vicinity, including Road 28H, Road 27, Road 103 and Road 104. There are intermittent views of the site, which is usually partly or fully obscured by trees and other intervening landscape features, from Road 105, and even less frequent views from State Route 113. The site is not visible from

Interstate 80. The landfill can be seen from several residences in the vicinity, particularly to the west along Road 103 and Road 102; and to the south, across Willow Slough Bypass and along Road 104A and Road 105. Figure 3.1-1 identifies six vantage points with views that include the landfill and that are considered in this analysis. Figures 3.1-2, 3.1-3, and 3.1-4 present existing views toward the landfill from these points. The vantage points were selected to show the clearest and most evident views of the landfill.

There are presently no highways within Yolo County that have been officially designated within the California Scenic Highway System. The nearest eligible state scenic highway is a 25.3-mile section of State Route 16 that extends from the State Route 20 intersection to Capay (California Department of Transportation, 2002). The Yolo County General Plan designates State Route 128 from Winters to Lake Berryessa, and State Route 16 through the Capay Valley as scenic highways (Yolo County, 1983). The landfill is not visible from either of these highways.

APPLICABLE PLANS AND POLICIES

Yolo County General Plan

The Yolo County General Plan includes several policies that are relevant to protecting views from scenic highways. The project site is not, however, visible from the scenic highways designated in the General Plan. The General Plan also includes several more general goals and polices that are relevant to the analysis of potential aesthetic impacts of the proposed project. These include the following:

<u>Goals</u>

Aesthetics – landscaping to enhance the community and preservation of rural scenery.

Improve the beauty, peace, and quiet of the County.

<u>Policies</u>

Policy CON 27. Landscaping/Screening. Yolo County shall require assured landscaping between certain uses which may otherwise conflict. Landscaping shall be required along freeways, between commercial, industrial, and residential uses, in public road frontage setback areas and in parking areas.

Policy SH 7. Natural Vegetation and Landscaping. Yolo County shall require retention of existing trees and vegetation and natural landforms, and shall require landscaping to enhance scenic qualities and/or screen unsightly views, and shall implement regulations to prohibit removal of trees along public rights-of-way without consideration of their scenic or historic value, and shall implement tree conservation or enhancement in new development, with emphasis on oak preservation.

NOTE: Airphoto taken in 1994

SOURCE: Environmental Science Associates, USGS

Figure 3.1-1
Vantage Point Location Map

Vantage Point 1

Vantage Point 2

SOURCE: Environmental Science Associates

Figure 3.1-2
Existing Views from
Vantage Points 1 & 2

Vantage Point 3

Vantage Point 4

SOURCE: Environmental Science Associates

Figure 3.1-3
Existing Views from
Vantage Points 3 & 4

Vantage Point 5

Vantage Point 6

SOURCE: Environmental Science Associates

Figure 3.1-4
Existing Views from
Vantage Points 5 & 6

California Code of Regulations Title 27

In addition to Yolo County General Plan goals and policies pertaining to visual quality, Title 27 of the California Code of Regulations (CCR) requires landfills to control litter, which can have adverse effects on visual quality, as follows:

> §20830 Litter Control. Litter shall be controlled, routinely collected and disposed of properly. Windblown materials shall be controlled to prevent injury to the public and personnel. Controls shall prevent the accumulation, or off-site migration, of litter in quantities that create a nuisance or cause other problems.

FINDINGS OF THE 1992 EIR

The 1992 EIR evaluated the potential effects of the previous landfill project on the aesthetic resources of the project's vicinity, including its potential to block views, degrade the visual quality of the area, and to create a litter or illegal dumping problem. The analysis concluded that there would be no significant deleterious effects of the project on visual resources, and that no mitigation measures were required. The discussion also alluded to the County's intention to continue to implement the existing litter control program, and to cover and re-vegetate completed areas of the landfill.

3.1.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The visual character of a landscape depends on such attributes as color, texture, complexity, and the form of landscape components. Impacts on visual resources are evaluated and determined by comparing changes in these attributes that would result from the project. The reduction of a view's complexity, the obstruction of or encroachment upon background or middle ground views, or the introduction of a disharmonious feature all would contribute to the significance of impacts. Consistent with CEQA Guidelines Appendix G (Environmental Checklist Form) the project would have a significant impact on visual resources if it:

- obstructed or substantially encroached upon a scenic vista;
- degraded the visual character of the site and its surroundings by introducing physical features that are substantially out of character with adjacent land uses;
- altered the natural landscape characteristics of the site to such a scale or degree that the change appears as a substantial, obvious, and disharmonious modification of the overall scene;
- conflicted with adopted plans or policies regarding visual resources; or
- introduced a new source of light or glare.

METHODOLOGY

The flat topography in the project vicinity means that even relatively low trees and structures tend to obscure distant views. This analysis therefore focuses on views from nearby residences and roadways from which the landfill is visible. In addition, the analysis examines whether the landfill may become visible from the City of Davis, if the project is approved.

As noted, Figure 3.1-1 identifies six vantage points from which the landfill can be seen and Figures 3.1-2, 3.1-3, and 3.1-4 show the existing setting as seen from these points. Simulations of the permitted and proposed final contours of the landfill from four representative vantage points are presented in conjunction with the impact analysis that follows.

In determining the significance of impacts associated with the proposed increased height of the landfill, the proposed final contours are compared to the currently permitted final contours. The difference between permitted and proposed contours is the change that is attributable to this project. The project's impacts, then, are confined to this difference.

IMPACTS AND MITIGATION MEASURES

Impact 3.1.1: The project is inconsistent with several goals and policies contained in the Yolo County General Plan. (Significant)

The project as proposed will introduce new landscape features and activities that will detract from the pastoral rural character of the area, but does not include any screening of these features and activities. This is in conflict with two goals and two policies of the Yolo County General Plan, as shown in Table 3.1-1. This is a significant impact.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in This Report

Mitigation Measure 3.1.1: Prior to final project approval the County Department of Planning and Public Works shall prepare a landscaping plan that includes strategic plantings of tall, native trees to screen views of the landfill from public vantage points and rights of way, consistent with the other mitigation measures identified in this section.

Level of Significance After Mitigation

Mitigation Measure 3.1.1 would increase the project's consistency with the above-cited General Plan goals and policies, and would therefore reduce this impact to a less-than-significant level.

TABLE 3.1-1
PROJECT CONSISTENCY WITH YOLO COUNTY GENERAL PLAN GOALS AND POLICIES

Countywide Plan Objective and Policies	Consistent with Countywide Plan?	Analysis
Goal: Aesthetics – landscaping to enhance the community and preservation of rural scenery	No	The project does not include landscaping of the project site.
Policy CON 27. Landscaping/Screening	No	The project site is already partially screened from surrounding land uses, but is visible from several nearby residences and roadways. The project does not include additional landscaping of the project site.
Policy SH 7. Natural Vegetation and Landscaping	Partly	The project does not include removal of any existing trees, and will involve the disturbance or removal of only small areas of vegetation. However, the project does not include landscaping to enhance scenic qualities and/or screen unsightly views.

SOURCE: Yolo County General Plan

Impact 3.1.2: Vantage point 1, view from Wildhorse Golf Course, on the outskirts of the City of Davis, approximately two miles southwest of the southern edge of the Landfill site, looking northeast. (Significant)

Figure 3.1-5 presents simulations of the view of the currently-permitted and proposed final landfill grades from the northern edge of the Wildhorse Golf Course, approximately two miles southwest of the landfill site (Vantage Point 1 in Figure 3.1-1). This vantage point is typical of other distant views of the site from the area south of the landfill, including from several residences along road 105, road 104A, and along Covell Boulevard.

The top frame shows the simulation of the currently-permitted final grade, while the bottom frame shows the simulation of the proposed final grade. The landfill is in the distance in this view. In the first simulation, the landfill appears as a broad, low feature that rises distinctly from the valley floor. In the foreground are fenced fields, and in the middle ground, between the vantage point and the landfill, are several structures. This first simulation shows that, from this vantage point, the landfill as permitted would have a distinct but minor effect on the landscape from this distance. While no other feature matches the landfill's scale in this view, its breadth and low rise above the horizon enable it almost to blend into the landscape.

Vantage Point 1 - Permitted

Vantage Point 1 - Proposed

SOURCE: Environmental Science Associates

Figure 3.1-5
Simulated Views from Vantage Point 1
Permitted and Proposed Final Contours

The second simulation shows the proposed final grades from the same vantage point. In this view, the landfill is much more distinct; where in the first simulation the viewer has to pick the landfill out from the landscape, in the second simulation there can be no question of its presence. The simulation suggests that the landfill could be mistaken for a natural feature, since it appears similar to a broad, low hill. However, there are no other hills like this in this area of the Sacramento Valley. From this vantage point, the proposed final grades of the project would appear to alter the natural landscape characteristics of the area to such a scale or degree that the change appears as a substantial, obvious, and disharmonious modification of the overall scene. This would therefore be a significant impact of the project.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in This Report

Mitigation Measure 3.1.2: Trees could be used to screen views of the landfill from the vicinity of Vantage Point 1. However, this view is not unique, but rather typical of the area. Therefore, plantings would have to be extensive, and might interrupt the broad, open nature of the views from this area; this mitigation measure may therefore create a new, substantial impact, and is therefore not considered feasible.

Level of Significance After Mitigation

No feasible mitigation measures are available for this impact. The impact would therefore remain significant and unavoidable.

Impact 3.1.3: Vantage Point 4, View from Road 103, one mile west of the western edge of the landfill site, looking east. (Significant)

Figure 3.1-6 presents simulations of the currently-permitted and proposed final landfill grades as seen from Vantage Point 4 (on Figure 3.1-1). The view is from Road 103, one mile west of the landfill. The top frame of Figure 3.1-6 shows the currently permitted maximum grade of the landfill. The view shows recently plowed and formed agricultural fields ending at the landfill, which dominates the middle distance. On a clear day, the permitted final contours would block the views of the Sacramento skyline and the Sierra Nevada looking directly east from this point.

The simulated view of the proposed final grades, shown in the lower frame of Figure 3.1-6, shows a more massive structure, substantially taller and more uniform than the currently permitted final grades. While the proposed increase in height and mass would not result in additional blocking of distant views, the change in the landscape resulting from construction of the landfill to the proposed final grade would substantially and permanently alter the character of the landscape from this vantage point. This would therefore be a significant impact.


Vantage Point 4 - Permitted


Vantage Point 4 - Proposed

SOURCE: Environmental Science Associates

Figure 3.1-6
Views from Vantage Point 4
Permitted and Proposed Final Contours

Mitigation Measure 3.1.3: As with the previous impact, trees could be used to screen views of the landfill from the vicinity of Vantage Point 2, but, like the previous impact, plantings would have to be extensive, and might interrupt the broad, open nature of the views from this area. This mitigation measure may therefore create a new, substantial impact, and is therefore not considered feasible.

Level of Significance After Mitigation

No feasible mitigation measures are available for this impact. The impact would therefore remain significant and unavoidable.

Impact 3.1.4: Vantage Point 5, View from south of Willow Slough Bypass, about 1,500 feet south of the southern edge of the landfill site, looking north. (Significant)

Figure 3.1-7 presents simulations of the currently-permitted and proposed final landfill grades from a point about 1,500 feet south of the landfill, across Willow Slough Bypass (Vantage Point 5 in Figure 3.1-1). The most apparent difference in the currently-permitted and proposed final grades as seen from this vantage point is the pronounced development of two peaks, with a low gap between them. The foot of the gap is the preferred location for the proposed development of a materials recovery facility (MRF), which is not depicted in the simulation. It is unlikely that the roof of the MRF structure would not appear to exceed the height of the finished landfill grade behind it. MRF buildings tend to be large, boxy structures, so the MRF could be expected to resemble a large agricultural building. However, this would depend on the design of the mass and exterior treatment of the building. A more industrial looking structure might be out of character with the surrounding rural area.

The effect on the character of the landscape of the proposed increase in the finished height of the landfill would, like the two previous vantage points, be substantial, obvious, and disharmonious. This would therefore be a significant impact.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in This Report

Mitigation Measure 3.1.4a: The massing and exterior treatment of the proposed MRF structure should be designed to mimic a typical large agricultural structure.

Mitigation Measure 3.1.4b: Planting of appropriate native trees along the southern boundary of the landfill would help to screen the landfill from this vantage point, and would serve to break-up the dominance of the mass of the landfill on the landscape. Trees should be selected for mature height and screening characteristics, and compatibility with natural stands in the area.

Vantage Point 5 - Permitted

Vantage Point 5 - Proposed

SOURCE: Environmental Science Associates

Figure 3.1-7
Simulated Views from Vantage Point 5
Permitted and Proposed Final Contours

Level of Significance After Mitigation

The combination of Mitigation Measures 3.1.4a and 3.1.4b would effectively reduce the visual impact on this vantage point of the proposed MRF and increase in landfill final grades. The resultant impact, with mitigation, would be less than significant.

Impact 3.1.5: Vantage Point 6, view from Road 104A, about one mile south of the southern boundary of the landfill site, looking north. (Significant)

Figure 3.1-8 presents the simulated views of the currently permitted and proposed landfill final grades from a point on Road 104A, about one mile south of the landfill site (Vantage Point 6 in Figure 3.1.1). The view shows agricultural fields stretching away to the landfill in the middle distance. In both frames, the landfill fills the horizon, though in the second frame, showing the proposed final grade, the structure rises significantly higher above the otherwise flat grade of the area, and appears as a much more dramatic and intrusive feature on this view. It is unlikely that the proposed MRF building would be distinctly visible from this vantage point. As in the previous impacts, the increased height and mass of the proposed final grades would create a substantial, obvious, and disharmonious change in the character of the landscape. The impact on this view would therefore be significant.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in This Report

Mitigation Measure 3.1.5: As with other distant views of the landfill, planting of trees to screen the view would require extensive planting (on land not controlled by the County), and might interrupt the broad, open nature of the views from this area. This mitigation measure may therefore create a new, substantial impact, and is therefore not considered feasible.

Level of Significance After Mitigation

No feasible mitigation measures are available for this impact. The impact would therefore remain significant and unavoidable.

Impact 3.1.6: Proposed new activities at the landfill, including composting, landfill mining, increased salvaging operations, and MRF operations, could result in creation of increased amounts of windblown litter leaving the site. (Less than Significant)

Several proposed activities at the landfill, including composting, landfill mining, increased salvaging operations, and MRF operations, could cause increases in the amount of litter in the

Vantage Point 6 - Permitted

Vantage Point 6 - Proposed

SOURCE: Environmental Science Associates

Figure 3.1-8
Simulated Views from Vantage Point 6
Permitted and Proposed Final Contours

vicinity of the landfill. However, a properly implemented litter control program would be capable of ensuring that the incremental increase in litter that could result from these activities would be minimized. The landfill's existing litter control program includes use of movable litter fences and daily collection of windblown litter by site personnel. This program has been effective in keeping the site free of litter and in preventing litter from blowing off-site. Continued implementation of this program, with adjustments as necessary to ensure compliance with 27 CCR 20830, would ensure that this potential impact remains less than significant.

Mitigation: None required.

Impact 3.1.7: Prior to landfill closure, the proposed changes in landfill contours (in conjunction with the revised fill sequencing plan) and new activities could increase the visibility of landfill activities as seen from public roadways and nearby residences. (Less than Significant)

The proposed increased height of the landfill may result in landfill operations becoming more visible at greater distances prior to landfill closure, including greater visibility at times of refuse handling operations at the working face. Other proposed activities and structures, including landfill mining operations, the MRF, and expansion of the composting facility may also be visible from roadways and residences. The increased visibility of the working face and other activities as seen from public roadways and nearby residences could potentially detract from the surrounding natural landscape. While the MRF building may be visible from points to the south of the landfill (see Figure 3.1-7), it will somewhat resemble the type of structure used for agricultural operations. Furthermore, as shown in Figure 3.1-7, the MRF structure will lay against the taller structure of the landfill itself, and so will tend not to affect distant views of the site. Other effects would be temporary and short-term, and would be minimally visible from most vantage points. Therefore, this impact is less than significant and does not require mitigation.

Mitigation: None required.

Impact 3.1.8: Construction of future landfills cells as anaerobic bioreactors could introduce a new source of glare. (Significant)

The existing full-scale anaerobic bioreactor demonstration cell in Module D of the landfill is covered with an impermeable polymer membrane that is weighted with tires. This cover resembles shiny black plastic, and is highly reflective. The project includes the proposal to develop all future landfill cells as bioreactors. This could result in a multiplication of the area covered with this type of highly reflective cover. This would result in the introduction of a new source of glare in the area, which would be a significant impact. One of the demonstration bioreactors at Module D is an aerobic cell, which is covered with ground greenwaste; such a cover is not reflective and would not introduce a new source of glare in the area. The County may develop some of the future bioreactor cells as aerobic bioreactors, in which case ground greenwaste or similar low-reflective materials would be used for cover.

Mitigation Measures Proposed as Part of the Project

None

Mitigation Measures Identified in This Report

Mitigation Measure 3.1.8: When developing anaerobic bioreactor cells, the County shall use a cover that has low reflective properties.

Level of Significance After Mitigation

The implementation of Mitigation Measure 3.1.8 would reduce this impact to a less-than-significant level.

Impact 3.1.9: Development of an off-site borrow area could degrade the visual character of the site and its surroundings by introducing physical features that are substantially out of character with adjacent land uses; alter the natural landscape characteristics of the site to such a scale or degree that the change appears as a substantial, obvious, and disharmonious modification of the overall scene; or conflict with adopted plans or policies regarding visual resources. (Significant)

The project includes development of an off-site soil borrow area (quarry). The location for the borrow area has not been identified, but is assumed to be within about a five-mile radius of the landfill. Soil borrow activities would include removal of any vegetation from the area being excavated, and removal of several feet of soil. This could substantially and permanently degrade the character of the site, for example, by changing an agricultural field to an open pit. In addition, while quarrying activities are taking place, the visual character of the site would include extensive heavy equipment and trucking operations, which might be disharmonious with the surrounding land uses. The site might be visible from a designated or candidate scenic highway. Any of these circumstances has the potential to be a significant impact.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.1.9a: The soil borrow area shall be located outside of the viewshed of any designated or candidate scenic highway, as stated in the siting criteria to be used in identifying a suitable soil borrow area.

Mitigation Measures Identified in This Report

Mitigation Measure 3.1.9b: Consistent with Yolo County General Plan Policies CON 27 and SH 7, development of the soil borrow area will include a **setback** from roadways, and to the extent possible will retain existing trees and vegetation. The site will be landscaped, including use of screen trees.

Mitigation Measure 3.1.9c: After completion of soil borrow activities, the site will be restored to an appropriate use, such as open space or wildlife refuge. This will include landscaping to produce a natural and harmonious character.

Level of Significance After Mitigation

At the programmatic level of analysis presented for this project component, the combination of the above mitigation measures would likely reduce this impact to a less-than-significant level. However, more detailed, site-specific visual analysis should be a part of project-level environmental review of this project component when a site for the soil borrow operation has been identified.

REFERENCES – Aesthetics

California Department of Transportation, California Scenic Highway System: A list of eligible and officially designated routes, http://www.dot.ca.gov/hq/LandArch/scenic/cahisys.htm (site accessed January 14, 2003).

Yolo County, Yolo County General Plan. Adopted July, 1983.

3.2 AIR QUALITY

This section evaluates the potential for the project to cause new or more severe air quality impacts. The 1992 EIR for the previous permit revisions at the Yolo County Central Landfill (YCCL) found that the project would have significant unavoidable air quality impacts.

In the 1992 EIR, total project emissions from all sources were estimated to be 880.6 lbs/day of carbon monoxide (CO), 633.3 lbs/day reactive hydrocarbons (ROG), 5,534.2 lbs/day nitrogen oxides (NOx), 88.4 lbs/day sulfur dioxide (SO2), and 760.2 lbs/day PM-10. The 1992 EIR also estimated that if the demonstration project to enhance methane generation were implemented throughout the expansion area, CO emissions would increase to 1,260.6 lbs/day, ROG emission would increase to 908.9 lbs/day, NOx emissions would increase to 8,454.2 lbs/day, SO_2 emissions would increase to 101.2 lbs/day, and PM-10 emissions would be the same (760.2 lbs/day).

Several mitigation measures were identified as follows:

- All on-site diesel vehicles and equipment should be operated with fuel-injected timing, be equipped with high-pressure injectors, and use reformulated fuel.
- All engines should be properly operated and maintained.
- Diesel fuel should be 0.05 percent sulfur by weight or less.
- Diesel-powered equipment should be turned off when not in use more than 30 minutes; and gas-powered equipment should be turned off when not in use more than five minutes.
- Unpaved roads and active portions of the landfill should be watered twice daily.
- Non-selective catalytic reduction should be used on landfill gas (LFG)-fueled generation.
- Air/fuel ratio controllers should be installed on landfill gas-fueled generators.
- Annual source testing should be conducted for the energy recovery facility.

Even with the implementation of the above mitigation measures, the air quality impact was still significant. For purposes of the 1992 EIR, 1,000 lbs/day was used as the significance criteria for CO and any net increase in emissions for all other criteria pollutants (hydrocarbons, NO_x, PM-10 and SO_2) was considered significant.

This section provides an update to the physical and regulatory setting discussions presented in the Air Quality Section of the 1992 EIR, and examines the potential for the proposed project to lead to new impacts or increase the severity of previously identified significant effects.

3.2.1 SETTING

GENERAL CLIMATE AND METEOROLOGY

The general climate and meteorology update is, as should be expected, similar to the information presented in the 1992 YCCL EIR. Some portions of the following description are excerpted directly from that report; the climate data have been updated for the period 1971 to 2000.

The proposed project is in the southern portion of the Sacramento Valley Air Basin, which is characterized by cool winters and hot, dry summers tempered by occasional westerly breezes from the Sacramento/San Joaquin delta. Weather in summer, spring, and fall is generally a result of the movement and intensity of the semi-permanent high-pressure area located in the Pacific Ocean several hundred miles to the west. Winter weather is generally a result of the size and location of low-pressure weather systems originating in the northern Pacific Ocean. The nearest climatic data station to the proposed project is the weather station in the City of Davis. The average daily maximum temperature recorded at this station was 73.9 degrees for the period of 1971 to 2000. The hottest months are July and August, with average maximum daily temperatures of 92.7 and 91.7 degrees, respectively. The coolest month is January with an average daily minimum temperature (1971 to 2000) of 37.1 degrees. The average annual precipitation recorded for the same period was 19.05 inches. Approximately 94 percent of this precipitation occurs between October and April.

Winter winds in the southern Sacramento Valley Air Basin are a result of frontal systems moving through the area and are generally oriented north or south along the axis of the valley. Spring and fall winds are generally greater than five knots and blow from the north or west (sea breeze). Summer winds are dominated by the westerly sea breeze generated by high temperatures, creating a low-pressure area and resulting in a pressure trough that carries marine air up the delta.

These sea breezes tend to disperse air pollutants and may prevent high ozone concentrations during the summer when high temperatures are likely to accelerate ozone formation. However, the westerly sea breezes may carry pollutants generated in the more industrialized areas (i.e., Benecia, Pittsburg, and Antioch) into the project area where high temperatures and abundant sunlight are conducive to ozone formation. The average wind direction in the project area is from the southwest.

The topography of the project area is such that frequent temperature inversions are not expected. However, meteorological conditions may occur such that the entire Sacramento Valley experiences a temperature inversion, facilitating the accumulation of ozone precursors and ozone formation.

AIR QUALITY STANDARDS

Regulation of air pollution is achieved through both national and state ambient air quality standards and emissions limits for individual sources of air pollutants.

Federal

The federal Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (EPA) to identify National Ambient Air Quality Standards (national standards) to protect public health and welfare. National standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulate matter (PM-10 and PM-2.5), and lead. These pollutants are called “criteria” air pollutants because standards have been established for each of them to meet specific public health and welfare criteria set forth in the CAA. California has adopted more stringent ambient air quality standards for the criteria air pollutants (referred to as State Ambient Air Quality Standards, or state standards) and has adopted air quality standards for some pollutants for which there is no corresponding national standard. Table 3.2-1 presents the most recent information regarding both federal and California ambient air quality standards, as reported by the California Air Resources Board.

In June of 1997, the U.S. EPA adopted new ozone and PM-10 national standards. The U.S. EPA changed the 1-hour ozone national standard of 0.12 ppm to an 8-hour standard of 0.08 ppm. The 1-hour standard continues to apply in areas that violated the standard at that time. The U.S. EPA has also adopted a standard for particulate matter of less than 2.5 microns (PM-2.5). Although these new standards have been adopted, sufficient air quality monitoring data are not available to determine attainment status. Therefore, the evaluation of air quality impacts and attainment status discussed herein refers only to the pre-June 1997 standards for these pollutants.

Pursuant to the 1990 federal Clean Air Act Amendments, the U.S. EPA classified air basins (or portions thereof) as either “attainment” or “nonattainment” for each criteria air pollutant, based on whether the national standards had been achieved. The project site lies within the Sacramento nonattainment area for the federal ozone standard, which includes Sacramento County, Yolo County, the northeast portion of Solano County, Placer and El Dorado Counties (except mountain portions), and the part of Sutter County adjacent to Sacramento County. Yolo County is attainment or unclassified for other federal criteria pollutants. “Unclassified” is defined by the Clean Air Act Amendments as any area that cannot be classified, on the basis of available information, as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

Regulation of Toxic Air Contaminants (TACs), termed Hazardous Air Pollutants (HAPs) under federal regulations, is achieved through federal and State controls on individual sources. The 1977 Clean Air Act Amendments required the U.S. EPA to identify National Emission Standards for Hazardous Air Pollutants (NESHAPs) to protect public health and welfare. These substances include certain volatile organic chemicals, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. There is uncertainty in the precise degree of hazard.

TABLE 3.2-1
AMBIENT NATIONAL AND STATE AIR QUALITY STANDARDS

Pollutant	Average Time	California Standards [1]		Federal Standards [2]		
		Concentration [3]	Method [4]	Primary [3, 5]	Secondary [3, 5]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 $\mu g/m^3$)	Ultraviolet Photometry	0.12 ppm (235 $\mu g/m^3$)[8]	Same as Primary Standard	Ultraviolet Photometry
	8 Hours	–		0.08 ppm (157 $\mu g/m^3$)[8]		
Respirable Particulate Matter (PM-10)	24 Hours	50 $\mu g/m^3$	Gravimetric or Beta Attenuation *	150 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 $\mu g/m^3$		50 $\mu g/m^3$		
Fine Particulate Matter (PM-2.5)	24 Hours	No Separate State Standards		65 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 $\mu g/m^3$	Gravimetric or Beta Attenuation	15 $\mu g/m^3$		
Carbon Monoxide (CO)	8 Hours	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)[8]	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)[8]		
	8 Hours (Lake Tahoe)	6 ppm (7 mg/m^3)		–	–	–
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	–	Gas Phase Chemiluminescence	0.053 ppm (100 $\mu g/m^3$)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.25 ppm (470 $\mu g/m^3$)		–		
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	Ultraviolet Fluorescence	0.030 ppm (80 $\mu g/m^3$)	–	Spectrophotometry (Paraosaniline Method)
	24 Hours	0.04 ppm (105 $\mu g/m^3$)		0.14 ppm (365 $\mu g/m^3$)	–	
	3 Hours	–		–	0.5 ppm (1,300 $\mu g/m^3$)	
	1 Hour	0.25 ppm (655 $\mu g/m^3$)		–	–	–
Lead [9]	30 Day Average	(1.5 $\mu g/m^3$)	Atomic Absorption	–	–	–
	Calendar Quarter	–		1.5 $\mu g/m^3$	Same as Primary Standard	High Volume Sampler and Atomic Absorption
Visibility Reducing Particles	8 Hours	Extinction coefficient of 0.23 per kilometer – visibility of ten miles or more (0.07–30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		**No Federal Standards**		
Sulfates	24 Hours	25 $\mu g/m^3$	Ion Chromatography *			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 $\mu g/m^3$)	Ultraviolet Fluorescence			
Vinyl Chloride [9]	24 Hours	0.01 ppm (26 $\mu g/m^3$)	Gas Chromatography			

* On June 20, 2002, the California Air Resources Board approved staff's recommendation to revise the PM-10 annual average standard to 20 $\mu g/m^3$ and to establish an annual average standard for PM-2.5 of 12 $\mu g/m^3$. Information regarding these revisions can be found at http://www.arb.ca.gov/research/aaqs/std-rs/std-rs.htm

SOURCE: California Air Resources Board (3/26/03)

TABLE 3.2-1 (continued)
AMBIENT NATIONAL AND STATE AIR QUALITY STANDARDS

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hours), nitrogen dioxide, suspended particulate matter–PM-10, PM-2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National Standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM-10, the 24 hour standard is attained when 99 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. For PM-2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent procedure which can be shown to the satisfaction of the CARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the EPA. An “equivalent method” of measurement any be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.
8. New federal 8-hour ozone and fine particulate matter standards were promulgated by U.S. EPA on July 18, 1997. Contact U.S. EPA for further clarification and current federal policies.
9. The CARB has identified lead and vinyl chloride as ‘toxic air contaminants’ with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

The 1990 Clean Air Act Amendments offer a technology-based and performance-based approach to reducing air toxics from major sources of air pollution, followed by a risk-based approach to address any remaining, or residual risks. Under the 1990 Clean Air Act Amendments, designated HAPs are regulated under a two-phase strategy. Under the technology based-approach, the U.S. EPA develops standards for controlling the routine emissions of air toxics from each major type of facility within an industry group (or source category). These standards require facilities to install controls, known as Maximum Achievable Control Technology (MACT), based on emissions levels that are already being achieved by better-controlled and lower-emitting sources in an industry. MACT includes measures, methods, and techniques (i.e., material substitutions, work practices, and operational improvements) aimed at reducing toxic air emissions. The MACT rule for municipal solid waste (MSW) landfills was promulgated in final on January 16, 2003 (40 CFR Part 63, Subpart AAAA). The primary requirements of the new rule are the preparation and implementation of a start-up, shutdown, and malfunction (SSM) plan for the landfill gas (LFG) collection and control system (GCCS) and preparation and submittal of semiannual reports. The YCCL is not currently subject to the MACT requirement because it is not a major source of HAPs (greater than 10 tons per year of an individual HAP or greater than 25 TPY for all HAPs combined) and the bioreactor operations do not meet the definition for bioreactors under this rule (the rule defines bioreactors as landfills with a minimum average moisture content of at least 40 percent by weight [§ 63.1990] and the YCCL average moisture content currently does not exceed 30 percent) (Moralez, 2004). When the YCCL becomes subject to the regulations they will have additional reporting requirements, the landfill gas collection and control system is already installed.

New landfills are regulated under Section 111(b) of the federal Clean Air Act Amendments; existing landfills will be controlled under the guidelines of Section 111(d). Collectively, these regulations are known as New Source Performance Standards (NSPS). NSPS and its associated Emission Guidelines (EG) for MSW landfills substantially affect landfill operations. Because of this regulation, owners and operators of MSW landfills are required, some for the first time, to evaluate and possibly control LFG emissions. The intent of the NSPS rule and EG is to reduce emissions of LFG, which is produced as a by-product of the decomposition of organic materials in the landfill, and the volatilization of various compounds in the landfill. The pollutants of concern contained in LFG are non-methane organic compounds (NMOC) and methane. Compliance requirements are based on the design capacity of the landfill and its NMOC emission rate to be calculated using the U.S. EPA's Landfill Gas Emissions Model. If a landfill exceeds a threshold of 50 Megagrams (Mg) per year, which is roughly equivalent to 250 pounds per day, of NMOC, then the operator must install a LFG collection and control system to extract and destructively combust LFG (i.e., in a flare, boiler, or engine generator). About 39 percent of the NMOC emissions are considered components of a class of gasses known as "reactive organic gases" (ROG), an ozone precursor. Operations, monitoring, record keeping, and reporting for the collection/control system must be implemented in accordance with regulatory requirements. YCCL has an existing LFG collection system and has proposed modifications to that system to operate additional cells as bioreactors to accelerate the formation of LFG that is used as fuel for the on-site electrical generators. Tier 2 analyses conducted in 1998 and in early 2004 both indicated that the landfill is producing less than the emission threshold of 50 Mg per year of NMOC (Sinderson, 2003, 2004).

Under the Federal 1990 Clean Air Act Amendments (40 Code of Federal Regulations [CFR], Part 70), major sources of criteria pollutants or HAPs are required to obtain a federally enforceable Title V operating permit. Title V programs are developed at the state or local level, as outlined in 40 CFR, Part 70. All landfills subject to NSPS or EG are also subject to Title V. A Title V permit acts as an umbrella permit, which consolidates all federal, state, and local air quality regulations and requirements into one permit. An application for a Title V permit has been submitted for YCCL. The Yolo-Solano Air Quality Management District (YSAQMD) is currently preparing a local permit for Yolo County for the fugitive air quality emissions from YCCL. A local permit will then allow YSAQMD to issue a Title V permit to Yolo County.

State

The California Air Resources Board (CARB) manages air quality, regulates mobile emissions sources, and oversees the activities of county Air Pollution Control Districts and regional Air Quality Management Districts. CARB regulates local air quality indirectly by establishing state ambient air quality standards and vehicle emissions standards, and by conducting research, planning, and coordinating activities.

California has adopted ambient standards that are more stringent than the federal standards for the criteria air pollutants. These are shown in Table 3.2-1. Under the California Clean Air Act (CCAA), patterned after the federal CAA, areas have been designated as attainment or nonattainment with respect to the state standards. The YSAQMD is in attainment of state standards for all criteria pollutants except ozone and PM-10.

California State law defines TACs as air pollutants having carcinogenic effects. The State Air Toxics Program was established in 1983 under Assembly Bill (AB) 1807 (Tanner). A total of 243 substances have been designated TACs under California law; they include the 189 (federal) HAPs. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; AB 2588 does not regulate air toxics emissions. Toxic air contaminant emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment and, if specific thresholds are violated, are required to communicate the results to the public in the form of notices and public meetings. Depending on the risk levels, emitting facilities are required to implement varying levels of risk reduction measures. The YSAQMD implements AB 2588, and is responsible for prioritizing facilities that emit air toxics.

California has implemented air emissions regulations for landfills under the state's air pollution control authority. The state has established control criteria, collection and control system requirements, testing and reporting requirements, and exemption criteria for MSW landfills.

Local

The YSAQMD is the primary local agency responsible for protecting human health and property from the harmful effects of air pollution for all of Yolo County and northeastern Solano County. The YSAQMD was established in 1971 by a joint powers agreement between the Yolo County and Solano County Board of Supervisors. The YSAQMD is governed by a Board of Directors composed of representatives from both the county boards of supervisors and city councils from the two counties and seven cities within the YSAQMD. The YSAQMD includes roughly 1,500 square miles and a population of approximately 270,000.

The YSAQMD is part of the Sacramento nonattainment area for the federal ozone standard, which includes Sacramento County, Yolo County, the northeast portion of Solano County, Placer and El Dorado Counties (except mountain portions), and the part of Sutter County adjacent to Sacramento County. The YSAQMD is in attainment of state standards for all criteria pollutants except ozone and PM-10. While all criteria pollutants are a concern of the YSAQMD, and a project is considered significant if it violates any of the state standards, ozone precursors and PM-10 emissions are emphasized in the review of projects.

The YSAQMD is required to adopt an Air Quality Attainment Plan and establish and enforce air pollution control rules and regulations in order to attain and maintain all state and federal ambient air quality standards. The YSAQMD regulates, permits, and inspects stationary sources of air pollution. Among these sources are industrial facilities, gasoline stations, auto body shops, and dry cleaners.

While the state is responsible for emission standards and controlling actual tailpipe emissions from motor vehicles, the YSAQMD is required to regulate agricultural burning and industrial emissions, implement transportation control measures and recommend mitigation measures for new growth and development designed to reduce the number of cars on the road, and promote the use of cleaner fuels.

The YSAQMD also funds a number of important public and private agency projects that provide innovative approaches to reducing air pollution from motor vehicles.

Prior to the requirement for a Title V permit, Yolo County has not had a local air quality permit for the YCCL with the YSAQMD. Neo Yolo LLC, MMYolo Power LLC, and Recycle America Alliance hold the existing local air quality permits that affect the landfill. Neo Yolo operates the gas collection system and the LFG flare for YCCL. Neo Yolo is under contract to continue this service. MMYolo Power LLC operates the energy recovery facility, which includes five (5) energy recovery generators powered by landfill gas. Each of the five generators is a major source because they have the capacity to emit more than 25 tons per year (TPY) of NO_x. Although the County may be responsible for future sources, currently the County has zero operations liability with respect to stationary source emissions at the landfill (Moralez, 2003). Recycle America Alliance has permits for an internal combustion (IC) engine used to power a water pump during the rainy season (156 BHP) and an IC engine (99 BHP) that powers a trommel for screening wood waste. Both of Recycle America Alliance’s engines are diesel-fueled.

YSAQMD Rule 2.38 now requires a local permit for the YCCL and a draft of the local permit is in process (Moralez, 2004). Rule 2.38 incorporates the provisions of Parts 60.751 - 60.759, Chapter I, Title 40, of the Code of Federal Regulations (40 CFR 60.751 - 60.759)[1]. 40 CFR 60.751 - 759 is Subpart WWW -- Standards of Performance for Municipal Solid Waste Landfills. The only exception from the federal regulations is that Rule 2.38 does not allow for the use of open flares. The performance standards affect the landfill collection systems, control systems (such as enclosed flares and electrical generators), test methods and procedures, compliance provisions, monitoring of operations, reporting requirements, record keeping requirements, and specifications for active collection systems. Control of NMOCs is the primary objective of the performance standards.

[1] Part 60 of Title 40, Code of Federal Regulations, establishes U.S. EPA’s Standards of Performance for New Stationary Sources.

The YSAQMD does not currently have a permit that covers fugitive gas emissions that escape from the landfill cover, and are not routed to either the landfill flare or the energy recovery generators.

Yolo County has one air quality goal set forth in the General Plan (Yolo County, 1983).

Goal. Work to improve air quality.

POLLUTANTS AFFECTING AIR QUALITY / HEALTH EFFECTS

A discussion of the air pollutants of interest to the regulatory agencies for their potential adverse impacts on the environment and sensitive receptors are described below.

Ozone

Short-term exposure to ozone can irritate the eyes and cause constriction of the airways. Besides causing shortness of breath, ozone can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

Ozone, the main component of photochemical smog, is primarily a summer and fall pollution problem. Ozone is not emitted directly into the air but is formed through a complex series of chemical reactions involving other compounds that are directly emitted. These directly emitted pollutants (also known as ozone precursors) include ROG and nitrogen oxides (NO_x). The time period required for ozone formation allows the reacting compounds to spread over a large area, producing a regional pollution problem. Ozone problems are the cumulative result of regional development patterns rather than the result of a few significant emission sources. Motor vehicles are the major source of ozone within the YSAQMD (YSAQMD, 2002).

Once formed, ozone remains in the atmosphere for one or two days. Ozone is then eliminated through chemical reaction with plants (reacts with chemicals on the leaves of plants), rainout (attaches to water droplets as they fall to earth) and washout (absorbed by water molecules in clouds and later falls to earth with rain).

Carbon Monoxide

Ambient carbon monoxide concentrations normally are considered a local effect and typically correspond closely to the spatial and temporal distributions of vehicular traffic. Wind speed and atmospheric mixing also influence carbon monoxide concentrations. Under inversion conditions, carbon monoxide concentrations may be distributed more uniformly over an area, out to some distance from vehicular sources.

When inhaled at high concentrations, carbon monoxide combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia, as well as for fetuses.

Carbon monoxide concentrations have declined dramatically in California due to existing controls and programs. Carbon monoxide concentrations are expected to continue declining due to the continued retirement of older, more polluting vehicles from the mix of vehicles on the road network. The U.S. EPA has designated YSAQMD as attainment for carbon monoxide since 1999 (YSAQMD, 2002). As such, the YSAQMD has deleted carbon monoxide as a pollutant of concern.

Suspended Particulate Matter (PM-10 and PM-2.5)

PM-10 and PM-2.5 consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. (A micron is one-millionth of a meter). PM-10 and PM-2.5 represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. Particulates also can damage materials and reduce visibility. One common source of PM-2.5 is diesel emissions.

Traffic primarily generates particulate matter and PM-10 emissions through entrainment of dust and dirt particles that settle onto roadways and parking lots. PM-10 also is emitted by burning wood in residential wood stoves and fireplaces and open agricultural burning. PM-10 can remain in the atmosphere for up to seven days before gravitational settling, rainout and washout remove it. The primary sources of PM-10 in the YSAQMD are from construction and demolition activities, farming operations and entrained road dust. The quantity of particulate matter and PM-10 is a function of soil type and soil moisture content (YSAQMD, 2002).

Toxic Air Contaminants (TACS)

Non-criteria air pollutants or TACs are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. Landfills are also sources of TACs. TACs are regulated separately from the criteria air pollutants at both federal and state levels. The federal regulations refer to TACs as HAPs. The introduction to the final rule for National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills notes that the final rule ensures reductions of emissions of nearly 30 HAPs including, but not limited to, vinyl chloride, ethyl benzene, toluene, and benzene. Vinyl chloride can adversely affect the central nervous system and has been shown to increase the risk of liver cancer in humans, while benzene is known to cause leukemia in humans (40 CFR Part 63).

Methane

Methane (CH_4) is a very potent greenhouse gas (GHG). In recognition of this fact, the U.S. EPA has established the Landfill Methane Outreach Program to promote the control of methane emissions from landfills. Methane is 21 times more potent than carbon dioxide as a GHG.

LFG is approximately 50 percent methane and methane contains energy to allow LFG recovery systems to produce electricity. Methane is also a concern at landfills because it can be flammable and explosive at various concentrations.

Non-Methane Organic Carbon (NMOCS)

NMOCs are organic gases other than methane. LFG has trace amounts of NMOCs. NMOCs include HAPs and TACs. NMOC data have been collected from emission test reports and concentrations from 23 landfills ranged from 240 to 14,300 ppmv (U.S. EPA, 1998). NMOC concentrations are assumed to be similar for dry landfills and bioreactors and approximately 98 percent of NMOCs are destroyed by use of a landfill flare (Sullivan, 2000).

Ammonia

Ammonia (NH_3) is produced naturally from decomposition of organic matter and under unusual conditions, can reach dangerous concentrations. The decomposition of organic matter during composting is a source of ammonia. At room temperature, ammonia is a colorless, highly irritating gas with a pungent, suffocating odor. It is lighter than air and flammable, with difficulty, at high concentrations and temperatures. Ammonia can form ammonium nitrate, a contributor to fine particulate pollution. The need to effectively control ammonia varies within California depending regionally on which precursor species limit particulate formation.

EXISTING AIR QUALITY IN THE PROJECT VICINITY

Criteria Air Pollutants

The air quality of the Air Basin is determined by routinely monitoring changes in the quantities of criteria pollutants in the ambient environment. Air quality in the area is a function of the criteria pollutants emitted locally, the existing regional ambient air quality, and the meteorological and topographic factors which influence the intrusion of pollutants into the area from sources outside the immediate vicinity.

The YSAQMD’s monitoring stations closest to the project site are in Davis and Woodland. Data collected at these stations are considered to be generally representative of air quality in the project area. Table 3.2-2 summarizes the highest concentrations of ozone, and PM-10 for 1998–2002 and compares ambient air pollutant concentrations with the national and state standards.

SENSITIVE RECEPTORS

Some land uses are considered more sensitive to air pollution than others. YSAQMD defines sensitive receptors as “people, or facilities that generally house people (schools, hospitals, residences, etc.), that may experience adverse effects from unhealthful concentrations of air pollutants,” especially those within one-quarter mile of an emission source (YSAQMD, 2002). Sensitive receptors within one mile of the Yolo County Central Landfill are the residences identified in Table 3.2-3.

TABLE 3.2-2
AIR QUALITY DATA SUMMARY (1998–2002) FOR THE PROJECT AREA

		Monitoring Data by Year				
Pollutant	**Standard**[a]	**1998**	**1999**	**2000**	**2001**	**2002**
Ozone: ***Woodland-Gibson Road***						
Highest 1-hour average (ppm) [b]		**0.114**	**0.110**	**0.100**	**0.103**	**0.110**
Days over State Standard Exceedances[d]	0.09	8	8	3	3	9
Days over National Standard	0.12	0	0	0	0	0
Highest 8-hour average (ppm) [b]	0.08	**0.102**	**0.089**	0.083	**0.089**	**0.091**
Highest 8-hour average, ppm[c]						
Days over National Standard Exceedances		4	4	0	1	4
Particulate Matter (PM-10): ***Woodland-Gibson Road***						
Highest 24-hour average ($\mu g/m^3$)[b]		**69**	**179**	**63**	**67**	**82**
Est. Days over State Standard [c]	50	7	60	12	18	30
Exceedances/Samples						
Est. Days over Fed. Standard [c]	150	NA	7	0	0	0
Annual Average State ($\mu g/m^3$) [b]	20	**21.1**	**23.1**	**20.5**	19.6	**22.5**
Ozone: ***Davis-UCD Campus***						
Highest 1-hour average (ppm) [b]		**0.115**	**0.117**	**0.103**	**0.100**	**0.121**
Days over State Standard Exceedances	0.09	9	9	5	5	3
Days over National Standard	0.12	0	0	0	0	0
Highest 8-hour average (ppm) [b]	0.08	**0.095**	**0.094**	**0.089**	**0.093**	**0.088**
Days over National Standard Exceedances		4	5	2	2	2

a Generally, state standards are not to be exceeded and national standards are not to be exceeded more than once per year.
b ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.
c PM-10 is not measured every day of the year. Estimated days over the standard is based on 365 days per year.

NOTES: Values in **bold** are in excess of applicable standard.
NA = Not Available.

SOURCE: California Air Resources Board, *Summaries of Air Quality Data*, 1998, 1999, 2000, 2001, 2002; http://www.arb.ca.gov/adam.

TABLE 3.2-3
RESIDENCES WITHIN ONE MILE OF THE YCCL

Use/Location	Direction from the YCCL	Distance from YCCL boundary (feet)
Approximately six (6) residences on Road 103	West of YCCL	4,300 to 5,200
Residence south of Willow Slough By-Pass	South of the southern boundary	600
Residence south of Willow Slough By-Pass	Southwest of the southwestern boundary	3,400
Residence south of Willow Slough By-Pass	South of the southeastern corner	1,400

SOURCE: Environmental Science Associates, 2003. Based on 1994 aerial photo and 2003 site reconnaissance.

Since publication of the 1992 EIR, two new residences have been built within one mile of the YCCL. One new residence is directly south of the YCCL and is now the closest sensitive receptor (approximately 600 feet from the landfill's southern fenceline). The other new residence is approximately 3,400 feet to the southwest of the YCCL's southwestern corner.

3.2.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

According to Appendix G of the *CEQA Guidelines* (Governor's Office of Planning and Research, 2002), a project would generally have a significant effect on the environment if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any nonattainment pollutant;
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

CEQA Guidelines Section 15125(d) further states that an EIR shall discuss "any inconsistencies between a proposed project and applicable general plans and regional plans. Such regional plans include, but are not limited to, the applicable air quality attainment or maintenance plan (or State Implementation Plan) …."

The YSAQMD has published a set of recommendations that provide specific guidance on quantitative emissions thresholds, qualitative thresholds, emissions concentrations, and cumulative impacts for evaluating projects under CEQA relative to the above general criteria (YSAQMD, 2002).

Quantitative Long-Term Emission Thresholds

For the purposes of this EIR, the long-term operational significance thresholds are (YSAQMD, 2002):

Reactive Organic Gases (ROG):	82	pounds per day
Oxides of Nitrogen (NO_x):	82	pounds per day
Particulate Matter (PM-10):	150	pounds per day
Carbon Monoxide (CO):	550	pounds per day

These thresholds are consistent with those established in YSAQMD Rule 3.4 (New Source Review), Section 302.1. A credit is allowed for existing quantifiable emissions at the project site (e.g., an office building currently in operation that will be demolished at the site where the proposed project is planned).

The thresholds are intended as a guide rather than strict, absolute values. When preliminary analysis of a project indicates estimated emissions are near the threshold values, the project should be viewed as potentially significant. Closer scrutiny will refine the emissions analysis, explore any mitigating characteristics of the project or site and identify feasible mitigation measures.

Qualitative Long-Term Emission Thresholds

Table 3.2-4 identifies additional indicators of potential secondary air quality impacts. Qualitative emission thresholds should be used as screening criteria to indicate the need for further analysis with respect to air quality.

Significance Criteria for Emissions Concentration

The more stringent state standards are the criteria for emissions concentration significance in the Yolo-Solano Air Quality Management District.

A violation of ambient air quality standards can occur during any of three project phases: Phase I construction (grading), Phase II construction (actual construction of roadways, structures, and facilities) and after construction is completed once the facility(s) are occupied (long-term emissions). A project (or project phase) is considered significant if:

1. The project’s contribution violates the state standards; or

2. The project’s contribution plus the background level violates the state standards, and

    a. A sensitive receptor is located within a quarter-mile of the project, or

TABLE 3.2-4
QUALITATIVE INDICATORS OF AIR QUALITY IMPACTS

- Potential to create or be near an objectionable odor (e.g., agriculture, wastewater treatment, food processing, chemical plants, composting, landfills, dairies, rendering, etc.).
- Potential for accidental release of air toxic emissions or acutely hazardous materials.
- Potential to emit an air toxic contaminant regulated by the District or on a federal or state air toxic list.
- Burning of hazardous, medical, or municipal waste as waste-to-energy facilities.
- Potential to produce a substantial amount of wastewater or potential for toxic discharge (e.g., aluminum forming, battery manufacture, chemical manufacture, dye casting, electroplating, food manufacture, reclamation plants, metal finishing, metal molding & casting, pharmaceutical, petroleum/fuel refining, photography, pulp & paper manufacture, etc.).
- Sensitive receptors (e.g., schools, households, etc.) located within a quarter mile of air toxic emissions or near CO hot spots.
- Carcinogenic or air toxic contaminant emissions that exceed or contribute to an exceedance of the District's action level for cancer (one in one million), chronic (one) and acute (one) risks.

SOURCE: Yolo-Solano Air Quality Management District. *Air Quality Handbook. Guidelines for Determining Air Quality Thresholds of Significance and Mitigation Measures for Proposed Development Projects that Generate Emissions from Motor Vehicles.* 1996 (revised 2002).

b. The project's contribution exceeds five percent of the state standards, or

c. The project's contribution exceeds 82 lbs/day of ROG or NOx, or 150 lbs/day of PM-10.

Significance Criteria for Cumulative Impacts

Development projects are considered cumulatively significant if:

1. The project requires a change in the existing land use designation (i.e., general plan amendment, rezone); and
2. Projected emissions (ROG, NO_x or PM-10) of the proposed project are greater than the emissions anticipated for the site if developed under the existing land use designation.

Projects meeting the above criteria are considered to have a significant adverse incremental effect on the region's ability to attain quality air. Air emission projections, attainment planning and related programs are based on growth levels and distributions reflected in local planning documents. Changes in land use that result in emissions greater than anticipated incrementally add to an overall increase in the pollutant load.

Impact 3.2.l: Project-related traffic would not increase air quality emissions from on-road mobile sources. (Less than Significant)

The YCCL's Solid Waste Facility Permit (SWFP) allows acceptance of up to 1,800 tons per day of waste and 1,047 vehicle trips per day, which the current project would not alter. The baseline against which to judge traffic-related air quality impacts is the current SWFP, and as such, the current project would not generate additional vehicle trips or increases in traffic-related air pollutant emissions. As identified in the traffic section of this EIR (Traffic, Section 3.10), recent traffic counts were compared to both then-existing traffic volumes and cumulative (2005) traffic volume forecasts developed for the 1992 EIR analysis. This comparison indicates that current (2003) daily traffic volumes are lower than those reported in the 1992 EIR for both daily and peak-hour conditions for all study roadways, except on County Road 102 and County Road 29, on which current daily volumes are higher than 1991, but current peak-hour volumes are similar to, or lower than, those reported in the 1992 EIR. In addition, the 1992 EIR predicted that traffic volumes would almost double over the 13 years to 2005, which, as indicated by the above-described 2003 volumes, will not happen. Therefore, the 1992 EIR continues to provide an adequate and conservative basis for traffic-related air quality impacts in this EIR.

Trip generation under the current project would be no higher than estimated in the 1992 EIR because this EIR evaluates the same maximum tons per day allowance as did the prior CEQA document. There is potential for some increased outbound trips generated by recovered materials from the MRF, composting and salvaging, and local trips to transport off-site borrow materials for soil cover, but these would be within the limits of the current permitted traffic. Specifically, future vehicle trips that would be the result of this project include:

- Trucks hauling soil from an off-site borrow area;
- Trucks hauling approximately 300 tpd of finished compost and 400 tpd of recovered materials from the MRF (assuming truck payloads of 18 tons, this would be a total of approximately 40 truck trips per day);
- Up to 50 trips per day for retail customers for the increased salvage operations.
- Potential for increased trips to the permanent household hazardous waste collection facility that would have longer operating hours.

On the basis of the above-described review, and since daily trips would not increase, no changes in the conditions of air quality emissions were ascertained that would result in any new significant impacts or an increase in severity of the impacts from those analyzed in the 1992 EIR.

Mitigation: None required.

Impact 3.2.2: Landfill mining could release odors, methane, hydrogen sulfide, and other gases. (Significant).

Decomposition of wastes in landfills causes the generation of a variety of gases, some which can be fatal when inhaled at sufficient concentrations. Methane and other gases, generated by decomposing wastes, can cause explosions and fires (U.S. EPA, 1997a). Landfill mining involves the excavation of landfill cells. During the excavation of wastes, gases that are trapped in the landfill or being transported by the LFG collection system could be released to the atmosphere. Workers at the YCCL would be at risk from any gas releases from landfill mining operations. Because of the buffer area between the landfill and the nearest off-site receptors, off-site receptors would not be significantly affected by landfill mining activities. A review of several articles on other landfill mining projects did not indicate that off-site odor complaints were frequent or severe.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.2.2a: A *Specific Health and Safety Plan for Landfill Mining at the Yolo County Central Landfill* was prepared for the County in 2001. The Health and Safety Plan (HASP) as drafted shall provide the guidance necessary to initiate the work and allow monitoring of site conditions to determine the required protection. Continual updating of the HASP is emphasized in the HASP. The updates shall be based upon consistent monitoring and implementation of the HASP.

Mitigation Measures Identified in This Report

Mitigation Measure 3.2.2b: One month prior to initiation of landfill mining activities, the HASP shall be forwarded to the Local Enforcement Agency (LEA) and YSAQMD for comments and suggestions. Appropriate suggestions shall be incorporated into the HASP and new features of the HASP shall be communicated to the workers. If additional gas monitoring equipment is needed, the equipment shall be purchased and tested prior to commencing landfill mining operations.

Level of Significance After Mitigation

The above mitigation measures would reduce this impact to less than significant.

Impact 3.2.3: Landfill changes could result in the temporary generation of odors that could affect adjacent residences. (Significant)

As of 2003, the new LEA inspector had not received any formal complaints regarding odors, and was not aware of past odor complaints at the landfill (Yeung, 2003). There was an odor complaint in early 2004, from odors from an on-site pond. That odor problem has been corrected (Sinderson, 2004). The YSAQMD indicated that they would not receive odor complaints regarding the landfill, those complaints would be directed to the LEA. To further document the existing odor at the landfill, ESA conducted odor surveys on two days at the western and southern boundaries of the landfill and at the nearest sensitive receptors. On one of the two days a weak garbage odor was detected on Road 104 just west of the working face (within 600 feet). No other landfill odors were noticed off the landfill property. The areas surrounding the landfill have other odors that are also obvious at times. Freshly cut agriculture fields are common in this area and also the City of Davis wastewater treatment plant is directly east of the landfill.

Some of the modifications proposed by the project could result in substantial odors. Specifically, these modifications include operation of future landfill modules as anaerobic bioreactors and the expanded composting activities. Potential odor impacts of proposed landfill mining is discussed in Impact 3.2.2.

Most odors at composting operations result from the incomplete breakdown of organic materials. Under anaerobic (oxygen-poor) conditions, organic materials, notably carbohydrates and proteins, decompose and produce odorous compounds such as sulfur-containing compounds and ammonia.

Composting odor can be controlled at the source by implementing best management practices and good processing control. These include prompt and thorough processing of incoming feedstocks, adequate blending of materials and turning of the windrows, and maintaining appropriate moisture in the windrows. The mitigation measures described below would ensure the minimization of odors at the site.

Under normal circumstances the proposed bioreactor and composting operations should not result in odor problems, with a buffer area of approximately 1,000 feet between the operations areas and the nearest off-site receptors (located south of the landfill). Gases from the bioreactor (including odorous gases) are collected and routed to the energy recovery plant or flare. Controlling odors has not been a major problem in the test operations of the bioreactor at YCCL, and because of the gas collection system, odors are not expected to increase as a result of the future operation of the anaerobic bioreactors. Aerobic bioreactors would not produce odors but would also not produce methane.

Aerobic compost piles sometimes become anaerobic and when they are then exposed to the air the noxious odors can affect areas up to one mile away or more. Such events could occur at the YCCL and given the possible composting wastestreams, intense noxious odors could occur. The proposed composting has few limitations on the possible feedstock materials. The project seeks to compost a variety of materials (500 TPD) including: greenwaste, food waste, agricultural crop residues, manure, biosolids (sewage sludge), and MSW. Should these compost processes go anaerobic, the resulting odors could have a short-term significant impact on the closest residences to the south of the landfill.

Mitigation Measures Identified in This Report

Mitigation Measure 3.2.3a: The project applicant shall formulate an Odor Impact Minimization Plan in accordance with the recently revised State composting regulations

(Title 14 CCR § 17863.4.) This plan will be submitted to the LEA as part of the application for a solid waste facilities permit for the compost facility. In accordance with the above-cited regulations, the plan shall contain, at a minimum:

1) an odor monitoring protocol which describes the proximity of possible odor receptors and a method for assessing odor impacts at the locations of the possible odor receptors; and,

2) a description of meteorological conditions effecting migration of odors and/or transport of odor-causing material off-site. Seasonal variations that effect wind velocity and direction shall also be described; and,

3) a complaint response protocol; and,

4) a description of design considerations and/or projected ranges of optimal operation to be employed in minimizing odor, including method and degree of aeration, moisture content of materials, feedstock characteristics, airborne emission production, process water distribution, pad and site drainage and permeability, equipment reliability, personnel training, weather event impacts, utility service interruptions, and site specific concerns; and,

5) a description of operating procedures for minimizing odor, including aeration, moisture management, feedstock quality, drainage controls, pad maintenance, wastewater pond controls, storage practices (e.g., storage time and pile geometry), contingency plans (i.e., equipment, water, power, and personnel), biofiltration, and tarping.

Level of Significance After Mitigation

The above mitigation measures would reduce this impact to less than significant.

Impact 3.2.4: The project could increase the annual emissions of criteria air pollutants and would extend the years of landfilling and composting at the site until the year 2100. (Significant)

Mining and subsequent redevelopment of waste management units (WMUs) 1-5, in combination with the proposed height increase to elevation 140-feet msl, and the proposed operation of new bioreactors would significantly increase the capacity of the landfill, to about 66 MCY. This would extend the active life of the YCCL to almost the year 2100. Currently, the remaining capacity for YCCL is about 16 MCY. The result of the project would be to increase capacity by about 50 MCY over a period of approximately 95 years.

Municipal solid waste landfill emissions, often collectively called LFG, consist primarily of methane (CH_4) and carbon dioxide (CO_2) (roughly 50 percent of each), with trace amounts of more than 100 non-methane organic compounds (NMOCs) such as ethane, toluene, and benzene (U.S. EPA, 1997b). At YCCL, the LFG collection and control system uses pipes and pumps to collect LFG that is created inside the landfill cells and the collected LFG is routed to either an enclosed flare that is operated by Neo Yolo, or to five (5) energy recovery generators operated by

MMYolo Power LLC. The basic assumption in this analysis is that 75 percent of the LFG is collected and 25 percent of the LFG is lost to the atmosphere as fugitive emissions (Sullivan, 2000). This is a conservative estimate so that fugitive LFG emissions are not underestimated. The full-scale bioreactor units at YCCL are currently achieving a collection efficiency of about 98 percent, while 75 percent is more typical of non-bioreactor landfills. For the 75 percent of the total LFG that is collected and processed by the flare and the electrical generation engines, about 98 percent of the NMOCs in the LFG are destroyed.

As mentioned earlier in this section, the LFG is collected through a negative pressure system and processed by either a flare operated by Neo Yolo LLC and/or used as fuel for electrical generation engines operated by MM Yolo Power LLC. Although these entities are not applying for a permit at this time, the project could affect the amount of LFG and thus affect the emissions from these sources. In fact, these emissions are a secondary effect of the project. Therefore, this section reviews the existing status of these emissions and impacts of the project.

Neo Yolo LLC Flare

In 2002, Neo Landfill Gas Inc. incinerated 217,599,527 standard cubic feet (scf) of LFG. This was less than 25 percent of the annual permitted limit of 1,083,000,000 scf. Their statement of compliance indicated that at no time did the daily throughput of the flare exceed the daily limit of 2,900,000 scf. Neo Yolo LLC has a Permit To Operate a LFG collection system including: methane gas collection wells not to exceed 175 vertical and horizontal wells, notwithstanding wells in active bioreactor cells; condensate traps; one (1) blower rated at 1,897 scfm; and associated piping and valves. Also the permit identified control equipment as: LFG Specialties, F-2000 enclosed flare with a one (1) second residence time and maximum firing rate of 53.6 MMBtu/hr.

The permit for the flare limits pollutants as shown in Table 3.2-6 on page 3.2-23. Other key provisions of the Permit To Operate the flare include:

- The Permit Holder shall notify the District of any occurrence, which constitutes an upset/breakdown condition as soon as reasonable possible. Verbal notification shall occur no later than one hour after the detection of an upset/breakdown condition.
- NO_x emission rate shall not exceed 0.06 lbs/MMBTU of landfill gas burned. [District Rule 3.4]
- The aboveground flare shall demonstrate a minimum VOC destruction efficiency of 98 percent. [District Rule 2.38 §300 and 40 CFR Part 60 §60.33Cc(2)]
- The Permit Holder shall conduct an annual compliance source test of the permitted equipment to verify NO_x and CO emission rates, as well as VOC destruction efficiency.
- Source test results shall be submitted to the District within 30 days of the test date. [District Rule 3.4]

- The Permit Holder shall monitor and record the cumulative quarterly and annual landfill gas usage (in cubic feet) from the totalizing meter. Historic annual data for the five (5) previous calendar years shall be kept and made available to the District upon request.

MM Yolo Power LLC Electrical Generation Internal Combustion Engines

Table 3.2-5 shows the LFG used as fuel in the electrical generators by MM Yolo Power LLC from 1998 to 2002. In 2002, MM Yolo Power generators used 468,300,000 scf of LFG.

TABLE 3.2-5
MM YOLO FUEL USE (1998–2002)

Unit Permit No. (Engine #)	1998 (mmscf)	1999 (mmscf)	2000 (mmscf)	2001 (mmscf)	2002 (mmscf)
78/98 (#1)	120.22	116.39	100.28	111.89	.25
79/98 (#2)	128.94	124.38	111.52	100.15	158.14
80/98 (#3)	99.46	133.31	150.89	107.97	159.63
81/98 (#4)	135.36	135.14	144.07	124.35	150.28
87/98 (#5)	2.48	76.79	16.54	0	0
26/98	328.43	199.84	208.53	0	0
Total	814.89	785.85	731.83	444.36	468.3

mmscf = million standard cubic feet

In response to a data request, YSAQMD provided copies of current permits for 5 internal combustion engines currently operated by MM Yolo Power LLC. These include all of the engines shown in Table 3.2-5 except for Unit 26-98, which is apparently no longer in service.

Engines #1 - #4 are all Caterpillar G399 Internal Combustion Engines rated for continuous operation at 805 HP. Engine #5 is a Caterpillar G398 Internal Combustion Engine rated for continuous operation at 603 HP.

The current permit limits for Engines #1 - #4 are shown in Table 3.2-6. Other key provisions of the Permit To Operate the engines include:

- The permitted engine shall not exceed 65 ppmv NO_x and 2,000 ppmv CO reference to 15 percent O2. [District Rule 3.4]

- LFG usage for all five engines shall be limited to the following [District Rule 3.4]:

  a. 1,094 mm btu/day
  b. 98,496 mm btu/qtr #1
  c. 99,590 mm btu/qtr #2
  d. 100,684 mm btu/qtr #3

e. 100.684 mm btu/qtr #4
f. 399,456 mm btu/year

- The Permit Holder shall record gas consumption for all five engines on a daily, quarterly and yearly basis. Annually updated records shall also be kept of btu content of fuel. Records shall be kept for five years and available to the District upon request. [District Rule 3.4]
- Only LFG shall be burned in the engines(s). [District Rule 3.4]
- The Permit Holder shall conduct annual compliance source tests of the permitted equipment to verify equipment emissions.
- Source test results shall be submitted to the District within 30 days of the test date. [District Rule 3.4]

Total LFG Generation

The total amount of LFG processed in 2002 by the flare and the electrical generation engines was (468.3 + 217.6) 685.9 mm scf. Assuming the collection system was 75 percent efficient another 228.6 mm scf of LFG would have escaped the landfill cover as fugitive emissions. Total 2002 emissions of LFG using this calculation were 914.5 mm scf.

Recycle America Alliance

Recycle America Alliance has two stationary source permits for operations at the YCCL. A diesel-fired stationary IC engine (99 BHP) powers a trommel for screening wood waste and a diesel-fired stationary IC engine ((156 BHP) powers a water pump during the rainy season. Both of the IC engines are sources of criteria pollutants.

Future Air Pollutant Emissions with the Project

Fugitive emissions from the landfill are primarily methane and CO_2. These are both greenhouse gasses and should be limited to the extent feasible. Use of the bioreactor method for landfilling would improve the collection of LFG thus reducing fugitive LFG emissions (including both methane and CO_2). The collection efficiency of the bioreactor landfill cells would increase compared to existing non-bioreactor landfill cells. This increase in collection efficiency versus dry-type landfills is based on the fact that bioreactor landfills are typically designed with extremely comprehensive gas collection and control systems and bioreactor landfills are maintained in highly controlled environments that are more conducive to increased LFG collection and control, including substantial liner and cover systems (Sullivan, 2000).

Future generation of criteria pollutants are limited by the existing permits discussed above. Table 3.2-6 shows the total generation of criteria pollutants as a result of the project and compares current estimated emissions in 2005 to the 2005 emission estimates evaluated in the 1992 EIR for the YCCL.

TABLE 3.2-6
TOTAL LANDFILL-RELATED EMISSIONS 2005 (LBS/DAY)

		ROG	CO	NO_x	SOx	TSP	PM-10
MM Yolo LLC	Engine #1 [a]	23.4 [e]	110.7	51.1	8.5	2.6	2.6
MM Yolo LLC	Engine #2 [a]	23.4 [e]	110.7	51.1	8.5	2.6	2.6
MM Yolo LLC	Engine #3 [a]	23.4 [e]	110.7	51.1	8.5	2.6	2.6
MM Yolo LLC	Engine #4 [a]	23.4 [e]	110.7	51.1	8.5	2.6	2.6
MM Yolo LLC	Engine #5 [a]	17.5 [e]	80.1	38.4	6.4	1.9	1.9
Neo Yolo LLC	Flare [a]	14.5 [e]	484.8	78.6	2.5	6.3	6.3
Recycle America	Water Pump [a]	0.8	109.0	56.3	5.4	0.4	0.4
Recycle America	Trommel Screen [a]	2.6	106.9	52.7	0.9	3.0	3.0
Yolo County	Composting [b]	533.3				12.5	12.5
Vehicle Emissions	On-Site Equipment [c]	26.3	97.4	224.5	20.9	34	34
Vehicle Emissions	Unpaved Roads [c]					123.6	123.6
Vehicle Emissions	Refuse Transport [c]	37.6	144.4	211.1	45.3	591.3	591.3
Vehicle Emissions	Soil Transport [d]	0.2	1.7	5.8	0.1	0.1	0.1
Total		**726.4**	**1467.1**	**871.8**	**115.5**	**783.5**	**783.5**
1992 Total Emissions (Maximum)		908.9	1260.6	8454.2	101.2	760.2	760.2
Difference in Emissions from 1992 EIR		-182.5	206.5	-7582.4	14.3	23.3	23.3
YSAQMD Significance Thresholds		82	550	82	None [f]	150	150
Increased Significance from 1992?		No	No	No	No	No	No

a Based on Current Permit Limits

b ROG emissions from composting are estimated to be 320 lbs/day for 300 TPD. This total estimate is for 500 TPD. TSP and PM-10 estimates are based on a calculation of 25 lb/day for a 1,000 TPD greenwaste compost facility in Bakersfield. Negative Declaration for Responsible Compost Management Facility, 2004.

c Based on estimates from the 1992 EIR; no changes in tons per day of waste or vehicle trips per day is requested for the current project.

d Soil site would be within 5 miles of the landfill and 20 daily round trips. Vehicle emissions only, fugitive particulate emissions would also occur from operations.

e These are VOC limits in existing permits. Assuming all VOCs could be ROG is a conservative assumption for this analysis.

f None identified by YSAQMD CEQA guidelines.

The current estimates are reduced for ROG, and NO_x. The NO_x reductions are large, the electrical generation facility permit limits are considerable below the NO_x emissions than were estimated in the 1992 EIR. Minor increases are predicted for CO, SO_x, TSP, and PM-10. The California Air Resources Board has recently adopted (July 2004) the final rule for reducing emissions from diesel-fueled commercial and residential solid waste and recycling collection vehicles. The rule requires owners to apply Best Available Control Technology (BACT) on their engines between 2004 and 2010. The rule will achieve a reduction in diesel particulate matter (DPM) emissions from collection vehicles by as much as 81 percent by 2010 and 85 percent by 2015. Some strategies to implement the rule will also result in lower levels of NOx emissions (CARB, 2004). This rule will have a positive impact at the YCCL because most haulers going to the YCCL (i.e., direct haul fleets from Davis, Woodland and West Sacramento) will be required to comply with this rule.

Although the current emissions are minor in comparison to the emissions estimated in the 1992 EIR, the project would continue these emissions for many decades beyond what was considered in the 1992 EIR. During the future years, beyond what was considered in the 1992 EIR, these emissions could be significant emissions in the air basin.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.2.4a: Yolo County is seeking to revise its permits to allow the future landfill modules to be operated as bioreactor landfills. This would allow leachate recirculation, the addition of supplementary liquid (such as groundwater), and acceptance of wet wastes. This will result in a significant increase in the rate of production of landfill gas. Due to accelerated decomposition LFG would be produced sooner and overall capture rates of LFG are expected to rise to as much as 98 percent, reducing the fugitive air emissions that escape from the landfill cover.

Mitigation Measure 3.2.4b: Various aspects of the proposed project, including future development of bioreactor modules and increasing the final height of the landfill, will result in a significant increase in the rate of production of landfill gas. Currently, YCCL has a landfill gas collection system, and the collected gas fuels on-site electric generators. The project proposes to expand the existing landfill gas collection and utilization system and to diversify the landfill gas products. This might include an increase in electrical generation and transmission capacity, production of steam or alternative fuels such as methanol and LNG, commercial production of CO_2, or other uses. The addition of new stationary source control equipment would be subject to permitting by the YSAQMD.

Mitigation Measures Identified in this Report

Mitigation Measure 3.2.4c: When replacing older vehicles at the landfill, the County shall commit to replacing them with diesel-powered vehicles (with proven technologies) that generate less NO_x and PM-10 than the older vehicles.

Mitigation Measure 3.2.4d: The County shall conduct periodic reviews to identify feasible retrofit equipment, or fuels that could lower vehicle emissions at the landfill.

Level of Significance After Mitigation

The above mitigation measures would not reduce this impact to less-than-significant. The impact of the emissions during the extended life of the landfill, due to changes in this project, would be significant and unavoidable. It should be noted that without the project, future wastes in the wasteshed would need to be processed and that processing, regardless of location, would result in emissions from transport of the wastes and emissions from decomposition of the materials. When compared to future operations at the YCCL, a replacement landfill or processing center could require increased transportation (and resulting emissions) and could be located in the proximity of more sensitive receptors.

Impact 3.2.5: The project would increase the amount of ROG and PM-10 emissions from expanded composting activities. (Significant)

DIWM is proposing to expand the existing composting facility to accept up to 500 tons per day of waste. The composting facility would accept a variety of materials that would be separated from other wastes at their source, including greenwaste, food waste, agricultural crop residues, manure, biosolids (sewage sludge), and MSW. This would be an increase of 300 tons per day above existing composting operations, which are permitted to process up to 200 tons per day of clean wood and greenwaste.

Particulates (PM-10)

Proposed composting activities that would generate PM-10 include material grinding, windrow construction, pile turning, and the loading of finished compost onto trucks for transfer off-site. PM-10 generated during material grinding is, and would continue to be, regulated under YSAQMD Rule 3.3.

Standard preparation of material for composting includes moisture-conditioning as necessary to maintain the appropriate moisture levels to support biological processes. Maintaining a moisture content of between 40 to 60 percent within the composting material significantly enhances the composting process. Keeping compost and feedstock moist and moistening compost prior to tearing down windrows also are practices that help control dust.

Reactive Organic Gasses (ROGs)

Recent studies and information produced by the South Coast Air Quality Management District (SCAQMD) and the California Integrated Waste Management Board (CIWMB) have focused on quantifying and measuring ROG emissions at composting facilities. The early findings of these studies suggest that composting activities may be a significant source of uncontrolled ROG emissions. Air emissions are produced during composting when microorganisms feeding on organic materials consume oxygen in a process that releases carbon dioxide, water vapor, heat and ROG. SCAQMD published a draft Technology Assessment on various composting methods (including windrow composting of greenwaste materials) that establishes an emission factor of

3.4 pounds of ROG per ton of green material composted by windrow method (SCAQMD, 2002).[2] This emission factor was derived from source testing conducted at three greenwaste windrow composting facilities in southern California. As shown in Table 3.2-7, the increase in windrow composting could increase ROG emissions by up to 320 pounds per day for greenwaste composting or 148 pounds per day for co-composting[3]. In either case, this amount exceeds YSAQMD's 82 pounds per day significance threshold.

TABLE 3.2-7
ESTIMATED EMISSIONS FROM INCREASED COMPOST OPERATIONS

		Emissions (lbs/day)		
Type of Composting	**Increased Throughput (TPD)**	**VOC**	**ROG**	**Ammonia**
Greenwaste Composting	300	821	320	182
Co-composting	300	380	148	628

Emissions would be from either an increase in 300 TPD of greenwaste, co-composting or a combination of the two. The total increase would be 300 TPD.

SOURCE: ESA, 2004

Recent discussions with compost experts at the CIWMB indicate that the pounds per day/ton of feedstock material emission factor is a rough number affected by many variables. The variables include the feedstock materials, moisture, ventilation, pile geometry and stage of compost development (Smyth, 2004). However, given the measurement by SCAQMD, the 3.4 pounds of ROG / tons of green material has been measured and can be used as an estimate. Although lower values have been indicated by CIWMB testing, this factor seems a conservative emission estimate for calculations in this EIR.

The information available for quantifying ROG emissions from composting facilities is still new and subject to further scrutiny and debate. However, the proposed increase in composting operations would lead to an exceedance of the YSAQMD thresholds of significance for ROG. While it is logical to assume that these emissions would occur if the green waste were landfilled rather than composted as part of the project, it is also likely that LFG collection systems would capture and destroy at least part of these emissions.

[2] South Coast Air Quality Management District, Draft for Proposed Rule 1133 Working Group Discussion Technology Assessment for Emissions Reductions from Composting and Related Operations March 22, 2002. The emission factor cited in the SCAQMD study is expressed in terms of volatile organic compounds (VOCs). VOCs are organic compounds that evaporate readily at normal temperatures and include gases and other compounds (e.g., organic compounds in the form of water vapor). ROG is the gaseous and major component of VOCs that reacts more readily in the atmosphere to form ozone. For the purposes of this analysis and comparison to YSAQMD significance criteria, SCAQMD's VOC emission factor for composting was multiplied by 0.39 to estimate ROG.

[3] Co-composting is the term used to describe the anaerobic digestion process of sewage sludge (SS) with something that will supply a source of carbon. The carbon source can be anything from shredded tires, old engine oil, or wood chips to grass cuttings, garbage and trash - most municipal solid waste (MSW).

By identifying composting facilities as potentially substantial sources of ROG emissions, local air districts can use the information in preparing emissions inventories that form the basis of plans developed to achieve attainment of state and national ozone standards. According to CIWMB staff, ROG emission controls for greenwaste composting are cost prohibitive and may inhibit other environmental benefits (e.g., diverting materials from landfills) achieved by composting (Smyth, 2004).

Mitigation Measures Proposed as Part of the Project

None

Mitigation Measures Identified in This Report

Mitigation Measure 3.2.5a: Water composted or cured materials during final windrow tear down and before loading the finished compost onto vehicles, taking care not to over wet the material, which could produce leachate or run-off. This would ensure that potential impacts from PM-10 are mitigated. In addition, the following measures shall also be implemented to reduce PM-10 emissions.

- Refrain from turning, screening, or loading activities on windy days;
- Use water sprays or mists during grinding, screening, and pile turning activities;
- Maintain proper moisture levels in active composting piles; and
- Maintain good housekeeping practices, including site cleanliness.

Mitigation Measure 3.2.5b: The project applicant shall maintain records of all materials composted (either in terms of volume or weight by material type) and shall comply with all applicable rules, regulations and permit conditions. This would enable the DIWM and the YSAQMD to track ROG emissions from the composting operation so that emissions reductions can be claimed if specific controls are implemented in the future.

Level of Significance After Mitigation

The above mitigation measures would reduce PM-10 emissions to a less-than-significant level, but would not reduce ROG emissions to a less-than-significant level.

Impact 3.2.6: Emissions of toxic air contaminants could pose a risk to human health. (Significant)

The project could potentially result in increased exposure of people to TACs. Increased emissions of TACs from the project would be from several different sources. These include:

- TAC emissions from LFG generated by the decomposition of more waste than is currently permitted to be placed in the landfill;

- TAC emissions from the increased size of the composting operations, and

- TAC emissions from diesel trucks and equipment used to haul and process future wastes not currently permitted.

TAC emissions from the greater volume of LFG treated by the LFG flare and electrical generation engines would be minimal, since the combustion process destroys toxic substances contained in the flared gas.

The principal health risks from the project would be due to increased emissions of carcinogens from the project components described above. Health risks at offsite receptors were determined by conducting dispersion modeling of the TAC emission sources of the project, using the EPA model SCREEN3 (U.S. EPA, 1995). The incremental health risks from each individual source of TAC emissions were added to determine the maximum total health risks at offsite receptors. The nearest sensitive receptor to the project site that could be affected by the project is the residence approximately 600 feet to the south of the YCCL. Other residences in the area, identified in the setting of this section, are located from 1,400 to 5,200 feet from YCCL. The health risk assessment is based on modeling of worst-case increases in project-related TAC concentrations. The modeling is, however, applicable to any sensitive receptors at the same distance from the project site.

LFG Emissions. LFG generally contains trace quantities of TACs. This assessment is based on a list of HAPs and average concentrations at landfills identified in EPA's AP-42 and the EPA's Landfill Gas Emissions Model (U.S. EPA, 1998). Cancer risk factors were calculated from sixteen (16) carcinogenic compounds identified by AP-42 (see Appendix AIR-1). California OEHHA cancer unit risk values were applied to the maximum concentration of LFG determined by the Screen3 model.

Using the estimated emission rate of fugitive LFG for 2002 (228.6 mm scf), the emissions were modeled using SCREEN3, assuming that emissions would occur over the entire permitted footprint of the landfill identified for disposal (473 acres). The SCREEN3 model was run identifying the YCCL as an area source with unit emissions for the area source. The SCREEN3 model predicts that the maximum annual average concentration and the distance from the landfill. Concentrations were also checked for the distances to sensitive receptors. The maximum locations of increased risk occurred at a distance of approximately 1,000 meters (approximately 3,300 feet) from the landfill. At this distance under worst-case meteorology the 70-year cancer risk would increase by 44 in a million for an individual with a constant exposure over 70 years. The 70-year cancer risk at the distance of the identified sensitive receptors would be as follows:

600 feet = 35 in 1 million
1,400 feet = 37 in 1 million
3,300 feet = 44 in 1 million
3,400 feet = 43 in 1 million
4,300 feet = 29 in 1 million
5,200 feet = 22 in 1 million

This is above the significance threshold of 1 in a million and would be a **significant impact** of the project because the project would extend the landfill lifetime and continue to produce LFG for years longer than the existing permitted landfill.

Compost Emissions. Composting of sewage sludge, greenwaste, and other organic matter generates ROG, including some TACs, during the decomposition process. Impact 3.2.5 indicates that the project's proposed increase in the scale of the composting and co-composting operations would generate an increase of about 320 pounds of ROG per day. TAC emissions have not been measured from composting at the YCCL, so TAC emissions from composting were estimated based on emissions measurements reported for a similar facility (i.e., a biosolids composting facility) (Hentz, et. al, 1996). In this study, TAC emissions are reported as fractions of total Volatile Organic Compounds (VOCs) measured from the process. Several TACs, both carcinogens and non carcinogens, were reported in the study. The non-carcinogenic TACs of measurable quantities include methanol, toluene, 2-butanone, styrene, and carbon disulfide. Since the threshold acceptable exposure levels for these substances are very high (in the hundreds of micrograms per cubic meter), the offsite concentrations of these substances would be well below the acceptable thresholds.

Carcinogenic TAC emissions from composting would include benzene, tetrachloroethane, trichloroethene, and methylene chloride. The fractions of these TAC species were multiplied by the total VOC emissions to determine emissions of carcinogenic TAC species. Offsite concentrations of the specific TAC species were determined by fractionating the VOC concentrations, which were determined from the SCREEN3 modeling (assumes a 15 acre site), by the measured fractions from the referenced report. These concentrations were then used to estimate incremental cancer risk at various distances offsite. The estimated incremental risks for the TAC species were determined by multiplying the predicted concentrations by the unit risk values as reported by California Office of Environmental Health Hazard Assessment (OEHHA, 2002). The total incremental risks from composting at the nearest offsite receptor distance (200 meters), which are given in Table 3.2-8, show that the increment is well below the significance threshold of 1 in a million.

Diesel Particulate Matter (DPM) Emissions. Diesel trucks that deliver waste to the site, and on-site, off-road diesel equipment are sources of diesel particulate matter (DPM), which is a TAC. Because the project would not increase the permitted amount of waste coming to the site there would be no annual increase in DPM.

Since the project would not increase DPM, there would be no increase in incremental risk from DPM. However, the years of DPM emissions from landfill sources would be increased because of the expansion of the landfill. Although the project introduces diesel emissions in the area, the overall risk from DPM in this area is unknown. Although landfill sources of DPM would raise the risk of cancers near the landfill, the overall background risk in this location is unknown in comparison to other areas in the state. The background may be less in this area because it is remote, and except for the landfill sources, there is not much traffic in the immediate vicinity of the landfill.

TABLE 3.2-8
INCREMENTAL CANCER RISK AT NEAREST OFFSITE RECEPTOR FROM COMPOSTING OPERATIONS

TAC	Concentration (% VOCs)	Unit Risk/μg/m^3	Incremental Risk (New Cancer Cases per 1 Million People Exposed)
Benzene	0.02	2.9 X 10^{-5}	0.004
Tetrachloroethane	0.003	5.8 X 10^{-5}	0.002
Trichloroethene	0.01	2.0 X 10^{-6}	>0.001
Methylene Chloride	0.001	1.0 X 10^{-6}	>0.001
		Total Risk	**0.006**

SOURCE: California EPA Office of Environmental Health Hazard Assessment (Unit Risk Values) (OEHHA, 2004)

CARB conducted a study to estimate cancer risks from exposure to diesel particulate matter (DPM) in the State and has developed a risk reduction plan (CARB, 2000). The study reported that the statewide average ambient air concentration of DPM was determined by using measured ambient air concentrations of surrogates to DPM in a receptor model to estimate exposure levels. For the year 2000, the statewide average cancer risk from exposure to DPM was estimated to be 540 in a million. The study also states that cancer risks from DPM are about 70% of the total risk from exposure to toxic air contaminants in the ambient air, so the average total exposure to all air contaminants has a cancer risk estimated to be 770 in a million. While the landfill operations would have an effect on receptors in this area, there is otherwise minimal traffic in the area of the YCCL (in comparison to population centers throughout California). On balance the area is probably near the statewide average with regard to risk from diesel exhaust, estimated to be 540 in a million.

Because of the magnitude of the risks and perception that the risks exist statewide, the ARB is undertaking major steps to reduce the risks. To address the risks from diesel engines, Air Resources Board has prepared the *Diesel Risk Reduction Plan* or Diesel RRP, as a comprehensive plan to significantly reduce diesel PM emissions in California. The basic premise behind the staff proposal is simple: to require all new diesel-fueled vehicles and engines to use state-of-the-art catalyzed diesel particulate filters (DPFs) and very low-sulfur diesel fuel. Further, all existing vehicles and engines should be evaluated, and wherever technically feasible and cost-effective, retrofitted with DPFs. As with new engines, very low-sulfur diesel fuel should be used by retrofitted vehicles and engines. In short, the staff's proposed plan contains the following three components:

1) New regulatory standards for all new on-road, off-road, and stationary diesel-fueled engines and vehicles to reduce diesel PM emissions by about 90 percent overall from current levels;

2) New retrofit requirements for existing on-road, off-road, and stationary diesel-fueled engines and vehicles where determined to be technically feasible and cost-effective; and

3) New Phase 2 diesel fuel regulations to reduce the sulfur content levels of diesel fuel to no more than 15 ppm to provide the quality of diesel fuel needed by the advanced diesel PM emission controls.

The projected emission benefits associated with the full implementation of this plan, including proposed federal measures, are reductions in DPM emissions and associated cancer risks of 75 percent by 2010 and 85 percent by 2020. The measures recommended in this plan will have a great impact on reducing the localized risks associated with activities that expose nearby individuals to DPM emissions. Furthermore, there are other benefits associated with reducing DPM emissions. These benefits include reduced ambient fine particulate matter levels, increased visibility, less material damage due to soiling of surfaces, and reduced incidences of noncancer health effects, such as bronchitis and asthma. CARB staff expects that the costs associated with carrying out this plan will be significant and will be on the order of the costs associated with other major CARB programs. A direct benefit of the CARB strategy is the recently adopted rule (July 2004) for solid waste collection diesel-fueled trucks. The rule requires owners to apply Best Available Control Technology (BACT) on their engines between 2004 and 2010. The rule will achieve a reduction in DPM emissions from collection vehicles by as much as 81 percent by 2010 and 85 percent by 2015. Some strategies to implement the rule will also result in lower levels of NOx emissions (CARB, 2004). This rule will have a positive impact at the YCCL because most haulers going to the YCCL (i.e., direct haul fleets from Davis, Woodland and West Sacramento) will be required to comply with this rule.

Total Incremental Risk at Residential Receptor. Because risks from DPM may be similar to statewide averages, the total incremental carcinogenic health risk at an offsite receptor in this area was determined by summing the maximum incremental risk for each component of the project. Incremental risk (worst-case meteorology) was estimated to be 44 in a million for LFG gas exposure and less than 1 in a million for the compost facility. The total risk from these sources is approximately 44 in a million. Because the daily limits on waste would not change, the future risk should not be substantially different. Increased use of the bioreactor landfill should reduce fugitive emissions of LFG and thus reduce the cancer risk from exposure to fugitive LFG. The risk from the LFG would be greater for the fugitive emission than the emissions that would be collected and flared or used as fuel to generate electricity. Compared to existing risks, overall the cancer risk from air contaminants in this area would not increase as a result of the project and overall risk would probably be no greater than average risk throughout the state. However, the duration of the risk would increase (it would occur over a longer number of years) because of the increase in landfill capacity.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.2.6a: The LFG collection system (and destruction via electrical generation or flaring) in combination with the bioreactor technology should substantially reduce the rate of fugitive emissions of LFG from the landfill.

Mitigation Measures Identified in This Report

Mitigation Measure 3.2.6b: The County shall retrofit diesel-fueled engines and vehicles to reduce DPM emissions where it is determined to be technically feasible and cost-effective.

Mitigation Measure 3.2.6c: The County shall use reduced sulfur fuel for existing on-road, off-road, and stationary diesel-fueled engines as soon as it is available, compatible with diesel-fueled engines on-site, and economically feasible.

Mitigation Measure 3.2.6d: The County shall maintain the existing residential buffer areas surrounding the landfill and expand the buffer areas when opportunities arise in the future.

Level of Significance After Mitigation

The project's use of bioreactors would reduce future fugitive LFG emissions thus reducing risks from the landfill in the short-term. This would be a beneficial effect in the short-term. In the long-term, the ARB Diesel Risk Reduction Plan should dramatically reduce the risk from DPM. However, the expansion of the landfill would extend the years of activity at the YCCL for many years beyond the time of refuse disposal and LFG production under the existing permit. Thus, even though risks would be reduced from existing levels by the mitigation measures and statewide programs, toxics risks would continue at the site due to the extension of the life of the landfill. This would be a significant, unavoidable impact of the project.

Impact 3.2.7: The project would not require a General Plan Amendment or rezoning and therefore would not have a significant cumulative air quality impact. (Less than Significant)

The project would not require a change in the existing land use designation, thus the project does not meet the primary test for cumulative air quality impacts identified by the YSAQMD. Implementation of the project would reduce fugitive air contaminant emissions from the landfill in the future, including methane and TACs.

Mitigation: None required.

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3.3 BIOLOGICAL RESOURCES

This section describes the biological resources and natural communities occurring within the project area, outlines potential impacts to biological resources that may result from the proposed project, and proposes mitigation measures to reduce those impacts to a level less than significant. This evaluation of biological resources includes a review of potentially occurring special-status species,[1] wildlife habitats, vegetation communities, and jurisdictional waters of the U.S. The results of this assessment are based upon field reconnaissance, literature searches and database queries. Site reconnaissances were conducted by ESA biologist Casey Stewman on December 12, 2002, and by ESA biologists Mary Pakenham-Walsh and Joshua Boldt on April 29, 2004. The sources of reference data reviewed for this section included the following:

- *Draft Environmental Impact Report, Yolo County Central Landfill*, SCH# 91123015. (Prepared for Yolo County Community Development Agency. Prepared by SCS Engineers in conjunction with Fugro McClelland. June 1992)
- *Yolo County General Plan*, (Yolo County Community Development Agency, July 1983)
- *Davis*, California 7.5-minute topographic quadrangle (U.S. Department of the Interior, Geological Survey [USGS], 1981)
- California Natural Diversity Database, (California Department of Fish and Game [CDFG], 2004a)
- Special Animals List (California Department of Fish and Game [CDFG], 2004b)
- Special Plants List (California Department of Fish and Game [CDFG], 2004c)
- California Native Plant Society, 6th Inventory of Rare Plants (California Native Plant Society [CNPS], 2004)
- U.S. Fish And Wildlife Service Official Species List (U.S. Fish and Wildlife Service [USFWS], 2004)

3.3.1 SETTING

REGIONAL SETTING

Yolo County lies in the central-western region of the Central Valley. Historically, Yolo County supported extensive native grasslands intermixed with a variety of vegetative communities, including oak woodland, wetlands, and riparian woodland. Intensive agricultural and urban development has resulted in large losses and conversion of these habitats. The remaining native

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1 Species that are protected pursuant to Federal or State endangered species laws, or have been designated as Species of Concern by the USFWS or Species of Special Concern by the CDFG, or species that are not included on any agency listing but meet the definition of rare, endangered or threatened species of the CEQA Guidelines section 15380(b), are collectively referred to as “special-status species.”

vegetative communities exist now as isolated remnant patches within urban and agricultural landscapes, or in areas where varied topography has made disturbance difficult. The project area includes Township 9 North, Range 3 East, sections 29 and 30 of the Davis 7.5-minute USGS Quadrangle, with elevations ranging from 20 to 30 feet above mean sea level.

PROJECT AREA SETTING

This section provides a review of the general natural communities / vegetation types, soils and associated wildlife that occur in the project area, followed by a description of the specific vegetation and natural community types found within the proposed project area. Also included in this section is a review of the special-status species either known or with potential to occur in the project area. The project site is located approximately four miles northeast of the City of Davis. The site is nearly level with less than a 10-foot difference in elevation (excluding the existing waste modules) across the 724.54 acre site. Of this total, 473 acres are permitted for landfill use. Currently, approximately 210 acres are filled or being filled with waste. Non-native annual grasses and herbaceous weed species dominate the vegetation at the site. Native plants are uncommon in the project area and are generally limited to the irrigation ditches bordering the site. The lack of native vegetation is most likely the result of a history of cultivation, flood-irrigation and other disturbance. A list of vascular plants identified at the site during site reconnaissance is included in Appendix E. Soils in the area are typically poorly drained and dominated by deep alluvium from the combined historical floodplains of Putah Creek and Cache Creek.

Soils

The project area is generally dominated by soils within the Capay-Clear Lake Association, which are composed of poorly to moderately drained silty clays and clays. Inclusions of other soil types also occur on the landfill site or in the vicinity, including Willows clay series, Pescadero silty clay and the Merritt complex, all of which are saline alkaline soil types with a high concentration of sodium (USDA NRCS, 1972).

Natural Community / Habitat Types

Vegetative communities are assemblages of plant species that occur together in the same area. They are defined by both species composition and relative abundance. The five primary community types in the project area are summarized below:

- Agricultural land
- California annual grassland series
- Arroyo willow series
- Cattail series
- Seasonal wetlands and ponds

Agricultural Lands

The project site has approximately 90 acres of agricultural land which is used for cultivation of kenaf, a fiber crop. The two approximately 45-acre fields are located in the southeastern portion of the site, and are rotated between fallow and crop production. Agricultural production is the main land use in Yolo County. Row crops, rice, alfalfa and vegetable crops characterize agricultural production within the area. Cultivated lands provide little habitat for native plant species, though natural vegetation can occur along field edges and irrigation features such as ditches and reservoirs. Open fields and cultivated fields provide an essential over-wintering forage base for many species of waterfowl, shorebirds, and raptors. Migratory waterfowl and shorebirds depend on waste rice and corn that remains after harvest while deer often forage in alfalfa and grain fields.

California Annual Grassland Series

Annual grasslands occur on relatively flat historic alluvial floodplains in the project area and are dominated by non-native annual grasses such as ripgut brome (*Bromus diandrus*) and wild oats (*Avena barbata*). Another common species is yellow star-thistle (*Centaurea solstitialis*), an invasive weed. Areas in and around these grasslands are dominated by saline alkaline soils. Annual grasslands are commonly found throughout Yolo County. Grasslands provide important foraging, breeding, and resting habitat for many species of wildlife.

The eastern portion of the project site supports annual grasslands. This community also occurs to the west of the site on the former Hunt Wesson Plant spray irrigation fields. Project area grasslands may attract reptiles such as western fence lizard (*Sceloporus occidentalis*), western skink (*Eumeces skiltonianus*), western whiptail (*Cnemidophorus tigris*), and gopher snake (*Pituophis melanoleucus*). This habitat also attracts seed- and insect-eating birds such as California quail (*Callipepla californica*), ring-necked pheasant (*Phasianus colchicus*), mourning dove (*Zenaidura macroura*), savanna sparrow (*Passerculus sandwichensis*), western kingbird (*Tyrannus verticalis*), meadowlark (*Sturnella neglecta*), scrub jay (*Aphelocoma coerulescens*), barn swallow (*Hirundo rustica*), and mockingbird (*Mimus polyglottus*). Small rodents attract raptors (birds of prey), including red-tailed hawks (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), white-tailed kite (*Elanus leucurus*), red-shouldered hawks (*Buteo lineatus*), and barn owl (*Tyto alba*). Grasslands are important foraging grounds for aerial and ground foraging insect eaters such as *Myotis* bat species and pallid bats (*Antrozous pallidus*). Mammals such as gray fox (*Urocyon cinereoargenteus*), California vole (*Microtus californicus*), Botta's pocket gopher (*Thomomys bottae*), western harvest mouse (*Reithrodontomys megalotis*), deer mouse (*Peromyscus maniculatus*), broad-footed mole (*Scapanus latimanus*), California ground squirrel (*Spermophilus beecheyi*), and black-tailed jackrabbit (*Lepus californicus*) forage and nest within the grassland. The project site is one of the few uncultivated fields in the area and is used extensively by wildlife.

Arroyo Willow Series

Small stands of arroyo willow (*Salix lasiolepis*) occur in a clean-closed leachate pond that now functions as a seasonal pond. The understory includes fallen limbs, natural debris, and herbaceous species including white sweetclover (*Melilotus alba*). These small stands of trees are important wildlife areas. The vegetation provides limited nesting habitat to migratory songbirds such as warblers, vireos, grosbeaks, and flycatchers.

Cattail Series

Broadleaf cattail (*Typha latifolia*) dominates portions of a perennially inundated irrigation ditch located outside of and adjacent to the northern fenceline of the landfill. Another cattail stand is found within a clean closed leachate pond. Other herbaceous species associated with these wetland habitats include lady's thumb (*Polygonum persicaria*) and bulrush (*Scirpus microcarpus*). The irrigation canal is approximately 25 feet wide, while the extent of dense cattail cover associated with the canal ranges between 5-15 feet wide. Cattail stands provide suitable nesting habitat for avian species including a special-status species, the tri-colored blackbird (*Ageliaus tricolor*).

Seasonal Wetlands and Ponds

Wetlands are areas that are periodically or permanently inundated by surface or ground water, and support specific vegetation adapted for life in damp soil. On a regional and national level, wetlands are recognized as important due to high inherent value to fish and wildlife. Shallow ponds and seasonal wetlands occur in both the active landfill area (a closed leachate pond, a storm water detention basin and water storage reservoir) and in excavated soil borrow areas in the non-active portion of the landfill. The project area also borders two sides of the City of Davis Wastewater Treatment Plant ponds, an area that provides resting and foraging habitat for migrating and resident water-dependent birds. While the water storage reservoir and wastewater treatment plant ponds contain aquatic habitat with no wetland vegetation, other wetlands within the project area become seasonally dry and support herbaceous vegetation.

A wetland delineation was conducted in April, 2004 for a 375-acre portion of the site that is currently not in active landfill use. Wetland mapping is provided in Appendix F. The delineation is subject to verification and jurisdictional determination by the U.S. Army Corps of Engineers (ACOE). Wetland features WA through WK referred to herein are shown in the delineation report (Appendix F). Approximately 61 acres of wetlands and "other waters of the U.S." were identified within the project site, including seven wetlands totaling 8.0 acres, four ponds totaling 50.7 acres, and five drainage ditches totaling 2.2 acres. All of the wetland and pond features were created from former upland areas by excavation between approximately 2 and 12 feet below original grade, for the purpose of obtaining borrow soil for active landfill operations. Borrow activities occurred between 1993 and the present. Due to the deep underlying clay layers within the project area, these areas form seasonal ponds and wetlands in the spring and early summer.

The delineation identified seven seasonal wetland areas within the project site (refer to Appendix F). Six of these (WA, WB, WC, WI, WJ and WK) have irregular shapes, while one centrally-located wetland (WG) consists of a series of straight, wide swales averaging 20 feet wide. These wetlands are shallow depressions (approximately 2 to 5 feet lower) in relation to the upland annual grasslands that surround them. Plant species diversity in these wetlands is generally low, due to both the excavation of topsoil (removing an upland grassland seed bank and exposing subsoil), and the saline alkaline soils, which are tolerated by fewer plant species. The two most abundant species are swamp pricklegrass (*Crypsis schoenoides*) and rough cocklebur (*Xanthium strumarium*). Also occurring regularly is rabbits-foot grass (*Polypogon monspeliensis*).

Four ponds also occur within the project site (WD, WE, WF and WH), one of which is a temporary agricultural irrigation return water pond (WE) that shifts location between the two rotating kenaf fields. The agricultural pond is part of a closed drainage system. The other three ponds resulted from borrow excavation, and are primarily open water with minimal emergent wetland vegetation in the winter and early spring. Throughout the course of the season, the water draws down to expose mudflat areas that become colonized by the species described above. The seasonal ponds are used extensively by wildlife including birds, amphibians and mammals. Surface water is available for a sufficient duration to support aquatic insects, invertebrates and amphibians. This community is used for foraging, as a source of water for mammals, and as a breeding area for amphibians.

Several drainage ditches, which were constructed from former uplands for site stormwater drainage, occur within the project site. The wetland delineation identified five ditches (Ditches A–E), but as mentioned the delineation was conducted for only the non-active portion of the site. See Section 3.5, Hydrology, for a more detailed discussion of surface water management within the project site. Ditches on-site are typically dry by mid-spring and contain little vegetation. Ditches (or portions thereof) with more perennial hydrology contain narrow fringes of cattails and bulrushes (*Scirpus acutus*). Most of the drainage ditches are ultimately linked via surface hydrology to off-site waters, e.g., Willow Slough Bypass to the south.

All identified wetlands and ponds within the project site are unlikely to be jurisdictional, pending confirmation from the ACOE. The basis for this is both the recency of creation of artificial wetlands in former upland areas and the hydrological isolation from navigable waters vis-à-vis the 2001 court decision SWANCC vs. U.S. Army Corps of Engineers (see “Regulatory Framework,” below). Although drainage ditches were constructed in former uplands for the purpose of site drainage, all but one (Ditch A) of the on-site ditches are potentially subject to ACOE jurisdiction based on hydrologic linkage to navigable surface waters. Ditch A is isolated from navigable surface waters and is not likely to be jurisdictional. The proposed project is not likely to impact ditches B, C, D and E, which are primarily located around the perimeter of the site and existing internal roadways.

Developed Portions of Landfill

Landfill Containment Areas (Modules 6A-6C, WMUs 1, 2, 4, and 5)

Limited areas with re-established natural communities occur within the existing landfill containment facilities (waste modules) and limited, marginal potential habitat for special-status species occurs in these disturbed areas. Areas within the waste modules that have not been developed or have become re-vegetated after closure of individual units are characterized by bare ground and/or heavily disturbed annual grassland. These areas form 20 to 60 foot high mounds in the western portion of the landfill, and include WMUs 6A-6C and WMUs 1, 2, 4, and 5. Mounded grassland habitat is especially prevalent in the older units (i.e., WMUs 1 and 2), and their use by small mammals and rodents coupled with the mounded topography, provide potential habitat for special-status species such as the burrowing owl. County staff have observed species such as the gray fox using the edges of these mounds to create dens (Sinderson, 2002). These areas currently total approximately 210 acres.

Leachate and Groundwater Storage Ponds

Limited natural communities occur within the leachate ponds (WMUs G, H1, H2, and H3), the water storage pond and the water storage reservoir associated with the landfill. Minimal potential habitat for special-status species occurs in these developed/disturbed areas. Areas within the water storage pond and reservoir are characterized by unvegetated, seasonal, shallow freshwater habitats. These areas are used intensively by gull species such as the California gull (*Larus californicus*). However, the storm water detention basin west of the City of Davis Wastewater Treatment Plant lagoons does contain moderate to sparse coverage from wetland species such as arroyo willow, broadleaf cattail and white sweetclover. This area provides marginal habitat for special-status plant species due to the land use history of the area. However, this area has the potential to support special-status wildlife species such as giant garter snake (*Thamnophis gigas*) whose occurrence has been documented within one mile of the landfill property. Habitat surrounding the City of Davis wastewater treatment ponds also supports a nesting population of western snowy plover (*Charadrius alexandrinus nivosus*).

Gas Pipeline

This underground feature transports high pressure natural gas. The alignment containing the pipeline is characterized by highly disturbed annual grassland and an access road that parallels the pipeline north of the central landfill road. South of the road, the pipeline runs parallel to a surface drainage ditch within disturbed annual grassland. The pipeline may be moved from its current location on the east side of modules A-D to a position along the perimeter road of the landfill near the fenceline west of Unit 3.

Roadways

The roadways that occur within the project area are heavily disturbed and their edges are typically sparsely vegetated with non-native grasses and forbs such as ripgut brome, ox-tongue daisy (*Picris echioides*) and rough cat’s ear (*Hypochaeris radicata*). These areas do not provide potential habitat for special-status plants or animals. The fencelines along the roadways surrounding the perimeter of the landfill are used extensively as perch sites by raptors.

Undeveloped Portions of Landfill

Open Grasslands and Soil Borrow Pits (Wetlands/Ponds)

Extensive annual grasslands occur on relatively flat historic alluvial floodplains in the project area and are dominated by non-native annual grasses such as ripgut brome and wild oats. Other common species include yellow star-thistle, an invasive weed. Broad grassland areas are interspersed with seasonal wetlands and ponds; these features are described above. Grassland plant species diversity is low, as dominant species tend to be non-native invasives which are indicative of lower species diversity. The yet-to-be filled disposal areas total approximately 243 acres. These are the future sites of waste modules 6E through 6H, and 7I through 7P (12 modules total).

Surrounding Areas

Potential Borrow Areas. As part of the proposed project, the County plans to purchase a site outside of the landfill property, but within five miles, to be utilized as a soil borrow area. The site, which would be approximately one square mile (640 acres), has not yet been identified. Potential sites could include the properties immediately west and north of the landfill property. Conaway Ranch, which supports row crop agriculture, is located to the north, and the approximately 300-acre former Hunt Wesson spray fields (used for disposal of liquid waste from tomato processing), are located to the west. The spray fields have been idle since their former use by Hunt Wesson, and are currently colonized by ruderal (weedy) species. The potential for occurrence of special-status plant species within these sites is low due to the history of intensive land use; however use by special-status wildlife species is intensive in the area. (Because the borrow area site has not been identified, potential impacts at possible sites are considered at a general, programmatic level in this EIR; additional environmental review will be required when a site is identified.)

Special-Status Species

Special-status species are those plants and animals that, because of their recognized rarity or vulnerability to various causes of habitat loss or population decline, are recognized in some fashion by federal, state, or other agencies as deserving special consideration. Some of these species receive specific legal protection pursuant to federal or state endangered species legislation. Others lack such legal protection, but have been characterized as “sensitive” on the basis of adopted policies and expertise of state resource agencies or organizations with acknowledged expertise, or policies adopted by local governmental agencies such as counties, cities, and special districts to meet local conservation objectives. These species are referred to collectively as “special status species” in this report, following a convention that has developed in practice but has no official sanction. The various categories encompassed by the term, and the legal status of each, are discussed later in this report under “Regulatory Framework,” below.

A list of special-status plants and animals potentially occurring in the project vicinity is presented in Table 3.3-1. The table is based on data from CDFG (2004a, 2004b, and 2004c), CNPS (2004), and U.S. Fish and Wildlife Service (2004). Nine animals and seven plants have a medium or higher potential to occur within the project area. These species are discussed in more detail below.

TABLE 3.3-1
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA

Common name *Scientific name*	**Listing Status USFWS/ CDFG/ CNPS**	**General Habitat**	**Potential to Occur**	**Period of Identification/ Flowering Period**
FEDERAL AND STATE LISTED, CANDIDATE AND PROPOSED SPECIES				
Invertebrates				
Vernal pool fairy shrimp *(Branchinecta lynchi)*	FT/--/--	Vernal pools and seasonal wetlands.	Low potential. No vernal pool habitat exists in the project area. Seasonal wetlands provide marginal habitat on-site.	December-April (eggs in dry season, adults in wet season)
Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)*	FT/--/--	Occurs in the Central Valley region in association with blue elderberry shrubs. Prefers to lay eggs in elderberry stems greater than 1" in diameter.	None, no potential habitat for this species was located during the field survey	Year-round (exit holes in shrub stems)
Vernal pool tadpole shrimp *(Lepidurus packardi)*	FE/--/--	Vernal pools and swales in the Sacramento Valley.	Low potential. No vernal pool habitat exists in the project area. Seasonal wetlands provide marginal habitat on-site.	December-April
Fish				
Green sturgeon *(Acipenser medirostris)*	FC/--/--	Occurs in Sacramento-San Joaquin Rivers and Delta; prefer to spawn in large cobble; eggs fertilized in relatively high water velocities.	Unlikely, no potential habitat occurs in or around the project area.	Year-round
Delta smelt *(Hypomesus transpacificus)*	FT/CT/--	Found in the Sacramento-San Joaquin delta, Suisun bay, Carquinez Straight, and San Pablo Bay.	Unlikely, potential water quality concerns due to limited effluent discharge	Year-round
Central Valley steelhead *(Onchorhynchus mykiss)*	FT/--/--	Spawning in the Sacramento and San Joaquin Rivers and associated tributaries.	Unlikely, potential water quality concerns due to limited effluent discharge	September-February
Fall-run chinook salmon *(Onchorhynchus tshawytscha)*	FC/--/--	Spawning in Sacramento and San Joaquin Rivers and associated tributaries	Unlikely, no potential habitat occurs in or around the project area.	September-May
Winter-run chinook salmon *(Onchorhynchus tshawytscha)*	FT/CE/--	Spawning in Sacramento River below Keswick Dam.	Unlikely, species limited to spawning in upper reaches of the Sacramento River	September-February
Reptiles				
Giant garter snake ***(Thamnophis gigas)***	FT/CT/--	Marshes, streams, and sloughs of the Central Valley.	High, potential habitat occurs in the open irrigation canal adjacent to the project area and vegetated ditches throughout the project area. Species occurs within 1 mile of project area.	Winter rains and March-April
Amphibians				
California tiger salamander *(Ambystoma califoniense)*	FT/CSC/--	These salamanders are found in seasonal pools and associated grasslands, they overwinter in small mammal burrows	Low, limited marginal habitat occurs in the seasonal ponds associated with the project area. No known CNDDB occurrences of this species exist within 5 miles of the project area.	December-February

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA

Common name ***Scientific name***	**Listing Status USFWS/ CDFG/ CNPS**	**General Habitat**	**Potential to Occur**	**Period of Identification/ Flowering Period**
FEDERAL AND STATE LISTED, CANDIDATE AND PROPOSED SPECIES				
Amphibians (cont.)				
California red-legged frog *(Rana aurora draytonii)*	FT/CSC/ --	Occurs in a broad range of freshwater and associated upland habitats throughout the Coast Range, Sierra Nevada and foothills, often found in perennial to seasonal drainages with dense vegetation	Unlikely, limited marginal habitat occurs in the seasonal ponds associated with the project area. No known CNDDB occurrences of this species exist within 10 miles of the project area.	April-October
Birds				
Aleutian Canada goose *(Branta canadensis leucopareia)*	D[FSC]/--/--	Winters on lakes and inland prairies; forages on pastures, cultivated fields, loafs on lakes, ponds, or reservoirs.	Low**,** species was observed during the field survey, however expansion activities unlikely to disturb.	Winter months
Swainson's hawk ***(Buteo swainsoni)***	FSC/CT/--	Breeds in riparian areas and oak woodlands adjacent to foraging areas such as grasslands, alfalfa, and grain fields that support rodent populations.	High, abundant potential foraging habitat and no nesting habitat within vicinity of proposed construction activity. Occupied nests occur less than 1 mile from the project area, while more than 30 occupied nests occur within a 5 mile radius.	Year-round
Western snowy plover (*Charadrius alexandrinus nivosus*)	FT/CSC/--	Nests on the ground in sandy depressions, forages on beaches, salt (alkaline) flats or dry mudflats with little vegetation. Feeds mainly insects and other invertebrates.	High, abundant foraging and limited nesting habitat in project area, a nesting population of this species occurs within the project area near the City of Davis Wastewater Treatment Ponds.	Year-round
Western yellow-billed cuckoo *(Coccyzus americanus occidentalis)*	FC/CE/--	Nests in riparian forests along broad, lower flood-bottoms or large river systems; riparian jungles of willow mixed with cottonwood and an understory of blackberry, nettles, or wild grape.	Low, though abundant riparian habitat occurs along the nearby Sacramento River, only limited, marginal nesting habitat occurs in the project area.	Year-round
American peregrine falcon *(Falco peregrinus anatum)*	D[FSC]/CE/--	Forages in marshes and grasslands. Nesting habitat includes high, protected cliffs and ledges near water.	Low, no suitable nesting habitat within the project vicinity	May-August
Greater sandhill crane *(Grus canadensis tabida)*	FSC/CT/--	Winters in the Central Valley. Prefers grain fields within 4 miles of a shallow body of water.	Unlikely. Species does not breed in the Central Valley. May use areas in the project vicinity for foraging and roosting in winter.	November-February
Bald eagle *(Haliaeetus leucocephalus)*	FT/CE/--	Ocean shorelines, lake margins, and river courses for both nesting and wintering.	Low, limited wintering habitat in project area.	August-January

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA

Common name *Scientific name*	**Listing Status USFWS/ CDFG/ CNPS**	**General Habitat**	**Potential to Occur**	**Period of Identification/ Flowering Period**
FEDERAL AND STATE LISTED, CANDIDATE AND PROPOSED SPECIES				
Birds (cont.)				
Bank swallow *(Riparia riparia)*	--/CT/--	Restricted to isolated places where fine-textured or sandy, vertical bluffs or riverbanks are available in which to dig burrows in colonies.	Low, limited habitat in project area.	Year-round
Plants				
Palmate-bracted bird's-beak ***(Cordylanthus palmatus)***	FE/CE/1B	Meadows and seeps, playas, valley and foothill grassland; typically associated with alkaline habitats	Medium, though abundant potential habitat occurs in the undeveloped portions of the landfill associated with alkaline soils, the lack of native plant diversity in the area suggests this species is unlikely to be impacted.	June-September
Colusa grass *(Neostapfia colusana)*	F-T/CE/1B	Vernal pool associate.	Unlikely, no vernal pool habitats exist in the project area.	May-July
Hairy Orcutt grass (*Orcuttia pilosa*)	FE/CE/1B	Vernal pool associate.	Unlikely, no vernal pool habitats exist in the project area.	May-September
Crampton's tuctoria *(Tuctoria mucronata)*	FE/CR/1B	Vernal pool associate.	Unlikely, no vernal pool habitats exist in the project area.	May-July
FEDERAL AND STATE SPECIES OF CONCERN				
Invertebrates				
Antioch Dunes anthicid beetle *(Anthicus antiochensis)*	FSC/--/	Found in dunes and sand-slip faces among willows.	Unlikely, no identified dune habitat within project vicinity	March-November
Sacramento anthicid beetle *(Anthicus sacramento)*	FSC/--/--	Found in dunes and sand-slip faces among willows.	Unlikely, no identified dune habitat within project vicinity	March-November
Midvalley fairy shrimp (*Branchinecta mesovallensis)*	FSC/--/--	Vernal pools, seasonal wetlands that fill with water during fall and winter rains.	Low potential. Seasonal wetlands provide marginal habitat on-site.	December-April
California linderiella fairy shrimp *(Linderiella occidentalis)*	FSC/--/--	Seasonal pools in intact grasslands where alluvial soils are underlain by hardpan or in sandstone depressions	Low potential. Species has been documented within 5 miles of the project site in highly disturbed habitat (CNDDB 2004). Seasonal wetlands provide marginal habitat on-site.	December-April
Fish				
River lamprey *(Lampetra ayresi)*	FSC/CSC/--	Spawning requires clean, gravelly riffles in permanent streams; ammocoetes require sandy backwaters or stream edges in which to bury themselves.	Unlikely, no potential habitat occurs in or around the project area.	Year-round

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA

Common name *Scientific name*	**Listing Status USFWS/ CDFG/ CNPS**	**General Habitat**	**Potential to Occur**	**Period of Identification/ Flowering Period**
FEDERAL AND STATE SPECIES OF CONCERN				
Fish (cont.)				
Pacific lamprey *(Lampetra tridentata)*	FSC/--/--	Commonly occupy sand, gravel, and rubble; ammocoetes favor sand/mud substrate; adults favor coarser gravel-rubble substrate for spawning.	Unlikely, no potential habitat occurs in or around the project area.	Year-round
Sacramento splittail *(Pogonichthys macrolepidotus)*	FSC/CSC/--	Prefers backwaters and sloughs of the Delta and lower San Joaquin and Sacramento rivers.	Unlikely, potential water quality concerns due to limited effluent discharge	Year-round
Reptiles				
Northwestern pond turtle *(Clemmys marmorata marmorata)*	FSC/CSC/--	Rivers and streams with some canopy cover.	Low, limited marginal habitat within project area	Year round, excluding winter
California horned lizard *(Phrynosoma coronatum frontale)*	FSC/CSC/--	Inhabits a variety of habitats, usually lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial. Feeds on ants and other insects.	Low, limited suitable habitat exists in the project area.	March-October
Amphibians				
California tiger salamander *(Ambystoma californiense)*	FSC/CSC/--	Annual grasslands and grassy understory of hardwood habitats; need underground refuges (i.e., ground squirrel burrows); need seasonal water sources for breeding.	Low, due to history of land-use and disturbance and the marginal habitat in the landfill, this species is not expected to occur in the project area.	October-April
Foothill yellow-legged frog *(Rana boylii)*	FSC/CSC/--	Fast-moving rivers and streams in chaparral, forests, and woodlands.	Unlikely, no suitable habitat in project area. Most likely outside of species range	February-September
Western spadefoot *(Scaphiopus hammondii)*	FSC/CSC/--	Primarily found in grasslands; also found in hardwood woodlands; vernal pools are essential for breeding and egg-laying but can also use shallow streams with riffles.	Low, limited suitable habitat in project area	October-April
Birds				
Tricolored blackbird *(Agelaius tricolor)*	FSC/CSC/--	Nomadic resident of Sacramento-San Joaquin Valley and low foothills; nests in colonies within vicinity of fresh water/ marshy areas. Colonies prefer heavy growths of cattails and tules.	Low, limited nesting and abundant foraging habitat occurs for this species in the project area. Species occurs within 2 miles of project area.	Year-round
Bell's sage sparrow *(Amphispiza belli belli)*	FSC/CSC/--	Found in low, dense stands of shrubs; forages on insects, spiders, and seeds; nests located on ground beneath shrub; seed diet must be supplemented with succulent foods.	Low, project area lacks suitable habitat	Year-round

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA

Common name ***Scientific name***	**Listing Status USFWS/ CDFG/ CNPS**	**General Habitat**	**Potential to Occur**	**Period of Identification/ Flowering Period**
FEDERAL AND STATE SPECIES OF CONCERN				
Birds (cont.)				
Great egret *(Ardea alba)*	-- /Sensitive*/-- *rookery only	Nests in riparian trees or shrubs in colonies, forages in marshes, wetlands, sloughs and riparian corridors.	Low, the seasonal wetlands, water storage ponds and adjacent agricultural canals provide foraging habitat for this species. Species observed during field survey.	Year-round
Short-eared owl **(*Asio flammeus*)**	--/CSC/--	Found in open marshes, fields and prairies, often in daylight. Feeds on rodents and small mammals. Nests on the ground in grasslands or shrubs.	Medium, project site contains potential nesting and foraging habitat within fallow ag. and disturbed grassland areas.	Year-round
Western burrowing owl ***(Athene cunicularia)***	FSC/CSC/--	Inhabits open, grasslands and shrublands characterized by low-growing vegetation. Subterranean nester dependent upon burrowing mammals, specifically California ground squirrel.	High, potential nesting and foraging sites within grasslands and seasonal wetlands of the project area. Species occurs within 1 mile of project area.	Year-round
Oak titmouse *(Baelophus inornatus)*	FSC/--/--	Deciduous or oak woodland or oak savannah	Unlikely, no suitable habitat occurs at the project site.	Year-round
Ferruginous hawk ***(Buteo regalis)***	FSC/CSC/--	Wintering resident; Inhabits open grasslands, low foothills and desert scrub; nests in trees, low cliffs, and other elevated structures. Eats mainly lagomorphs, and other small mammals; also birds, amphibians, and reptiles. No nesting records in California.	Medium, , potential foraging habitat exists within fallow ag. and disturbed grassland areas.	Winter
Lawrence's goldfinch *(Carduelis lawrencei)*	FSC/--/--	Dry grassy slopes and chaparral	Unlikely, no suitable habitat occurs at the project site.	Summer
Vaux's swift *Chaetura vauxi*	FSC/--/--	Riparian woodlands and woodlands near lakes	Unlikely, no suitable habitat occurs at the project site. Do not breed in the Central Valley.	Year-round
Mountain plover *(Charadrius montanus)*	FC/CSC/--	Winters in Central California on bare dirt fields and short grasslands. No nesting records in California.	Low, abundant foraging habitat with no suitable nesting areas.	September-March
Northern harrier ***(Circus cyaneus)***	--/CSC/--	Nests in coastal freshwater and saltwater marshes; forages in grasslands, agricultural fields, and marshes.	High, potential nesting and foraging habitat within grasslands, agricultural and limited wetland areas. Species observed during field survey.	Year-round

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA

Common name *Scientific name*	Listing Status USFWS/ CDFG/ CNPS	General Habitat	Potential to Occur	Period of Identification/ Flowering Period
FEDERAL AND STATE SPECIES OF CONCERN				
Birds (cont.)				
Snowy egret *(Egretta thula)*	--/--/--	Nests in riparian trees or shrubs in colonies, forages in marshes, wetlands, sloughs and riparian corridors.	Low, the seasonal wetlands, water storage ponds and adjacent agricultural canals provide foraging habitat for this species. Species observed during field survey.	Year-round
White-tailed kite **(*Elanus leucurus)***	FSC/CP/--	Nests in dense oak, willow, or other tree stand near open grasslands meadows, farmlands, and emergent wetlands.	High, limited nesting and abundant foraging habitat occurs in the project area. Species observed during field survey. Nests within 1 mile of project area.	Year-round
Little willow flycatcher *(Empidonax trailii brewsteri)*	FSC/--/--	Nests in dense riparian cover. Summer migrant in the project area.	Low, limited riparian habitat within project area.	Summer
California horned lark ***(Eremophila alpestris actia)***	--/CSC/--	Open grassland habitats of the Central Valley.	Medium, project site contains abundant open grassland habitat.	Year-round
Loggerhead shrike *(Lanius ludovicianus)*	FSC/CSC/--	Nests in dense shrubs and brush near open foraging areas such as grasslands.	Low, no nesting habitat and abundant potential foraging habitat within project area grasslands.	Year-round
Lewis' woodpecker *(Melanerpes lewis)*	FSC/--/--	Open woodlands in interior foothills and valleys	Unlikely, no suitable habitat exists in the project vicinity. Uncommon in Central Valley.	Year-round
Long-billed curlew *(Numenius americanus)*	FSC/CSC/--	Lake beaches, nests in both dry and wet uplands	Unlikely, no suitable habitat exists in the project vicinity. Species does not breed in Central Valley.	Winter
Black-crowned night heron (*Nycticorax nycticorax)*	--/--/--	Preys on small rodents and mammals in grasslands as well as amphibians and fish in marshes and swamps. Often nests in reedbeds or streamside thickets.	Low**,** potential foraging sites within grasslands and seasonal wetlands of the project area.	Year-round
Nuttall's woodpecker *(Picoides nuttallii)*	FSC/--/--	Riparian habitat oak woodlands of northern California. In other more arid areas, these woodpeckers inhabit deciduous trees alongside streams as well as oak scrublands and chaparral.	Unlikely, no suitable habitat exists in the project vicinity.	Year-round
White-faced ibis *(Plegadis chihi)*	FSC/CSC/--	Historically nested around Los Banos in freshwater wetland areas; presently only a few breeding individuals occur in the northern Sacramento Valley.	Low, limited foraging and no nesting habitat within project area.	October-March
Rufous hummingbird *(Selasphorus rufus)*	FSC/--/--	Forests, woodland edges, thickets	Unlikely, does not breed in the Central Valley. Possible as occasional migrant.	Spring and Fall

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA

Common name *Scientific name*	Listing Status USFWS/ CDFG/ CNPS	General Habitat	Potential to Occur	Period of Identification/ Flowering Period
FEDERAL AND STATE SPECIES OF CONCERN				
Birds (cont.)				
Allen's hummingbird *(Selasphorus sasin)*	FSC/--/--	Brush and woodlands	Unlikely, suitable habitat does not occur at the project site. Likely occurs only as migrant.	Spring and Fall
Mammals				
Pacific western big-eared bat *(Coryrhinus townsendii townsendii*)	FSC/CSC/--	Forages over grasslands and roosts in buildings, caves, and rock crevices in relatively arid woody and brushy uplands near water.	Low, though abundant potential foraging habitat is available, no identified roosting sites occur in or around the project area.	Year-round
Small-footed myotis bat *(Myotis ciliolabrum)*	FSC/--/--	Forages over grasslands and roosts in buildings, caves, and rock crevices in relatively arid woody and brushy uplands near water	Low, though abundant potential foraging habitat is available, no identified roosting sites occur in or around the project area.	Year-round
Long-legged myotis bat *(Myotis volans)*	FSC/--/--	Forages over grasslands and chaparral and roosts in trees, caves, buildings and rock crevices.	Low, abundant potential foraging habitat, no identified roosting sites in the project area.	March-November
Yuma myotis bat *(Myotis yumanensis)*	FSC/--/--	Forages over open water and streams and roosts in trees, buildings, caves and rock crevices.	Low, abundant potential foraging habitat, no identified roosting sites in the project area.	April-October
San Joaquin pocket mouse *(Perognathus inornatus inornatus)*	FSC/CSC/--	Typically found in grasslands and blue oak savannas between 110 to 2000 feet; need friable soils.	Low**,** potential habitat occurs in project area grasslands however the elevation is most likely outside of species range.	Year- round
Plants				
Ferris's milk-vetch ***(Astragalus tener var. ferrisiae)***	--/--/1B	Playas, valley and foothill grassland and subalkaline flats; typically associated with alkaline soils.	Medium, though potential habitat occurs in the undeveloped portions of the landfill associated with alkaline soils, the lack of native plant diversity in the area reduces the likelihood that this species occurs. in the project area	April-May
Alkali milk-vetch ***(Astragalus tener var. tener)***	--/--/1B	Playas, valley and foothill grassland and vernal pools; often on alkaline soils.	Medium, though potential habitat occurs in the undeveloped portions of the landfill, the lack of native plant diversity in the area reduces the likelihood that this species occurs in the project area. The species occurs within 2.5 miles of the project area.	March-June

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA

Common name *Scientific name*	**Listing Status USFWS/ CDFG/ CNPS**	**General Habitat**	**Potential to Occur**	**Period of Identification/ Flowering Period**
		FEDERAL AND STATE SPECIES OF CONCERN		
Plants (cont.)				
Heartscale ***(Atriplex cordulata)***	FSC/--/1B	Valley foothill grasslands on alkaline sandy soils.	Medium, though potential habitat occurs in the undeveloped portions of the landfill, the lack of native plant diversity in the area reduces the likelihood that this species occurs in the project area. The species occurs within 1 mile of the project area.	May-October
Brittlescale ***(Atriplex depressa)***	FSC/-- /1B	Alkaline or clay grasslands, chenopod scrub, and playas.	Medium, though potential habitat occurs in the undeveloped portions of the landfill, the lack of native plant diversity in the area reduces the likelihood this species occurs on site. The species is known to occur within 5 miles of the project area.	May-October
San Joaquin spearscale ***(Atriplex joaquiniana)***	FSC/-- /1B	Chenopod scrub, meadows and seeps, playas and valley and foothill grassland; typically with alkaline soils.	Medium, though abundant potential habitat occurs in the undeveloped portions of the landfill, the lack of native plant diversity in the area reduces the likelihood that this species occurs in the project area. The species occurs within 1.5 miles of the project area.	April-October
Adobe-lily *(Fritillaria pluriflora)*	--/--/1B	Chaparral, cismontane woodland, valley and foothill grassland, often on adobe clay soils.	Low, though abundant grassland habitat occurs in the project area, the diversity of native herbaceous species is very low. Project area is also below species known elevation range.	February-April
Rose-mallow (*Hibiscus lasiocarpus*)	--/--/2	Typically associated with marshes, swamps and other freshwater wetland habitats.	Low, though potential habitat occurs in the undeveloped portions of the landfill, the lack of native plant diversity in the area suggests there is low potential for this species to occur in the project area	June-September
Northern California black walnut (*Juglans hindsii*)	--/--/1B	Occurs in riparian forest and woodland, 0-44 m elevation. Blooms April-May.	Unlikely, no walnut trees were observed in the project area during the field survey.	Year-round
Heckard's pepper-grass ***(Lepidium latipes var. heckardii)***	--/--/1B	Associated with alkaline flats within valley and foothill grasslands.	Medium, abundant potential habitat for this species occurs in the project area, especially on grasslands dominated by alkaline soils. The species occurs within 1 mile of the project area.	March-May

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA

Common name ***Scientific name***	**Listing Status USFWS/ CDFG/ CNPS**	**General Habitat**	**Potential to Occur**	**Period of Identification/ Flowering Period**
		FEDERAL AND STATE SPECIES OF CONCERN		
Plants (cont.)				
Woolly-headed lessingia (*Lessingia hololeuca*)	--/--/3	Broadleaved upland forest, coastal scrub, lower montane coniferous forest, valley and foothill grassland, often on clay or serpentine soils.	Low, the project area contains limited marginal habitat for the species, the annual grasslands do not contain a strong component of native herbaceous species.	June-October
Sanford's arrowhead *(Sagittaria sanfordii)*	--/--/1B	Assorted shallow, freshwater habitats, including marshes, stream banks and wetlands.	Low, limited marginal habitat for this species occurs in the project area.	May-August
Sensitive Habitats				
Elderberry savanna	--/--/--	Elderberry savanna occurs along riparian corridors within the Central Valley and the range of this habitat has become restricted due to habitat loss.	None, no elderberry shrubs occur within the project area.	Year-round
Great valley cottonwood riparian forest	--/--/--	Cottonwood riparian forests are important wildlife habitats within the Central Valley and loss of these habitats has become a conservation concern	None, no cottonwood forests occur within the project area.	Year-round
Valley oak woodland	--/--/--	Valley oak (*Quercus lobata*) woodlands have become increasingly rare in the California landscape and their conservation has become a growing concern state-wide for resource managers.	None, no valley oak woodlands are in or around the project area.	Year -round

FEDERAL: (U.S. Fish and Wildlife Service)
FE = Federally listed as Endangered (in danger of extinction).
FT = Federally listed as Threatened (likely to become Endangered within foreseeable future).
PE = Proposed for listing as Endangered.
PT = Proposed for listing as Threatened.
FC = Candidate to become a *proposed* species.
FSC = Federal Species of Concern.
D[FSC] = Delisted; considered a Federal Species of Concern.

STATE: (California Department of Fish and Game)
CE = State listed as Endangered.
CT = State listed as Threatened.
CR = State listed as Rare.
CSC = California species of special concern.
CP = Fully protected by the State of California under Section 3511 and 4700 of the CDFG Code.

California Native Plant Society classifications:
List 1A = Plants presumed extinct in California.
List 1B = Plants rare, Threatened, or Endangered in California and elsewhere.
List 2 = Plants rare, Threatened or Endangered in California but more common elsewhere.
List 3 = Plants about which more information is needed.
List 4 = Plants of limited distribution.

Unlikely = The project site and/or immediate area do not support suitable habitat for a particular species. Project site is outside of the species known range.
Low Potential = The project site and/or immediate area only provide limited habitat for a particular species. In addition, the known range for a particular species may be outside of the project area.
Medium Potential = The project site and/or immediate area provide suitable habitat for a particular species.
High Potential = The project site and/or immediate area provide ideal habitat conditions for a particular species.

Species with a medium to high potential to occur in the project area are shown in **bold** type.

SOURCE: CDFG, 2004a, 2004b, 2004c; CNPS, 2004; USFWS, 2004

Reptiles

The **Giant garter snake** (*Thamnophis gigas*) historically ranged throughout the Sacramento and San Joaquin valleys but is very scarce throughout its range due to the elimination of natural sloughs and marshy areas. This species is an active diurnal snake rarely found away from water. Habitat types utilized by giant garter snakes include freshwater marsh, flooded rice fields, and drainage canals. Giant garter snakes are usually found within a few feet of water, often between the water level and the top of adjacent banks. It aestivates in uplands adjacent to aquatic habitat during its inactive period (approximately October through mid-April). Winter retreats utilized by the giant garter snake include small mammal burrows and man-made structures such as piles of large rocks or riprap. It typically feeds upon small fish and amphibians. Potential habitat within the project area is located within the open irrigation canal, surface run-off ditches, and adjacent uplands. Several of the seasonal ditches within the landfill site have marginal habitat as they lack aquatic vegetation and are dry for much of the snake's active period. During a field survey conducted in late April, 2004, ESA biologists noted dry conditions in many of the on-site perimeter ditches. As of the field survey date, water-year rainfall totals (October through April, 2004) were approximately 80 percent of average precipitation totals (Western Regional Climate Center, 2004). Giant garter snake occurs less than one mile from the project area, and has been observed in the Willow Slough Bypass (CNDDB, 2004).

Birds

The **California horned lark** (*Eremophila alpestris actia*), a federal Species of Concern and California Species of Special Concern, inhabits grasslands and other open habitats with low vegetative cover. This songbird that forages for seeds and insects in open plains, agricultural fields and beaches and breeds from Alaska through most of the western United States. These birds nest on the ground in small hollows lined with grass. Open fields within the landfill, and off-site agricultural land that potentially could be used for a soil borrow area, represent potential foraging habitat for the species, while the undeveloped grasslands within the landfill site represent potential nesting habitat.

Ferruginous hawks (*Buteo regalis*) are birds of the open country that winter, but do not breed, in the Central Valley. They occur in grasslands with scattered trees, rocky mounds or outcrops, and shallow canyons that overlook open valleys. They may occur along streams or in agricultural areas in migration. The birds select rocky outcrops, hillsides, rock pinnacles, or trees for nest sites. Nests can be built directly on the ground. Ferruginous hawks rely primarily upon rodents found in their grassland ecosystems. Prey includes Richardson's ground squirrels, white-tailed jackrabbits, black-tailed jackrabbits, ground squirrels, pocket gophers, prairie dogs, and kangaroo rats. Other prey includes snakes, lizards, meadowlarks, grasshoppers, and crickets. Open fields within the landfill, and off-site agricultural land that potentially could be used for a soil borrow area, represent potential foraging habitat for the species.

Northern harriers (*Circus cyaneus)* inhabit areas of tall, dense, grasses, moist or dry shrubs, and the edges of row crops for nesting, cover, and feeding. Common food items are voles, frogs, small reptiles, crustaceans, and insects. Nests are built on ground with shrubby vegetation.

These birds could nest in grasslands in the project site or grain fields in the project vicinity. Several individual northern harriers, exhibiting hunting behavior, were observed within the open grasslands of the project area during the site survey; a potential nest site also was observed.

Short-eared owl (*Asio flammeus*). This species hunts in open grasslands, dunes, fresh and saltwater marshes and other open country. The species nests on the ground in a grass-lined depression that is often concealed in weeds or beneath shrubs. It typically hunts for small mammals during the late afternoon and onward through the night. The project area and off-site areas potentially to be used for a soil borrow area contain open grasslands and agricultural lands that represent both nesting and foraging habitat for the species.

Swainson's hawk (*Buteo swainsoni*) is a migratory raptor listed as threatened by the State of California, and as a Species of Concern by the USFWS. It breeds in western North America and winters in Mexico and South America. It nests in trees and shrubs, and forages over pasturelands and open agricultural fields. In the Central Valley it is often associated with riparian corridors adjacent to field crops and grasslands and subsists largely on small mammals, especially California vole, California ground squirrel, and large insects. The species also nests in isolated trees in agricultural fields and landscaping associated with rural residences. Suitable foraging habitat within an energetically efficient flight distance from active Swainson's hawk nests has been found to be of great importance. The decline of the species in the Central Valley has been associated with extensive reduction of suitable foraging habitat. Suitable foraging habitat is present within the project area in open grasslands, where abundant populations of prey species are supported. High quality nesting habitat occurs in the vicinity of the project area along the Sacramento River. There have been more than 30 Swainson's hawk nests recorded by CDFG within a 5-mile radius of the project area and an occupied nest active in 2002 and previous years occurs less than 0.5 mile from the landfill site (CDFG, 2004a).

The **western burrowing owl** (*Athene cunicularia*) inhabits open grasslands and shrublands that have perches and burrows. These owls eat mainly insects, with small mammals and birds also making up a portion of the diet. The owls use old rodent burrows for cover and breeding. Burrows, which may potentially be used for nesting or cover, occur in open grasslands of the landfill site, adjacent grasslands, and the capped waste modules on-site. This species recently has been documented as nesting along County Road 28H just southeast of the City of Davis wastewater lagoons, within one mile of the project site. There also have been several other documented sightings east and north of Davis and within two to five miles of the project area (CDFG, 2004a).

Western snowy plover (*Charadrius alexandrinus nivosus)*. This small shorebird forages in flat open areas having little vegetation, including sandy beaches and salt flats. It nests in small depressions on the ground. The species is known to occur near the City of Davis wastewater lagoons near the project site (CDFG, 2004a). Open unvegetated seasonal ponds and wetlands within the project site represent foraging and limited nesting habitat.

White-tailed kites (*Elanus leucurus*) inhabit areas of tall, dense, grasses and shrubs, farmlands, and open country, and feed mainly on rodents and insects. They typically build nests in tall trees near a water source. These birds forage in grasslands and grain fields in the project area. Several individual white-tailed kites were observed within the open grasslands of the project area during the site survey, and hunting behavior was observed.

Plants

Alkali milk-vetch (*Astragalus tener var. tener*). This diminutive herbaceous annual member of the pea family (Fabaceae) occurs on alkaline flats and in seasonally moist alkaline meadows at elevations typically below 200 feet. The species is rare and endemic to California. It is known to occur in the southern Sacramento Valley, northern San Joaquin Valley and the eastern San Francisco Bay Area. Twenty-three of the 35 known occurrences of this species have been extirpated by habitat destruction. The only protected population of this species occurs at the Jepson Prairie Preserve in Solano County. The seasonally saturated alkaline habitats in the eastern grassland portion of the project area provide potential habitat for this species.

Brittlescale (*Atriplex depressa*) is a small herbaceous annual species of saltbush in the goosefoot family (Chenopodiaceae). It occurs on saline and alkaline soils, often with a significant clay component, below 600 feet in the southern Sacramento Valley and San Joaquin Valley. The species is rare and endemic to California. It typically occurs in chenopod scrub and seasonally wet areas including meadows and seeps. The species is threatened by development and habitat destruction. The seasonally saturated alkaline habitats in the eastern grassland portion of the project area provide potential habitat for this species.

Ferris's milk-vetch (*Astragalus tener var. ferrisiae*). This diminutive herbaceous annual member of the pea family (Fabaceae) occurs on alkaline flats and in seasonally moist alkaline meadows at elevations typically below 200 feet. The species is rare and endemic to California. It is known to occur in the northern Sacramento Valley, and the eastern San Francisco Bay Area. Though most populations of this species have been extirpated, 4 known occurrences of this remain in Butte and Glenn Counties. Most historical occurrences have been destroyed by agricultural development. The seasonally saturated alkaline habitats in the eastern grassland portion of the project area provide potential habitat for this species.

Heartscale (*Atriplex cordulata*) is a small herbaceous annual species of saltbush in the goosefoot family (Chenopodiaceae). It occurs on saline and alkaline soils below 700 feet in the southern Sacramento Valley and San Joaquin Valley. The species is rare and endemic to California. It typically occurs in chenopod scrub and seasonally wet areas including meadows and seeps. The species is threatened by development and habitat destruction. The seasonally saturated alkaline habitats in the eastern grassland portion of the project area provide potential habitat for this species.

Heckard's pepper-grass (*Lepidium latipes var. heckardii*) is a small annual herb in the mustard family (Brassicaceae). It occurs on alkaline flats in open grasslands at elevations typically below 660 feet. This species is rare and endemic to California. It is known to occur in Glenn, Solano and Yolo Counties. This variety of *Lepidium latipes* is distinguished from the more common *L. latipes* var. *latipes* by its erect stem that is branched above the base and the absence (typically) of basal leaves. (By contrast *L. latipes* var. *latipes* is prostrate, branches from the base of the stem, and typically has basal leaves.) The seasonally saturated alkaline habitats in the eastern grassland portion of the project area provide potential habitat for this species.

Palmate-bracted bird's-beak (*Cordylanthus palmatus*). This diminutive annual hemiparisitic species is a member of the figwort family (Scrophulariaceae). It occurs on saline and alkaline soils in grasslands and chenopod scrub, typically below 550 feet elevation in the Sacramento Valley, San Joaquin Valley and eastern San Francisco Bay Area. This species, a listed federal and California endangered species, is rare and endemic to California. Nine known populations of the species remain. The seasonally saturated alkaline habitats and meadows in the eastern portion of the project area provide potential habitat for this species.

San Joaquin spearscale (*Atriplex joaquiniana*) is a small herbaceous annual species of saltbush in the goosefoot family (Chenopodiaceae). It occurs on saline and alkaline soils that often have a significant clay component, below 600 feet in the southern Sacramento Valley and San Joaquin Valley; it typically occurs in chenopod scrub and seasonally wet areas, including meadows and seeps. The species is rare and endemic to California. Grazing, agriculture and development threaten the species. The seasonally saturated alkaline habitats in the eastern grassland portion of the project area provide potential habitat for this species.

REGULATORY FRAMEWORK

Special-Status Species

Special-status species potentially occurring within or adjacent to the project area are discussed above. This section describes the federal and state regulations, policies, and codes that afford certain species this status.

Federal Endangered Species Act

Under the Federal Endangered Species Act (FESA), the Secretary of the Interior and the Secretary of Commerce jointly have the authority to list a species as threatened or endangered (16 USC 1533[c]). Pursuant to the requirements of FESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed threatened or endangered species could be present in the project area and determine whether the proposed project would have a potentially significant impact on such species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under FESA or result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC 1536[3], [4]).

The USFWS also publishes a list of candidate species. Species on this list receive "special attention" from federal agencies during environmental review, although they are not protected otherwise under the FESA. The candidate species are taxa for which the USFWS has sufficient biological information to support a proposal to list as endangered or threatened.

California Endangered Species Act

The CDFG administers a number of laws and programs designed to protect fish and wildlife resources. Principal of these is the California Endangered Species Act of 1984 (CESA - Fish and Game Code Section 2050 et seq), which regulates the listing and "take" of endangered (CE) and threatened species (CT). A "take" of such a species may be permitted by CDFG through issuance of permits pursuant to Fish and Game Code section 2081.

Under the CESA, CDFG has the responsibility for maintaining a list of threatened species and endangered species (California Fish and Game Code 2070). CDFG also maintains lists for Candidate-Endangered Species (SCE) and Candidate-Threatened Species (SCT). California candidate species are afforded the same level of protection as listed species. The agency also designates Species of Special Concern (CSC) which are species of limited distribution, declining populations, diminishing habitat, unusual scientific, recreational, or educational value. These species do not have the same legal protection as listed species, but may be added to official lists in the future. The CSC list is intended by CDFG as a management tool for consideration in future land use decisions. Fish and Game Code includes provisions for the protection of the nests of particular types of birds, including birds of prey (Section 3503.5).

CEQA Guidelines Section 15380 provides protection to both currently listed rare or endangered species and those that may soon become rare or endangered in order to determine whether a project could have a significant effect on, for example, a "candidate species" that has not yet been listed by either the USFWS or CDFG. Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species could be present in the project area and determine whether the proposed project would have a potentially significant impact on such species. In addition, the Department encourages informal consultation on any proposed project that could impact a candidate species.

Prior to enactment of the CESA, the designation of "Fully Protected" was used by CDFG to identify species that had been given special protection by the California Legislature by a series of statutes in the California Fish and Game Code. (See §§ 3503.5, 3505, 3511, 3513, 4700, 4800, 5050, 5515.) Many fully protected species have also been listed as threatened or endangered species under the more recent endangered species laws and regulations; however, the original statutes have not been repealed, and the legal protection they give the species identified within them remains in place. Fully Protected species may not be taken or possessed at any time; and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. Because endangered or threatened species can be "taken" for development purposes with the issuance of a permit by CDFG, "fully protected species" actually enjoy a greater level of legal protection than "listed" species.

CEQA Guidelines Section 15380

Although threatened and endangered species are protected by specific federal and state statutes, CEQA Guidelines Section 15380 provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definition in FESA and the section of the California Fish and Game Code dealing with rare or endangered plants or animals. This section was included in the Guidelines primarily to deal with situations in which a public pursuant thereto." Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "taking" by the CDFG.

Other Statutes, Codes, and Policies Affording Limited Species Protection

The federal Migratory Bird Treaty Act (16 U.S.C., Sec. 703, Supp. I, 1989) prohibits killing, possessing, or trading in migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs. Birds of Prey are protected in California under the State Fish and Game Code, (Section 3503.5, 1992). Section 3503.5 states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted

The federal Bald Eagle Protection Act prohibits persons within the United States (or places subject to U.S. jurisdiction) from "possessing, selling, purchasing, offering to sell, transporting, exporting or importing any bald eagle or any golden eagle, alive or dead, or any part, nest, or egg thereof."

Vascular plants listed as rare or endangered by the CNPS (CNPS, 2004), but which have no designated status or protection under federal or state endangered species legislation, are defined as follows:

- List 1A. Plants Believed Extinct.
- List 1B. Plants Rare, Threatened, or Endangered in California and elsewhere.
- List 2. Plants Rare, Threatened, or Endangered in California, but more numerous elsewhere.
- List 3. Plants About Which We Need More Information - A Review List.
- List 4. Plants of Limited Distribution - A Watch List.

Regulation of Activities in Waters of the United States

Federal Regulation

The ACOE has primary federal responsibility for administering regulations that concern "waters of the U.S." within the project area. The ACOE acts under two statutory authorities, the Rivers and Harbors Act (Sections 9 and 10) which governs specified activities in "navigable waters of the U.S.," and the Clean Water Act (Section 404), which governs specified activities in "other waters of the U. S." including wetlands. The ACOE requires that a permit be obtained if a project proposes placing structures within, over, or under navigable waters and/or discharging dredged or fill material into "waters of the U.S." below the ordinary high-water mark in non-tidal waters.

The U.S. Environmental Protection Agency (EPA), USFWS, the National Marine Fisheries Services (NMFS), and several other agencies provide comment on ACOE permit applications.

Wetlands are ecologically complex habitats that support a variety of both plant and animal life. In a jurisdictional sense, the federal government defines wetlands in Section 404 of the Clean Water Act as “areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support (and do support, under normal circumstances) a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3[b] and 40 CFR 230.3). The federal definition of wetlands requires three wetland identification parameters to be present: wetland hydrology, hydric soils, and hydrophytic vegetation. Examples of wetlands include freshwater marsh, seasonal wetlands, and vernal pool complexes that have a hydrologic link to other waters of the U.S. (see definition below for “other waters of the U.S.”). The U.S. Army Corps of Engineers (ACOE) is the responsible agency for regulating wetlands under Section 404 of the Clean Water Act, while the EPA has overall responsibility for the Act.

“Other waters of the U.S.” refers to those hydric features that are regulated by the Clean Water Act but are not wetlands (33 CFR 328.4). To be considered jurisdictional, these features must exhibit a defined bed and bank and an ordinary high-water mark. Examples of other waters of the U.S. include rivers, creeks, intermittent and ephemeral channels, ponds, and lakes.

Wetlands and other waters of the U.S. are subject to jurisdiction by the ACOE and EPA under Section 404 of the Clean Water Act. The discharge of fill into a jurisdictional feature requires a permit from the ACOE. Wet areas that are not regulated under this act include stock watering ponds, created water treatment facilities and agricultural ditches created and maintained in upland areas. The ACOE’s authority to regulate wetlands that do not have a hydrologic link to other waters of the U.S., either through surface or subsurface flow, was redefined in January 2001 when the U.S. Supreme Court issued a decision in the case of the Solid Waste Agency of Northern Cook County (SWANCC) vs. U.S. Army Corps of Engineers.[2] The ACOE has the option to issue a permit on a case-by-case basis (individual permit) or at a program level (general permit). Nationwide permits (NWPs) are an example of general permits; they cover specific activities that generally have minimal environmental effects. Activities covered under a particular NWP must fulfill several general and specific conditions, as defined by the NWP. If a Proposed Project cannot meet these conditions, an individual permit may be required.

State Regulation

The state’s authority to regulate activities in “waters of the U.S.” resides primarily with the CDFG and the State Water Resources Control Board (SWRCB). CDFG provides comment on

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2 Since the SWANCC decision, waters covered solely by this definition by virtue of their use as habitat by migratory birds are no longer considered “waters of the United States.” The Supreme Court’s opinion did not specifically address what other connections with interstate commerce might support the assertion of CWA jurisdiction over “nonnavigable, isolated, intrastate waters” under this definition, and the ACOE is recommending case by case consideration. A factor that may be relevant to this consideration includes, but is not limited to, the following: Jurisdiction of isolated, intrastate, and nonnavigable waters may be possible if their use, degradation, or destruction could affect other “waters of the United States,” thus establishing a significant nexus between the water in question and other “waters of the United States” (ACOE, undated memorandum).

ACOE permit actions under the Fish and Wildlife Coordination Act. California Fish and Game Code Sections 1600-1616 require the notification of CDFG for any activity that would obstruct the flow of, or alter the bed, channel, or bank of a river or stream in which there is a fish or wildlife resource, including intermittent and ephemeral streams. Upon notification, the CDFG has the responsibility to prepare a Streambed Alteration Agreement, in consultation with the project proponent, that includes development of mitigation measures.

Under Section 401 of the Clean Water Act, the SWRCB, acting through the appropriate Regional Water Quality Control Board (RWQCB), must certify that an ACOE permit action meets state water quality objectives (Section 401, Clean Water Act). The SWRCB may also require Waste Discharge Requirements (WDRs) or waiver thereof, in addition to 401 Water Quality Certification and may require water quality requirements, conditions and/or mitigation separate than those set forth in the 404/401 permitting process.

Discharges to wetlands and "other waters of the state" are also subject to state regulation under the California Porter-Cologne Water Quality Control Act (Porter-Cologne; Ca. Water Code, Div. 7, § 13000 *et seq.*). Water Code section 13260 requires "any person discharging waste, or proposing to discharge waste, within any region that could affect the *waters of the state* to file a report of waste discharge (Water Code § 13260(a)(1)). The term "waters of the state" is defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (Water Code § 13050 (e)). Therefore, regardless of ACOE concurrent jurisdiction under Section 404 of CWA, the SWRCB and RWQCB have jurisdiction to regulate waters of the state by issuing Waste Discharge Requirements or waiver thereof, independently of the Section 401 program.

Local Plans and Policies

Yolo County General Plan

The 1983 Yolo County General Plan (Yolo County, 1983) includes a Conservation Element containing policies and planning principles designed to protect natural resources in perpetuity for the benefit of current and future residents. Such resources include water, forests, soils, rivers, lakes, harbors, fisheries, wildlife, and minerals, and decision-making regarding these resources should be based on adequate resource-inventory information. The following conservation policies taken from the General Plan are relevant to biological resources that may occur on the project site:

CON 1. Conservation, Basic – Yolo County shall conserve its land and other resources through available means of land use controls, regulations, and advice and guidance, and through coordination with the other elements of this General Plan, as amended, and with other agencies.

CON 2. Conservation, Basic Methods – Yolo County shall foster conservation of its resources and avoid natural hazards by planning, encouraging, and regulating the development and use of these resources and the areas where they exist.

CON 5. Element Content – In order to avoid conflict with this General Plan, as amended, or to avoid environmental hazards, Yolo County shall require conservation of natural resources, in the development and managed utilization including:

- Tree borders along roads and highways
- Fisheries
- Wildlife
- Regulation of the use of land in stream channels and other areas required for the accomplishment of the conservation plan

CON 6. Long Term Values – Yolo County shall plan, encourage, and regulate to ensure that natural resources are maintained for their long-term ecological values as well as for their more direct and immediate benefits.

CON 7. Design and Site Development Standards – Yolo County shall establish design and site development standards and shall apply these standards to development to prevent unnecessary disruption of the terrain, vegetation, and significant resource areas. Application of the standards shall include mitigation of potential adverse environmental impacts.

CON 9. State Resources – Yolo County shall ensure the protection, maintenance, and wise use of the State's natural resources, especially scarce resources and those that require special control and management.

CON 10. Protection of Resources – Yolo County shall plan, encourage, and regulate public and private agencies to prevent the wasteful exploitation, destruction, or neglect of the State's resources.

CON 28. Tree Preservation – Yolo County shall establish a tree planting program. Yolo County shall adopt a tree preservation ordinance and shall require extensive use of trees on private and public lands.

CON 30. Wildlife Habitat – Yolo County shall safeguard existing and encourage development and protection of additional wildlife habitat and shall coordinate with other agencies and programs to enhance and create wildlife preserves and to preserve and rehabilitate wildlife habitat areas suitable for ecological education sites.

CON 32. Weed Abatement – Yolo County shall review and amend, if necessary, weed abatement ordinances to ensure that overly stringent standards do not cause unnecessary vegetation destruction in natural areas.

CON 33. Vegetation Conservation – Existing natural vegetation shall be conserved where possible, integrated into new development and its life and continuity shall be assured by means of Conditional Use Permit procedures applied to permit approvals for new or reconstruction work.

Yolo County Natural Communities Conservation Plan and Habitat Conservation Plan

The Yolo County General Plan supports the development of a County Natural Communities Conservation Plan (NCCP) that would mitigate for impacts of urban development on 26 covered species through habitat conservation and enhancement of the habitat value for these species in Yolo County (Yolo County, 1983). If adopted, the NCCP would establish a long-range strategy or framework for habitat conservation and enhancement to occur at a countywide level. Currently the County has yet to adopt an NCCP. The Yolo County Habitat Conservation Joint Powers Agency (JPA) was formed in August 2002 for the purposes of acquiring habitat conservation easements and to serve as the lead agency for the preparation of a Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP) for all of Yolo County. As a local governmental agency, the JPA has two primary roles: to facilitate mitigation for impacts to the foraging habitat of the Swainson's hawk, and to assist in the planning, preparation and subsequent administration of a County-wide NCCP/HCP. At the time this document was prepared, an NCCP Steering Committee had been chosen and a private firm selected to prepare the NCCP/HCP. The NCCP/HCP has not been finalized.

Tree Preservation Ordinance

The County of Yolo has not adopted a tree preservation ordinance.

3.3.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Based on Section 15065 and Appendix G of the CEQA Guidelines, as well as best professional judgment of the County’s staff and consultants, the County concludes that the project would result in a significant impact on the environment if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS;
- Have a substantial adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFG or USFWS;
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory native wildlife corridors, or impede the use of wildlife nursery sites;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan;
- Substantially reduce the habitat of a fish and wildlife species;

- Cause a fish or wildlife population to drop below self-sustaining levels;
- Threaten to eliminate a plant or animal community; or
- Reduce the number or restrict the range of an endangered, rare or threatened species.

CEQA Section 15380 provides that a plant or animal species may be treated as "rare or endangered" even if not on one of the official lists if, for example, it is likely to become endangered in the foreseeable future. As species of plants and animals become restricted in range and limited in population numbers, species may become listed or candidates for listing as endangered or threatened and become recognized under CEQA as a significant resource. Examples of such species are vernal pool fairy shrimp (listed by USFWS) and burrowing owl (California Species of Special Concern).

METHODOLOGY

The impact analysis focuses on foreseeable changes to the baseline condition in the context of the significance criteria presented above. In conducting the impact analysis, three principal components of the CEQA Guidelines outlined above were considered:

1) Magnitude of the impact (e.g., substantial/not substantial);
2) Uniqueness of the affected resource (i.e., rarity of the resource); and
3) Susceptibility of the affected resource to perturbation (i.e., sensitivity of the resource).

The evaluation of the significance of the following impacts considered the interrelationship of these three components. For example, a relatively small magnitude of impact to a federal- or state-listed species would be considered significant if the species were very rare and believed to be very susceptible to disturbance. Conversely, a plant community such as California annual grassland is not necessarily rare or sensitive to disturbance. Therefore, a much larger magnitude of impact would be required to result in a significant impact.

Impact 3.3.1: The proposed project may have significant adverse impacts, either directly or through habitat modifications, to special status bird species as defined in this section. (Significant)

Swainson's Hawk. The mining of landfill soils and the eventual construction of waste management units would affect suitable foraging habitat, in the form of agricultural fields and extensive grasslands. Over the life of the proposed project, up to 640 acres of off-site agricultural land that is potential foraging habitat for this species would be affected by borrow activities, and up to 300 acres of upland grassland potential foraging habitat within the landfill would be affected. Within the landfill site, a "rolling replacement" of upland grassland habitat would occur as approximately 20-acre active landfill modules are filled, covered and hydroseeded with grass mixture. Although no nesting habitat for this species occurs in the project area, more than 30 breeding pairs of Swainson's hawk are known to occur within 5 miles of the project area (CNDDB, 2002) and a breeding pair was documented within 0.5 mile of the project site in 2002 (CNDDB, 2004).

Ferruginous Hawk, California Horned Lark, Northern Harrier, Western Burrowing Owl, Short-eared Owl and White-Tailed Kite. These species of birds may be impacted by the removal of potential foraging habitat through landfill construction. In the case of the northern harrier, western burrowing owl and short-eared owl, potential nesting habitat will also be impacted. Removal or causing the failure of nests of these species would be considered a significant impact. This impact would be the same as described for Swainson's hawk. See Impact 3.3.2 for further discussion of western burrowing owl.

Within the landfill site, a "rolling replacement" of upland grassland habitat would occur as approximately 10-acre landfill cells are filled (at the rate of one cell every two to three years) covered and hydroseeded with grass mixture. Completed bioreactor cells may be covered with a geomembrane during the period of active bioreactor operations (10 to 15 years after cell completion), delaying re-seeding during this period. At most, five completed, active bioreactor cells and one current cell being filled would be operational at one time. Therefore, up to 60 acres of the approximate 300 acres of upland grasslands will be in operational use at any one time over the planning period of this project. Two possible closure designs are available for future waste modules. The most likely design that will be utilized involves capping the finished modules with a geomembrane, over which one to two feet of soil would be placed. Hydroseeding with a yet-to-be specified grass mixture, which may include native grasses, will be done to revegetate finished modules. With up to two feet of soil above the geomembrane, completed waste modules will retain foraging habitat value for Swainson's hawk and other raptors by allowing for small mammal (e.g., vole) burrowing. In addition to the temporary loss of grasslands during active landfill operations, about five acres of grassland will be permanently lost with development of the MRF. While this rolling replacement of grasslands will reduce the amount of habitat unavailable at any given time, the loss of up to 60 acres of grasslands during the operational life of the landfill is considered a significant impact.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.3.1a: There will be a "rolling replacement" of lost grasslands as landfill modules are completed, covered with soil, and re-seeded.

Mitigation Measures Identified in This Report

Mitigation Measure 3.3.1b: For construction of any facilities that will occur between March 15 and September 15 of any given year, the DIWM shall conduct preconstruction surveys in suitable nesting habitat within 0.5 mile of the project site for Swainson's hawk and within 1,000 feet of the project site for tree-nesting raptors. Surveys shall be conducted by a qualified biologist and will conform to the Swainson's Hawk Technical Advisory Committee (2000) guidelines (Appendix G). If nesting raptors are recorded within their respective buffers, the applicant will consult with CDFG regarding suitable measures to avoid impacting breeding effort. Measures may include, but are not limited to:

- Maintaining a 500-foot buffer around each active raptor nest; no construction activities shall be permitted within this buffer except as described below in this mitigation measure. This buffer may be reduced in consultation with CDFG.

- Depending on conditions specific to each nest, and the relative location and rate of construction activities, it may be feasible for construction to occur as planned within the buffer without impacting the breeding effort. In this case (to be determined in consultation with CDFG), the nest(s) shall be monitored by a qualified biologist during construction within the buffer. If, in the professional opinion of the monitor, the project would impact the nest, the biologist shall immediately inform the construction manager and CDFG. The construction manager shall stop construction activities within the buffer until either the nest is no longer active or the project receives approval to continue from CDFG.

Mitigation Measure 3.3.1c: In order to protect wildlife habitat and existing open space as described in the conservation and open space policies of the Yolo County General Plan (1983), and the pending Yolo County NCCP/HCP, the applicant shall purchase shares in an appropriate mitigation bank or purchase comparable raptor foraging area in consultation with the CDFG at an appropriate ratio (1:1) to maintain no net loss of wildlife habitat in the region from the proposed landfill expansion. This ratio shall be applied to on-site grassland and agricultural land that will be permanently altered from natural to developed state. This ratio also shall be applied to off-site agricultural lands if such lands are acquired for use as a soil borrow area. The applicant shall consult with CDFG to fulfill appropriate mitigation acreage and/or ratio requirements in consideration of the anticipated "rolling replacement" of upland grasslands within the landfill site.

Level of Significance After Mitigation

Implementation of Mitigation Measures 3.3.1a, 3.3.1b, and 3.3.1c would reduce this impact to a less-than-significant level.

Impact 3.3.2: The proposed project may have significant adverse impacts, either directly or through habitat modifications, on western burrowing owl. (Significant)

Burrowing owls may nest in burrows and forage in grasslands found within the project area. Proposed construction activities may directly affect burrowing owl nest sites (i.e., destroying active burrows) or cause indirect impacts (e.g., nest abandonment), thereby reducing the viability of local populations. Removal or causing the failure of nests of these species would be considered a significant impact.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.3.2a: See Mitigation Measure 3.3.1a.

Mitigation Measures Identified in This Report

Mitigation Measure 3.3.2b: For any construction that will occur between March 15 and September 15 of any given year, the applicant shall conduct preconstruction surveys in suitable nesting habitat within the project site and within 500 feet of the project site, for burrowing owls prior to construction. Surveys shall be conducted by a qualified biologist and will conform to the CDFG burrowing owl recommendations (Appendix H). Burrowing owl surveys shall be conducted in both the breeding and non-breeding season.

Mitigation Measure 3.3.2c: If nesting burrowing owls are detected within the project area, mitigation to avoid active nest sites or compensate for the loss of nest sites shall be developed in coordination with CDFG. Mitigation may include, but is not restricted to, precluding entry into buffer zones around nests, creating new burrows for every nest site lost at a 2:1 ratio, the passive relocation of resident owls, if necessary, and retention of a qualified wildlife biologist to monitor active nests during construction; this biologist would have the authority to halt construction if construction activities would result in the abandonment of a nest.

Level of Significance After Mitigation

Implementation of Mitigation Measures 3.3.2a, 3.3.2b, and 3.3.2c would reduce this impact to a less-than-significant level.

Impact 3.3.3: The proposed project may have significant adverse impacts, either directly or through habitat modifications, on giant garter snake. (Significant)

The proposed project may affect giant garter snake if the snakes are present in the unlined irrigation canal and ditches adjacent to and within the project area. Snakes may be incidentally harmed or harassed by construction activities if they are foraging within the project area adjacent to the canal or within ditches. Because these surface run-off ditches lack a continuous water supply and sufficient emergent vegetation, they provide very marginal habitat for this species. It is likely vegetation is regularly removed from the irrigation systems, further limiting habitat opportunities for the species. This is particularly true for on-site stormwater drainage ditches that have only seasonal hydrology and typically become dry before the active period for giant garter snake. However, potential aquatic habitat is present on the project site (the unlined irrigation canal and ditches) and this species was once present throughout this region. Uplands within 200 feet of aquatic habitat for snakes is considered potential aestivation (wintering) habitat; therefore, following the guidelines of the USFWS' Programmatic Formal Consultation for giant garter snake (USFWS, 1997), a 200-foot radius around aquatic habitat for the species is used to evaluate temporary and/or permanent disturbances and identify mitigation measures. The following Mitigation Measures 3.3.3a through 3.3.3d are proposed.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in This Report

Mitigation Measure 3.3.3a: The applicant will ensure that construction either within potential aquatic habitat for giant garter snake, and/or upland habitat within 200 feet of potential aquatic habitat (i.e., the unlined irrigation canals and ditches), shall conform to USFWS guidelines for procedures and timing of activities in giant garter snake habitat (Appendix I).

Mitigation Measure 3.3.3b: In accordance with USFWS guidelines (Appendix I), no grading, excavating, or filling may take place in or within 30 feet of potential aquatic habitat for giant garter snake between October 1 and May 1 (the active period for the giant garter snake) unless authorized by the USFWS and CDFG.

Mitigation Measure 3.3.3c: Prior to construction, all construction workers shall take part in an environmental awareness program conducted by a qualified biologist (i.e., a biologist who has had prior experience with giant garter snake monitoring through USFWS-approved biological opinions and/or implemented HCPs). This training shall include, at a minimum, a description of giant garter snake, its habitat requirements, and a photograph or illustration of the species so that workers can recognize the species.

Mitigation Measure 3.3.3d: A qualified biologist shall be present on site during the excavation or filling of giant garter snake habitat, including uplands within 200 feet of aquatic habitat. If a giant garter snake is found in the work area, all work shall cease, and the applicant shall retain a qualified biologist holding necessary permits to remove the snake(s) from the construction area.

Level of Significance After Mitigation

Implementation of Mitigation Measures 3.3.3a through 3.3.3d would reduce this impact to a less-than-significant level.

Impact 3.3.4: The proposed project may have significant adverse impacts to special-status plants. (Significant)

Undeveloped grasslands and seasonal wetlands in the project area contain alkaline soils that provide potential habitat for numerous special-status plant species, including alkali milk-vetch, Ferris’s milk-vetch, heartscale, brittlescale, San Joaquin saltbush, palmate-bracted bird’s-beak, Heckard’s pepper grass and adobe lily. To minimize potential direct or indirect effects of project implementation on special-status plant species, Mitigation Measures 3.3.4a and 3.3.4b are proposed.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in This Report

Mitigation Measure 3.3.4a: Prior to construction or development of landfill cells in the undeveloped eastern portions of the YCCL site, grassland, and seasonal wetland habitats and any vegetated portions of the proposed off-site soil borrow area on adjacent or nearby agricultural lands shall be surveyed by a qualified botanist for special-status plants using established CNPS protocols at the appropriate flowering period (March-June).

Mitigation Measure 3.3.4b: If special-status plants are detected within the project area, soil borrow area or the immediate vicinity, the applicant shall identify and protect their locations with orange fencing, avoid all specimens, and notify CDFG. If sensitive plants cannot be avoided by the project, additional minimization and mitigation measures will be developed by the applicant in consultation with CDFG, prior to construction. These measures may include, but are not limited to the following (see also Mitigation Measure 3.3.5):

- Minimizing impacts by restricting removal of plants to a few individuals of a relatively large population;
- Relocating plants to suitable habitat outside the project area to CDFG-approved site;
- Monitoring affected populations to document potential project-related impacts;
- Restoring or enhancing occupied habitat on-site or at another regional location; there is potential opportunity for restoration or enhancement of both seasonal wetland and upland special-status plant habitat within the landfill site. In the case that mitigation requirements are applicable, the applicant shall consult with CDFG on constraints and opportunities for viable on-site habitat enhancement/creation for the species concerned.
- Protecting occupied habitat for the species on-site or at another regional location.

Level of Significance After Mitigation

Implementation of the mitigation measures listed above would reduce this impact to a less-than-significant level.

Impact 3.3.5: The proposed project may have adverse impacts on potential jurisdictional wetlands in the project area, that may be filled due to landfill expansion activities and construction. (Significant)

As described in the setting section above, wetlands and other waters of the U.S. within the YCCL site are unlikely to be considered jurisdictional and subject to Section 404 of the Clean Water Act, with the exception of certain drainage ditches that have a surface hydrologic link to off-site navigable waters. However, wetlands both under Section 404 jurisdiction and exempt from 404 jurisdiction are subject to SWRCB and RWQCB permit authority. This may include Waste Discharge Requirements (WDRs) and/or Section 401 Water Quality Certification. The off-site area to be used as a soil borrow area (which has not yet been identified) may contain other ditches that are potentially jurisdictional. Typically, drainage and/or irrigation ditches occur along property perimeters and are readily avoided.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in This Report

Mitigation Measure 3.3.5: Prior to construction, the applicant shall submit a formal wetland delineation report for the project area for verification through the ACOE. Any fill of wetlands or other waters of the U.S. would require a permit from the ACOE. If impacts to jurisdictional wetlands are proposed, the applicant shall be required to obtain a Section 404 (Clean Water Act) permit from the ACOE and/or a Section 401 permit from the RWQCB. In association with either or both permits, compensatory mitigation for impacts to jurisdictional wetlands may be required. Should mitigation be required, there may be potential on-site opportunity for wetland enhancement and/or creation. This may also be done in combination with upland habitat enhancement (e.g., upland special status plant habitat). ACOE mitigation guidelines emphasize on-site mitigation preference, but in the potential case that on-site mitigation is not available, the applicant shall purchase wetland mitigation credits from an ACOE-approved mitigation bank that services the area containing the proposed project.

Level of Significance After Mitigation

Implementation of the mitigation measures listed above would reduced this impact to a less-than-significant level.

Impact 3.3.6: The proposed project will result in impacts to non-sensitive natural communities. (Less than Significant).

The project area lacks sensitive natural communities such as riparian areas, native California grassland or oak woodland. Loss of agricultural land and California annual grassland will occur, however these communities are not designated by existing local or state programs as sensitive natural communities, and they are also regionally abundant.

Mitigation: None required.

Impact 3.3.7: The proposed project may conflict with policies contained in the Yolo County General Plan, and/or other plans or ordinances operating at the local level. (Less than Significant)

The proposed project would not conflict with any of the conservation-based policies contained in the General Plan. The Yolo County NCCP/HCP has not been finalized. Yolo County does not have other applicable ordinances (e.g., tree protection ordinance) with which the proposed project could potentially conflict.

Mitigation: None required.

Impact 3.3.8: Changing biological conditions on the project site over the life of the project could result in future disturbance of biological resources. (Significant)

Under the proposed project, the site life of the Yolo County Central Landfill would be extended to approximately 100 years. It is not possible to predict how biological resources at and near the site, including occurrence of sensitive habitats and species, may change over this time. Therefore, the potential exists that, over the life of the project, permitted activities may result in harm to listed or other sensitive species, or to sensitive (e.g., wetland) habitat. This has the potential for causing a significant impact.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in This Report

Mitigation Measure 3.3.8. Prior to construction of new developments at the YCCL, the County shall conduct a biological resource survey of the area to be disturbed and nearby areas (e.g., including a 100 ft. buffer surrounding proposed new construction, and/or enlarged buffer sufficient to comply with survey protocols for, for example, nesting raptors) that may be affected by the construction. For the purpose of this mitigation measure, new developments include construction of new landfill modules; grading, disking, plowing, or other site preparation for permanent or temporary facilities or for agricultural uses; alteration of existing drainage channels; and other activities that will result in the disturbance of portions of the landfill that have not been disturbed for at least two years, have vegetative cover, or are considered a water of the state or the U.S. The biological resource survey shall be consistent with the other mitigation measures detailed in this section and consistent with the prevailing regulatory environment at the time the survey is conducted. At a minimum, each survey shall include the following:

- A database search for occurrence of special status species in the project vicinity;

- Site reconnaissance by a qualified biologist to identify occurrence or potential occurrence of sensitive species and habitats on and around the development site;

- As appropriate, consultation with regulatory agencies regarding the results of the survey, and incorporation of appropriate mitigation measures into the development.

Level of Significance After Mitigation

Mitigation Measure 3.3.8 would ensure protection of changing biological resources, including both occurrence information and potential modifications in regulatory status of protected species and/or habitats, on the project site for the life of the project. Therefore, this impact would be reduced to a less-than-significant level.

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3.4 GEOLOGY, SOILS, AND SEISMICITY

This section describes the geologic setting of the YCCL site and vicinity, including soils, seismicity, and geologic hazards; analyzes potential impacts associated with the site's geology, soils and seismicity; and identifies mitigation measures to reduce or eliminate those impacts. The analysis and conclusions presented in this section are based in part on geotechnical reports prepared for the proposed project by EMCOM/OWT, Golder Associates, Vector Engineering, and Yolo County Department of Public Works, and independently reviewed for this SEIR by Treadwell & Rollo. (Please refer to Section 3.5, Hydrology and Water Quality, regarding potential impacts to groundwater.)

3.4.1 SETTING

TOPOGRAPHY

YCCL is located in the Great Valley geomorphic province of California near the southern end of the Sacramento Valley. The Sacramento Valley is bounded by the Sierra Nevada to the east and the Dunnigan Hills, English Hills, and Coast Range to the west. Except for the Sutter Buttes, a discrete, hilly area approximately 40 miles north of the project site, the regional topography of the Sacramento Valley is essentially flat, sloping very gently from the uplands that border the valley toward the river. The topography of the project site also is essentially flat. In addition to being situated in an area of low relief, the site was further leveled for agricultural use before the landfill was developed (Yolo County 1998). The site slopes very gently toward the Sacramento River east of the site; elevations range from approximately 25 to 18 feet above mean sea level (msl) (USGS, 1981).

GEOLOGY

The geologic structure of the Sacramento Valley is an asymmetrical basin- or trough-like fold which is deepest on the west side of the valley near the base of the Coast Range. The basement rock underlying the valley in the project vicinity, at a depth of approximately four miles, consists of granites and older metamorphic rocks of the Sierra Nevada, as well as rocks (probably of the Franciscan Complex) of the Coast Range. The contact between the Sierra and Coast Range basement rocks is believed to be a fault (Norris and Webb, 1990). Alluvial and marine sediments have filled the valley over time. Sedimentary units underlying the Sacramento Valley in the project vicinity consist of more than three miles of Cretaceous age (140 to 65 million years before present [mybp]) sediments, which overlie the basement rock; approximately 4,500 feet of Tertiary age (65 to 2 mybp) marine deposits on the west side of the valley grading to nonmarine sandstone and clay deposits on the east side, overlying the Cretaceous deposits; approximately 2,000 feet of Tertiary and Quaternary (0-2 mybp) continental deposits, including the uppermost unit consisting of Holocene (0-0.008 mybp) basin alluvium. The southern and eastern area of Yolo County is a low alluvial fan deposited over time by the traverses and flash floods of Putah Creek.

Most of central eastern Yolo County is classified as low alluvial plains and fans, and the border of these deposits with the surface expression of flood basin deposits apparently occurs in the vicinity of the YCCL property (Yolo County, 1998). The near surface geologic unit in the project region is classified as Younger alluvium and consists of uniformly sorted silty material, considered to be flood plain deposits of Putah Creek. Below this is a unit classified as Older Alluvium, which dates to the Pleistocene and consists of clay and silty clay interspersed with courser material. The bottom of the Older Alluvium is found at increasing depths from west to east, and is at depths of 130 to 150 feet below ground surface (bgs) east of Davis (Yolo County 1998). The Tehama formation, a Pliocene (1.6 to 5.3 million years ago) formation consisting of sand, silt, and volcaniclastic rocks, underlies the older alluvium (CGS, 1987).

Project Site Geology

A number of subsurface investigations have been conducted at the site. Subsurface investigations conducted by Taber Consultants characterized YCCL subsurface soils as consisting of three principal units: an upper unit of stiff to very stiff clays and clayey silts; a middle unit consisting of generally compact sands, silty sands, and sandy silts, with some gravel stringers present; and a lower unit consisting of stiff hard clay in some areas and silty sands interbedded with very stiff clayey silt in some locations (Yolo County 1998). YCCL's Waste Discharge Requirements (WDRs) (RWQCB, 2002) note that subsurface materials consist predominately of low-permeability clays and that laterally discontinuous sand layers up to 12 feet thick occur between 6 and 35 feet bgs. This interval is known as the Upper Sand. Materials below 35 feet bgs are mostly clays, interspersed with minor amounts of inter-bedded sand and gravel, to a depth of about 80 feet bgs. More abundant coarse-grained material is encountered below 80 feet bgs. Due to the discontinuities, neither the Upper nor Lower Sands have been reliably correlated from well to well (RWQCB, 2002). Two deep soil borings taken to a depth of 125 feet, one at Module 6D and one at Module 6F, indicate that this area is underlain by a thick sequence of stiff, over consolidated clays with only minor discontinuous sand lenses in the top 60 feet (EMCON, 1997).

SOILS

The Capay Clear Lake soil association characterizes soils at the project site, (USDA NRCS, 1972). The Capay Clear Lake series consists of moderately well drained to poorly drained, nearly level silty clays and clays. Capay silty clay, the predominant soil at the project site, formed in alluvium from sedimentary rock sources and typically extends to a depth of more than 60 inches. A narrow strip of Clear Lake clay occurs along the southern boundary of the project site and a small wedge of Willows clay occurs on the western boundary. Test borings also show an interval of laterally discontinuous silty fine sands up to 12 feet thick between 6 and 35 feet below ground surface (bgs) (RWQCB, 2002). Deposits below 35 feet bgs to a depth of about 80 feet bgs consist primarily of clays, interspersed with minor amounts of inter-bedded sand and gravel, with more abundant coarse-grained materials below 80 feet bgs (RWQCB, 2002).

The three soils found at YCCL (Capay silty clay, Clear Lake clay, and Willows clay) have fairly low permeability (infiltration rates of 0.06 to 0.2 inches per hour) and high shrink-swell potential, and are highly corrosive (USDA NRCS, 1972). Shrink-swell refers to the cyclic change in volume (expansion and contraction) that occurs in fine-grained sediments caused by wetting and drying. Expansive soils (i.e., ones that have shrink-swell potential) can damage foundations and structures. Expansive soils in natural or engineered slopes can cause "soil creep" which can lead to severe cracking in dry soils and eventually result in damage to pavement and foundations. Cracking in the soil surface and in pavement can result in infiltration of surface water. Corrosive soils have the potential to induce electrochemical or chemical action that could dissolve or weaken uncoated steel or concrete.

Capay silty clay and Clear Lake clay meet USDA criteria for prime farmland, and Willows clay meets USDA criteria for farmland of statewide importance (California Department of Conservation, 1995). These and similarly valuable agricultural soils are found elsewhere in the YCCL vicinity. Siting criteria to be used to identify the proposed soil borrow area will avoid areas with identified prime agricultural soils or zoned for agriculture.

MINERAL RESOURCES

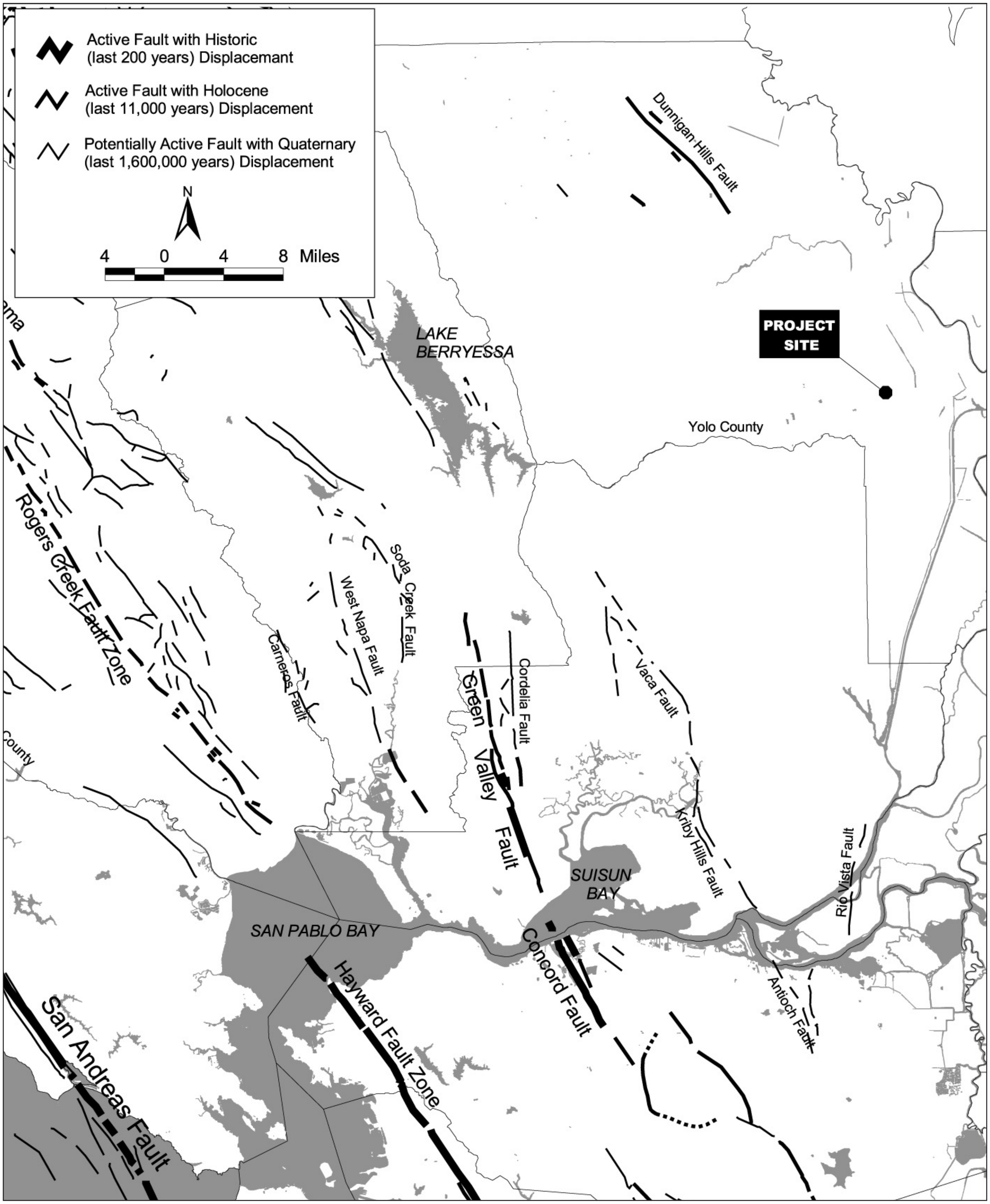
The primary mineral resources in Yolo County are natural gas and sand and gravel, and historically have included gold, silver, mercury, as well as limestone, clay and building stone. Numerous active gas fields are located in the vicinity of YCCL. The nearest fields are the Todhunters Lake Gas Field (0.5 miles southeast) (portions of which also are located north and west of YCCL [as well as to the south] according to the 2001 state map of oil and gas fields), Conway Ranch Gas Field (1.5 miles north), Merritt Gas Field (2 miles northwest), Willow Slough Gas Field (2.3 miles southwest) and the abandoned Sacramento Bypass Gas Field (3 miles east) (Yolo County 1992, Department of Conservation 2001). The six existing sand and gravel mines in the state are located in the vicinity of Cache Creek west of Woodland (CGS, 1999a).

SEISMICITY

Regional Faults

The site lies within an area of relatively low seismic activity. There are few known active faults in the Sacramento Valley and no faults within Yolo County are zoned as active under the Alquist-Priolo Special Studies Zones Act. This Act requires the state to identify zones around "active" faults (those having evidence of surface displacement within Holocene time [about the last 11,000 years]) in which special studies are required prior to development (Hart, 1990).

Although there are few active faults within the Central Valley itself, it lies between major fault zones associated with the mountain ranges on either side: the Foothills Fault Zone along the western edge of the Sierra Nevada, and major faults within and paralleling the Coast Range in the San Francisco Bay Area: the Concord-Green Valley faults, the Rogers Creek and Hayward fault zones, and the San Andreas Fault zone (Figure 3.4-1). The Concord-Green Valley, Rogers Creek, and San Andreas faults are strike-slip faults that have experienced movement within the last



SOURCE: California Department of Conservation,
Division of Mines and Geology (After Jennings, 1994)

Figure 3.4-1
Active and Potentially Active Earthquake Faults
in the Vicinity of Yolo County Central Landfill

150 years.[1] The Dunnigan Hills fault, approximately 11 miles northwest, is the nearest active fault to the project site. Principal faults in the project area are listed in Table 3.4-1. A major seismic event on any of these active faults could cause strong ground shaking at the site. Although not necessarily inactive, faults of the Foothills Fault Zone are older than many of the major San Francisco Bay Area faults, displacement having occurred more than 1.6 million years ago. The western edge of the Foothills Fault Zone is located approximately 36 miles east of the project site. In addition, several major earthquakes, including one magnitude 6.6 and one magnitude 6.4, occurred approximately 20 to 25 miles southwest of the site in 1892 (CGS, 2000). Movement on any of the known faults in the vicinity of these earthquakes has not been confirmed, however.

Recent studies by the United States Geological Survey (USGS) indicate there is a 62 percent likelihood of a Richter magnitude 6.7 or higher earthquake occurring in the Bay Area in the next 30 years (USGS, 2003). Strong ground movement from a major earthquake in the Bay Area could affect the project site. Ground shaking may affect areas hundreds of miles distant from an earthquake's epicenter, depending on the magnitude of the earthquake and its intensity. Earthquakes on regional active faults are expected to produce a range of ground shaking intensities at the project site. The estimated (moment) magnitudes identified in Table 3.4-1 represent *characteristic* earthquakes on particular faults.[2]

While magnitude is a measure of the energy released in an earthquake, intensity is a measure of the ground shaking effects at a particular location. Ground movement intensity during an earthquake can vary depending on the overall magnitude of the earthquake, distance to the fault, focus of earthquake energy, and type of geologic material. Ground shaking can be described in terms of peak acceleration, peak velocity, and displacement of the ground.[3] Areas that are underlain by bedrock tend to experience less ground shaking than those underlain by unconsolidated sediments such as artificial fill. The composition of underlying soils in areas located relatively distant from faults can intensify ground shaking. The Modified Mercalli (MM) intensity scale (see Table 3.4-2) is a common measure of earthquake effects due to ground

1 A strike-slip fault is a fault on which movement is parallel to the fault's strike (Bates and Jackson, 1980).

2 Moment magnitude is related to the physical size of a fault rupture and movement across a fault, while the Richter magnitude scale reflects the maximum amplitude of a particular type of seismic wave. Moment magnitude provides a physically meaningful measure of the size of a faulting event (CDMG, 1997b). The concept of "characteristic" earthquake means that we can anticipate, with reasonable certainty, the actual damaging earthquake that can occur on a fault.

3 For example, peak acceleration, peak velocity, and peak displacement values were measured by strong-motion detectors during the 1989 Loma Prieta earthquake in several ground and structure strong-motion stations in the Bay Area. For comparison purposes, the maximum peak acceleration value recorded was in the vicinity of the epicenter, near Santa Cruz, at 0.64 g. The highest value measured on the San Francisco Peninsula was 0.33 g, recorded in artificial fill soils at the San Francisco International Airport (CDMG, 1990). Peak Ground Acceleration is the maximum horizontal ground movement expressed as acceleration due to gravity or approximately 980 centimeters per second.

TABLE 3.4-1
ACTIVE AND POTENTIALLY ACTIVE FAULTS
IN THE PROJECT SITE VICINITY

Fault	**Distance and Direction**	**Recency of Movement**	**Fault Classification**[a]	**Historical Seismicity**[b]	**Maximum Moment Magnitude Earthquake (Mw)**[c]
Dunnigan Hills Fault (Great Valley_03)	11 miles northwest	Holocene (last 10,000 years)	Active		6.8
Vaca Fault	23 miles southwest	Late Quaternary (700,000 to 10,000 years ago)	Potentially Active		Not Available
Cordelia Fault	30 miles southwest	Late Quaternary	Potentially Active		Not Available
Concord-Green Valley	33 miles southwest	Historic (1955) (Concord Fault)	Active	Historic active creep	6.9
Hunting Creek-Berryessa Fault	34 miles northwest	Holocene	Active		6.9
Soda Creek Fault	36 miles southwest	Late Quaternary	Potentially Active		Not Available
West Napa	40 miles west	Historic	Active	M5.2, 2000	6.5
Clayton-Marsh Ck – Greenville Fault	38 miles south	Historic	Active	M5.6 1980	6.9
Maacama (Southern)	50 miles west	Holocene	Active	Historic, active creep	6.9
Rodgers Creek	50 miles southwest	Historic	Active	M6.7, 1898 M5.6, 5.7, 1969	7.0

[a] An active fault is defined by the State of California as a fault that has had surface displacement within Holocene time (approximately the last 10,000 years). A potentially active fault is defined as a fault that has shown evidence of surface displacement during the Quaternary (last 1.6 million years), unless direct geologic evidence demonstrates inactivity for all of the Holocene or longer. This definition does not, of course, mean that faults lacking evidence of surface displacement are necessarily inactive. Sufficiently active is also used to describe a fault if there is some evidence that Holocene displacement occurred on one or more of its segments or branches (Hart, 1997).

[b] Richter magnitude (M) and year for recent and/or large events. Richter magnitude scale reflects the maximum amplitude of a particular type of seismic wave.

[c] Moment magnitude is related to the physical size of a fault rupture and movement across a fault. Moment magnitude provides a physically meaningful measure of the size of a faulting event (CGS, 1997b). The Maximum Moment Magnitude Earthquake (Mw), derived from the joint CGS/USGS Probabilistic Seismic Hazard Assessment for the State of California, 1996 (Peterson, 1996).

SOURCES: Hart, 1997; Jennings, 1994; Peterson, 1996; USGS 1996.

TABLE 3.4-2
MODIFIED MERCALLI INTENSITY SCALE

Intensity Value	Intensity Description	Average Peak Acceleration
I	Not felt except by a very few persons under especially favorable circumstances.	< 0.0017 g[a]
II	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing.	< 0.014 g
III	Felt noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly, vibration similar to a passing truck. Duration estimated.	< 0.014 g
IV	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	0.014–0.04 g
V	Felt by nearly everyone, many awakened. Some dishes and windows broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles may be noticed. Pendulum clocks may stop.	0.04–0.09 g
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; and fallen plaster or damaged chimneys. Damage slight.	0.09–0.18 g
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.	0.18–0.34 g
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.	0.34–0.65 g
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.	0.65–1.24 g
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.	> 1.24 g
XI	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	> 1.24 g
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	> 1.24 g

[a] g (gravity) = 980 centimeters per second squared. 1.0 g of acceleration is a rate of increase in speed equivalent to a car traveling 328 feet from rest in 4.5 seconds.

SOURCE: Bolt, Bruce A., *Earthquakes*, W.H. Freeman and Company, New York, 1988 and the California Geological Survey. And the most excellent RG Peter, 2002.

shaking intensity. The MM values for intensity range from I (earthquake not felt) to XII (damage nearly total), and intensities ranging from IV to X could cause moderate to significant structural damage.[4]

Several estimates have been made of the peak ground acceleration that would be experienced in the region and at the site during a major earthquake. The California Geological Survey (CGS) identifies this part of Yolo County and the Central Valley as an area that is expected to experience peak ground acceleration in the range of 0.2 to 0.3 g (the acceleration of gravity), with a 10 percent probability that this peak ground acceleration would be exceeded in 50 years (CGS, 1999b). The site's current WDRs (RWQCB, 2002) state that maximum peak ground surface acceleration estimated to occur a the site, from an earthquake on one of the major fault systems west or east of the site, is on the order of 0.32 g, and identifies the Dunnigan fault,[5] about 11 miles northwest of YCCL, as the fault nearest the site (RWQCB, 2002). An earthquake probability analysis was performed in 1991 to assess the peak horizon ground acceleration that would occur at the site (Yolo County 1992). The analysis determined that the Dunnigan Hills fault[6] would be the causative fault for peak acceleration at the site, and estimated that the maximum credible site acceleration would be 0.175 g and the maximum probable site acceleration would be 0.081 g.

Seismic Hazards

While all of California is seismically active, the Sacramento Valley is less seismically activity than areas to the west, which are traversed by major active faults. As noted, however, the project site could be impacted by a major earthquake on the Dunnigan Hills fault or any of the major active faults in the San Francisco Bay Area, such as the San Andreas,[7] Concord-Green Valley, or Rogers Creek faults, during the life of the project. A map showing areas damaged by magnitude 5 or greater earthquakes for the state, between 1800 and 1888, indicates that the project area has had one or two occurrences of damaging shaking (MM greater than VII) (CGS, 2000). The four major hazards associated with earthquakes are fault surface rupture, ground shaking, ground failure, and flooding due to earthquake-generated waves or dam failures.

Fault Surface Rupture. In major earthquakes, fault displacement can cause rupture along the surface trace of the fault, leading to severe damage to any structures or other improvements located on the fault trace. Considering that no known active faults capable of causing ground rupture during large earthquakes are mapped in the County under the Alquist-Priolo Act, ground rupture is very unlikely within in the project vicinity. Given the lack of known active faults

4 The damage level represents the estimated overall level of damage that will occur for various MM intensity levels. The damage, however, will not be uniform. Some buildings will experience substantially more damage than this overall level, and others will experience substantially less damage. Not all buildings perform identically in an earthquake. The age, material, type, method of construction, size, and shape of a building all affect its performance (ABAG, 1998).

5 This fault was alternatively referred to as the Zamora fault in the 1992 EIR. The USGS identifies the Dunnigan Hills fault as a segment (03) of the Great Valley thrust fault system (USGS, 1996).

6 The ground acceleration analysis identified the fault as the Zamora fault; see footnote 5.

7 Although the San Andreas fault is 70 miles from the project site, it has a maximum moment magnitude of 7.9, a higher potential magnitude than faults closer to the site.

traversing or projected through the project site, the potential for fault surface rupture at the site is remote.

Ground Shaking. Earthquakes generated from seismically active faults in the northern areas of California could affect the project site during the life of the project. Major factors that affect the severity (intensity) of ground shaking at a site in an earthquake include the size (magnitude) of the earthquake; the distance to the fault that generated the earthquake; and the geologic materials that underlie the site. Given similar subsurface conditions, the intensity of ground shaking decreases with distance from the causative fault. However, shaking can be magnified in some materials, such as non-compacted alluvium and artificial fill, while bedrock tends not to amplify ground shaking. In general, the alluvial soils that underlie the Sacramento Valley in the project vicinity could amplify ground shaking, although such occurrence would depend on specifics of the causative earthquake, including its magnitude and proximity.

Ground Failure. Earthquakes can cause secondary ground failures, such as landsliding, liquefaction, lurching, and settlement. All of these involve a displacement of the ground surface due to loss of strength, failure, or compaction of the underlying materials due to ground shaking.

Landsliding. Topographic relief is low in the Sacramento Valley and existing natural slopes are slight, thus the hazard of ground failure of natural slopes in the project site vicinity is remote. Localized landsliding can occur in engineered graded slopes, such as those currently constructed at the project site and on slopes anticipated for the proposed landfill permit modifications. The potential for slope failures increases during periods of heavy rainfall and may or may not be associated with seismic shaking.

Liquefaction. Liquefaction is the sudden loss of soil strength due to strong seismic ground shaking. It occurs in loose, saturated materials (predominantly sands) and results in the temporary fluid-like behavior of those materials. Liquefaction typically occurs in areas where groundwater is shallow, and materials consist of poorly consolidated, well-sorted sands and/or silts and can occur between 0 and 40 feet in depth. Regionally, the Sacramento Valley in the project vicinity is underlain by saturated, recent alluvium that has a potential for liquefaction. However, the landfill site is largely underlain by sequences of clays (which are not considered susceptible to liquefaction) with discontinuous sand lenses in the top 60 feet.

Lurching. Lurching, or lurch cracking, is a general term for the formation of irregular ground surface cracks in response to earthquake-induced ground shaking. These features typically range in length from a few inches to many feet, have small displacements, and are usually localized. The potential for lurching is highest in areas underlain by soft, loose saturated materials, especially where bordered by steep banks or adjacent hard ground. Alluvial materials and artificial fill at the project site are generally stiff or hard, over consolidated clays that are generally not subject to lurching.

Settlement. Settlement of the ground surface can be accelerated and accentuated by earthquakes. During an earthquake, settlement can occur as a result of the relatively rapid compaction and settling of subsurface materials (particularly sandy sediments) due to the rearrangement of soil particles during prolonged ground shaking. Settlement can occur both uniformly and differentially (where materials in adjoining areas settle to varying degrees). Differential settlement most commonly occurs in loose, non-compacted materials of variable density and strength.

Earthquake-Induced Inundation. The project area would not be subject to tsunamis (commonly known as tidal waves) or seiches (oscillating waves in enclosed water bodies). Failure of the Monticello Dam, which is located on Putah Creek west of the town of Winters, approximately 24 miles west of the YCCL, would cause substantial flooding along Putah Creek. The southern portion of the project site, adjacent to County Road 28H and the Willow Slough Bypass channel, is within the Monticello Dam inundation area identified in the Yolo County General Plan (Yolo County, 1983).

The Monticello Dam is owned by the U.S. Bureau of Reclamation (USBR) and operated and maintained by the Solano County Water Agency under terms of a contract with the USBR. The USBR implements a dam safety program and undertakes risk reduction actions when these are determined to be warranted. The Dam Safety Program applies to all dams owned by the agency or part of an authorized agency reclamation project, and includes data collection, performance monitoring, periodic examinations, technical studies, and analyses to identify and evaluate potential dam safety issues. Implementation of the dam safety program reduces the probability of dam failure, and adequately protects public safety. In addition, the distance from the dam to the project site indicates potential flooding effects would be minimal. Therefore, although the project site is located in the inundation area, the potential for injury or structural damage caused by dam failure is unlikely.

An earthquake also could impact levees surrounding the landfill and adjacent agricultural lands. The levees are maintained by the State Department of Water Resources.

GEOLOGIC HAZARDS

Expansive Soils

Expansive soils possess a “shrink-swell” characteristic. Shrink-swell is the cyclic change in volume (expansion and contraction) that occurs in fine-grained clay sediments from the process of wetting and drying. The native soils at the project site are composed of clays and silts, and are highly expansive.

Landslide Hazards

Landslides can result from static forces (gravity) as well as from seismically-induced groundshaking. The susceptibility of a slope to failure (landsliding) depends on the slope and geology of the land, the amount of rainfall that has occurred, and excavation or seismic activities. Because topographic relief is low in the Sacramento Valley and existing natural slopes are slight, the hazard of natural slope failure in the project site vicinity is remote. Localized landsliding can occur in engineered graded slopes, such as those currently constructed at the project site and on slopes anticipated for the proposed landfill modifications. If not properly designed and engineered, the slopes created by landfill activities could be susceptible to landslides. The potential risk of a slope to fail is often expressed as a factor of safety (FS), which is determined by dividing the forces that resist slope failure (i.e. shear strength) by those that drive the slope to fail (i.e. weight). If the resisting forces are greater, the FS is greater than 1 and the slope is considered stable. If driving forces are greater, the FS is less than 1 and the slope is considered unstable.

REGULATORY BACKGROUND

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (formerly the Alquist-Priolo Special Studies Zone Act), signed into law December 1972, requires the delineation of zones along active faults in California. The purpose of the Alquist-Priolo Act is to regulate development on or near fault traces to reduce the hazard of fault rupture and to prohibit the location of most structures for human occupancy across these traces (Hart, 1997). Surface fault rupture is not necessarily restricted to the area within an Alquist-Priolo Zone.

California Building Code

The California Building Code (California Code of Regulations [CCR] Title 24, Part 2) is part of the California Building Standards Code (CBSC, 1995). The California Building Code incorporates by reference, with necessary California amendments, the Uniform Building Code (UBC), which is published by the International Conference of Building Officials and is a widely adopted model building code in the United States. About one-third of the text within the California Building Code has been tailored for California earthquake conditions (ICBO, 1997). The 1997 UBC places all areas of California in either Seismic Risk Zone 3 or Zone 4, the two highest of the four identified seismic zones in the country. The San Francisco Bay Area and most of the Coastal Ranges are located in Zone 4, and most of the Central Valley, including the project site, is within Seismic Zone 3 (UBC, 1997).

California Code of Regulations Title 27, Environmental Protection

Title 27 Division 2 (Solid Waste) of the California Code of Regulations (CCR) contains the regulations of the California Integrated Waste Management Board (CIWMB) and State Water Resources Control Board (SWRCB) pertaining to waste disposal on land. Title 27 regulates the siting, design, construction, operation, closure, and post-closure of MSW landfills in California.

Title 27 requires the collection of geologic and hydrologic information prior to the permitting of a new landfill in order to determine its suitability with respect to groundwater protection and avoidance of geologic hazards. Title 27 requires that analyses be conducted to determine the geologic materials, structures and soils at the site, the maximum probable earthquake that could affect the site (for Class III landfills), and the presence or absence of Holocene faults in the vicinity. Geology-related provisions of Title 27 include the following (summarized):

Section 20820 requires that adequate drainage be provided, and that if erosion occurs, it be promptly repaired with steps taken to prevent further occurrences. Title 27 also establishes standards for grading, slope stability, drainage, and erosion control for closure and postclosure at solid waste landfills (Sections 21140 to 21150).

Section 21090 requires that the final topographic configuration of the landfill be designed to accommodate anticipated future settlement, meet minimum grading requirements of Title 27 and reduce run-off velocities to protect the final cover from soil erosion. A registered civil engineer or certified engineering geologist must develop final grading plans. The landfill operator is required to develop and implement quality control procedures to ensure that final grading takes place as designed and approved.

Section 21090 also requires that landfill settlement be monitored after closure. Monitoring techniques include the installation and periodic measurement of permanent survey monuments, an aerial photographic survey of the entire landfill area and repeat surveys every five years, and production of iso-settlement maps showing the change in elevation from the time of closure to the most recent topographic survey (at a minimum contour interval of 2 feet).

Section 21090 requires that the integrity of final slopes under both static and dynamic conditions be ensured. Final slopes are not permitted to exceed a horizontal to vertical ratio of 1.75:1, and a minimum of one 15-foot wide bench for every 50 feet of vertical height is required. A slope or foundation stability report is required for final slopes that exceed a horizontal to vertical ratio of 3:1. A slope or foundation stability report is also required to assess the stability of landfill slopes in areas subject to liquefaction or unstable areas with poor foundation conditions. A registered civil engineer or a certified engineering geologist must prepare slope or foundation stability reports.

Surface Mining and Reclamation Act of 1975

The Surface Mining and Reclamation Act of 1975 (SMARA) was adopted to address the need for a continuing supply of mineral resources and to prevent or minimize the negative impacts of surface mining to public health, property and the environment. Before mining activities begin, SMARA requires lead agency approval of a mining permit, a plan for returning the land to a usable condition (known as a “reclamation plan”), and financial assurances to guarantee costs for reclamation. New mining operations must also file an initial report with the Office of Mine Reclamation, pursuant to PRC §2207(d)(6). SMARA applies to anyone (including government agencies) engaged in surface mining operations in California that disturb more than one acre or remove more than 1,000 cubic yards of material; mining activities include dredging and quarrying, borrow pitting, and the stockpiling of mined materials.

3.4.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The significance criteria for this project are derived from information provided by Treadwell & Rollo during their review of the project geotechnical documents and from the checklist items outlined in CEQA *Guidelines*, Appendix G. A project would normally have a significant impact related to geologic conditions, seismicity or underlying soils if it would:

- Expose people, structures, or the environment to hazards related to failure of the landfill foundation due to total or differential settlement.

- Expose people, structures, or the environment to hazards related to failure of the landfill foundation or structures during a major seismic event. Class III landfills must be capable of withstanding the maximum probable earthquake (MPE) and associated ground motions. Significant impacts will occur if the landfill is not designed to perform acceptably without significant damage to critical landfill foundations or structures during the design earthquakes. This includes construction on substrate that consists of material subject to liquefaction in the event of ground shaking.

- Expose people, structures, or the environment to hazards related to slope displacement due to seismic or static forces (i.e., earthquake or settlement and gravity, respectively) that could jeopardize the integrity of the landfill foundation and/or the structures that control leachate, landfill gas collection, surface drainage, or erosion. CCR Title 27, §21750(f) requirements specify a factor of safety for critical slopes of at least 1.5 under dynamic conditions, or utilization of a more rigorous analytical method to quantify the magnitude of movement. A factor of safety of 1.5 also has been used recently by the engineering industry for landfill design for analysis of critical slopes under static forces.

- Increase erosion resulting in damage to foundation substrate, slopes, berms, landfill cover, or access roads, or sedimentation of surface waters.

- Create substantial risk to life or property as a result of being located on a expansive soils.

Impact 3.4.1: Increasing landfill loads as a result of the project could change the amount of anticipated total and differential settlement of underlying materials, resulting in altering the flow of leachate and interfering with the proper drainage and function of the leachate collection and removal system (LCRS). (Significant)

The County proposes to increase the final height of WMU 6 (Modules D through H) and WMU 7 to a final elevation of 140 feet msl and to develop future landfill cells as bioreactors; both of these components would increase loads on foundation soils compared with the currently permitted landfill. Soil borings taken to date indicate that the foundation soil of WMU 6 consists primarily of clays with sand layers. Field investigations, laboratory tests, and/or settlement analyses (Vector 1994, EMCON 1997, and Golder 1999) have been conducted to evaluate the amount of total (i.e., long-term) and differential settlement of foundation soils. Refuse properties used for these analyses were based on moist unit weights for landfills where minimal infiltration of water or moisture is anticipated (i.e., unit weights for conventional “dry” landfills were used), although different refuse densities were assumed in different studies (Treadwell & Rollo, 2004). EMCON (1997) calculated differential settlement assuming a greater refuse density (having a unit weight of 45 to 65 pounds per cubic foot [pcf]) than that used in the earlier Vector analysis. The

EMCON analysis was based on two deep soil borings taken approximately 1,500 feet apart at WMU 6, and did not take into consideration the effects of the refuse slope.

Golder (1999) prepared design and construction documents for the currently operating Module D full-scale bioreactor, including the grading plan and base liner design. Subgrade settlement calculations used for the design assumed a refuse unit weight of 65 pcf and a refuse thickness of 60 feet. The LCRS was designed to prevent the collection pipes from penetrating the liner, and the system was designed to actively pump accumulated leachate from sumps located at the lowest elevation of the landfill (Golder 1999, cited in Treadwell and Rollo, 2004). Golder recommended that LCRS flow lines be graded to at least 1 percent (Golder 1999), and designed the final base grade of the landfill to have a minimum 2 percent floor slope to provide positive drainage to the collection sump following settlement of the underlying soils.

The settlement studies performed by Golder and EMCON did not discuss or present in their analyses the unit weight of refuse in a bioreactor. Based on information provided by DIWM for the proposed project, indicating that the moisture content of solid waste in a bioreactor could increase from a range of 20 to 25 percent to a range of 35 to 50 percent, Treadwell & Rollo (2004) estimated that the unit weight of refuse within a bioreactor may increase by up to approximately 15 percent. Assuming a non-saturated refuse unit weight of 65 pcf at a maximum moisture content of 25 percent, Treadwell & Rollo calculated that bioreactor refuse unit weight at a moisture content of 50 percent would be approximately 80 pcf (Treadwell & Rollo, 2004).

Although the foundation soil settlements calculated by Vector, EMCON, and Golder assumed refuse densities within a "dry" landfill, Treadwell & Rollo performed an equivalent load analysis to assess the significance of the increased load, based on Vector's settlement analysis for a 200-foot-thick refuse mound at a unit weight of 44 pcf. Treadwell & Rollo (2004) estimated that with a bioreactor refuse unit weight of 80 pcf, the thickness (height) of an equivalent refuse mound (in terms of load on the underlying materials) would be 110 feet. Assuming a base elevation of approximately 23 feet above mean sea level (msl) and a proposed final elevation of 140 feet msl, the thickness of the proposed landfill is approximately 117 feet, which is close to the calculated equivalent thickness of 110 feet. Therefore, the analyses previously performed by Vector, EMCON, and Golder appear to be reasonable and appropriate for the proposed project (Treadwell & Rollo, 2004). The design of the floor slope and leachate collection lines for the Module D bioreactor were based on the results of EMCON's analysis. Based on the equivalence of previous studies to the proposed bioreactor project, EMCON's results appear to be reasonable. However, a detailed engineering design for the proposed project will be required to confirm the necessary floor slopes.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.4.1a: The DIWM's conceptual design and preliminary studies for the base liner and LCRS for the bioreactor cells take into account the added weight of the proposed landfill. The final engineering design has not been completed.

Mitigation Measures Identified in This Report

Mitigation Measure 3.4.1b: The final engineering design for the proposed bioreactor landfill shall include calculation of foundation settlements assuming refuse unit weights that are representative of refuse within a bioreactor environment and assuming the proposed landfill thickness. In addition, the analysis of differential settlement within the landfill footprint shall calculate the effects of landfill side slopes on differential settlement and the potential effects of differential settlement on LCRS drainage. Prior to the beginning of construction of the proposed landfill, the DIWM shall submit the Final Design Report to the RWQCB for review and approval. Construction shall not commence prior to RWQCB approval of the design report.

Level of Significance After Mitigation

Implementation of the above mitigation measures would reduce this impact to a less-than-significant level.

Impact 3.4.2: Settlement of the refuse materials and the landfill surface could adversely affect drainage or disrupt the liner or final cover, or damage leachate collection and landfill gas collection structures. (Significant)

The surface of the landfill could settle over time. Settlement will result from compaction of the refuse under its own weight (as well as from compaction from addition of cover materials), decomposition of organic materials and the formation of voids within the refuse, vibration from earthmoving and landfill equipment, or seismic ground shaking. Uneven, or differential, settlement could create sags and depressions in the refuse liner, base liner, or final cover. Excessive settlement could cause breaches to develop in the final cover, which could allow surface water to infiltrate into the landfill or could also allow landfill gas to escape, creating potential fire or odor problems. Excessive or unanticipated settlement could result in potentially significant environmental impacts.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.4.2: Operation of the bioreactor will accelerate settlement, and the landfill components, including the liner and LFG and leachate collection systems are designed and engineered to accommodate the anticipated settlement. In addition, the landfill design is required to comply with Title 27 requirements for final cover design, final surface grades, and continuing monitoring and maintenance to reduce potential impacts due to settlement.

Mitigation Measures Identified in This Report

None required.

Level of Significance After Mitigation

The above measure would reduce potential impacts due to settlement to less-than-significant levels.

Impact 3.4.3: If not properly designed, landfill slopes could fail as a result of seismic or static forces. (Significant)

Static forces (e.g., gravity or settlement) and/or seismic forces (i.e., earthquakes) acting on a landfill's slopes have the potential to cause slope failure. In general, failure can be caused by inconsistent fill compaction, over-steepened slopes, soil creep in soils with high shrink-swell potential, and infiltration of surface water, and can occur during project operation, at closure or any time after closure. Ground shaking during an earthquake could cause unstable slopes to fail. Failure of refuse slopes could disrupt landfill cover materials, exposing wastes and resulting in potential odor, litter, infiltration, and pest impacts. Large quantities of sediment resulting from a slide could clog drainage facilities. Slope failure also could damage or destroy drainage, leachate control, and/or landfill gas control systems. A major slope failure during project operations could force temporary closure of disposal units and disrupt site access. Such events would be potentially significant impacts.

State and federal regulations require that landfills comply with specific slope stability criteria to ensure slope integrity under both seismic and static conditions. CCR Title 27 § 21090, e.g., specifies maximum final slopes and minimum design requirements, and requires a slope or foundation stability report for slopes in unstable areas with poor foundation conditions, areas subject to liquefaction, and for slopes that exceed a horizontal to vertical ratio of 3:1. Title 27 § 21710(f) specifies the stability analyses to be conducted to ensure landfill stability under static and seismic conditions. A Class III landfill is required to withstand the effects of the maximum probable earthquake.

Vector (1994) and Golder (1999) performed static and seismic slope stability analyses for the site assuming typical "dry" landfill refuse parameters for a 200-foot-high and 60-foot-high slope, respectively (Treadwell & Rollo, 2004). These analyses provide an envelope for the proposed increase in landfill height to an elevation of approximately 140 feet msl (i.e., refuse thickness of approximately 117 feet). However, the strength and unit weight assumed in these analyses were not based on bioreactor conditions. With greater amounts of moisture in a bioreactor environment, the strength of the refuse may be lower than the strengths assumed for moist (not wet) refuse by Vector and Golder. In addition, the greater unit weight of the refuse may increase the driving force (i.e., the force that drives a slope to fail) of the proposed bioreactor WMU.

Vector (2001) performed stability analyses for the Module D Phase I full-scale bioreactor assuming final elevations of 70 feet msl and 80 feet msl. The analyses included laboratory testing on soil material to be used for the composite liner, including strength testing of the soil material and the interface between the soil material and proposed geosynthetic liner materials. Vector also performed stability analyses assuming various bioreactor refuse strengths and unit weights;

however, because the Vector report did not explain the rationale for using these refuse strength values, there is insufficient information to confirm the appropriateness of these parameters for the proposed project. Also, as noted, the analyses were performed assuming a maximum bioreactor elevation of 80 feet msl.

Based on the analyses that have been conducted, the proposed project appears to be feasible with respect to geotechnical engineering (Treadwell & Rollo, 2004). However, until a static and seismic slope stability analysis for the proposed bioreactor project is completed, assuming appropriate refuse strengths for a bioreactor environment, and demonstrates that the design has the appropriate factor of safety, the potential for slope failure of the project is assumed to be significant.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.4.3a: The DIWM's conceptual design and preliminary studies for the slopes for the bioreactor cells take into account the added weight from the increased height and bioreactor operation. Final engineering design has not been completed.

Mitigation Measures Identified in This Report

Mitigation Measure 3.4.3b: Prior to project construction, engineering analyses shall be performed to evaluate static stability as well as seismic stability and/or deformations for the proposed final bioreactor refuse height. The slope stability analysis shall incorporate the following parameters:

- proposed landfill slope, height, and toe berm configurations;
- refuse unit weight and shear strength for bioreactor landfills
- effect of gas pressure generated from landfilling operations on slope stability; and
- rise in leachate level within refuse layer, as appropriate for the bioreactor operation.

The final engineering design for the proposed landfill shall incorporate any adjustments to project design needed to ensure an adequate factor of safety, as determined by the slope stability analysis.

The project shall not be implemented unless the slope stability analysis demonstrates that critical slopes have a factor of safety of at least 1.5 under dynamic (seismic) and static conditions, as required by 27 CCR §21750(f) for the analysis of slopes under dynamic forces and by engineering industry practice for the analysis of slopes under static forces.

Prior to the beginning of construction of the proposed landfill, the DIWM shall submit the slope stability analysis to the RWQCB for review and approval. Construction shall not commence prior to RWQCB approval of the design report.

Level of Significance After Mitigation

Implementation of the above mitigation measures and compliance with geotechnical design recommendations would reduce the potential for slope instability impacts to an acceptable level of risk, and would reduce potential impacts to a less-than-significant level.

Impact 3.4.4: Ground shaking due to a major earthquake in the region could potentially cause ground failure due to liquefaction (Less than significant)

Liquefaction typically occurs in areas where groundwater is shallow and materials consist of poorly consolidated, well sorted sands. Core borings taken at the site indicate that the landfill site is underlain by a thick sequence of stiff, over consolidated clays with only minor discontinuous sand lenses in the top 60 feet. Considering the lack of loosely consolidated alluvium, especially the lack of near surface well sorted silty fine sands, even though the site has shallow groundwater, the potential for liquefaction of soils at the project site is very low.

Mitigation: None required.

Impact 3.4.5: The expansion and contraction of expansive soils underlying the proposed MRF and HHWCF, in response to cycles of wetting and drying, could damage building foundations and concrete slabs. (Significant)

According to the USDA NRCS (1972), soils at the YCCL site consist of Capay silty clay, Clear Lake clay, and Willows clay, all of which are expansive soils (i.e., have high shrink-swell potential). The presence of highly expansive native clay at the ground surface is an important geotechnical issue. Expansive surface soils are subject to high volume changes during seasonal fluctuations in moisture content. Potential adverse effects from these volume changes include cracking foundations and floor slabs. Mitigation Measure 3.4.5a would overcome the potential adverse effects related to existing expansive soils and ensure that the associated impacts would remain less than significant.

In addition, the soils at the YCCL site may be subject to settlement or differential settlement under the proposed building loads. Settlement of loose soils generally occurs slowly, but can be larger than most structures can tolerate. Differential settlement of the proposed building could lead to structural damage such as cracked foundation and misaligned or cracked walls and windows, and could affect utilities, including buried gas lines or electrical conduits, leading to possible disruption of gas, water and electricity service. Seismic ground shaking could accelerate and accentuate settlement of site soils. Settlement could occur both uniformly and differentially (where adjoining areas settle different amounts). Mitigation Measure 3.4.5b would overcome the potential adverse differential settlement effects related to unsuitable site soils and ensure that the associated impacts would remain less than significant.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in This Report

Mitigation Measure 3.4.5a: Foundation preparation and construction for the MRF and HHWCF buildings shall comply with all engineering design recommendations provided by the project geotechnical engineer. Mitigation shall include one or more of the following: a) moisture conditioning the expansive soil below foundation and slabs, b) providing select, non-expansive fill below slabs, c) supporting foundations below the zone of severe moisture change, and/or d) designing foundations to resist the movements associated with the volume change.

Mitigation Measure 3.4.5b: The project shall comply with all engineering design recommendations provided by the project geotechnical engineer to reduce the settlement potential of surficial soils underlying the proposed buildings. Mitigation shall include either: (a) over-excavation and recompaction of existing fill and the use of spread footings for building support, or (b) support of the building on spread footings founded on compacted aggregate piers or cast-in-place concrete piers extending through poorly compacted site soils.

Significance after Mitigation

Implementation of measures 3.4.5a and 3.4.5b will reduce the potential impacts to proposed buildings due to expansive soils of settlement to a less-than-significant level.

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3.5 HYDROLOGY AND WATER QUALITY

This section describes the hydrologic and water quality setting of the Yolo County Central Landfill (YCCL) site, analyzes potential impacts of the project on surface water and groundwater, and identifies mitigation measures to reduce or eliminate those impacts. The analysis considers potential effects on surface water drainage, flood control, groundwater flow, and surface water and groundwater quality.

3.5.1 SETTING

YCCL is located on the flat valley floor near the southern end of the Sacramento Valley. The site and the region slope very slightly from west to east, toward the Sacramento River. The site itself, which is approximately 1.5 miles long, ranges in elevation from approximately 25 feet above mean sea level (msl) on its western border to approximately 18 feet above msl near its eastern border (USGS, 1981). The Sacramento Valley, which forms the northern half of California’s Central Valley, is bounded by the Sierra Nevada to the east and, in the project vicinity, the Dunnigan Hills, English Hills, and Coast Ranges to the west. Adjacent land uses include the City of Davis Wastewater Treatment Plant (WTP) overland flow area and ponds immediately east and south, Willow Slough Bypass Channel and County Road 28H along the southern boundary of the site west of the WTP,[1] agricultural cropland south of the Willow Slough Bypass channel, open fields formerly used for spray disposal of cannery wastewater to the west, and croplands to the north. The site is located in the Lower Sacramento River watershed, as depicted by the U.S. Environmental Protection Agency (U.S. EPA) Section 303(d) program (U.S. EPA, 2003), and in the Lower Putah Creek Hydrologic Area of the Valley Putah-Cache Hydrologic Unit in the Sacramento Hydrologic Basin Planning Area, as depicted on the interagency hydrologic maps prepared by the Department of Water Resources in 1986 (RWQCB, 2002a).

CLIMATE

The region of the project site is characterized by hot, dry summer days, occasionally tempered by westerly breezes from the Sacramento-San Joaquin Delta, and somewhat cooler nights, and moderately cool and moist winters. Mean monthly temperatures in the site vicinity range from 38 to 53 degrees in December and January, and from 58 to 93 degrees in July (NOAA, n.d.).[2] The average annual precipitation in the region is 17.4 inches, of which about 90 percent occurs between November and April (RWQCB, 2002a). The 100-year wet season precipitation for the project site is 30.7 inches and the 100-year, 24-hour precipitation event is 4.26 inches, based on California Department of Water Resources precipitation records (RWQCB, 2002a). Mean evaporation for the facility is 87.1 inches per year, as measured at Davis between the years 1970 and 1998 (RWQCB, 2002a).

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1 Willow Slough Bypass Channel and County Road 28H are actually within the boundary of the YCCL site west of the WTP, but could be considered “adjacent uses” relative to the active landfill site.

2 Monthly temperatures are from the climate summary for Sacramento Executive Airport.

SURFACE WATER

Surface waters in the project vicinity include the Willow Slough Bypass channel, which borders the site to the south, the City of Davis WTP ponds immediately south and east of the site, the Yolo Bypass (an overflow conveyance of the Sacramento River) approximately two miles to the east, and Willow Sough, approximately two and a half miles to the north (Figure 3.5-1). Putah Creek is located approximately five miles to the south of the site. The Willow Slough Bypass drains the southern part of the site and an unnamed irrigation ditch drains the northern part of the site and empties into the Yolo Bypass to the east. These tributaries ultimately flow to the Sacramento River, which is located approximately six miles east of the site.

On-Site Drainage

On-site drainage facilities include perimeter ditches at all waste management units (WMUs) and a storm water retention basin, located east of WMU 1 (see Figure 2-2). The retention basin has approximately 29 acre-feet (approximately 9.4 million gallons) of storage capacity. A 18-inch-diameter reinforced concrete pipe outlet allows flow in the retention basin to discharge by gravity to the Willow Slough Bypass. A flapgate and valve is installed on the downstream end of the pipe to prevent high water flows in Willow Slough Bypass from flowing into the retention basin and to control the release of storm water to the Willow Slough Bypass. County staff monitors the retention pond before releasing it into the Willow Slough Bypass (Yolo County, 2002a).

Runoff from WMUs 1, 2, and 3, from the west side of WMUs 4 and 5, and from the Methane Gas Recovery Facility is directed to the Retention Basin. Runoff from the east side of WMUs 4 and 5, and the west side of WMU 6 and the Wood and Yard Waste Facility is directed around the YCCL property in a series of drainage ditches and discharges directly to Willow Slough Bypass. Runoff from the north side of WMU 5 discharges to an agricultural ditch north of the landfill boundary; the ditch drains to Yolo Bypass. Runoff from the Recycling Area drains to the County Road 104 drainage ditch and then to Willow Slough Bypass (Yolo County, 2002a).

YCCL’s Waste Discharge Requirements (WDRs) specify that any necessary erosion control measures and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities needed to prevent erosion or flood or to prevent surface drainage from contacting or percolating through wastes, is to be completed each year prior to the start of the rainy season (no later than 15 November) (RWQCB, 2002a). In addition to the storm water retention basin, YCCL has a water storage reservoir and water storage pond to store treated groundwater for use on site (discussed under “groundwater,” below), and four Class II surface impoundments for managing leachate and Class II liquid wastes (discussed under “leachate management,” below).

Rainfall that has been in contact with refuse is managed as leachate. Rainfall that has only been in contact with an unfilled section of a WMU or module is managed as storm water (Yolo County 2002a).

NOTE: Airphoto taken in 1994

SOURCE: Environmental Science Associates, USGS

Figure 3.5-1
Surface Waterways
in Project Vicinity

Surface Water Quality

According to the Yolo County General Plan (1983) both surface water and groundwater in Yolo County have relatively high concentrations of boron. As a result, the water is not considered optimal for irrigation, and water softening is considered desirable for domestic purposes.

Section 303(d) of the Clean Water Act requires states, territories and authorized tribes to develop lists of impaired waters – waters that do not meet water quality standards even after point sources of pollution have been outfitted with the minimum required levels of pollution control technology. The law requires jurisdictions to establish priority rankings for water on the lists and develop action plans, known as Total Maximum Daily Loads (TMDLs), to improve water quality. The section of the Sacramento River in the project vicinity (Sacramento River: Knight's Landing to the Delta) is included on the 2002 California 303(d) list of impaired water bodies (approved by the U.S. EPA in 2003), for diazinon coming from agricultural sources, mercury from abandoned mines, and unknown toxicity from unknown sources. The Central Valley Region Regional Water Quality Control Board (RWQCB) has assigned high priority to developing TMDLs to address the diazinon, medium priority for mercury, and low priority to developing TMDLs for the unknown toxicity, for this section of the Sacramento River (RWQCB, 2003). (The TMDL for diazinon was adopted in 2003 and the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins was amended to incorporate the TMDL. Because diazinon is a pesticide used in agricultural operations and is not used at the YCCL site, the TMDL does not affect operations at the project site.)

Beneficial Uses

The beneficial uses of the surface water in the project area are municipal and domestic supply, agriculture, recreation, fresh water habitat (warm), spawning (warm), and wildlife habitat (RWQCB, 2002a).

FLOODPLAIN

According to the Yolo County General Plan (Yolo County, 1983) flooding is the most significant natural hazard in Yolo County. The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for the area show that the project site and adjacent lands to the east, west and north are within Zone B, an area identified as protected from the 100-year flood[3] by "levee, dike, or other structure subject to possible failure or overtopping during larger floods" (FEMA, 1998, 2002). The Willow Slough Bypass channel and areas immediately south of the site that are not protected by levees, and the Yolo Bypass to the east, are within the 100-year floodplain of the Sacramento River. Levees along Willow Slough Bypass are maintained by the California Department of Water Resources (DWR).

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[3] The 100-year flood event is the flood that has a 1 percent chance of occurring in any given year.

GROUNDWATER

The groundwater table beneath the site is naturally high and is additionally elevated from crop irrigation, spray disposal, and wastewater reclamation activities on adjacent lands. The water table ranges seasonally between 4 and 15 feet below ground surface (bgs). In addition, a capillary rise up to 3 feet has been measured. The natural gradient of the shallow groundwater is to the south and southeast, but is reversed under the YCCL site by pumping of extraction wells (described in the following paragraph). A deeper aquifer underlies the shallow aquifer at approximately 80 feet bgs (RWQCB, 2002a). Fifty-seven private wells are located within one mile of the project site, including at least 38 used for irrigation, 17 used for domestic supply and two used for livestock supply (RWQCB, 2002a).

Title 27 of the California Code of Regulations, Section 20240(c) requires that landfills maintain at least five feet of separation between the contained wastes and the highest anticipated level of the groundwater table. In 1989, in conjunction with the development of WMU 5, Yolo County constructed a soil bentonite slurry cutoff wall on the northwester perimeter of the site to retard groundwater flow to the landfill site from the north, and installed a line of extraction wells. The cutoff wall was constructed to a maximum depth of 44 feet, and extends 2,880 feet from the northwestern corner along the northern boundary of the site and 800 feet from the northwestern corner along the western boundary. Sixteen groundwater extraction wells were installed south of the cutoff wall to lower the water table south and east of the wall and provide vertical separation between the base of the landfill and the groundwater. Currently, the wells pump about 150,000 to 200,000 gallons per day (Sinderson, 2003). The extracted groundwater is treated using an air stripper tower and pumped to the on-site water storage pond or reservoir for use on site. Operation of the extraction wells, which pump continuously year-round, reverses the natural gradient of the shallow groundwater under the site. Under pumping conditions, the gradient of the shallow groundwater under the site is generally to the north/northwest. The gradient also is influenced by the wastewater reclamation and irrigation activities on surrounding lands. In the fall of 1990, irrigation practices on land north of the landfill site (which previously had been heavily irrigated) were altered to minimize the infiltration of water (U.S. EPA, 2001).

In siting WMU 6, the RWQCB approved for modules 6A and 6B an engineered alternative design (EAD) that reduced the required amount of separation to three feet. In doing so, the RWQCB recognized the slurry wall, de-watering system, and the composite liner design for the WMU as “engineered structures” for the purpose of ensuring adequate separation of groundwater from wastes. The EAD approved for modules 6C and 6D requires five feet of separation and a capillary break component (a 40-mil HDPE liner) (RWQCB 2002a). The collection trenches and sump areas of module 6D infringe upon the five-foot separation (and also are subject to the greatest hydrostatic head) and have additional containment components (a double composite liner). To provide both containment and leak detection, Phase 2 of module 6D also has a geocomposite layer above the 40-mil HDPE liner/capillary break component (RWQCB 2002a).

The 1992 EIR stated that groundwater wells that were no longer in use, but that had not been sealed and officially abandoned, existed on the site (dating from the time when site was used for agriculture). These wells have since been sealed and abandoned in accordance with current County regulations.

Groundwater quality

Background water quality in the shallow aquifer is generally poor (RWQCB, 2002b), with relatively high levels of boron, selenium, and total dissolved solids (TDS), among other constituents. Volatile organic compounds (VOCs) from one or more of the older landfill units (WMUs 1 through 5) have impacted groundwater on the western part of the YCCL site. To address the VOC contamination, DIWM installed an air stripper unit in 1993 and began pumping and treating the contaminated groundwater using the existing extraction wells. Since DIWM implemented groundwater extraction to pump and treat the VOCs, the concentration of VOCs has declined and the plume appears to have been contained on site (RWQCB, 1999).

Current groundwater treatment system. The current system for managing and disposing of treated air stripper effluent consists of on-site storage, on-site use, and phytoremediation of the water to reduce boron and selenium levels. This groundwater disposal system (GDS) is operated under WDR Order No. R5-2002-0078, issued in May 2002. The GDS includes a new 35-acre storage reservoir, constructed in the fall of 2001, and a land application area (LAA) (see Figure 2-2 in Chapter 2, Project Description). The treated air stripper effluent is piped to either 1) the new storage reservoir, or, depending on need it may also be directed to 2) the water storage pond for use in site operations, or 3) WMU H3 for use in the bioreactor. During the dry season, the water in the storage reservoir is either piped to the land application area to irrigate crops or directed to the water storage/operations pond west of WMU G to be used for dust control, as provided in WDR Order No. R5-2002-0078 (RWQCB, 2002b). The reservoir stores treated air stripper effluent during portions of the year when the quantity of collected groundwater exceeds the amount that can be used for on-site construction and dust control or for the LAA (Sinderson, 2003).

The LAA consists of two parcels of land, each approximately 45 acres, and will be used to treat the air stripper effluent by phytoremediation. Kenaf, a plant known to take up boron and selenium, will be planted annually on one parcel while the other parcel remains fallow. The kenaf will be harvested in the fall and used as alternative daily cover (ADC) for lined WMUs (Sinderson, 2003). This sequence is designed to help prevent the buildup of boron and selenium in the soil prior to the fallow period (RWQCB, 2002b). To minimize percolation of the treated groundwater (which has higher levels of boron and selenium than the underlying aquifer) the LAA will be sized and crops will be selected so that irrigation demand exceeds the volume of treated groundwater from the storage reservoir (RWQCB, 2002b).

Monitoring program. Groundwater monitoring is required by the Monitoring and Reporting Program (MRP) of WDR Order No. R5-2002-0118, the WDR covering YCCL landfill operations. Currently there are 72 groundwater monitoring wells at YCCL, including the original extraction wells, shallow observation wells, and deep wells. Nine of these wells were added to the monitoring program under the current WDR R5-2002-0118 and are being sampled quarterly to establish sufficient data to set concentration limits for them (Yolo County, 2002b). The

DIWM prepares regular monitoring reports as part of the MRP. The Second Semester/2001 Annual Report, e.g., indicated that one of the previously impacted observation wells was determined to no longer be impacted, one of the previously unimpacted extraction wells was determined now to be impacted (by 1,1,-Dicholorethane, one of the VOCs found at the site), and a well previously considered "tentatively impacted" continues to be so considered.

Beneficial uses. In WDR Order No. R5-2002-0118the RWQCB (2002a) identifies municipal and domestic supply, industrial service supply, and industrial process supply as beneficial uses of both shallow and deep groundwater in the area, and identifies agricultural supply as an additional beneficial use of the deep groundwater. (Beneficial uses of the shallow groundwater do not include agriculture due to the presence of naturally high levels of boron [RWQCB, 1999].)

LEACHATE MANAGEMENT

Background

Prior to May 1998 leachate had been directed to WMU G, where it was stored temporarily and then piped to the City of Davis Wastewater Treatment Plant (WTP) adjacent to the landfill. After testing of the leachate in May 1998 indicated the presence of low levels of dioxins and furans, however, the City of Davis notified the County that the City would no longer accept the leachate without pretreatment to remove the dioxins. Subsequently, as the County continued to seek an approach to treat the leachate or identify alternative disposal options, collected leachate exceeded the required freeboard in WMU G. The RWQCB issued a notice of freeboard violation (NOV) in January 1999. To avoid overtopping the leachate pond, as the County sought alternative treatment and disposal options, leachate pumps were turned off. This led to a buildup of hydrostatic head on the landfill liners and the possible subsequent discharge of leachate to groundwater. The groundwater extraction system captured most of the discharge, except for that beneath WMU 1. Cleanup and Abatement Order (CAO) No. 99-719, issued by the RWQCB in June 1999, (1) directed the County to report its final decision on how to dispose of the leachate; (2) required the construction of new surface impoundments by November 1, 1999, and (3) specified the date by which pumping was to resume (in July 1999), after which he pumps were not to be turned off (RWQCB, 1999). Three new Class II impoundments with a combined capacity of 16 million gallons were constructed at WMU H in 1999. CAO No. 99-719 also required the County to determine the source and magnitude of MTBE and benzene contamination that had been identified in the shallow groundwater at the site. The DIWM subsequently determined that the source of the MTBE and benzene was contamination that occurred during sampling by fuel from the portable generator used during sampling. Order 99-719 no longer applies to the site, as the DIWM has fulfilled all its requirements.

Current Leachate Management

YCCL generates approximately 6 million gallons of leachate per year (Yolo County 2003, 2004). WMUs 1 through 4, which were constructed prior to adoption of current Subtitle D liner requirements, are underlain by native clay and were constructed on compacted subgrade that is graded to promote leachate runoff to a perimeter collection trench. From the perimeter trench the leachate is conveyed by a trunk line to Pump Station No. 1. WMU 5 is constructed on a two-foot compacted clay liner and has a dendritic leachate collection and removal system (LCRS) consisting of lateral trenches containing gravel and perforated pipe that drain via longitudinal trenches and a trunk line to Pump Station No. 1. WMU 6 is constructed with a Subtitle D composite liner and a blanket-type LCRS consisting of a geonet that drains via longitudinal trenches to a perimeter trunk line. The trunk line, which was sized to accommodate the development of all future modules at WMU 6, consists of a 6-inch diameter HDPE pipe capable of transmitting 135,717 gallons per day. Leachate from WMUs 6A, 6B, and 6C is conveyed to Pump Station No. 2. The two pump stations direct the leachate to YCCL's four Class II impoundments. Leachate collected in the four sumps at WMU 6D is pumped directly to the impoundments.

The four Class II impoundments consist of WMU G, which has a capacity of 1.5 million gallons, and three impoundments at WMU H (WMUs H1, H2, and H3), which have a combined capacity of 16 million gallons. The three impoundments at WMU H, constructed in 1999, are hydraulically connected by overflow weirs and piping to form a single WMU. The impoundments are used to store landfill leachate during the wet season and evaporate it during the dry season. The largest of the three ponds at WMU H, WMU H3, is equipped with spray and drip facilities to enhance evaporation. The discharge of leachate or any other solid or liquid wastes to surface water drainage courses or groundwater is prohibited (RWQCB, 2002a).

In addition to leachate collected in the landfill's LCRS, the Class II impoundments also receive gas condensate from the landfill gas (LFG) system, cooling water from the on-site LFG power plant, and any contact water (e.g., surface runoff that has contacted refuse at the working face). YCCL no longer accepts deliveries of liquid wastes, which previously also were discharged to the facility's Class II impoundments (Yolo County, 2002b).

Between August and December 1998 YCCL used leachate for dust control at the site, after receiving RWQCB approval for this use. Leachate has not been used for dust control since.

As a follow-up to the small scale pilot bioreactor project at Module 6B, the DIWM currently operates a full-scale bioreactor demonstration project at Module 6D. The bioreactor utilizes collected leachate as well as supplemental liquids if needed to achieve optimum moisture levels for biological activity. Phase 1 of the demonstration project at Module D includes operation of two anaerobic bioreactor cells and one aerobic cell. DIWM anticipates that the rate of liquid addition in the anaerobic bioreactor will be 10 gallons per minute (gpm) per 10,000 square feet (equivalent to approximately 44 gpm per acre), the same rate as for the small-scale pilot anaerobic cell at Module B. The peak leachate production rate is anticipated to be about 20 gpm per acre over the six-acre cell area (i.e., 47 percent of the peak injection rate). The addition of liquid at the aerobic bioreactor at Module D is expected to be at a rate three to four times higher than that for the anaerobic cell (RWQCB, 2002a), because the higher temperatures of the aerobic reaction evaporate much of the added liquid.

The DIWM monitors leachate monitoring and control facilities at least twice weekly, when meter readings for the leachate sumps and pump stations are taken. The 2003 annual monitoring report indicates that no problems with the facilities were noted during the year and the minimum freeboard of two feet was continuously maintained (Yolo County, 2004).

REGULATORY SETTING

The existing Yolo County Central Landfill and the proposed project are subject to numerous regulations regarding landfill siting, design, operation, groundwater and surface water quality monitoring, corrective action, and closure and post-closure requirements. Regulations specifically related to water resources include California Water Code Section 13273; California Code of Regulations (CCR) Title 27, Chapter 3, Criteria for All Waste Management Units, evident Facilities, and Disposal Sites; 40 Code of Federal Regulations (CFR) parts 257 and 258 (also known as Subtitle D of the Resource Conservation and Recovery Act [RCRA]); and the National Pollutant Discharge Elimination System (NPDES), authorized by the Clean Water Act and federally administered by the U.S. EPA. Municipal solid waste landfills also are subject to state and federal regulations contained in SWRCB Resolution No. 93-62. The EPA also administers the Project XL program, which gives a limited number of regulated entities the opportunity to develop their own pilot projects and alternative strategies to achieve environmental performance that is superior to what would be achieved through reasonable compliance with current and reasonably anticipated future regulations. YCCL currently operates the bioreactor demonstration project at Module D as part of the Project XL program and pursuant to a site-specific regulation (40 CFR Part 258.41) promulgated by U.S. EPA (U.S. EPA, 2001) and a Final Project Agreement between Yolo County DIWM, U.S. EPA, and other participating entities.

Yolo County General Plan Policies

The Yolo County General Plan (1983) has established the following Conservation policies regarding surface water and groundwater resources:

- <u>CON 16-Water versus Development</u>. Yolo County shall relate new development to water availability and water pollution avoidance or mitigation.

- <u>CON 17-Water Reclamation</u>. Yolo County shall encourage waste water reclamation and reuse.

- <u>CON 20-Groundwater</u>. Groundwater shall be protected from overdraft and shall not be encroached upon by construction. Impervious surfaces should be reduced or replaced and groundwater recharge enhanced. The use of non-impervious surfaces is encouraged.

- <u>CON 38-Provision of Water</u>. Yolo County shall coordinate with providing agencies to assure that sufficient clean waters is available for existing, approved, and presently planned uses. First priority for water resources shall go to existing legal land uses.

- <u>CON 40-Water Pollution Prevention</u>. Yolo County shall prohibit surface water courses or groundwater recharge areas to be used for dumping sites for toxic materials or secondarily treated waste water and shall support agricultural practices to minimize chemical and nutrient runoff, erosion, and siltation, and support the use of check dams.

Existing Permits

YCCL operates under the following Waste Discharge Requirements (WDRs) and plan requirements of the RWQCB, Central Valley Region:

- WDR Order No. R5-2002-0078, Waste Discharge Requirements for YCCL's Groundwater Extraction and Treatment System; issued by the RWQCB 26 April 2002. *Regulates the storage during wet months of treated groundwater from the extraction system and its application to land during the dry season to irrigate crops. Kenaf, a crop know to take up substantial amounts of boron and selenium will be grown annually as a phytoremediation method of treating the groundwater, and harvested for use as alternative daily cover. The WDRs incorporate waste discharge and monitoring requirements to protect surface water and groundwater from degradation from boron and selenium in the discharge. This WDR supersedes Order No. 98-197, under which treated groundwater had been discharged to the canal on the northern border of the site. In addition, in June 2002 the RWQCB rescinded Cease and Desist Order No. 98-198,which required DIWM to achieve compliance with boron and selenium limits on discharged effluent, since air stripper effluent no longer is discharged to off-site surface waters*.

- WDR Order No. R5-2002-0118, Waste Discharge Requirements for County of Yolo Planning and Public Works Department YCCL Class III Landfills and Class II Surface Impoundments, issued by the RWQCB 7 June 2002. *Among other provisions, regulates the active modules at WMU 6, including the bioreactor pilot project at Module B and three full-scale demonstration project bioreactors at Module D; prohibits discharges to inactive WMUs except as specified and needed to bring them to final grade; regulates discharges to the four Class II surface impoundments at WMUs G and H; and establishes limits on the discharge of leachate and other liquids to the bioreactors. Includes closure specifications for the WMUs and surface impoundment, and establishes a closure schedule for WMUs 1 through 5 and an incremental closure schedule for WMU 6. Includes compliance Monitoring and Reporting Program No. R5-2002-0118. This WDR supersedes Order No. 5-00-134, the previous WDR for the Class III landfills and Class II surface impoundment.*

- Maintenance and Operations Plan: Module D Full Scale Bioreactor Project Yolo County Central Landfill, November 2000. *This plan was developed and submitted by DIWM pursuant to requirements in WDR Order No. 5-00-134. WDR Order No. R5-2002-0118 requires DWIM to submit a revised plan if any changes to operations and/or maintenance of the bioreactors occurs.*

- Surface Impoundments Maintenance and Operations Plan. *This plan was developed by DWIM pursuant to requirements in WDR Order No. R5-2002-0118.*

YCCL also has obtained coverage under the NPDES General Industrial Storm Water Permit (General Permit) for storm water discharges. The General Permit authorizes storm water and authorized non-storm water discharges from facilities covered by the storm water permit. Facilities covered by the General Permit are required to meet all applicable provisions of the Clean Water Act, including use of best available technology (BAT) to control pollutant discharges and best conventional technology (BCT) to prevent and reduce pollutants and any more stringent controls necessary to meet water quality standards. The General Permit establishes discharge prohibitions and effluent and receiving water limitations. Facility operators must prepare, retain on site, and implement an Storm Water Pollution Prevention Plan (SWPPP), and develop and implement a monitoring program. YCCL's current SWPPP was prepared in 2000 and updated in 2001 and 2002 (Yolo County, 2002c).

3.5.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Consistent with CEQA Guidelines Appendix G, a project would normally have a significant impact on hydrology or water quality if it would:

- violate any water quality standards, waste discharge requirements, or otherwise substantially degrade water quality;
- substantially alter the existing drainage pattern of the site or area in a manner that would result in substantial erosion, siltation, or flooding on- or off-site;
- create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff;
- place within a 100-year flood hazard area structures that would impede or redirect flood flows;
- fail to adequately contain landfill leachate and prevent its discharge to groundwater on- or off-site; or
- otherwise result in a change in conditions that could lead to significant adverse changes to groundwater quality or potentially impair the downstream groundwater-surface water system.

Impact 3.5.1: Pressure from collected leachate on the bioreactor liner, especially in the collection trenches and sump areas, could result in leakage and the potential contamination of nearby groundwater. (Significant)

The potential for leachate to be discharged from a landfill and thereby contaminate nearby groundwater or surface waters is a concern in the management of both conventional landfills and bioreactor landfills. Leachate is liquid that has come in contact with or percolated through the waste mass and contains substances (contaminants) extracted or dissolved from the waste. In addition to adherence to liner standards, leachate management at a conventional landfill includes minimizing the amount of water that can infiltrate into the landfill cell, thereby reducing the amount of leachate generated.

By contrast, in a bioreactor landfill, controlled amounts of leachate collected by the landfill's leachate collection and removal system (LCRS) and other liquids are added back into and circulated through the waste mass, to promote the decomposition of organic wastes and accelerate stabilization of the waste mass. Tests and demonstration projects have indicated that the waste at YCCL requires about 15 percent additional moisture to reach optimum moisture conditions for operation of the bioreactor (Yolo County, 2001a). This translates to adding from 25 to 50 gallons of liquid per ton of municipal solid waste (MSW) to reach the "equilibrium field capacity," the point at which the amount of moisture added equals the amount of leachate coming out of the landfill. The LCRS and liner system of a bioreactor must be designed to accommodate the increased density of the waste resulting from the added moisture and the extra leachate flowing through the landfill; if the liner and LCRS were not appropriately designed and constructed, there could be an increased risk of leachate being discharged to groundwater or the surrounding environment. The addition of liquids to solid waste landfills also increases the potential for leachate seeps or breakouts to occur if liquid additions are not properly controlled. If not quickly contained and repaired, such seeps could potentially contaminate non-contact surface water at the site or nearby groundwater.

The LCRS includes a drainage layer above the impermeable liner that allows leachate that collects below the waste to be drained off, to prevent a buildup of pressure on the liner. The drainage layer is considered "perhaps the most critical element of the [leachate] collection system" by some authorities on bioreactor technology, who also note that the system needs to be designed to prevent the drainage layer from becoming clogged over time (Reinhart and Townsend, 1998).

Current federal regulations outline two methods for complying with liner requirements for MSW landfills. The first method is a performance standard (40 CFR 258.40[a][1]) and the second is a prescriptive standard (40 CFR 258.40[a][2] and [b]), which specifies a "composite liner" consisting of two components – an upper component consisting of a minimum 30-mil flexible membrane liner (or at least 60-mil thick if the material used is high density polyethylene [HDPE]) and a lower component consisting of at least a two-foot layer of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} cm/sec. The flexible membrane liner component must be installed in direct and uniform contact with the compacted soil component. The bioreactor at Module D at YCCL is required under 40 CFR 258.41 to be constructed with the prescriptive, composite liner as defined in §258.40(b) and with a leachate collection system that is continuously monitored to ensure that the depth of leachate on the liner is maintained at less than 30 centimeters. In addition, WDR Order No. R5-2002-0118 prohibits the addition of leachate or supplemental liquids to a bioreactor cell in excess of its moisture-holding capacity, and specifies that hydraulic head on the bioreactors' liners shall not exceed four inches and the steps the DIWM must take if such an exceedance occurs (RWQCB, 2002a).

As described in YCCL's current WDR Order R5-2002-0118, the as-built liner at Module D consists of the following components, from top to bottom: An operations layer consisting of 3 feet of shredded tires, a drainage layer consisting of 6 inches of pea gravel and a blanket type LCRS consisting of geotextile bonded to both sides of geonet that drains via longitudinal trenches to interior sumps or 12 inches of pea gravel, a 60-mil HDPE liner, 2 feet of compacted clay (with hydraulic conductivity no more than $1x10^{-7}$), 3 feet of earthfill, and a 40-mil HDPE liner as a capillary break overlain by geotextile used for drainage to pan lysimeters located under the LCRS sumps. U.S. EPA's Site-Specific Rulemaking for the YCCL Module D bioreactor (U.S. EPA, 2001) states that the composite liner for Module D exceeds the requirements set forth at 40 CFR 258.40(b), and that Module D is suitable for the addition of household liquid waste, other than septic waste, and recirculated leachate or condensate gas derived from the landfill unit. Modeling of leachate flows by the DIWM indicates that the level of leachate accumulating on the liner can be limited to 0.18 inches (approximately 0.5 centimeters) per day (Yolo County, 2001a).

The LCRS collection trenches and sump areas have double composite liners to account for infringement on the 5-foot groundwater offset and to minimize potential leakage in these critical collection areas where head on the primary liner will be its greatest. Specifically, the liner and leachate collection system in the collection trenches and sumps consists, from top to bottom, of a minimum of 2 feet of gravel drainage material, a protective geotextile layer, a blanket geocomposite drainage layer, a primary 60-mil HDPE liner, a geosynthetic clay liner (GCL) (with hydraulic conductivity less than $5x10^{-9}$ cm/sec), a secondary 60-mil HDPE liner, 2 feet of compacted clay (with hydraulic conductivity less than $6x10^{-9}$ cm/sec), a minimum of 0.5 feet of compacted earth fill (with hydraulic conductivity less than $1x10^{-8}$ cm/sec), and a 40-mil HDPE vapor barrier layer. The thickness of the compacted earth fill actually varies from a minimum of 0.5 feet at the south end of the trench to a maximum of about 2.5 feet at the upper, north end of the leachate collection trench (U.S. EPA, 2001).

The base liner design for the Module D Phase 2 is similar to Phase 1 described above. Module D Phase 2 also includes a leak detection geocomposite drainage layer between the compacted three feet of earth fill and the 40-mil geomembrane liner/vapor barrier. As with the Phase 1 design, the Phase 2 trench and sump areas include an additional composite liner of 60-mil HDPE overlying a geosynthetic clay layer.

WDR Order R5-2002-0118 requires the DIWM to place instrumentation at various levels within the bioreactor, during waste placement, to monitor process conditions, including temperature sensors, moisture sensors, and pressure transducers. The pressure transducers measure hydrostatic head (pressure from buildup of leachate) on the LCRS (RWQCB, 2002a). (Placement of this instrumentation also is described in the EPA’s Site-Specific Rulemaking [U.S, EPA, 2001].) The moisture sensors enable the County to determine where liquid application can be increased or decreased to optimize the effectiveness of the system and to prevent build-up of leachate over the liner (U.S. EPA, 2001). The County will measure the quantity of leachate and applied liquid throughout life of the Project XL module. Flow sensors installed on the leachate discharge line provide direct flow rate readouts for determining flow rates in the pipelines and the total flow of all the liquid used and leachate produced. If the pressure transducers installed on the primary liner indicate head is going to exceed the allowable value, the system will automatically start pumps to reduce liquid level and shut-off valves to reduce the liquid application rate across the entire module or specifically, in the area of head build-up. The County also will closely monitor the quality of the leachate to determine the methods for future leachate treatment (U.S. EPA, 2001). The County will apply information acquired from the implementation and monitoring of the Project XL bioreactor at Module D to the operation of future bioreactor cells at the site.

The County submitted to the RWQCB a liner performance demonstration for Phase 2 of the Module D bioreactor (Golder, 2002) which demonstrates that the Phase 2 liner system will comply with applicable Title 27 performance standards. The County’s demonstration included calculations of the system efficiency for inhibiting leaks and the potential leakage rates, and an estimate of the potential impacts on groundwater (RWQCB, 2002a). The demonstration concluded that there would be no measurable groundwater impairment.

The geotechnical review conducted as part of this EIR analysis was not able to confirm the adequacy of final engineering design for the proposed project because the final engineering design documents are not yet available. However, the geotechnical review concluded that incorporation of the liner system components described for Module D (Golder, 2002; RWQCB, 2002a) for the floor and leachate collection trench and sump areas of the proposed bioreactor landfill units would reduce to a less-than-significant level the potential impacts of increased hydrostatic pressure in these critical collection areas.

Item (e) of the Maintenance and Operations Plan for the Module D Bioreactor (Yolo County, 2000) describes the DIWM's response plan to address the contingency of leachate production exceeding expected levels. As stated in the plan, the head over the liner will be monitored shortly after the first lift of waste has been placed using a network of pressure transducers and bubbler gages. These devices will be installed on the primary liner immediately before waste placement, and within the waste mass, to provide measurements of the leachate depth.

In the event that the transducers and bubbler gages indicate that the leachate head over the primary liner system is going to exceed the average allowable value of four inches, the system will automatically start pumps to reduce the liquid level and shut-off valves to reduce the liquid application rate. A computerized control and monitoring system will be used to accomplish this task. This system which originated in the utility and petroleum industries, is often referred to as Supervisory Control and Data Acquisition Control (SCADA), such systems are now widely used in many different applications such as waste water treatment systems. These measures would be used to either reduce the liquid application rate across the entire module or specifically, in the area of head build-up. In an event of a pump failure, in which the average head over the liner continues to exceed the allowable value of four inches, the SCADA system will notify the operator via the so that an emergency pump could be installed to reduce the head over the liner below ten inches. The Regional Water Quality Control Board shall be notified in case the head over the liner reaches an average of ten inches of head over the primary liner system (Yolo County, 2000).

It is also noted that studies conducted at bioreactor landfills indicate that the process of leachate recirculation in a bioreactor landfill improves the quality of the leachate. In the course of recirculation, metals are removed from leachate through the formation of metal sulfide and hydroxide precipitation and through capture in the waste matrix by encapsulation, sorption, ion-exchange, and filtration (Reinhart and Townsend, 1998). Reinhart and Townsend (1998) have noted that after the waste in a bioreactor has stabilized, there is a potential for metals encapsulated in the waste/soil matrix to remobilize if aerobic conditions return. Removal of all moisture in the cell after the waste is sufficiently stabilized is recommended to prevent the remobilization of metals (Reinhart and Townsend, 1998). Improvement of leachate quality over time in a bioreactor does not reduce the need for a well-designed liner, leachate collection, and monitoring system, but it may increase YCCL's options for treatment and disposal of the leachate when a bioreactor cell is stabilized and closed.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.5.1a: The DIWM will design and construct future bioreactor cells with the same containment features included in the Project XL bioreactor at Module D (modified as necessary to accommodate the increased anticipated settlement of the proposed project). Monitoring instruments and sensors will be placed to ensure safe and efficient recirculation of leachate, as was done for the Project XL bioreactor, and a comparable monitoring program will be implemented.

Mitigation Measure 3.5.1b: The Maintenance and Operations Plan developed by the DIWM for the Module D Full Scale Bioreactor Project, pursuant to requirements in the facility's previous WDR, Order No. 5-00-134, or comparable plan approved by the RWQCB, shall be implemented for the proposed future bioreactor units. The Maintenance and Operations Plan will apply to the development and operation of the proposed future bioreactor cells and will be revised as warranted, pursuant to the applicable WDR order. The Maintenance and Operations Plan will address the following areas:

- Leachate recirculation strategies and methods,
- Supplemental liquid injection,
- Achieving moisture holding capacity,
- Calculation regarding expected leachate production levels, and
- Response plan to correct leachate seeps or breakouts as they develop or in the event leachate production level exceeds expected levels.

Mitigation Measure 3.5.1c: The DWIM will maintain a response plan to address the contingency of leachate production level exceeding expected levels, as described under item (e) of the Maintenance and Operations Plan for the Module D bioreactor project or a comparable plan.

Mitigation Measures Identified in this Report

Mitigation Measure 3.51d: The final engineering design plans for the proposed bioreactors will incorporate the containment features and recommendations for leachate collection trench and sump areas described in Golder's Liner Performance Demonstration for Module D (Golder 2002). The engineering plans and drawings shall be submitted to RWQCB for approval prior to project construction.

Level of Significance after Mitigation

Implementation of Measures 3.5.1a, 3.5.1b, 3.5.1c and 3.5.1d, including construction and implementation of the liner, leachate collection and monitoring systems as described for Module D, at the proposed future YCCL bioreactor cells would reduce this impact to a less-than-significant level.

Impact 3.5.2: Operation of the landfill as a bioreactor will entail the use of extracted groundwater. If increased extraction rates were required, this could have adverse impacts

on regional groundwater quality, quantity, and the underlying groundwater basin. (Less than significant)

YCCL currently pumps approximately 150,000 to 200,000 gallons per day (104 to 139 gallons per minute) of groundwater. Operation of the anaerobic bioreactor cells is estimated to require an average of 30,000 gallons per day of liquid, based on a projection of 20.8 gallons per minute. Once the waste in a given cell reaches field capacity, it will produce leachate so water will no longer need to be added. (Leachate also could be used to wet the dry incoming waste, so that no groundwater would be required for that purpose.) Tests and demonstration projects have indicated that to reach optimum moisture conditions, from 25 to 50 gallons of liquid per ton of municipal solid waste (MSW) needs to be added to the waste at YCCL to reach the "equilibrium field capacity." Conservatively assuming a requirement of 50 gallons of water per ton of waste, if the landfill disposes 600 tons per day (or 215,400 tons per year), the average pumping rate would be approximately 20.8 gallons per minute (gpm). (Annually this equates to approximately 10,770,000 gallons per year for 215,400 tons of MSW.) Assuming that the landfill disposes the permitted daily quantity of 1,800 tons, the average pumping rate would increase to 62.5 gpm. The rest of the liquid to be pumped and recirculated would be leachate produced by the bioreactor rather than groundwater. As described previously the waste in a bioreactor cell would decompose much more quickly than in a conventional landfill cell. The DIWM estimates that liquid recirculation time will be a maximum of 10 years for each cell. For the aerobic cell the additional moisture required per ton of disposed waste is estimated to be about 4 to 8 times greater. Therefore, at a disposal rate of 600 tons per day it would require an average rate of 83 to 166 gpm, which is close to current groundwater pumping rates.) At a disposal rate if 1800 tons per day, the rate would be 246 gpm to 492 gpm. Groundwater would be used to supplement leachate and landfill gas system condensate.

The current WDRs also permit the use of supply water, if needed. As these calculations demonstrate, little if any additional groundwater water would be required at the rate of current operations, even assuming the development of aerobic cells. Even assuming the maximum permitted levels of operation and the conservatively high use rate of 50 gpm, the County would avoid the need for supplementary groundwater (or other water or liquids) above the quantities currently extracted by developing relatively fewer aerobic cells or developing anaerobic cells exclusively.

Mitigation: None required.

Impact 3.5.3: Liquids added to the bioreactor cell, including collected leachate, landfill gas condensate, and other liquids as needed, could exceed the capacity of the LCRS and result in soil or groundwater contamination. (Significant)

Landfill leachate generation rates typically depend on the amount of liquid originally in the waste and on the quantity of additional liquids such as precipitation that infiltrate into the landfill, either through the cover or at the working face (U.S. EPA, 1995). The amount of external water entering the landfill largely governs the quantity produced (Schroeder, et al., 1994). Once the waste reaches field capacity, the volume of water percolating through the mass is roughly equal to the amount of leachate produced (U.S. EPA 1995).

The leachate generation rate and LCRS capacity requirements were initially estimated by Golder (1999a) assuming "dry" landfill conditions. Leachate generation was estimated using the HELP model and was based on weather information from Sacramento, California (Golder, 1999a). The "dry" landfill assumption did not take into account leachate recirculation within the proposed bioreactor landfill (Treadwell & Rollo, 2004).

The DIWM has developed information on leachate generation from the pilot scale bioreactor. The County's Maintenance and Operations Plan for the Module 6D Full Scale Bioreactor Project (Yolo County, 2000) includes an estimate of expected leachate production for the full scale operation based on the pilot scale project. For the Module 6D anaerobic operation, the County estimated that the peak liquid addition, up to 10 gallons per minute (gpm) of liquid per 10,000 square feet of disposal area (44 gpm per acre), typically will be delivered to the waste once the module has reached its design height. Based on the pilot demonstration cell performance, the County estimated that the total amount of liquid added would be in the range of 30 to 50 gallons per ton of waste. According to an evaluation of the hydraulic characteristics of the bioreactor pilot project (Moore et al. 1997), the average leachate generated during liquid introduction peaked at about 47 percent of the liquid delivery rate, which would equate to approximately 20 gpm per acre. Given a 6-acre drainage area for each sump on Module 6D, the total anticipated flow into either sump would be approximately 120 gpm (173,000 gallons per day). For the Module 6D aerobic operation, liquid is be added to waste at a faster rate, since the aerobic reaction uses much of the water in the evaporation of liquid added. It is estimated that the total water evaporated will range between 200 to 400 gallons of water per ton of waste.

Based on the estimated leachate production, the County estimated that drainage into the Module 6D leachate collection layer would be about 4.6×10^{-4} gpm per square foot of disposal area. The County's calculation assumed a distance of approximately 200 feet between the top ridge of the base liner and the collection trench. Using these values, the peak flow through the geocomposite was estimated to be about 0.09 gpm per linear foot of trench. The geocomposite for Module D has a measured capacity of 1.0 gpm per foot (Golder, 1999b), over 10 times the capacity required under peak flow conditions. Instrumentation is being placed at various levels within the bioreactor cells as waste is placed to monitor process conditions, including temperature sensors, moisture sensors, and pressure transducers. The County also will continue to monitor the quantity of leachate collected in the LCRS through the life of the bioreactor cells in Module D, and will refine leachate generation calculations as more recent data may warrant. Information based on the pilot scale bioreactor indicated that the LCRS designed for the proposed increase in height would accommodate 10 times the anticipated generation rate, well more than the capacity of twice the peak leachate production rate required in Title 27.

The DIWM is continuing to develop information on leachate generation, from the full-scale bioreactor project at Module 6D. Based on current operations of the Northeast and West Anaerobic cells in Module 6D, the average peak liquid addition rate was been 57 gpm (16.3 gpm per acre) and 90.6 gpm (15.1 gpm per acre) for the 3.5-acre Northeast cell and 6-acre West cell, respectively. This is considerably less than the 10 gpm per 10,000 square feet or 44 gpm per acre that was estimated from the smaller demonstration cells and included in the County's Maintenance and Operations Plan for the Module 6D Full-Scale Bioreactor Project (Yolo County, 2000). The actual average peak leachate production rate was measured as 6.3 and 6.9 gpm per acre for the Northeast and West cells, respectively. Given a 6-acre drainage area for each sump on Module 6D, the total anticipated flow into either sump would range from approximately 38 to 41 gpm (55,000 to 60,000 gpd), or only about 50 percent of the flows estimated from the pilot project results, indicating that the LCRS can easily accommodate the measured peak flow rate.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.5.3a: The DIWM's conceptual design and preliminary studies pertaining to LCRS capacity requirements utilize data garnered from the on-site pilot-scale demonstration project and provide capacity to accommodate twice the anticipated peak rate, consistent with Title 27 requirements. The final engineering design for the LCRS has not been completed.

Mitigation Measures Identified in this Report

Mitigation Measure 3.5.3b: The final engineering design for the LCRS for the proposed bioreactor landfill units will utilize all relevant, current data from the Module D project to calculate LCRS capacity requirements and provide the capacity to accommodate twice the anticipated peak rate, as required in Title 27. The LCRS design will be submitted to the RWQCB for review and approval prior to LCRS construction.

Level of Significance after Mitigation

Implementation of measures 3.5.3a and 3.5.3b would reduce this impact to a less-than–significant level.

Impact 3.5.4: Mining and redevelopment of the older landfill cells could impact groundwater quality. (Significant)

As part of the project the DIWM proposes to mine the older, inactive landfill units at the site (WMUs 1 through 5). These landfill units were filled prior to adoption of current regulations establishing minimum standards for the design, construction and operation of MSW landfills and prior to establishment of current waste acceptance criteria and loadcheck programs. Consequently they were built without Subtitle D-compliant liners and information on the types of wastes that may be buried in the older units is limited. As noted in the setting section, above, the water table below the YCCL site ranges seasonally between 15 and 4 feet below ground surface (bgs) (i.e., at elevations between approximately 10 and 21 feet above msl in the vicinity of the older units). Wastes were deposited in WMUs 1 through 5 commencing at an elevation of 15.5

feet above msl (Yolo County, 2001a) (i.e., approximately 9.5 feet bgs) Waste at the bottom of WMUs 1 through 5 are at or below current groundwater levels during certain times of the year, which has caused an impact to groundwater in the area. The County operates a program to pump and treat contaminated groundwater and prevent the spread of the contaminant plume. In addition, to inhibit groundwater flow across these areas, the County constructed a slurry bentonite cutoff wall along portions of the north and west perimeters of the site near WMU-3 and WMU-5 and installed groundwater extraction wells south of the cutoff wall to artificially suppress the groundwater table to provide vertical separation of waste and groundwater (IT, 2001).

Following excavation, the base of the unit will be tested for signs of contamination within the underlying sub grade soil. The DIWM estimates that an additional two feet of soil below elevation 15.5 feet msl will need to be excavated to remove contaminated soil, although the actual base elevation is unknown (Yolo County, 2001b). Groundwater pumping and monitoring would continue during excavation of the older cells and could help contain any contamination encountered in the saturated zone of these units. Nevertheless, groundwater is very likely to be encountered in the course of excavating these older units during the portion of the year when groundwater levels are high. The DIWM has indicated interest, based on an evaluation of landfill operational strategies and disposal options at YCCL (EMCOM/OWT, 1999), in excavating all the waste in a mined unit from top to base at the same time, regardless of whether groundwater is encountered.

Because load checks and other programs to prevent the disposal of hazardous wastes also were generally less common when these units were operated than today, potentially harmful materials could be encountered during excavation. Disturbance of hazardous materials during mining operations could result in distributing the contaminant over a larger area and/or releasing hazardous materials to groundwater (CalRecovery, 1993). Excavation of wastes within the groundwater zone and/or the accidental disturbance of unknown hazardous materials could cause or exacerbate the release of contaminants to groundwater.

Mined wastes that could not be reused would be placed within the currently active, permitted landfill unit at the site. Following excavation, about 3 to 5 feet of earthfill would be placed to establish a five-foot separation between waste and the groundwater required by CCR Title 27, and a base liner that meets current regulatory standards would be constructed for future use of the reclaimed landfill units. As proposed for WMUs 6 and 7, the new landfill units proposed for WMUs 1 through 5 would be constructed to a final elevation of 140 feet msl and may be developed as bioreactor landfills.

Removal of wastes from the unlined units, placement of any unrecoverable wastes into fully lined waste units, and replacement of the old WMUs with new landfill units that comply with all current regulatory standards would constitute beneficial effects of the project. However, incomplete removal of existing wastes from the mined units could result in continuing groundwater contamination, or continued risks thereof. In addition, settlement of foundation soils due to future landfill operations needs to be calculated to ensure that the five-foot separation between the base of the waste unit and groundwater is maintained throughout landfill development and following closure

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.5.4a: Prior to excavating units the DIWM will research the history of the particular landfill unit and perform preliminary site investigations to determine, to the extent feasible, the types of materials that will be encountered.

Mitigation Measure 3.5.4b: The DIWM will test soils in excavated cells to ensure all wastes have been removed before placement of backfill. The soils will be tested at intervals determined in consultation with the RWQCB and as specified in YCCL's revised WDRs. (For example, a testing interval in the range of one test per acre has been acceptable to the RWQCB in similar situations, according to EMCOM/OWT [1999]). The following soil tests will be completed on each sampled area:

- U.S. EPA CAM 17 Metals
- Chlorinated Herbicides (U.S. EPA Method 8160)
- Volatile Organic Compounds (U.S. EPA Method 8260)

Mitigation Measure 3.5.4c: DIWM's reclamation plan will include monitoring and incorporate the flexibility to address concerns as they arise once the program begins.

Mitigation Measure 3.5.4d: In reclaimed areas, approximately three to five feet of clean earthfill will be placed to reestablish the regulation-mandated five feet of separation between wastes and the groundwater table, prior to construction of the base liner for the landfill units.

Mitigation Measure 3.5.4e: If required by the RWQCB, saturated wastes that cannot be sorted will be dewatered as specified in the YCCL's revised WDRs, prior to disposal in an active, permitted landfill cell at the site. It is not expected that any wastes disposed of in a bioreactor would require dewatering.

Mitigation Measures Identified in this Report

Mitigation Measure 3.5.4f: Landfill mining work shall be conducted during the season of the year when the water table is low relative to other seasons.

Mitigation Measure 3.5.4g: The analysis of the settlement of foundation soils due to landfill operation conducted pursuant to Mitigation Measures 3.4.1a and 3.4.1b (in Section 3.4., Geology, Soils and Seismicity) shall be incorporated into the design of the reconstructed WMUs 1 through 5, including the determination of subgrade fill depth and the design of the future composite liner to meet the five feet of separation requirement.

Level of Significance after Mitigation

Implementation of measures 3.5.4a-g will reduce adverse short term impacts to groundwater during the mining operations to a less-than-significant level and provide for long term protection of groundwater in the vicinity of these units. With implementation of these measures, the removal of waste from unlined units, proper disposal of unrecoverable or contaminated materials encountered into a Subtitle D-compliant unit, and development of future cells in compliance with Subtitle D and Title 27 requirements will result in a long term beneficial impact.

Impact 3.5.5: Future mining of the stabilized bioreactor landfill units could result in the remobilization of metals and other contaminants that were precipitated and sequestered in the soil/waste matrix during leachate recirculation, resulting in the contamination of water contacting mined materials. (Significant)

As part of the project the DIWM proposes to mine current and future landfill units at the site. As discussed under Impact 3.5.1, leachate recirculation has been found to improve leachate quality, as metals and other toxic constituents are precipitated or chemically altered (through the formation of metal sulfides, for example), and sequestered in the soil/waste matrix. Reinhart and Townsend (1998) have noted that after the waste in a bioreactor has stabilized, there is a potential for metals encapsulated in the waste/soil matrix to "remobilize if aerobic conditions return," and recommend removal of all moisture in the cell after the waste is sufficiently stabilized, to prevent the remobilization of metals. Reinhart and Townsend (1998) do not raise the potential for the remobilization of sequestered metals in their discussion of the potential for mining bioreactor cells after waste stabilization has occurred. (In general, the potential for mining bioreactor units is viewed quite favorably by these authors.) However, considering that the potential for remobilization of metals appears to increase upon exposure to air and moisture, it seems reasonable to expect that exposure to surface conditions (including air and potentially moisture) of the soil/waste material from a bioreactor cell could result in the release to the environment of metals that had been chemically bound and stable under anaerobic conditions of the bioreactor.

Mining the stabilized material in bioreactor cells holds a number of substantial potential benefits, including conserving and reusing landfill space and the continual reuse of limited resources such as mined soils as cover materials in ongoing landfill operations. However, considerable uncertainty exists about the behavior of material – and constituents thereof – that has been stabilized within a bioreactor, when such material is exposed to surface conditions in a mining operation. Until more information is developed that proves otherwise, the potential release of toxic constituents from mined bioreactor landfill material is considered a significant impact.

In addition, pursuant to 27 CCR §20690(b), the proposed use of mined bioreactor landfill soils for alternative daily cover (ADC) or intermediate cover material must be approved by the LEA in writing prior to use at the landfill. Mined landfill materials currently are not included on the list of the materials approved for ADC at §20690(b). Therefore, a site-specific demonstration project, approved by the LEA with concurrence by the CIWMB, would be required to establish the suitability of this material as daily cover. The mined soils also would need to meet SWRCB standards for daily and/or intermediate cover specified in 27 CCR §20705. These standards include limiting materials used for cover to those whose constituents (other than water) and foreseeable breakdown byproducts are listed as constituents of concern in the landfill's water quality protection standard.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure 3.5.5: Because experience regarding the behavior of materials mined from bioreactor landfills is extremely limited or non-existent and soil materials from bioreactor units have not been approved by the CIWMB for use as ADC, prior to mining stabilized material from a bioreactor landfill unit, the DIWM shall, in consultation with the LEA, conduct tests on samples taken from the bioreactor cell to be mined. In consultation with the LEA and the RWQCB, the DIWM shall develop an appropriate site specific demonstration to evaluate the suitability of mined bioreactor landfill materials for daily, intermediate, or final materials. The demonstration project should address the potential remobilization of metals and other toxic constituents that typically are sequestered and stabilized within the waste matrix during leachate recirculation, when the materials are exposed to atmospheric conditions at the landfill surface, and other parameters as determined appropriate in consultation with the LEA and RWQCB. Testing may include TCLP parameters and other test(s) as specified by the LEA and/or RWQCB.

During the initial excavations and pilot demonstration phase, all stockpiled materials excavated from bioreactor cells shall be stored on impermeable pads that are bermed or equipped with an LCRS to prevent the offsite discharge of runoff from the storage area, and shall be covered with impermeable tarps during the rainy season, or as otherwise specified by the RWQCB. No material excavated from the bioreactor landfills shall be used as alternative landfill cover prior to approval of such use by the LEA and RWQCB.

Level of Significance after Mitigation

Implementation of Mitigation Measure 3.5.5 would reduce this impact to a less-than-significant level.

Impact 3.5.6: Expansion of composting or salvaging operations could degrade underlying groundwater. (Significant)

If the expanded composting operations or proposed salvaged materials area are not located on appropriately constructed, impermeable pads with appropriate drainage controls, pollutants entrained in rainwater that has contacted the composting or salvaged materials could infiltrate and degrade the underlying groundwater.

As components of the project, the DIWM proposes to expand the composting operations and to establish an area where salvageable materials would be placed to allow landfill customers to take materials they can use. Implementation of either of these expanded operations on permeable surfaces could allow contact water (i.e., rain water that has contacted the compost or salvaged materials and is therefore potentially contaminated) to infiltrate the ground and degrade the underlying groundwater.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure 3.5.6: Composting operations and public salvage area operations shall be conducted on pads that are designed and constructed to limit infiltration and to control run-off. The pads shall be designed and constructed to promote surface drainage and prevent ponding. Runoff will be directed to a properly designed sump and pumped into a truck for disposal into the leachate ponds or into a sewage line to the WWTP.

Level of Significance after Mitigation

Implementation of Mitigation Measure 3.5.6 would reduce this impact to a less-than-significant level.

Impact 3.5.7: Stormwater runoff from landfill, composting facility, and other facility surfaces, if not properly controlled, could contribute to peak flows downstream or degrade surface receiving waters. (Significant)

Construction of buildings (the MRF and HHWCF) with associated paved receiving and parking areas, and the expansion of composting and salvage operations on impermeable pads, would increase the amount of impervious surface at the site and generate increased storm water runoff. If not property managed, increased runoff could contribute to peak flows downstream, and runoff from parking areas and roadways can carry pollutants to receiving waters. Runoff occurring at erosive velocities could increase erosion and, consequently, sedimentation in nearby surface waters.

“Contact water,” water that has contacted refuse, compost materials, or excavated materials from the landfill mining operation, has the potential to transport dissolved or suspended contaminants, initially to on-site impoundments and ultimately to off-site receiving waters. Contact water at solid waste and composting facilities is generally considered and managed the same as leachate, and kept separate from non-contact storm water runoff. To minimize the potential contamination of water resources, YCCL currently directs contact water from the working face to one of the Class II surface impoundment. With expansion of the compost facility and salvaging operation, and implementation of the landfill mining operation, the project would substantially increase the sources of contact water at the YCCL site. In 1999 YCCL addressed problems related to insufficient leachate capacity with construction of three additional surface impoundments at Module H, which provide a combined total of 16 million gallons of additional capacity.

Operation of the landfill units as bioreactors will enable the DIWM to utilize leachate that would otherwise be required to be evaporated from the surface impoundments or treated and taken to an appropriate facility for off-site disposal. While the surface impoundments greatly enhance YCCL's capacity to retain on-site leachate generated as contact water, calculations of the amount of additional contact water that could be expected from the expanded composting and landfill mining operations have not been performed.

Surface drainage structures would be designed, operated and maintained to conform with CCR Title 27 precipitation and drainage control requirements and performance standards for active Class III landfills. Among other provisions, Title 27 requires Class III landfills such as YCCL to maintain surface drainage facilities that are capable of handling flows of the 100-year 24-hour storm and are designed to minimize soil erosion and protect water quality.

In addition, YCCL operates under the provisions of a National Pollutant Discharge Elimination System (NPDES) General Industrial Storm Water Permit (Waste Discharger Identification [WDID] No. 5S57S001398). The General Permit authorizes storm water and authorized non-storm water discharges from facilities covered by the storm water permit. Facilities covered by the General Permit are required to meet all applicable provisions of the Clean Water Act, including use of best available technology (BAT) to control pollutant discharges and best conventional technology (BCT) to prevent and reduce pollutants and any more stringent controls necessary to meet water quality standards. The General Permit establishes discharge prohibitions and effluent and receiving water limitations. Facility operators must prepare, retain on site, and implement an Storm Water Pollution Prevention Plan (SWPPP), and develop and implement a monitoring program. As required by the General Permit, YCCL's SWPPP describes industrial activities and pollutant sources at the site, and describes site-specific best management practices (BMPs) to reduce or prevent pollutants associated with activities at the site in storm water discharges. The SWPPP will need to be updated to address changes to site operations and facilities, including the composting operations.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.5.7a: The DIWM will update YCCL's Storm Water Pollution Prevention Plan (SWPPP), required under the NPDES General Industrial Storm Water Permit, to address pollution controls and the containment and control runoff at non-erosive velocities from new and expanded site operations. The updated SWPPP will address composting facility operations.

Mitigation Measures Identified in This Report

Mitigation Measure 3.5.7b: Prior to project implementation the DIWM shall update its maintenance and operations plan (MOP) for YCCL. The revised MOP shall include calculations as to the amount of leachate expected to be generated as a result of precipitation contacting compost feedstock and composting materials, as well as any runoff from application of quench water applied to the composting materials. The MOP will outline strategies for managing the collected leachate to ensure that adequate capacity is maintained.

The updated MOP shall be submitted to the RWQCB prior to implementation of the composting component of the project.

Level of Significance after Mitigation

Implementation of Measures 3.5.7a and 3.5.7b, in conjunction with requirements specified in Title 27 for precipitation and drainage controls and the existing drainage controls and management practices at the landfill, would reduce this impact to a less-than-significant level.

Impact 3.5.8: Construction activities associated with construction of a MRF, a permanent HHW Collection Facility, composting pads and receiving area for the expanded composting operation, and pad for the salvaging operation, could increase soil erosion and result in the transport of sediments and other contaminants to off-site surface waters. Excavation undertaken during construction activities also could impact groundwater quality. (Significant)

Project construction activities would expose bare soil and potentially generate other water quality pollutants that during the rainy season could be entrained in surface runoff. Construction activities involving soil disturbance, excavation, cutting/filling, stockpiling, and grading could result in increased erosion and the sedimentation of surface waters. Construction materials such as asphalt, concrete, and equipment fluids could be exposed to precipitation and subsequent runoff. If precautions were not taken to contain contaminants, construction activities could produce contaminated storm water runoff, and degrade off-site surface water and groundwater quality. In general, construction activities are controlled under construction permits and requirements.

Subsurface excavation for the new buildings potentially could impact groundwater. As noted in the setting section, the groundwater table at YCCL is high, fluctuating seasonally from 4 to 15 feet bgs. Therefore, although household hazardous waste facilities sometimes are constructed with deep sub-floors (to contain spills), the design of the proposed HHWCF would not include a subfloor. Construction of both the HHWCF and MRF would entail no more than standard grading to prepare the site.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.5.8a: Due to the high groundwater beneath the site, the design of the proposed permanent HHW facility will not include a sub-floor. The facility will be designed to incorporate a double containment system to contain spills and water used for any fire control activities above ground. Excavation for the HHWCF and MRF will be limited to surface grading and preparation needed to meet building construction standards.

Mitigation Measures Identified in This Report

Mitigation Measure 3.5.8b: Prior to the start of grading or construction, the DIWM will prepare a Construction Storm Water Pollution Prevention Plan (SWPPP) that incorporates best management practices to minimize erosion and the off-site transport of soil and sediment, and minimize potential adverse impacts to water quality impacts associated with project construction. The objectives of the SWPPP are to identify pollutant sources that could affect the quality of storm water discharge, to implement control practices to reduce pollutants in storm water discharges, and to protect receiving water quality. The DIWM shall incorporate into contract specifications the requirement that the contractor comply with and implements the provisions of the SWPPP.

Level of Significance after Mitigation

Implementation of Mitigation Measures 3.5.8a and 3.5.8b would reduce this impact to a less-than-significant level.

Impact 3.5.9: Use of an off-site parcel as a soil borrow area could degrade groundwater or surface water quality on or near the borrow area site. (Significant)

As one component of the project, the County proposes to identify and purchase a piece of land to be used as a soil borrow area, or quarry, to provide cover material for landfill operations. A specific site has not yet been identified. Regardless of the specific location of such a site, excavation activities at a soil borrow area could result in adverse impacts to surface water or groundwater quality. Excavation will require removal of vegetative cover, which could result in increased erosion of the exposed soils and consequent sedimentation of nearby surface waters. If the depth to groundwater in the area of the borrow is not monitored, excavation activities could penetrate the water table and directly impact groundwater at the site.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.5.9a: Prior to commencement of any quarrying or excavation at a new borrow area, the DIWM will produce a stormwater pollution prevention plan for the quarry site, or if the site is adjacent, update YCCL's existing SWPPP to include the borrow area. The SWPPP will describe activities and potential pollution sources at the site and best management practices to limit soil erosion and prevent the sedimentation of nearby surface drainage channels and other surface waters. Control measures may include, but are not limited to, placement of hay bales, sediment fences, and other structures to limit erosion and the transport of sediments, and limiting the size of the area being cleared and excavated to the minimum needed for the operation. The revised SWPPP will provide for reseeding exposed areas when they are no longer actively being quarried, and include a monitoring program. Pursuant to NPDES General Permit requirements, the revised SWPPP will be implemented, and a copy of the SWPPP will be retained at the YCCL site and available for RWQCB review upon request.

Mitigation Measure 3.5.9b: Before quarrying activities commence, the DIWM shall obtain a permit if required by the Surface Mining and Reclamation Act (SMARA). Permit approval requires submission of a plan for returning the land to a usable condition (known as a "reclamation plan"), and financial assurances to guarantee costs for reclamation. New mining operations must also file an initial report with the Office of Mine Reclamation, pursuant to PRC §2207(d)(6).

Mitigation Measure 3.5.9c: Drainage structures at the site will be designed and constructed to prevent the off-site discharge of surface run-off.

Mitigation Measures Identified in This Report

None required.

Level of Significance after Mitigation

Implementation of Mitigation Measures 3.5.9a, 3.5.9b, and 3.5.9c will likely reduce impacts of soil borrowing activities on groundwater and surface water to a less-than-significant level. However, project-level environmental review of this aspect of the project will be required after identification of site for the proposed soil borrow area.

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3.6 LAND USE AND PLANNING

The purpose of this section is to identify possible environmental impacts through the evaluation of existing County planning policies relevant to the site and vicinity. If the proposed project is inconsistent with the intent of County policies and fulfills the significance criteria set forth in this section, then the issue may be considered a potential environmental impact. In these cases, this section also identifies mitigation measures to reduce the potential impacts to a less than significant level, if possible.

3.6.1 SETTING

EXISTING LAND USES

The predominant land use in the project vicinity is agriculture. Agricultural uses predominate for several miles in each direction from the project site. Portions of the eastern and southern boundaries of the site are adjacent to the City of Davis wastewater treatment plant lagoons. The parcel to the west of the site was formerly used for spray irrigation of waste processing water by the Hunt-Wesson company. Willow Slough By-Pass, an engineered waterway, is located across road 28H to the south of the landfill. Portions of the City of Davis are about 1.5 miles southwest of the site. Other land uses in the project vicinity include the road grid, utility corridors, farm houses, and outbuildings. There are several non-farm residences in the project vicinity.

APPLICABLE PLANS AND POLICIES

The Yolo County General Plan

The Yolo County Central Landfill is located in the unincorporated area of Yolo County and thus the site is subject to the policies of the Yolo County General Plan (1983). The Land Use Policies of the General Plan include a map designating the current YCCL property as "Landfill." The parcels to the north of the YCCL, and to the east of the YCCL and the City of Davis Wastewater Treatment Plant are designated as Possible Future Expansion for the landfill. The map references General Plan Policies LU53 through LU59.

The Yolo County General Plan is divided into eleven elements. The Land Use, Circulation, Open Space, Conservation, and Administration elements of the General Plan contain policies relevant to the project site and its vicinity. The following policies are relevant to the project:

> <u>LU 53. Basic, Landfill Sites</u>: The County may maintain one or more Landfill Sites, including one or more convenience centers. These sites shall be shown on the Master Plan map of Yolo County.
>
> <u>LU 54. Zoning</u>: These Landfill Sites shall be zoned to allow solid and liquid waste disposal, landfills, convenience centers, and similar uses, with a Conditional Land Use Permit.

TABLE 3.6-1
PROJECT CONSISTENCY WITH RELEVANT GENERAL PLAN POLICIES

General Plan Policies	Consistent With General Plan?	Analysis
LU-53	Yes	The site of the Yolo County Central Landfill is designated as landfill in the General Plan.
LU-54	Yes	The landfill is zoned to allow solid and liquid waste disposal, landfilling, convenience centers operations, and activities of this nature.
LU-55	Yes	The landfill does possess a conditional land use permit.
LU-56	Yes	This project does not seek to acquire adjoining parcels that may interfere with landfill or convenience center operations.
LU-57	Yes	The project proposes to include additional land uses that are compatible with those stated in the general plan. The land uses are not harmful to the continued landfill operations. In addition, the project will possibly extend the capacity of the landfill and provide environmental benefits in the form of energy production, minimizing leachate creation, and reusing and recycling additional materials.
LU-58	Yes	This project does not seek to approve an on-site or adjoining land use for activities that may restrict or preclude the establishment or expansion of the solid waste facility.
LU-59	Yes	There is no intension of rescinding the conditional land use permit in order to remove the Yolo County Central landfill.
OS-3	No	Modifications to the YCCL would not affect surrounding agricultural uses. However, the proposed off-site borrow area could be located in an area zoned for agriculture. Use of agricultural land for soil mining is not consistent with the policy to preserve such land for agriculture.
OS-5	Yes	Although this policy primarily relates to the extension of sewer and similar service facilities, its intent is to limit factors that would encourage urbanization of open space lands. The project would not require or result in the extension of sewer or other similar services. Sufficient landfill capacity currently exists in the region, and, in general, landfill capacity (or lack thereof) is not considered a major factor in encouraging (or limiting) growth. Also refer to the discussion of growth inducing impacts in Chapter 4.
CONS-12	No	The location of the proposed soil borrow area has not been established, but there is the possibility that the borrow area could be sited in an area of prime agricultural soil.

LU 55. Operations: A Conditional Land Use Permit shall be required for each Landfill Site or Convenience Center and with permit approval shall be supported by findings that such uses are consistent with the General Plan. Full General Plan Amendment proceedings shall be used to decide upon the Conditional Land Use Permit.

LU 56. Adjoining Land Uses: Adjoining Land Uses which may interfere with the use and operation of the Landfill Site(s) or Convenience Center(s) shall not be approved.

LU 57. Additional On-Site Land Uses: If the Planning Commission and the Board of Supervisors find that additional land uses on the Landfill Sites or Convenience Centers are not harmful to the continued operation of Landfill(s) or Convenience Center(s) may be allowed by conditional Land Use Permit if otherwise permitted by law [sic]. Such additional land uses may include recreational, hazardous, extensive uses, or those related to solar, wind, biochemical pyrogenic, or other similar energy production or experimental processes to produce usable energy. Appropriate agreements with the County shall be used to limit the time, extent, intensity, or other parameters of the use.

LU 58. Operational, Adjoining Land Use: No additional on-site or adjoining land use shall be approved if such use would restrict or preclude the establishment or expansion of the solid waste facility or site. Solid Waste Facility or Site includes Landfill Sites, Convenience Centers, and similar waste disposal or use.

LU 59. Operational/Remove Site: General Plan Amendment or actions to rescind Conditional Land Use Permits to remove a Landfill Site or Convenience Center from the General Plan may be accomplished.

OS 3. Agricultural Land: Yolo County shall preserve agricultural land as the principal component of open space

OS 5. Limiting Facility Extensions: Yolo County shall protect open space lands from urban uses by limiting the extension of existing service facilities, particularly sewers. Where the County does not directly control the provision of such facilities, it shall respond in the negative to proposals to extend services by respective cities or districts and shall respond in the negative to related environmental impact reports produced by the lead agency on such proposals.

Cons 12. Soils: Yolo County shall regulate land use and encourage and cooperate with appropriate agencies to conserve, study, and improve soils. Prime soils shall be preserved outside of designated urban areas.

Yolo County Code Title 8 Zoning Regulations

The land surrounding Yolo County Central Landfill is utilized for either agricultural activities or wastewater treatment operations. Overall, the landfill facility is compatible with these surrounding land uses and the corresponding zoning. Zoning of the site and adjacent land is summarized in the table below.

TABLE 3.6-2
SUMMARY OF ADJACENT ZONING FOR THE YOLO COUNTY CENTRAL LANDFILL

Area (and extent of applicable zoning)	Zoning
Yolo County Central Landfill	A-1
North of the YCCL (1 mile)	A-P
West of the YCCL (1/2 mile)	A-1
East of the YCCL (2 miles)	A-P
South of the YCCL (1/2 mile)	A-P

The following are zoning definitions for A-1 and A-P designations, as stated in the Yolo County Zoning Regulations, Title 8, Chapter 2, Zoning:

Article 6. Agricultural General Zone (A-1)

Sec. 8-2.601. Purpose (A-1)

The purpose of the Agricultural General Zone (A-1) shall be to preserve lands best suited for agricultural use from the encroachment of incompatible uses and to preserve in agricultural use land suited for eventual development to other uses, pending proper timing for the economical provision of utilities, major streets, and other facilities so that compact, orderly development shall occur. A change of zoning classification from the A-1 Zone to any other zoning classification shall only be made in general accord with the Master Plan, and any such development shall receive more favorable consideration if planned for less productive soils.

Article 4. Agricultural Preserve Zone (A-P)

Sec. 8-2.401. Purpose (A-P)

The purpose of the Agricultural Preserve Zone (A-P) shall be to preserve land best suited for agricultural use from the encroachment of nonagricultural uses. The A-P Zone is intended to be used to establish agricultural preserves in accordance with the California Land Conservation Act of 1965. Uses approved on contracted land shall be consistent and compatible with the provisions of the Act. Uses authorized shall not include Agribusiness Development Park Areas.

The Yolo County Board of Supervisors officially approved the establishment of the YCCL at its present location in Resolution No. 74-67, which also certified the Final Environmental Impact Report (EIR) and other preliminary investigations that had been completed for the site. As indicated in the resolution, the present landfill location was thoroughly evaluated and determined to be suitable for a solid waste disposal site. Approval of the proposed site was consistent with the Yolo County Planning Commission findings to locate a solid waste facility in an A-1 zone.

The Yolo County General Plan policies specify that a Conditional Use Permit (CUP) is required to site a solid waste facility in an A-1 zone. A CUP was implicitly granted for the site with the approval of the Final EIR via Resolution 74-67. This initial action applied to only the original

640 acres proposed for the site. The planned expansion of the site to include 724.54 acres and additional operations required a new CUP in 1992. In October, 1992, the Yolo County Board of Supervisors and the Yolo County Planning Commission concurred that the facility expansion was compatible with the adjacent zoning and surrounding land use when the CUP was granted and the EIR was certified.

Yolo County Integrated Waste Management Plans

Yolo County's waste management plan consists of the following elements:

- 1995 Siting Element for Yolo County
- 1995 Summary Plan for Yolo County
- Source Reduction and Recycling Elements (SRRE) for each City within the County and for the Unincorporated Area
- Household Hazardous Waste Elements for each City within the County and for the Unincorporated Area;
- Nondisposal Facility Elements for each City within the County and for the Unincorporated Area.

Together these plans establish county-wide goals and objectives for integrated waste management planning, describe the current system of solid waste management in the county and its cities, and summarize the programs and facilities selected in the multi-jurisdictional planning documents prepared for Yolo County and its cities.

The following waste management plan goals and policies are relevant to the Project.

From the Yolo County Siting Element

Siting Element Goal 2. Ensure compliance with all state and federal standards for locating and operating solid waste disposal facilities.

Siting Element Goal 3. Operate and maintain solid waste facilities that ensure protection of public health and minimize environmental impacts and nuisances.

Siting Element Goal 4 Policy A. Maintain a hazardous waste exclusion program using trained technicians at disposal facilities for loads inspection and removal of inappropriate materials.

Siting Element Goal 5. Ensure availability of solid waste disposal facility capacity to meet Yolo County's long term needs.

Siting Element Goal 6. Manage solid waste disposal facilities to maximize cost effectiveness and convenience to county residents.

Siting Element Goal 8. Consider regional approaches to solid waste disposal that are mutually convenient and beneficial to those involved.

Siting Element Goal 9. Prevent the development of new or expanded solid waste facilities in incompatible land use areas. Protect existing facilities from encroachment of incompatible land uses.

Siting Element Goal 10. Maintain an integrated waste management system for Yolo County based on the waste management hierarchy and optimizing the use of economically feasible source reduction, recycling, and composting to conserve existing landfill capacity at YCCL and Davis Landfill.

From the Summary Plan for Yolo County

Summary Plan Goal 1. To conserve natural resources, energy and disposal capacity, the cities and county will minimize the quantity of solid waste requiring disposal using the hierarchy of: (1) source reduction; (2) recycling and composting; and (3) transformation and land disposal.

Summary Plan Goal 2. All integrated waste management programs will continue to be implemented so as to reduce to the maximum extent possible environmental impacts and nuisances and ensure public safety.

Summary Plan Goal 3. The cities and county will seek to increase interagency cooperation and cooperation with institutions and the private sector to achieve efficient and cost effective integrated waste management service in Yolo County.

Summary Plan Goal 4. To minimize the improper disposal of hazardous wastes, Yolo County residents and appropriate businesses will be provided reasonable access to programs for the safe and efficient management of Household hazardous Waste (HHW) and small quantity generator (SQG) wastes. Where technically and/or economically feasible, HHW materials will be reused or recycled and the remainder disposed of in an environmentally safe manner.

Table 3.6-3 summarizes Project consistency with the County's solid waste management policies.

3.6.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The project would have a significant impact if it were to:

- conflict with an applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect; or
- result in a substantial change to land use patterns.

TABLE 3.6-3
PROJECT CONSISTENCY WITH INTEGRATED WASTE MANAGEMENT PLAN GOALS AND POLICIES

Yolo County Integrated Waste Management Plan Goals & Policies	Consistent With Integrated Waste Management Plan?	Analysis
Siting Element Goal 2	Refer to Chapter 3 sections 3.1 through 3.11 and Chapter 4.	The compliance of the project with relevant state and federal disposal facility standards is considered in each analysis section of Chapter 3 to which such standards apply. Refer to the discussion in those sections.
Siting Element Goal 3	Refer to the impact discussions in Chapters 3 and 4.	Potential environmental impacts and nuisances are the subject of this EIR. Refer to impact analyses presented in Chapter 3, sections 3.1 through 3.11 and the impact overview in Chapter 4.
Siting Element Goal 4 Policy A	Yes	YCCL would continue its hazardous waste exclusion program at the Class III landfill, which uses trained technicians for load inspection and removal of inappropriate materials. Conversion of the temporary Household Hazardous Waste Collection Facility to a permanent facility would facilitate the ultimate management of any hazardous materials found during load inspections.
Siting Element Goal 5	Yes	The Siting Element requires a minimum of 15 years solid waste disposal capacity for Yolo County. Additional landfill capacity is not required to ensure that Yolo County maintains adequate landfill capacity through the year 2032.
Siting Element Goal 6	Yes	The intent of the project is to maximize cost-effectiveness in order to avoid future landfill tipping fee increases, even after considering the construction and operation of the new facilities. Siting additional solid waste facilities at the same location would maximize convenience to county residents.
Siting Element Goal 9	Yes	The proposed project does not involve development or expansion of solid waste facilities on incompatible land use areas. Proposed solid waste facilities and operations would continue to operate on the existing landfill site that has a conditional use permit.
Siting Element Goal 10 & Summary Plan Goal 1	Partly	The project involves expansion of salvage operations and development of new recycling and expanded composting capacity through the construction and operation of a material recovery facility and expansion of the existing composting facility. However, the project involves considerable investment of resources to increase disposal capacity This commitment of resources can be seen as being contrary to the goal of maximizing source reduction In addition, increasing landfill capacity could result in more modest increases in landfill tipping fees, thus possibly removing or reducing an economic incentive to reduce, recycle, or compost.
Summary Plan Goal 2	Yes	The purpose of this EIR is to identify potential environmental impacts of the project and identify mitigation measures to minimize those impacts and ensure public safety.
Summary Plan Goal 3	Yes	The successful development and expansion of the various facilities would require interagency cooperation and partnerships with private sector representatives.
Summary Plan Goal 4	Yes	The conversion of the existing temporary household hazardous waste collection facility to permanent status addresses the County's goal of providing reasonable access to programs that safely and efficiently manage HHW and small quantity generator wastes.

Impact 3.6.1: Development of an off-site borrow area could result in conflicts with agricultural uses. (Significant)

The project includes siting a soil borrow area, up to 640 acres in size, within a five mile radius of the landfill. Since most of the non-urban land within this radius is agricultural land, the soil borrow area will most likely be located on a parcel currently used for agriculture, designated as agricultural land in the General Plan, and zoned for agriculture. The use of agricultural lands for non-agricultural purposes conflicts with the Open Space Element's third goal (OS -3) that Yolo County will preserve agricultural land. The use of agricultural land for non-agricultural use could also conflict with the existing land use designation. To the extent that locating the soil borrow area in a location where this use conflicts with the intent to preserve agricultural land and with the existing land use designation and zoning, it may be considered a significant impact.

Mitigation Measures Proposed as Part of the Project

None proposed.

Mitigation Measures Identified in This Report

Mitigation Measure 3.6.1a: The off-site soil borrow area should be sited in the "possible future expansion" areas identified in the General Plan, located directly east and north of Yolo County Central Landfill. Although these areas are currently designated as A-P, the intent of the general plan is to allow future landfill expansion in the adjacent northern and eastern parcels; therefore, the use of theses parcels as a borrow area should not conflict with the General Plan's intent to preserve agricultural land. Also, the Yolo County Zoning Regulations, Title 8, Chapter 2 Zoning, Sec. 8-2.404 states that upon review and approval, conditional uses such as the operation of a solid waste disposal site shall be authorized by a Minor Use Permit.

Mitigation Measure 3.6.1b: The County could site the off-site borrow area in a location that is not zoned or designated as agricultural land.

Mitigation Measure 3.6.1c: The County can re-zone and re-designate the borrow area site so the use of the site would not conflict with the land use designation. However, re-designating the site could conflict with other land use policies.

Mitigation Measure 3.6.1d: The County can use alternative sources of daily cover (e.g. fines from the landfill mining operations, the compost generated from the compost operations), which would reduce the need to develop an off-site borrow area.

Level of Significance After Mitigation

Implementation of Mitigation Measures 3.6.1a, 3.6.1b, 3.6.1c, or 3.6.1d or a combination of the measures would likely reduce this impact to a less-than-significant level. However, this impact will have to be re-visited in a project-level environmental review when a location is established for the off-site borrow area.

Impact 3.6.2: Development of an off-site borrow area could result in the inappropriate use of prime agricultural soils. (Significant)

The proposed project includes acquiring a 640 acre parcel for mining of soil to be used as daily cover. The use of soil for daily cover from a soil borrow area that is considered prime agricultural land could conflict with the Conservation Element Goal 12 (CONS-12) which requires the preservation of prime soils outside of the designated urban areas and therefore may be considered a significant impact.

Mitigation Measures Proposed as Part of the Project

None proposed.

Mitigation Measures Identified in This Report

Mitigation Measure 3.6.2: The County should not locate the borrow area or areas on prime agricultural land where prime soils may be found. The California Department of Conservation's "important farmlands" designation may be used to identify the areas of prime agricultural soils.

Level of Significance After Mitigation

Implementation of Mitigation Measure 3.6.2 would reduce this impact to a less-than-significant level.

Impact 3.6.3: Implementation of the proposed project may conflict with the County's goal to adhere to the disposal hierarchy of (1) source reduction; (2) recycling and composting; and (3) transformation and land disposal. (Significant)

The resources invested in the expansion of disposal capacity and the increased capacity to recover and compost materials may be seen as being contrary to the goal of maximizing source reduction. In addition, increasing the landfill capacity may result in economies of scale that lead to the County's ability to delay or reduce tipping fee increases. Low landfill tipping fees may provide a disincentive for County residents and businesses to reduce or recycle their waste, since the option to dispose is relatively inexpensive. While the potential negative impact on diversion programs is not urgent since the County achieved a 65% diversion rate in 2000 in the unincorporated area and the County's cities of Davis, Winters, Woodland, and West Sacramento also achieved at least 50 percent diversion or a CIWMB-approved variance from the 50 percent diversion goal based on "good faith effort"(CIWMB, 2004), the project could be seen as being incompatible with Siting Element Goal 10 and Summary Plan Goal 1, which require the County to adhere to the disposal hierarchy of (1) source reduction; (2) recycling and composting; and (3) transformation and land disposal. YCCL currently offers opportunities for customers to drop-off materials for recycling, without paying to enter the landfill. Continuation of this program, as well as enabling customers free access to the proposed salvage area, would ensure that an economic incentive exists for customers to separate materials for recycling or reuse, rather than disposal. This may therefore be considered a significant impact.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.6.3a: Yolo County charges differential rates depending on the type of load dropped off. Separated materials such as green waste and recyclables have a lower tipping fee than landfilled materials. This provides an incentive to deliver clean loads of material for recovery, rather than disposal.

Mitigation Measure 3.6.3b: Yolo County uses tipping fees from the YCCL to subsidize or pay for the costs associated with most of the County's recycling, reuse and waste reduction programs. This keeps recycling fees down as compared with disposal fees.

Mitigation Measure 3.6.3c: The current configuration of the landfill entrance allows customers to drop-off source separated recyclables prior to entering the paid area of the landfill. This arrangement will be maintained under the project.

Mitigation Measures Identified in This Report

Mitigation Measure 3.6.3d: The landfill entrance shall ould be configured to allow customers access to the proposed salvage area without entering the paid area of the landfill.

Level of Significance After Mitigation

The combination of Mitigation Measures 3.6.3a, 3.6.23, 3.6.3c, and 3.6.3d will ensure that this impact is reduced to a less-than-significant level.

REFERENCES – Land Use and Planning

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3.7 NOISE

This section evaluates the potential for the project to cause new or more severe noise impacts. The 1992 EIR for the previous permit revisions at the Yolo County Central Landfill found that the project did not have the potential to cause significant noise impacts on the environment. This was primarily due to the buffer area between the landfill boundary and the nearest sensitive receptor. Although there is now a residence closer than in 1992, the landfill still has a substantial buffer area.

This section provides an update to the physical and regulatory setting discussions presented in the Noise Section of the 1992 EIR, and examines the potential for the proposed project to increase noise levels at the Yolo County Central Landfill to the extent that a new, significant environmental impact could occur.

3.7.1 SETTING

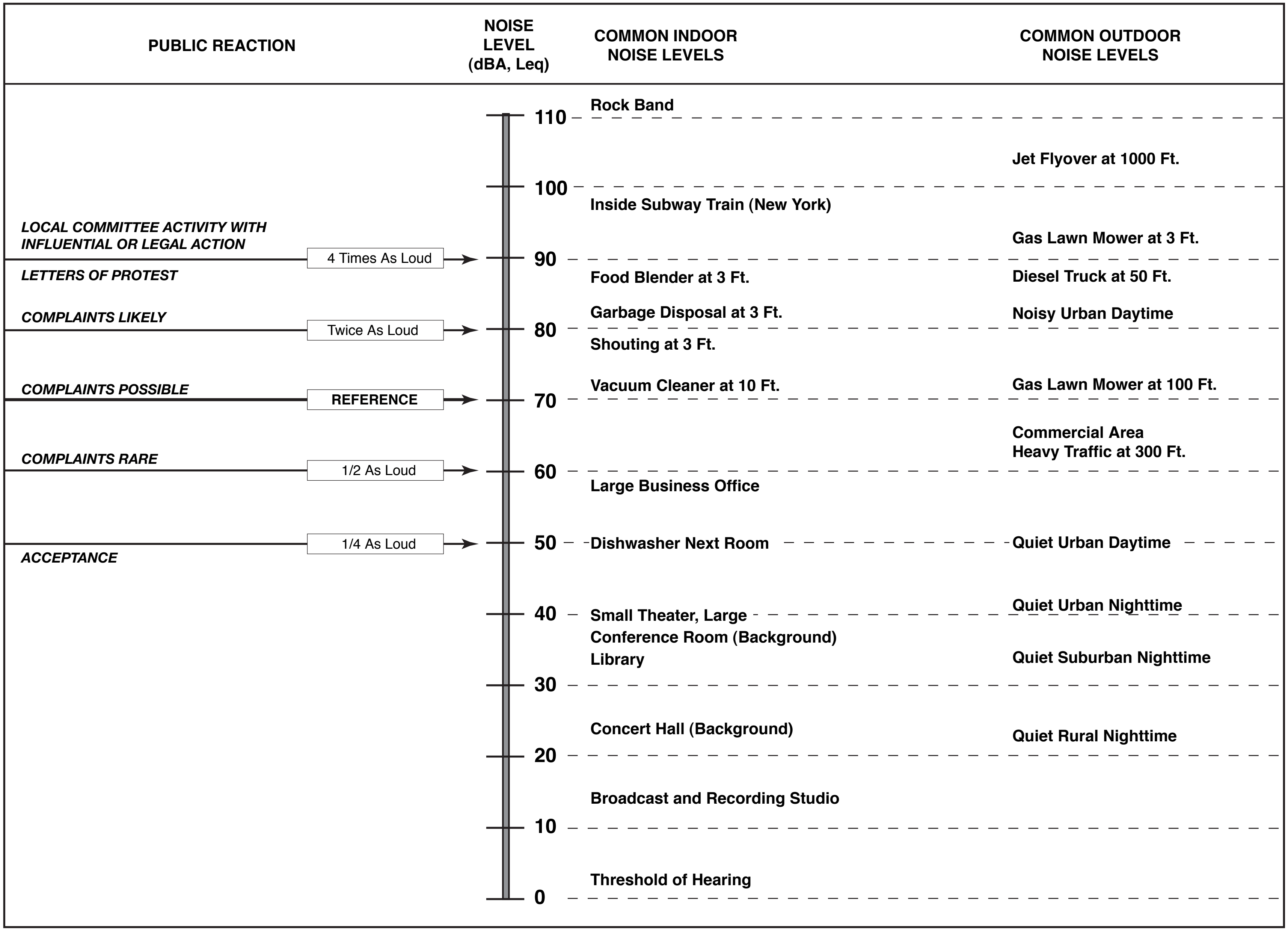
INTRODUCTION TO NOISE PRINCIPLES AND DESCRIPTORS

Noise is defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) that is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum (20 to 20,000 Hz). As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the decreased sensitivity of the human ear to low and extremely high frequencies in comparison to the better sensitivity of the human ear to mid-range frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). Frequency A-weighting follows an international standard method of frequency de-emphasis and is typically applied to community noise measurements. In practice, the level of a sound source is measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve. Some representative noise sources and their corresponding A-weighted noise levels are shown in Figure 3.7-1. All of the noise levels reported herein are A-weighted unless otherwise stated.

Noise Exposure and Community Noise

An individual's noise exposure is a measure of noise over a period of time. A noise level is a measure of noise at a given instant in time. The noise levels presented in Figure 3.7-1 are representative of measured noise at a given instant; however, they rarely persist consistently over a long period of time. Rather, community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise



SOURCE: Caltrans Transportation Laboratory Noise Manual, 1982; and Modification by Environmental Science Associates

Figure 3.7-1
Effects of Noise on People

is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources such as aircraft flyovers, vehicle passbys, sirens, etc., which are readily identifiable to the individual. These successive additions of sound to the community noise environment vary the community noise level from instant to instant, requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{eq}: the equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The L_{eq} is the constant sound level that would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

L_{max}: the instantaneous maximum noise level for a specified period of time.

L_{10}: the noise level that is equaled or exceeded 10 percent of the specified time period. The L_{10} is often considered the maximum noise level averaged over the specified time period.

L_{90}: the noise level that is equaled or exceeded 90 percent of the specified time period. The L_{90} is often considered the background noise level averaged over the specified time period.

DNL: 24-hour day and night A-weighed noise exposure level that accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night (“penalizing” nighttime noises). Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noise. (also referred to as Ldn)

CNEL: similar to the DNL, the Community Noise Equivalent Level (CNEL) adds a 5 dBA “penalty” for the evening hours between 7:00 p.m. and 10:00 p.m. in addition to a 10 dBA penalty between the hours of 10:00 p.m. and 7:00 a.m.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning; and
- physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual’s past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur (Caltrans, 1998):

- under controlled conditions in an acoustics laboratory, the trained healthy human ear is able to discern changes in sound levels of 1 dBA;
- outside of such controlled conditions, the trained ear can detect changes of 2 dBA in normal environmental noise;
- It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of 3 dBA;
- a change in level of 5 dBA is a readily perceptible increase in noise level; and
- a 10-dBA change is recognized as twice as loud as the original source.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. Noise levels are measured on a logarithmic scale, instead of a linear scale. On a logarithmic scale, the sum of two noise sources of equal loudness is 3 dBA greater than the noise generated by just one of the noise sources (e.g., a noise source of 60 dBA plus another noise source of 60 dBA generate a composite noise level of 63 dBA). To apply this formula to a specific noise source, in areas where existing levels are dominated by traffic, a doubling in the volume of the traffic will increase ambient noise levels by 3 dBA. Similarly, a doubling in the use of heavy equipment, such as use of two landfill dozer/compactors where formerly one was used, would also increase ambient noise levels by 3 dBA. A 3 dBA increase is the smallest change in noise level detectable to the average person. A change in ambient sound of 5 dBA can start to create concern among neighbors. A change in sound of 7 to 10 dBA typically brings calls to government officials and letters to the newspaper.

Noise Attenuation

Stationary "point" sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate of 6 to 7.5 dBA per doubling of distance from the source, depending on environmental conditions (i.e., atmospheric conditions and noise barriers, either vegetative or manufactured, etc.). Widely distributed noises, such as a large industrial facility spread over many acres or a street with moving vehicles (a "line" source), would typically attenuate at a lower rate, approximately 3 to 4.5 dBA per doubling distance from the source (also dependent upon environmental conditions) (Caltrans, 1998). Noise from large construction sites (or a landfill with heavy equipment moving dirt and solid waste daily and trucks entering and exiting the main gate daily -- activities similar to construction sites) would have characteristics of both "point" and "line" sources, so attenuation would probably range between 4.5 and 7.5 dBA per doubling of distance.

NOISE REGULATIONS, PLANS, AND POLICIES

In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains fairly constant with time. Air and rail traffic, and commercial and industrial activities are also major sources of noise in some areas. Federal, state, and local agencies regulate different aspects of environmental noise. Noise regulations established by each branch of government are described below.

Federal Regulations

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 CFR, Part 205, Subpart B. The federal truck pass-by noise standard is 80 dB at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers.

State Regulations

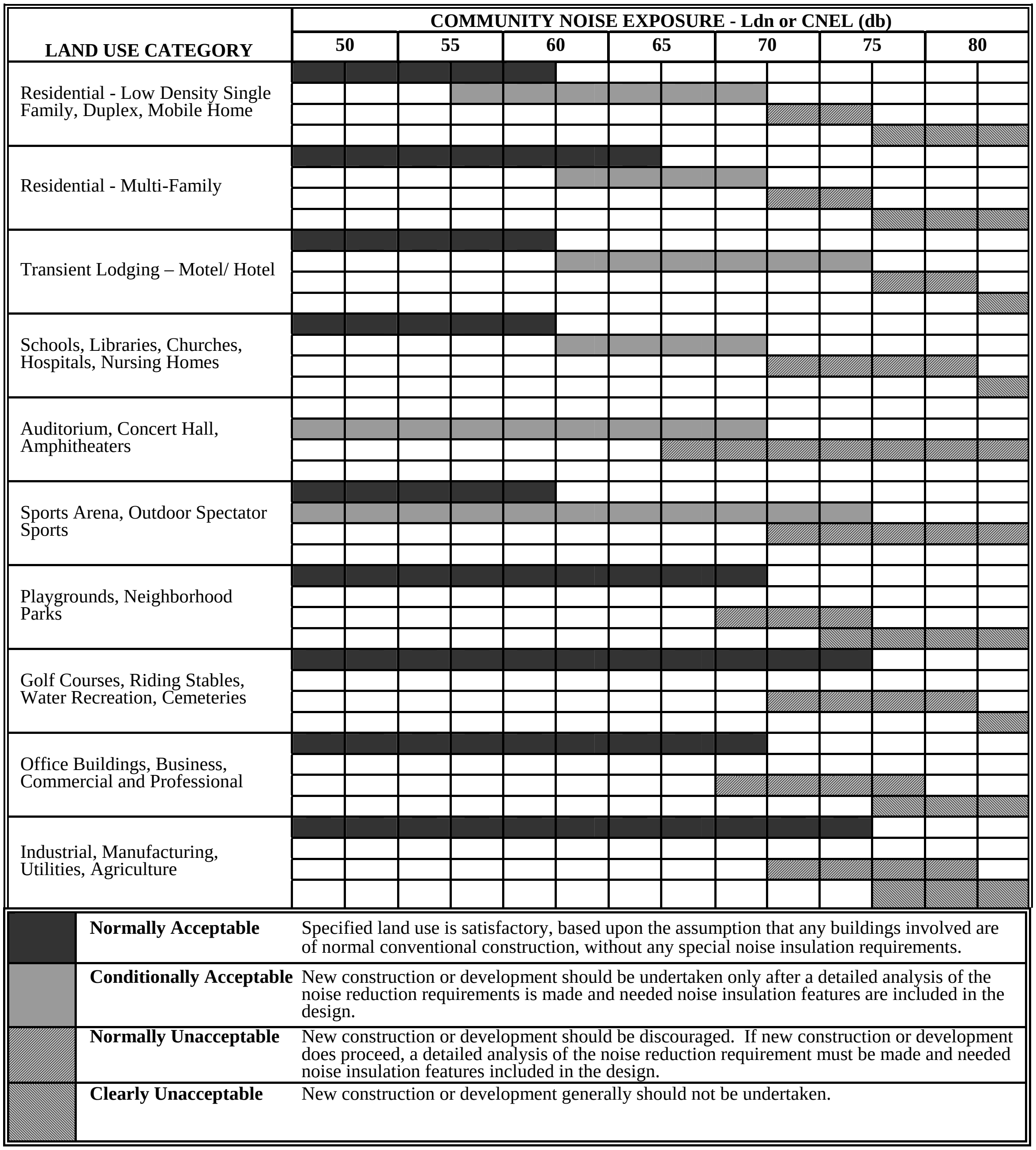
Title 4, California Code of Regulations has guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The State land use compatibility guidelines are listed in Figure 3.7-2.

The State of California establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dB. The State pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dB at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by state and local law enforcement officials.

The State has also established noise insulation standards for new multi-family residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24, California Code of Regulations). The noise insulation standards set forth an interior standard of DNL 45 dB in any habitable room. They require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than DNL 60 dB. Title 24 standards are typically enforced by local jurisdictions through the building permit application process

Local Regulations

In California, local regulation of noise involves implementation of General Plan policies and Noise Ordinance standards. Local General Plans identify general principles intended to guide and influence development plans, and Noise Ordinances set forth the specific standards and procedures for addressing particular noise sources and activities. Yolo County has not adopted a Noise Ordinance.



SOURCE: State of California General Plan Guidelines, Office of Planning and Research, June 1990.

Yolo County Central Landfill Permit Revision EIR / 202102 ■

Figure 3.7-2

Land Use Compatibility for Community Noise Environment

General Plans recognize that different types of land uses have different sensitivities toward their noise environment; residential areas are considered to be the most sensitive type of land use to noise and industrial/commercial areas are considered to be the least sensitive.

Yolo County General Plan

County of Yolo goals and policies pertaining to noise are set forth in the General Plan (Yolo County, 1983). The following goals and policies are relevant to the proposed project:

> Goal. Work on noise problems and their solutions.
>
> Goal. Improve the beauty, peace, and quiet of the County.
>
> Policy N1. Yolo County shall regulate, educate, and cooperate to reduce excessive noise levels within the environment and particularly those noise levels which impinge upon the home environment.
>
> Policy N2. Yolo County shall regulate the location and operation of land uses to avoid or mitigate harmful or nuisance levels of noise.
>
> Policy N3. Noise shall be prevented, avoided, and suppressed by controlling noises at the source, providing barriers or buffers, by the implementation of a noise ordinance and by means of wise land use planning and implementation.
>
> Policy N7. *Development Control/Noise*: Yolo County shall review development plans for noise compatibility of the proposed use with the surrounding uses and planned uses, and shall incorporate noise reduction, avoidance, or mitigation techniques as necessary. In addition to other ordinances, standards, or devices, the following may be used to accomplish these policies:
>
> - Provide open space, berms or walls, or landscaped areas between occupied dwellings and noise generators.
>
> Policy N8. *Implementation*: Yolo County shall achieve these policies by the application of available review, guidance, and regulatory devices including:
>
> - Placing future development within areas of noise compatible land uses.
> - Supporting efforts to reduce noise levels.
> - Application of design standards to avoid or mitigate noise problems, including structure design, materials, and location.
>
> Policy N9. *Mitigation and Reduction*: Yolo County will require mitigation to reduce noise to acceptable levels throughout the County and particularly within home environments. Reduction of noise shall be sought at the source, along its path, and/or at receiver points if such noise is determined to be excessive.

SENSITIVE RECEPTORS AND EXISTING NOISE ENVIRONMENT

Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. Residences, motels and hotels, schools, libraries, churches, hospitals, nursing homes, auditoriums, and parks and other outdoor recreation areas generally are more sensitive to noise than are commercial and industrial land uses. Sensitive receptors within one mile of the Yolo County Central Landfill are identified in Table 3.7-1.

FINDINGS OF THE 1992 EIR

This section summarizes the Noise section from the 1992 EIR for activities at the YCCL. The summary includes a review of the environmental setting described in the 1992 EIR, significance criteria established for determining significant noise effects of the previous project, and noise impacts and mitigation measures identified in that document.

The 1992 EIR notes that the noise environment in the project area was characterized by low ambient noise levels, with the primary noise sources consisting of (1) operations at the YCCL, (2) power generation at the methane gas recovery facility, (3) operation of processing equipment

TABLE 3.7-1
RESIDENCES WITHIN ONE MILE OF THE YCCL

Use/Location	Direction from the YCCL	Distance from YCCL boundary (feet)
Approximately six (6) residence on Road 103	West of YCCL	4,300 to 5,200
Residence south of Willow Slough By-Pass	South of the southern boundary	600
Residence south of Willow Slough By-Pass	Southwest of the southwestern boundary	3,400
Residence south of Willow Slough By-Pass	South of the southeastern corner	1,400

SOURCE: Environmental Science Associates, 2003. Based on 1994 aerial photo and 2003 site reconnaissance.

at the wood and yard waste processing facility, and (4) vehicular traffic on area roadways. A mix of agricultural activities and operations at the City of Davis Wastewater Treatment Facility also generated secondary noise in the project area.

The 1992 EIR found that the closest sensitive receptor area was located approximately 1500 feet southeast of the landfill property boundary. Also, in 1992 receptor areas in proximity to the project site were exposed to average sound levels below 55 dBA from equipment operations within WMU 6, Module A.

For the purposes of the 1992 EIR, noise was considered a significant impact if noise-sensitive land uses would be exposed to an exterior noise level of 65 dBA CNEL or greater.

The 1992 EIR found that the cumulative noise impacts from all landfill operations (equipment operations, methane gas recovery generations, waste processing grinder, bin transfer operations, and the HHW collection facility) would not increase average noise levels by more than 1 dBA for receptors located outside the project site. Therefore, cumulative noise levels associated with all operations at the site would be below threshold levels of 65 dBA CNEL at off-site receptors, and no additional mitigation measures were recommended for off-site noise effects.

The noise section also identified that persons working in the vicinity of heavy equipment should be required to wear hearing-protective devices. Because the County was committed to implementing hearing protection for on-site workers, no further mitigation was required or recommended for noise impacts associated with YCCL operations.

Existing Noise Environment

24-Hour Measurements

The existing noise environment in the vicinity of the YCCL is attributed to various stationary and mobile sources, mostly from activities of YCCL. The major noises are: (1) vehicles coming to and from the landfill [primarily on Road 105 and Road 28H]; and (2) activities at the landfill. Both short- and long-term noise measurements were taken to describe accurately the existing setting in this EIR. Table 3.7-2 shows the CNEL levels measured at three locations on the landfill boundary. The highest CNEL (64 DBA) was recorded near the entrance facility at a location that was exposed to all the traffic entering and exiting the YCCL (since Road 105 was temporarily closed all the traffic entered and exited YCCL from Road 28H to the west. Graphs of the long-term noise monitoring events are provided in Appendix J.

Short-Term Measurements

In addition to the 24-hour measurements, short-term measurements were collected (both close to landfill noise sources and from locations near the sensitive receptors) of existing noise-generating activities at YCCL to document the existing setting and also to determine reference distances and sound energy levels as a basis for estimating off-site noise levels from landfill operations (using standard noise attenuation factors). Table 3.7-3 summarizes the short-term measurements.

CHANGES IN THE ENVIRONMENTAL SETTING SINCE THE 1992 EIR

The 1992 EIR estimated that the 65-dBA contour line would be within the YCCL boundary and the 60-dBA contour line would be approximately at the boundary of the YCCL. Noise levels at the nearest receptor (at that time the nearest receptor was the residence just south of the junction of Road 105 and Willow Slough Bypass Channel) were estimated to be between 55 and 60 dBA.

Since the 1992 EIR two new residences have been built within one mile of the YCCL. One new residence is directly south of the YCCL and is now the closest sensitive receptor (approximately 600 feet from the landfill's southern fenceline). The other new residence is approximately 3,400 feet to the southwest of the YCCL's southwestern corner. Based on the long-term and short-term

TABLE 3.7-2
LONG-TERM NOISE MONITORING RESULTS AT YCCL[a,b]

Location	CNEL	Peak Hourly Leq
Site #1; on fence near southeastern YCCL boundary 36' from roadway edge	60 dBA	59.6 dBA @ 9-10 AM
Site #2; on fence at western YCCL boundary ~100-200' from working face (Unit 3)	61 dBA	65.6 dBA @ 3-4 PM
Site #3; on fence at southwestern YCCL boundary, 100' west of entrance gate and 35' north of Road 28H	64 dBA	64.3 dBA @ 11-12 AM

a All noise measurements taken Wednesday, November 6, 2002.
b Road 105 was closed for repairs so landfill traffic entered the site coming from Road 28H from the west.

SOURCE: Environmental Science Associates, 2002

TABLE 3.7-3
SHORT-TERM NOISE MONITORING RESULTS AT YCCL[a,b]

Noise Source	Reference Distance (feet)	L_{eq} (dBA)	L_{10}	Notes and Observations
Landfill gas-fired electrical generation plant (Caterpillar 399 engine)	50	84.8	85	Only one generator was operating. Measurements taken directly east in loudest location [exhaust end]. Constant noise level.
Landfill gas-fired electrical generation plant (Caterpillar 399 engine)	25	88.6	89	Measurement of the same generator at a closer distance. Attenuation is about 4 dBA per doubling of reference distance.
Working face (various combinations of waste compactor, D8-dozer, and various dump trucks)	200	62.8	66	Sound levels varied from 60 to 68 dBA depending on activity levels.
Road 29 just south of Willow Slough Bypass Channel; near the closest residential receptor	500	46.9	49	North levee berm acts as sound wall to reduce noise from truck traffic. Back-up beepers and truck noises occasionally were distinguishable at ~50 dBA.

a All noise measurements taken Tuesday, November 19, 2002. Duration of each measurement was 15 minutes.
b Road 105 was open to landfill traffic; repairs completed.

SOURCE: Environmental Science Associates, 2002 measurements described above, the closest residence probably experiences existing noise levels between 55 and 60 dBA (or less) under worst-case conditions. Although noise levels can vary considerably, the short-term noise measurement at this location was approximately 47 dBA.

3.7.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

According to the *CEQA Guidelines*, a project would normally result in a significant noise impact if it would:

- Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project; or
- Substantially change the existing vibration levels in the project vicinity; or
- Expose persons to or generate excessive ground-borne vibration.

The County has no established noise standards that would apply to this project. Because the landfill is located in a rural, agricultural area that is currently exposed to noise from landfill activities and could be exposed to noise from other agricultural activities, 65 dBA, CNEL seems an appropriate significance standard for this project. The state land use compatibility guidelines note that conditionally acceptable noise levels for residential areas can be as high as 70 dBA and 60 dBA is normally acceptable. As was done for the 1992 EIR, this EIR will consider noise a significant impact if noise-sensitive land uses would be exposed to an exterior noise level of 65 dBA CNEL or greater.

Impact 3.7.1: New on-site project activities that are proposed (including landfill mining, construction and operation of a MRF, salvaging operations and a public buy-back area, construction and operation of a compost facility, construction and operation of a permanent household hazardous waste collection facility, and expanded landfill gas management and utilization options) or design changes (raising the height from 80 to 140 feet MSL) could increase noise levels at sensitive off-site residential receptors. (Less than significant)

The proposed changes considered in this EIR would affect noise levels at YCCL and the surrounding area. However, the changes would not be expected to increase exterior noise levels at off-site sensitive receptors above 65 dBA, CNEL. There are several reasons for this conclusion:

- Only approximately nine (9) residential receptors are within one mile of the site, and the closest sensitive receptors are to the south, an area that is protected from noise on Road 28H by the levees that contain Willow Slough Bypass Channel.

- The noise from new activities at the landfill should not be significantly louder than activities that already occur at the landfill.

- Permitted hours and days of operation would be 6:00 a.m. to 5:00 p.m., Monday through Saturday, and 8:30 a.m. to 6:00 p.m. on Sunday. Only the 6:00 to 7:00 a.m. hour is penalized in the CNEL calculation and considered to be noise sensitive.
- The highest CNEL recorded at the YCCL perimeter was 64 CNEL (24-hour Site #3) at the main entrance gate. Other fenceline locations (Site #1 and Site #2) were measured at 60 and 61 dBA, CNEL. The noise from the traffic on Road 28H (including the entrance gate area) is effectively shielded from the residential receptors to the south by the levees that contain Willow Slough Bypass Channel.
- Although the levees to the south reduce the noise from traffic on Road 28H, the sensitive receptors to the south already have effective line of sight to some of the landfill working face areas. Existing noise measurements on November 19, 2003 taken on Road 29 in the area of the nearest sensitive receptor found that noise levels are approximately 50 dBA at this location from activities on the working face (the working face was on Unit 3 that day with direct line of site).
- Although typical landfill activities are similar to construction activities and construction activities can create high noise levels (see typical levels in Tables 3.7-4 and 3.7-5), the buffer area to the surrounding receptors would minimize noise impacts from construction of new facilities and noise impacts of operations at the new facilities or from new activities (e.g., landfill mining).

TABLE 3.7-4
TYPICAL CONSTRUCTION NOISE LEVELS

Construction Phase	Noise Level (dBA, L_{eq})[a]
Ground Clearing	84
Excavation	89
Foundations	78
Erection	85
Finishing	89

[a] Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

SOURCE: Bolt, Baranek, and Newman, Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, 1971.

Although the impact should be less than significant, there are some unknown details of future activities that could result in unnecessarily high off-site noise levels unless mitigated. The following mitigation measures are suggested to minimize the off-site impacts of project noise.

Mitigation Measures Proposed as Part of the Project

None.

TABLE 3.7-5
TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVELS

Equipment	Noise Level (dBA) @ 50 Feet	With Feasible Noise Control[a]
Earthmoving		
Front Loader	79	75
Backhoe	85	75
Dozer	80	75
Tractor	80	75
Scraper	88	80
Grader	85	75
Paver	89	80
Materials Handling		
Concrete Mixer	85	75
Concrete Pump	82	75
Crane	83	75
Stationary		
Pump	76	75
Generator	78	75
Impact		
Pile Driver	101	95
Jack Hammer	88	75
Rock Drill	98	80
Pneumatic Tools	86	80
Other		
Saw	78	75
Vibrator	76	75

a Estimated levels obtainable by selecting quieter procedures or machines and implementing noise-control features requiring no major redesign or extreme cost.

SOURCE: U.S. Environmental Protection Agency (1971)

Mitigation Measures Identified in This Report

Mitigation Measure 3.7.1a: Construction activities for new facilities shall be limited to 6:00 a.m. to 5:00 p.m., Monday through Saturday, and 7:00 a.m. to 6:00 p.m. on Sunday.

Mitigation Measure 3.7.1b: Stationary noise sources that emit noise levels greater than 80 dBA at 50 feet shall be oriented to contain the noise within the YCCL boundary to the extent possible. Noise levels from continuous stationary sources (ones that may operate 24 hours per day) shall not exceed 70 dBA at the YCCL property line.

Mitigation Measure 3.7.1c: Operating hours for the landfill shall not be expanded from current limits: 6 a.m. to 5 p.m. Monday through Saturday and 7 a.m. to 6 p.m. on Sunday.

Level of Significance After Mitigation

The combination of Mitigation Measures 3.7.1a, 3.7.1b, and 3.7.1c will further reduce the significance of this impact.

Impact 3.7.2: Noise from activities at the "soil-borrow" area could affect sensitive receptors. (Significant)

At this time the location of the "soil-borrow" area is not known. Activities to mine the soil are likely to have noise levels similar to those identified in Table 3.7-4: ground clearing, 84 dBA; and excavation, 89 dBA (reference distance of 50 feet). The excavation noise levels would be reduced to 65 dBA at an approximate distance of 2,000 feet (using an attenuation of 4.5 dBA per doubling of distance). Excavation activities could be a significant impact if they occur within 2,000 feet of sensitive noise receptors

The truck noise from hauling soil from the "soil-borrow" area to YCCL could also be a significant noise impact depending upon the location of sensitive receptors on the haul route, the number of trucks per day and the time of day of the hauling. It is assumed that truck trips for hauling soil would be limited to the hours of 7 a.m. to 5 p.m. Even with this limitation, a residence with a setback of 50 feet would be subjected to an exterior noise level of 65 dBA when the number of heavy truck trips exceeds 25 trips per hour. This would be a significant impact.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.7.2a: As stated in the siting criteria for the soil borrow operation in Chapter 2, Project Description, "Soil-borrow" activities shall be located in areas with a buffer zone of 2,000 feet to the nearest sensitive receptors.

Mitigation Measures Identified in This Report

Mitigation Measure 3.7.2b: Soil borrow activities will be limited to achieve an hourly average noise level that does not exceed 65 dBA at the nearest sensitive receptor.

Mitigation Measure 3.7.2c: If haul routes pass sensitive noise receptors that are within approximately 50 feet of the roadway, hourly heavy truck trips should be limited to no more than 25 passbys of the sensitive receptor per hour.

Mitigation Measure 3.7.2d: To avoid noise effects of nighttime operations, haul trips leaving the soil-borrow area shall be limited to 7 a.m. to 5 p.m.

Level of Significance After Mitigation

The combination of Mitigation Measures 3.7.2a, 3.7.2b, 3.7.2c, and 3.7.2d will likely reduce this impact to a less-than-significant level. However, project-level environmental review of this aspect of the project will be required after identification of site for the proposed soil borrow area.

Impact 3.7.3: Truck trips to YCCL would not increase noise levels at sensitive noise receptors. (Less than significant)

The project would not increase the daily limit for vehicles per day. The current and future limit would remain at 1,047 vehicles per day.

Mitigation: None required.

Impact 3.7.4: The project would not have a cumulative impact on noise levels in the project area. (Less than significant)

There are many different aspects of the proposed project at YCCL that would have noise impacts and mitigations have been recommended to reduce the potential impacts from the noise associated with the proposed projects. There are no other major noise sources in the vicinity of YCCL and therefore YCCL does not contribute to a cumulative noise impact.

Mitigation: None required.

REFERENCES – Noise

Caltrans, *Technical Noise Guidance*, 1998.

U.S. Environmental Protection Agency, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, December 1971.

Yolo County, *Yolo County General Plan*, 1983.

3.8 PUBLIC HEALTH AND SAFETY

This section describes the regulatory setting that pertains to public health and safety issues at Yolo County Central Landfill (YCCL), analyzes potential impacts of the proposed project on public health and safety, and identifies mitigation measures to reduce or eliminate those impacts. Issues having to do with public health and safety aspects of specific impact areas (e.g., water quality, air quality, and traffic hazards) are presented in the sections on those impact areas (Sections 3.5, 3.2, and 3.10, respectively).

3.8.1 SETTING

REGULATORY SETTING

Various requirements for the permitting and development of sanitary landfills are imposed by governmental agencies at the federal, state, regional, and local levels. The requirements come in the form of statutes, regulations, and policies adopted by the agencies, and are enforced by permitting and approval processes that have been established to prevent landfills from being poorly designed or improperly operated. Relevant responsibilities of the regulatory agencies and agency policies are summarized in this section and elsewhere in this EIR. A common goal of all regulatory oversight is to assure that adequate controls are in place to prevent the landfill from having adverse impacts on public health, safety, or the environment.

Regulatory Agencies

Federal

The U.S. EPA is responsible at the federal level for enforcing regulations pertaining to solid waste management and hazardous substances and wastes. Principal federal statutes that affect solid waste management and the handling of hazardous waste include the Solid Waste Disposal Act of 1967, the Resource Recovery Act of 1970, the Resource Conservation and Recovery Act (RCRA) of 1976, the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the Superfund Amendment and Reauthorization Act of 1986.

U.S. EPA also administers the Project XL program, which gives a limited number of regulated entities the opportunity to develop their own pilot projects and alternative strategies to achieve environmental performance that is superior to what would be achieved through reasonable compliance with current and reasonably anticipated future regulations. The program, which began in 1995, is intended to allow U.S. EPA to experiment with untried, potentially promising regulatory approaches to assess whether they provide benefits at the specific facility, and whether they should be considered for wider applications (U.S. EPA, 2001).

The federal Occupational Safety and Health Administration (Fed/OSHA) regulates occupational workplaces to protect worker safety pursuant to the Occupational Safety and Health Act. In California, Fed/OSHA has delegated most of its regulatory authority to the corresponding state agency, Cal/OSHA. Regulations regarding worker health and safety are discussed below.

State and Regional

The U.S. EPA has delegated much of its regulatory authority to individual states where adequate state regulatory programs exist. In California, four state agencies are involved to a large degree in solid waste management: the California Integrated Waste Management Board (CIWMB); the Department of Toxic Substances Control (DTSC); the California Air Resources Board (CARB); and the State Water Resources Control Board (SWRCB).

The CIWMB regulates landfills, transfer stations, and other major solid waste facilities in the state. DTSC, a department of the California Environmental Protection Agency, is responsible for protecting public health and the environment from harmful exposure to hazardous substances. Working with local agencies, DTSC implements its Unified Program, which consists of hazardous waste generator and onsite treatment programs, aboveground and underground storage tank programs, Hazardous Materials Management and Business Plans and Inventory Statements, and the Risk Management and Prevention Program. CARB is responsible for preserving and enhancing air quality within the state. The Yolo-Solano Air Quality Management District (AQM) implements CARB policies in Yolo County (see Section 3.2, Air Quality, for a more detailed discussion of Yolo-Solano AQMD responsibilities and project effects on air quality). The SWRCB is responsible for protecting California's surface water and groundwater, and administers and enforces Title 27 of the California Code of Regulations (CCR). Regionally, the SWRCB is represented by the Central Valley Regional Water Quality Control Board (RWQCB). Pursuant to CCR, Title 27, any person discharging, having discharged, or proposing to discharge any waste that might affect the quality of surface water or groundwater in the region must submit a Report of Waste Discharge (ROWD) to the RWQCB and develop a groundwater monitoring program. Groundwater sampling is required semi-annually and is used to determine if the water quality protection standards established by the RWQCB are being maintained. (See Section 3.5, Hydrology and Water Quality, for a more detailed discussion of project effects on water quality.)

Local

California law places responsibility for the provision of solid waste collection, processing, transfer, and disposal with local jurisdictions. State standards are enforced by local officials through the Local Enforcement Agency (LEA) appointed by the CIWMB. Yolo County Health Department Environmental Health Services division (EHS) is the appointed LEA in Yolo County. The LEA has the primary responsibility for ensuring that a solid waste management facility complies with all applicable federal, state, and local regulations. The LEA is responsible for issuing solid waste facility permits (SWFPs) for solid waste disposal facilities and enforces the Title 14 operating controls and standards described below. Enforcement responsibilities include field inspections of composting facilities and disposal sites for compliance with state standards. The LEA also has the responsibility to protect public health and safety, prevent environmental damage, and enforce long-term environmental protection.

DTSC certifies a local agency, generally a part of the county or city Fire Department or Environmental Health Department, to conduct DTSC's Unified Program within a given jurisdiction. EHS is the Certified Unified Program Agency (CUPA) in Yolo County.

Worker Health and Safety

The California Occupational Safety and Health Administration (Cal/OSHA) and the Federal Occupational Safety and Health Administration (Fed/OSHA) are the agencies responsible for assuring worker safety. Pursuant to the Occupational Safety and Health Act of 1970, Fed/OSHA has adopted numerous regulations pertaining to worker safety, contained in the Code of Federal Regulations Title 29 (29 CFR). These regulations set standards for safe workplaces and work practices, including standards relating to hazardous material handling. Cal/OSHA assumes primary responsibility for developing and enforcing state workplace safety regulations. Because California has a federally approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in 29 CFR. Cal/OSHA standards are generally more stringent than federal regulations.

Cal/OSHA regulations concerning the use of hazardous materials in the workplace, as detailed in Title 8 of the CCR, include requirements for safety training, availability of safety equipment, implementation and maintenance of accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Title 8 regulations (§3203) include requirements for worker safety training and injury/illness prevention programs contained in Senate Bill 198, which was adopted in 1990. Cal/OSHA enforces hazard communication program regulations that contain training and information requirements, including procedures for identifying and labeling hazardous substances, communicating hazard information related to hazardous substances and their handling, and preparation of health and safety plans to protect workers and employees at hazardous waste sites.

Regulations covering waste disposal site operations specifically are given in CCR Title 27, Division 2, Chapter 3, §20550-§20750. Several sections deal specifically with worker health and safety. §20590 requires that operating and maintenance personnel wear and use approved safety equipment for personal health and safety, as determined necessary by the LEA. §20610 requires that personnel assigned to operate the site must be adequately trained in subjects pertinent to site operation and maintenance, with emphasis on safety, health, environmental controls, and emergency procedures. It is the responsibility of the site operator to provide adequate numbers of qualified personnel to staff the site and deal effectively and promptly with matters of environmental controls, emergencies, and health and safety. The site operator is required to provide adequate supervision to insure proper compliance with all applicable laws, regulations, permit conditions, and other requirements.

Landfill Controls and Standards

Title 27 of the California Code of Regulations (CCR) contains regulations of the State Water Resources Control Board (SWRCB) and the California Integrated Waste Management Board (CIWMB) pertaining to the disposal of waste on land. Title 27, Division 2, Chapter 3, establishes minimum standards for solid waste handling and disposal. Articles 4 and 6 contain specific landfill disposal site controls that relate to public health and safety:

- <u>§20760. Nuisance Control</u>. Each disposal site shall be operated and maintained so as to not create a public nuisance.

- §20770. Animal Feeding. Feeding of refuse to animals which will be used for human consumption is expressly prohibited on disposal sites. Grazing of livestock away from operating areas is permitted.

- §20790. Leachate Control. The operator shall ensure that leachate is controlled to prevent contact with the public.

- §20800. Dust Control. The operator shall take adequate measures to minimize the creation of dust and prevent safety hazards due to obscured visibility.

- §20810. Vector and Bird Control. The operator shall take adequate steps to control or prevent the propagation, harborage or attraction of flies, rodents or other vectors and to minimize bird problems.

- §20820. Drainage and Erosion Control. The drainage system shall be designed and maintained to:

  (a) ensure integrity of roads, structures, and gas monitoring and control systems;
  (b) prevent safety hazards; and
  (c) prevent exposure of waste.

- §20830. Litter Control. Litter shall be controlled, routinely collected and disposed of properly. Windblown materials shall be controlled to prevent injury to the public and personnel. Controls shall prevent the accumulation, or off-site migration, of litter in quantities that create nuisance or cause other problems.

- §20840. Noise Control. Noise shall be controlled to prevent health and safety hazards to persons using the site and to nearby residents.

- §20860. Traffic Control. Traffic flow into, on, and out of the disposal site shall be controlled to minimize the following:

  (a) interference and safety problems with traffic on adjacent public streets or roads.
  (b) on-site safety hazards, and
  (c) interference with site operations.

- §20870. Hazardous Wastes. Owners or operators of all Municipal Solid Waste Landfill units must implement a program at the facility for detecting and preventing the disposal of regulated hazardous wastes as defined in 40 CFR Part 261 and polychlorinated biphenyls (PCB) wastes as defined in 40 CFR Part 761. This program must include, at a minimum:

  (a) Random inspections of incoming loads unless the owner or operator takes other steps to ensure that incoming loads do not contain regulated hazardous wastes or PCB wastes;

  (b) Records of any inspections;

  (c) Training of facility personnel to recognize regulated hazardous wastes and PCB wastes; and

  (d) Notification of the EA, the Director of the California Department of Toxic Substances Control (DTSC) or its delegated agent, and the Regional Water Quality Control Board (RWQCB), if a regulated hazardous waste or PCB waste is discovered at the facility.

  The site shall not accept hazardous waste unless the site has been approved for the particular waste involved.

At sites where hazardous materials are processed, precautions must be taken to eliminate or control dusts, fumes, mists, vapors or gases that may be produced in quantities and under conditions which may have harmful effects on site personnel, the general public or animals.

- §20919. Gas Control. Where the enforcement agency, the local fire control authority, or the CIWMB has cause to believe a hazard or nuisance may be created by landfill decomposition gases, they shall so notify the owner. Thereafter, the site owner shall cause the site to be monitored for presence and movement of gases, and shall take necessary action to control such gases. The site owner shall inform the operator of any actions ordered by the EA, the local fire control authority or the CIWMB concerning gas control methods. The monitoring program shall be developed pursuant to the specifications of the above agencies. The monitoring program shall not be discontinued until authorized to do so in writing by the requiring agency. Results of the monitoring shall be submitted to the appropriate agencies. If monitoring indicates methane gas movement away from the site, the owner shall, within a period of time specified by the requiring agency, construct a gas control system approved by that agency. The agency may waive this requirement if satisfactory evidence is presented indicating that adjacent properties are safe from hazard or nuisance caused by methane gas movement. The operator shall duly inform the disposal site owner of possible landfill gas problems.

CCR Title 14, Division 7, establishes minimum regulatory standards for solid waste management, handling and disposal (Chapter 3) and establishes guidelines for enforcement of solid waste standards and administration of solid waste facilities permits (Chapter 5). Article 6.2 of Chapter 3 establishes solid waste facility operating standards pertaining to health and safety, including the following:

- §17407.1. Burning Wastes and Open Burning. Burning wastes received at a facility shall be separated from other wastes and deposited in a safe area, spread, and extinguished.

- §17407.5. Hazardous, Liquid, and Special Wastes. A facility shall not intentionally accept or store hazardous wastes unless it has been approved to handle the particular waste by the appropriate regulatory agencies. At facilities where unauthorized hazardous wastes are discovered, control measures as are necessary to protect public health, safety and the environment shall be taken prior to isolation or removal from the operation or facility. Liquid wastes and sludges shall not be accepted or stored at an operation or facility unless the operator has written approval to accept such wastes from the appropriate agencies and the enforcement agency.

- §17409.5. Loadchecking. The operator of an attended operation or facility shall implement a loadchecking program to prevent the acceptance of waste prohibited by this Article. This program must include at a minimum:

  (1) the number of random loadchecks to be performed;
  (2) a location for the storage of prohibited wastes removed during the loadchecking process that is separately secured or isolated;
  (3) records of loadchecks and the training of personnel in the recognition, proper handling, and disposition of prohibited waste.

  A copy of the loadchecking program and copies of the loadchecking records for the last year shall be maintained in the operating record and be available for review by the appropriate regulatory agencies.

- §17410.4. Vector, Bird and Animal Control. The operator shall take adequate steps to control or prevent the propagation, harborage and attraction of flies, rodents, or other vectors, and animals, and to minimize bird attraction.

Hazardous Waste Regulation

Definitions

Certain chemical and physical properties of substances cause them to be considered hazardous. The terms hazardous material and hazardous waste are legal terms defined in State regulations. CCR Title 22 defines hazardous material as a substance or combination of substances, which because of quantity, concentration, or physical, chemical or infectious characteristics, may either: (1) cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of, or otherwise managed (CCR, Title 22, Chapter 10, Article 2, §66260.10). Title 22 classifies hazardous substances according to four properties: toxicity, ignitability, corrosivity, and reactivity. Carcinogens (substances known to cause cancer) are a special class of toxic substances. Explosives, volatile fuels, and landfill gas are examples of reactive materials. Hazardous wastes are hazardous residues or discards that no longer have practical use, such as substances that have been discarded, spilled, contaminated, or disposed (CCR, Title 22, Chapter 11, Article 2, §66261.10).

Household Hazardous Waste (HHW) consists of hazardous products used and disposed of by residential as opposed to industrial consumers. HHW includes paints, stains, varnishes, solvents, pesticides, and other materials or products containing volatile chemicals that can catch fire, react or explode, or that are corrosive or toxic (U.S. EPA, 2003).

As noted above, DTSC implements its Unified Program on hazardous materials and wastes locally through the CUPA for the particular city or county. Temporary and permanent household hazardous waste collection facilities (HHWCFs) operate under Permit by Rule authorization pursuant to CCR Title 22, §66270.60, and are overseen by the CUPA.

Hazards vs. Risk

Workers and public health are potentially at risk whenever hazardous wastes are encountered. The “hazard” of a material is different from the “risk” it poses to human health or the environment (e.g., through exposure to the material as a consequence of accidental upset or release). Risk is determined by a combination of (1) the probability of exposure to the hazardous material and (2) the severity of consequences should exposure occur (California Office of Emergency Services, 1989). In other words, the likelihood of exposure to the hazardous material coupled with its inherent hazardous properties determines the degree of risk to health or the environment. To be of high risk, exposure to a hazardous material must be both likely and consequential.

Hazard Exposure

Exposure to hazardous compounds or disease organisms could arise through transport by air of potentially toxic materials released in gaseous form or as smoke emitted by a fire; transport by animal vectors, such as scavenging birds, rodents, or insects; and transport by surface water or groundwater where hazardous materials leave the landfill site due to leaks, spills, or uncontrolled runoff. Pathways of exposure to a hazardous material or waste depend on the chemical and physical properties of the waste and the type of occurrence or accident that released it. The four common exposure pathways are inhalation, ingestion, direct contact (with skin or eyes), and injection (skin puncture or cut). Factors that influence the health effects of exposure to hazardous material include the dose to which the person is exposed, the frequency of exposure, the exposure pathway, and individual susceptibility. A material may be hazardous by one exposure pathway but not another; for example, a chemical might be toxic if ingested but not if touched.

Effects of Exposure

Health effects of exposure to hazardous chemicals can vary greatly and are specific to each chemical. Possible health effects of exposure may be acute (immediate, or of short-term severity) or chronic (long-term, recurring, or resulting from repeated exposure). Acute effects, usually resulting from a single exposure, might include burns or injury to body organs or systems such as from exposure to corrosive, reactive, or ignitable materials. Chronic effects, usually resulting from repeated or long-term exposure to a toxic material (as in a poorly ventilated work place, for example), could also include systemic or organ damage. Chronic toxic effects of particular concern are birth defects and cancer.

Designated Waste

“Designated waste” is defined and regulated by the RWQCB. Designated waste is defined as either: (1) nonhazardous waste that consists of or contains pollutants that, under ambient environmental conditions at the landfill, could be released at concentrations in excess of applicable water quality objectives, or that could cause degradation of waters of the state; or (2) hazardous waste that has been granted a variance from hazardous waste management requirements pursuant to the CCR Title 22, §66310. Designated wastes in the latter category are similar to “Special Wastes,” which are defined in Title 22 (§66260.10) as wastes that are hazardous only because they pose a chronic toxicity hazard if managed improperly. While designated wastes are classified by the RWQCB, special wastes are classified by DTSC.

SENSITIVE RECEPTORS

With regard to public health and safety, a sensitive receptor is an individual or population that resides near or encounters a potential health hazard. For example, an individual living near the landfill site would be subject to the greatest risk from a grass fire or landfill gas explosion occurring at the site, vectors, or a release that could contaminate air or water. Land uses surrounding the landfill are primarily agricultural or related to waste and wastewater treatment. Several residences are located within a mile of the project site. The nearest residence is approximately 600 feet south of the Willow Pass Bypass channel and YCCL boundary. Two other residences are located south of the landfill, at distances of approximately 1,400 feet and 3,400 feet, and approximately six residences are located between 4,300 and 5,200 feet west of the site on County Road 103.

EXISTING SITE CONDITIONS

Existing Hazards

Public health and safety concerns associated with current landfill operations include exposure to household hazardous waste (HHW) in loads of incoming municipal solid waste, exposure to HHW associated with the Temporary HHW Collections Facility (HHWCF); exposure to sharp and hazardous materials at the unloading area; emissions of toxic air contaminants from landfill operations; releases of leachate to groundwater or nearby surface waters; the risk of landfill gas (LFG) explosion; the presence of vectors in the refuse or green waste; and the risk of fire from landfill operations. Refer to Sections 3.2 Air Quality, 3.5 Hydrology and Water Quality, and 3.9 Public Services and Utilities regarding toxic air contaminants, leachate management, and potential fire-related impacts, respectively.

Hazardous Waste Exclusion Program

YCCL has an ongoing loadcheck program to detect and prevent prohibited wastes from entering the landfill commingled with refuse loads (Yolo County, 1998b). The program includes signage, visual inspection or incoming loads and random load checks. The program is administered by County personnel (Solid Waste Attendants [SWA]). All loads of incoming solid waste must stop at the scale house to be weighed and/or to pay a fee. At that point, loads are visually inspected and drivers are questioned about the contents of their loads. If any suspicious materials, liquids, or odoriferous wastes are found the driver is directed to pull aside and wait for closer inspection. Regular account holders, such as commercial refuse haulers, are allowed to pass without visual inspection of the contents of their vehicles. Random inspections of commercial vehicles using YCCL are conducted at random, at least five times per week. All commercial companies are inspected on a rotational basis determined by SWA or YCCL's Solid Waste Operations Manager. SWA staff are trained in health and safety as required by law. Training covers protective clothing and general safety practices. All staff are trained in first aid and cardio-pulmonary resuscitation.

Temporary Household Hazardous Wastes Collections Facility

DIWM operates a temporary Household Hazardous Waste Collection Facility (HHWCF) and conducts a bi-monthly (six times per year) hazardous waste collection program for small-quantity commercial generators [of hazardous waste] (SQGs) and private individuals under a Permit by Rule of the DTSC. As the CUPA, EHS oversees the temporary HHWCF and collections program. The bi-monthly 24-hour collection period spans two days, Friday and Saturday; SQG collections take place on Friday and HHW collections on Saturday. The collection events have taken place since 1992, and help keep hazardous waste out of the MSW stream by providing an alternative disposal option. The events are managed and operated by a licensed hazardous waste management firm under contract with the County. The temporary HHWCF is located adjacent to the Recycling Area .

Operation of the temporary HHWCF includes a health and safety plan, emergency contacts, labeling, marketing and manifesting procedures, Labpack instruction, chemical classification, provision of material safety data sheets and completion of reporting forms. (Under an agreement between the County and the City of Sacramento, Yolo County residents also may take their HHW materials to the City of Sacramento's Recycling and Transfer Station.)

The County's 1993 Household Hazardous Waste Element (part of the County-wide Integrated Waste Management Plan) anticipates the future construction of a permanent HHWCF at YCCL (Yolo County, 1993).

Designated Waste

YCCL's current (1995) SWFP permits the facility to accept up to 16 tons per day of designated waste, including commercial and industrial wastes, dewatered sewage sludge, grits and screenings, treated medical waste, non-friable asbestos, and triple-rinsed pesticide containers that have been inspected by the Department of Agriculture. Designated liquid waste, to be disposed of in the Class II impoundments, include lime sludge and septage. The SWFP also permits YCCL to accept motor oil and vehicle batteries, which are classified as hazardous wastes.

The landfill's 2002 WDRs (RWQCB, 2002) indicate that DIWM does not propose to accept solid waste defined as hazardous or designated for disposal at YCCL, and the WDRs prohibit the acceptance of hazardous or designated solid waste. The WDRs do not prohibit discharge of nonhazardous or designated liquid wastes proposed to be discharged to the Class II impoundments, including landfill leachate, gas condensate and cooling water from the on-site power plant, private septage, chemical toilet waste, and water treatment lime sludge.

Liquid septic waste previously was received at the YCCL Class II impoundment, as permitted in the SWFP and WDRs. However, according to DIWM's *Second Semester, 2001 Annual Monitoring Report*, in October 1998, the Yolo County Board of Supervisors approved the staff recommendation to cease acceptance of septic waste in WMU G due to the need for storage volume in the impoundment (Yolo County, 2002a).

Landfill Gas

Natural processes in landfills (i.e., the decomposition of organic waste) generate carbon dioxide, a nontoxic gas, and methane, a non-toxic but flammable and explosive gas. During the anaerobic phase of decomposition (i.e., without oxygen), if enough moisture is present, methane continues to be generated until all organic matter in the landfill has decomposed. The presence of an optimal moisture content within the landfill waste can speed waste decomposition and increases the rate of landfill gas (LFG) generation. Landfill gas typically consists of about 50 percent methane (CH_4), the primary component of natural gas, and about 50 percent carbon dioxide (CO_2) and a small amount of non-methane organic compounds (U.S. EPA, 2002). Because of relatively impermeable liners, landfill gases tend to accumulate in landfills and gradually seep out along paths of least resistance, such as cracks or fissures. If methane gas enters confined spaces, such as buildings, it can become explosive and present a significant threat to health and safety. The lower explosive concentration limit for methane is 5 percent by volume and the upper explosive limit is 15 percent by volume (ATSDR, 2001). CCR Title 27, §21600 requires landfills to have and describe their systems for monitoring, venting, controlling, and possibly using, landfill gas.

The YCCL pilot project of two small-scale bioreactors showed that a leachate recirculation landfill will generate LFG sooner and at a higher rate than a conventional landfill. At YCCL's current full-scale bioreactor project, the LFG collection system is being installed in the bioreactor landfill area in conjunction with the liquid injection system so that the landfill gas can be efficiently collected at the onset of liquid addition. (The LFG and leachate collection systems must be designed to withstand added pressure exerted by the higher-density waste mass within a bioreactor cell.) The collected gas from YCCL's older landfill units, which continue to produce LFG, as well as from the bioreactors, is transmitted through collection pipes to a methane gas recovery facility located west of the water storage pond. At the gas recovery facility the LFG is refined through condensation and filtration, and used to fuel up to five internal combustion engines that generate electricity with any surplus going to the flare. The collected gas condensate is added to the leachate and other liquids circulated back into the bioreactor cell.

Current, ongoing monitoring for landfill gas consists of regularly checking LFG collection lines for leaks, which is done by walking the lines with a gas detector. A gas migration study was performed as part of an Air Quality Solid Waste Assessment Test (Air SWAT). The analysis found only low concentrations of landfill gas migrating off-site, and that the highest concentrations that did occur were adjacent to the cannery wastewater disposal fields west of the site. YCCL's LFG collection system was not yet in place at the time of the Air SWAT (Yolo County, 1998a).

As required by the California Code of Regulations (CCR), Title 27, § 20921 - 20937, the Yolo County Central Landfill property boundary and its facilities are monitored on a quarterly basis for landfill gas (methane). Testing for methane, oxygen, and carbon dioxide, is performed using a Lantec Gem-500 Gas Analyzer. This instrument measures combustible gas concentrations in air directly as percent by volume (0 to 100 percent) in the gas tested. Per Title 27, § 20921, the concentration of methane from each migration monitoring probe shall not exceed 5 percent by volume in air and for structures, shall not exceed 1.25 percent by volume in air.

Monitoring of on-site landfill structures also is conducted with a Gem-500 gas analyzer. In this case, a continuous stream of air is sampled as the unit is taken to each room in each structure. With the exception of the Supervisory Control and Data Acquisition control system (SCADA) shed, no methane has been detected in landfill structures during the quarterly monitoring events.

The SCADA shed has a gas sensor and alarm to notify personnel before gas levels reach regulatory levels.

Vectors

As defined in CCR Title 14 §17225.73, a "'vector' includes any insect or other arthropod, rodent, or other animal capable of transmitting the causative agents of human disease, or disrupting the normal enjoyment of life by adversely affecting the public health and well being." Pathogenic microorganisms (disease) potentially carried by vectors can originate from a number of sources in municipal solid waste, such as animal feces, human feces in diapers, septic waste, and even from contaminated materials such as glass, metal, plastic, paper, and yard wastes. The vectors of greatest concern are flies and rats because of their ability to reproduce rapidly and disperse from a site. Other vectors of concern include birds and other insects and arthropods. Birds such as seagulls are frequently found at landfills. Although birds generally are only a nuisance (especially when they defecate on property or people), they can be a serious concern for low-flying aircraft.

As outlined above, CCR Title 27, §20810, and CCR Title 14, §17410.4, direct landfill operators to take adequate steps to control or prevent the propagation, harborage or attraction of flies, rodents or other vectors and to minimize bird populations. Title 27 §20680 requires landfill operators to compact and cover waste with soil or alternative cover material to control vectors. This practice lessens the potential for the landfill to provide food, shelter, and breeding grounds for vectors. The application of daily cover material at YCCL limits problems associated with insects, vermin, and other vectors, which historically have not been a problem at the landfill. No citations related to vector problems have been issued in recent years. In addition, the County Agriculture Commission is on retainer with YCCL to deal appropriately with vectors at the site should they become a problem (Yolo County 1998a). Seagulls attracted to food wastes in the refuse are present at various times of the year, with the largest numbers present in February. The current landfill contractor employs a propane-powered gun that shoots blanks to disperse the seagulls from the site. During periods when the seagulls are present, they do not interfere with operations at Sacramento International Airport or University Airport, which are both approximately 8 miles from the site (Yolo County, 1998a).

Rats historically have not been a problem at the site (Yolo County, 1992). During YCCL's one-year demonstration project to evaluate the use of chipped greenwaste as ADC (Yolo County, 1993), live traps baited with a variety of foods were set during the demonstration period (June 1992 to June 1993). Monthly trap surveys were conducted for six months and one every third month thereafter. The first survey yielded a kitten and a possum; no other animals were collected in that survey or any of the surveys that followed. According to DIWM, rats that are introduced to the landfill are brought in with garbage. These animals are assumed to be crushed by the compactor, or possibly killed by the population of feral cats believed to exist in the project vicinity.

Accidents

Accidents can occur at any industrial facility, regardless of how well it is managed. Few accidents have occurred at YCCL, and the landfill has never been cited for health and safety violations. Daily Activity Reports prepared by landfill personnel note any special occurrences, including fires, explosions, accidents, and hazardous waste spills that occur at the site. Daily Activity Reports provided by YCCL for the past two years indicate that several accidents have occurred at the site, several involving injuries to site employees (a cut from a paint can, a fall from a ladder, an instance of a piece of rebar going through the window of the compactor and cutting the driver above his eye, and one of an employee hitting his head with a piece of equipment being used to drive a pole in the ground). There also were three instances of a truck or roll-off trailer tipping over, without injury to the driver or other persons.

Yolo County's Injury and Illness Prevention Program (IIPP) includes employee training on specific hazards, such as fire prevention and fire extinguisher use, obtaining emergency medical assistance and first aid, hazard communication, use of personal protective equipment and other topics relevant to specific departments. The program includes regular safety inspections as a means to identify any unsafe conditions or practices, and regular safety meetings. Monthly safety meetings are held at the landfill and at County offices, and tailgate meetings are held as necessary for special projects. The landfill maintains on-site an inventory of necessary safety equipment. This equipment currently is kept in a storage container in the operations building.

Aspergillus fumigatus

Bioaerosols are suspensions of particles in the air consisting partially or wholly of microorganisms. *Aspergillis fumigatus* is a common bioaerosol of concern at composting facilities. Activities that result in routine exposure to the fungus include lawn mowing, gardening, potting of household plants, and raking leaves (CIWMB, 1993). Because *Aspergillus fumigatus* often colonizes incoming yard trimmings at composting facilities, is ubiquitous in the environment and especially common in agricultural settings, it is assumed to be present to some degree in yard trimmings received and ground at YCCL for use as alternative daily cover. *Aspergillus fumigatus* is not considered a health hazard to healthy individuals, but can inhibit lung function and produce fungal infections in susceptible individuals. Levels of the fungus decrease rapidly only a short distance from the source to background levels.[1]

3.8.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

According to CEQA guidelines, a project would be considered to have a significant adverse impact on the environment if it would:

- create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- interfere with safe operations of a nearby airport or result in a safety hazard for people residing or working in the project area, due to its proximity to an airport;
- interfere with emergency response plans or emergency evacuation plans; or
- expose people or structures to risk of loss, injury, or death involving wildland fires.

Impact 3.8.1: Increased LFG generation could potentially result in the accumulation of methane at explosive concentrations either off-site or within the waste mass. (Significant)

Operation of the landfill units as bioreactors would accelerate the generation of LFG. In addition, the increased capacity from the proposed increase in landfill height (to approximately twice its currently permitted maximum waste thickness) would greatly increase the total amount of LFG generated over the life of the landfill. If the LFG collection system within a landfill were improperly operated and monitored, methane concentrations could potentially reach explosive

1 For example, a study of a bio-solids composting facility cited by EPA (1994) found the highest concentration of colony-forming units (CFU) of *Aspergillus fumigatus* at the mix area (110 to 120 CFU) and relatively high concentrations associated with front-end loader activities (11 to 79 CFU), while concentrations dropped to background levels (2 CFU) at the site periphery (U.S. EPA, 1994).

levels within the unit. LFG escaping through subsurface cracks potentially could accumulate beneath buildings on-site or off-site, depending on available migration pathways, with potentially explosive consequences. The site is underlain by a thick sequence of very low permeability native clay materials that do not permit significant LFG migration. In addition, the high groundwater levels reduce the vadose zone thickness to a minimum over most of the site, and the soil bentonite slurry wall adjacent to the extraction wells where the vadose zone is the thickest also reduces significantly the potential for off-site LFG migration.

The bioreactor process produces gas over a shorter period of time compared with conventional landfills. In a bioreactor, most of the LFG is generated within 5 to 10 years after initiation of the bioreactor process, the rate of production peaks at about five times that of a drier landfill, and the gas generation ceases decades earlier. Landfill gas collection systems for conventional and bioreactor landfills collect and remove LFG from the unit, thus preventing the accumulation of methane at explosive levels. Although bioreactor technology is relatively new, substantial experience has been acquired – including site-specific experience from YCCL's small scale and current full-scale projects – about LFG generation rates and management implications and requirements. At the full-scale bioreactor at Module D, Yolo County began collecting landfill gas from the collection system consisting of pipes that were installed as the waste was placed. In addition an impermeable geomembrane surface liner was installed over the entire bioreactor module. This system minimizes the amount of landfill gas emitted to the environment. Future bioreactor cells would be developed with comparable LFG collection systems. The higher production rate enhances the potential to collect and utilize methane as an energy source. The LFG collection system is installed as waste is placed, as is the leachate recirculation system. The systems are designed to accommodate the increased load caused by the greater density (and weight) of the waste mass resulting from moisture uptake and settlement.

While methane typically occurs in concentrations outside its explosive limits within a landfill, it has been known to migrate away from the waste unit in which it was generated, become trapped in a confined space (such as a basement) and accumulate to explosive concentration levels. No buildings or residences in the project vicinity would be expected to have a basement, due to the high groundwater level. However, it is conceivable that building foundations similarly could impede migrating gas and allow it to accumulate.

Although not generally designed to control lateral subsurface migration of gas, LFG collection systems lower the gas pressure within a refuse unit, thereby reducing the potential of gas within the unit to migrate. In addition, a composite liner such as that used for the bioreactor at Module D helps to contain the LFG and limit its migration from the unit. Future landfill cells at YCCL also would be constructed with composite base liners and surface covers meeting relevant Subtitle D specifications.

Therefore, the potential for methane to migrate and accumulate on or off site to explosive concentrations is limited. However, because the potential consequences of such an accumulation would be substantial, this is considered a significant impact.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.8.1a: YCCL will meet current state and federal requirements for LFG management.

Mitigation Measure 3.8.1b: YCCL will continue quarterly monitoring and reporting.

Mitigation Measures Identified in This Report

Mitigation Measure 3.8.1c: If monitoring indicates levels of gas above state requirements at the boundaries of the site, the perimeter monitoring system shall be expanded and modified to include extraction and collection and/or additional extraction wells can be installed in the landfill units nearest the problem area.

Level of Significance After Mitigation

Mitigation Measures 3.8.1a, 3.8.1b, and 3.8.1c would reduce the potential hazard impacts from project generation of LFG to a less-than-significant level. In addition, these measures would serve to mitigate potential adverse effects from the older, unlined units at the site.

Impact 3.8.2: Excavation of hazardous waste encountered in the process of mining the older landfill units could result in exposure of workers and the environment to harmful substances resulting in adverse health impacts. (Significant)

DIWM proposes to mine the older, unlined or non-Subtitle D lined landfill units at YCCL (Units 1 through 5) in order to reclaim these areas for future disposal (after construction of an appropriate liner), recycle any recovered metals, use recovered soil in current landfill operations, and dispose of any unrecoverable wastes in a properly lined, active landfill unit at the site. Wastes in these older units were disposed of prior to the establishment of current waste acceptance criteria and loadcheck programs, and information on the types of wastes that may be buried is limited. Disturbance of unknown, buried hazardous or toxic materials could expose workers to harmful materials/substances and/or release hazardous materials to the environment.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.8.2: Yolo County has developed a site-specific Health and Safety Plan (HASP) for landfill mining at YCCL. The plan provides guidelines and establishes procedures for the protection of personnel performing the scope of activities involved in landfill mining against hazardous or toxic wastes that may have been deposited within the landfill (EMCON/OWT, 2001). The HASP provides guidance to initiate the work and calls for monitoring of site conditions to determine the required protection. It is intended to be continually updated, based on consistent monitoring and implementation of the HASP adjustments. The HASP encompasses the following topics:

- personnel requirements
- training requirements

- hazard evaluation, including:
  - potential chemical hazards,
  - physical hazards (including utility clearances, use of heavy equipment, electrical hazards, adverse weather conditions, slip/trip/hit/fall injuries, heat stress, and cold stress); and
  - biological hazards (vectors and poisonous plants);
- accident prevention (including fire prevention and control);
- personal protective equipment;
- air sampling and exposure monitoring;
- site control and establishment of work zones, including
  - provision of communication equipment,
  - establishment of a buddy system, and
  - maintenance of site security;
- decontamination procedures; and
- emergency response contingency procedures.

Mitigation Measures Identified in This Report

None required.

Level of Significance After Mitigation

Mitigation Measure 3.8.2 would reduce the potential impacts from landfill mining to a less-than-significant level.

Impact 3.8.3: Operation of a materials recovery facility and expanded salvaging operations could pose health and safety threats to workers. (Significant)

The County is considering construction of a materials recovery facility (MRF) located near the landfill entrance or near the existing metals recycling area. The MRF would include a truck scale, sorting belts, a trommel, extensive push walls for accumulating and sorting waste during peak periods, and two gravity loading hoppers for consolidating refuse directly into trailers, intermodal containers or a pre-load compactor. The interior layout would be designed to accommodate the simultaneous unloading of up to nine commercial/contractor customers and six self-haul customers, with designated, physically separate tipping areas for commercial and self-haul customers. Overall, the tipping floor would be approximately 43,350 square feet. Select incoming loads with a high percentage of recoverable materials would be directed to the MRF rather than the landfill face; the sorting and recovery operation would focus on commercial roll-off boxes and self-haul loads. Administration offices, employee restrooms, and lunchroom facilities would occur in existing facilities at YCCL.

The primary public health and safety concerns with operation of the proposed MRF are air quality concerns related to dust control and ventilation; potential noise impacts; and safety concerns related to vehicular circulation, the separation of commercial and self-haul unloading areas, and the operation of or working near heavy equipment and industrial machinery. The proposed MRF would be required to meet state minimum standards for solid waste handling facilities contained in CCR Title 14 as well as requirements of federal and state Occupational

Safety and Health Acts (fed-OSHA and Cal-OSHA, respectively), requirements of the state Department of Industrial Relations, the Yolo-Solano Air Quality Management District, and other applicable authorities.

As required under Title 14 Chapter 3 Article 6.1, the MRF would be designed and constructed utilizing appropriate expertise, including in the fields of engineering, air quality control, and structural design, and the facility's operation design would take into consideration such factors as dust control, noise control, public safety, and other relevant matters related to the protection of public health at the facility. In reviewing the facility design the LEA may require the applicant to describe how he or she has complied with applicable local and state requirements regarding odor control measures, personnel health and safety, and sanitary facilities. Title 14 § 17407.4 requires the facility operator to take adequate measures to minimize the creation, emission or accumulation of excessive dust and implement appropriate dust control measures, which may include, but would not be limited to, reduced processing, periodic sweeping and cleaning, misting systems, and/or ventilation control. Title 14 § 17408.3 requires the facility operator to control noise to prevent health hazards and to prevent nuisance to nearby residents. Measures to control noise include, but are not limited to, the posting of warning signs that recommend or require hearing protection; the use of separation barriers to limit access to authorized personnel only; and/or the use enclosures to reduce noise transmission. In addition, the MRF would be subject to regular inspections by the LEA. Under provision of AB 1127, employee safety legislation which became law on January 1, 2000, the LEA has the right to file formal complaints with the state Department of Industrial Relations Division of Occupational Safety and Health (DOSH); DOSH is required to respond to the complaint within a specific number of days (CIWMB, 2002).

The proposed expanded salvaging operation also would expose health and safety hazards to site workers. Sorting activities by YCCL or contractor personnel would take place at or near the working face. Potential hazards include work around heavy equipment, mechanical operations, manual sorting operations, and the use of unsafe lifting techniques. For example, working around heavy equipment can be hazardous due to the size and power of the equipment, the limited operator field of vision, and the loudness of the equipment. Hazards associated with manual sorting include contact with sharp containers, loud noise, mechanical motion, repetitive motion, back strain, and flying particles or nuisance dust.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.8.3a: Current Yolo County Illness and Injury Prevention Plan practices and policies would be implemented as applicable at the new MRF and Salvaging Operations.

Mitigation Measures Identified in This Report

Mitigation Measures 3.8.3b: DIWM (or its contractor) shall prepare a Health and Safety Plan (HASP) for MRF Operations and a HASP for salvaging operations, and submit the plan for approval to the LEA prior to commencement of MRF or salvaging operations, respectively. Each HASP shall include staff training requirements, emergency procedures and equipment, personal protective equipment for facility staff, communications equipment, and emergency contacts, hearing loss prevention, equipment maintenance, and other policies to ensure the protection of worker and public health and safety.

Mitigation Measure 3.8.3c: Prior to MRF construction the DIWM shall submit drawings showing the final facility layout to the LEA for approval.

Level of Significance After Mitigation

Mitigation Measures 3.8.3a-c, in conjunction with state minimum standards for the design and operation of waste handling facilities in CCR Title 14 and existing federal and state occupational safety and health regulations would reduce potential health and safety impacts of MRF operations and expanded salvaging operations to a less-than-significant level.

Impact 3.8.4: Expanding the composting operations could increase the health threat to workers from exposure to *Aspergillus fumigatus* and endotoxins. (Significant)

As noted above, *Aspergillus fumigatus* is a common bioaerosol of concern at composting facilities; it is a ubiquitous fungus that is both a normal and integral part of the composting process and a potential health risk to certain high-risk individuals. Although the fungus is present in ambient air both indoors and outdoors, a study of compost facilities in the United States found airborne concentration of *Aspergillus fumigatus* at the active site of operations to be, on the average, 10-fold higher than background levels (CIWMB, 1993). Endotoxins are another health concern at composting facilities. Endotoxins are toxins produced within microorganisms that are released upon destruction of the cell in which they are produced.

A properly operated composting facility should not present a health risk from *Aspergillis fumgatus*. Sound management practices include maintaining moisture, temperature and pH levels, aerating, turning and mixing. Reducing the dispersal of dust and spores best controls exposure. The use of water sprays or mists while turning piles, and refraining from turning on windy days will help accomplish this (CIWMB, 1993). These practices also would limit the dispersal of and exposure to endotoxins.

Due to the distance of the landfill to the nearest residences, *Aspergillus fumigatus* poses little risk to off-site sensitive receptors. Without dust control measures, there is an elevated risk of exposure to spores for YCCL personnel, particularly those working at the compost operation, and site visitors. Exposure of YCCL staff and visitors to unmitigated *Aspergillus fumigatus* spores and endotoxins at the proposed composting facility would be a significant impact.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.8.4a: The County will operate the expanded composting facility in conformance with current state and federal regulations.

Mitigation Measures Identified in This Report

Mitigation Measure 3.8.4b: The project applicant shall follow sound composting management practices, including maintaining moisture, temperature and pH levels, and properly aerating, turning and mixing the composting materials. Specifically, the following practices will help minimize the generation and dispersal of dust and fungus spores during composting operations and thus limit exposure:

- Refrain from turning, screening, or loading activities on windy days;
- Use water sprays or mists during grinding, screening, and pile turning activities;
- Maintain proper moisture levels in active composting piles; and
- Maintain good housekeeping practices, including site cleanliness.

Level of Significance After Mitigation

Implementation of Mitigation Measures 3.8.4a and 3.8.4b, in conjunction with Measure 3.2.5a in Section 3.2, Air Quality (to control PM-10 and limit the generation and dispersal of dust in composting operations) would limit dispersal of spores and reduce potential impacts of exposure to *Aspergillus fumigatus* and endotoxins to a less-than-significant level.

Impact 3.8.5: Composting of mixed municipal solid waste (MSW) could result in a contaminated compost product, which could pose a public health and safety risk. (Significant)

MSW composting involves composting of unsorted solid waste. Typically, compost produced from MSW has very limited applications. In the case of YCCL, these would likely include use as alternative daily cover or as inert fill material. However, MSW may contain small amounts of hazardous substances. If not removed, these could contaminate the final product, and pose a health and safety hazard to workers; this could also render the material unsuitable for its intended use. This would be a significant impact.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.8.5a: MSW composting would have to comply with state regulations regarding operation of composting facilities and testing of final product for pathogenic and chemical contaminants.

Mitigation Measure 3.8.5b: The existing load checking program would reduce or remove many hazardous substances that may be contained in MSW loads.

Mitigation Measures Identified in This Report

Mitigation Measures 3.8.5c: The design for the MSW processing system will include another level of visual screening of incoming materials to ensure that hazardous substances are removed prior to the composting operation.

Mitigation Measure 3.8.5d: DIWM will periodically test compost produced from MSW for a wide range of hazardous substances regulated under Title 22, but not required under the state regulations for composting facilities. If the material exceeds concentrations for any regulated substance, the load will be directed to a hazardous waste disposal site, and the DIWM will examine its waste acceptance and screening procedures for the MSW composting facility.

Level of Significance After Mitigation

The above Mitigation Measures would reduce potential health and safety impacts of MSW composting to a less-than-significant level.

Impact 3.8.6: Operation of a permanent Household Hazardous Waste Collection Facility (HHWCF) could increase risk of exposure of site workers and visitors to hazardous or toxic materials collected by the facility. (Less than Significant)

YCCL currently operates a temporary HHWCF under permit by rule authority of the DTSC, and has conducted bi-monthly HHW and SQG drop off collection events at the site for more than 10 years. The collection events and temporary HHWCF are conducted and managed by a licensed hazardous waste contractor. The proposed permanent facility also would be operated by a licensed hazardous waste contractor.

Permanent and temporary HHWCFs both require permit by rule notification to be submitted to the CUPA. Permanent HHWCFs require written authorization from the CUPA, whereas the receipt of notification constitutes authorization for temporary facilities. Both permanent and temporary facilities must meet permit by rule facility operation requirements, may collect hazardous wastes from conditionally exempt small quantity generators (CESQGs), and may operate a material exchange program if they maintain a written Quality Assurance/Quality Control (QA/QC) program.

Among the differences between permanent and temporary facilities, a permanent HHWCF:

- requires a permanent or semi-permanent structure at a fixed location;
- operates on a regular schedule;
- may store collected HW up to one year;
- may involve the bulking of flammables, solvents, and other materials (i.e., combining like materials in bulk containers) during collection hours if approved by the local air district and fire department; and
- is subject to additional regulatory requirements compared with temporary facilities.

A temporary facility:

- operates not more than once per month, no more than two consecutive days at the same site;
- must remove all waste from the collection location within six days; and
- may not bulk flammables solvents and other materials during collection hours.

General facility requirements for permanent HHWCFs include the following:

- A certified containment system for storage areas;
- storage tanks that are certified by the manufacturer or a registered engineer;
- 24-hour surveillance or barrier around the facility;
- prominent signage warning of hazardous waste;
- regular inspections according to written schedule of monitoring equipment, safety and emergency equipment security devices, operation and structural equipment, as well as regular inspections for signs of malfunctions, deterioration, operator errors, and discharges;
- facility personnel must successful complete training program within six moths of being hired;
- cover systems and drainage designed to function without failure when filled to capacity; and
- waste analysis plan, including plan to identify hazardous characteristics of unknown waste.

In terms of preparedness and prevention, permanent HHWCFs must:

- be designed, constructed and operated to minimize possibility of fire explosion or release;
- be equipped with an internal communication or alarm system, portable fire extinguishers, spill control equipment, decontamination equipment, and water; and have adequate aisle space;
- persons handling waste must have access to a communication device; and
- operators must make arrangements to familiarize police, fire departments, emergency response teams and the state Office of Emergency Services with the operation and layout of the facility.

Permanent HHWCF contingency plans and emergency procedures must include:

- devising and following a written plan to minimize hazards;
- a contingency plan that describe actions staff will take in response to release of wastes;
- a description of arrangements agreed to by local police, fire department, hospital, contractors, and emergency response teams;
- a list of persons qualified to act as emergency coordinator;
- a list of emergency equipment and location of evacuation plan and current telephone number of the state Office of Emergency Services;
- a contingency plan maintained at facility; and
- emergency coordinator available to respond to emergency at all times.

In addition, operators of permanent HHWFCs must follow specific manifesting and record keeping and reporting requirements. Operators must inspect storage containers and tanks regularly to ensure their integrity, and follow specific response procedures in the event of a leak or spill. Special requirements must be followed for reactive and ignitable wastes, and waste analysis must be conducted prior to storing any hazardous waste that is substantially different from waste previously stored in the tank.

Requirements for the facility site include:

- location in an area that is clearly marked to control public access
- a buffer zone approved by a local agency
- sufficient area to accommodate staff, equipment, and vehicles; has physical barriers to delineate waste handling and storage areas; and
- written approval from local agency for storage area for ignitable and reactive waste.

Within one year of commencing operation a Phase 1 Environmental Assessment must be completed and submitted to DTSC.

The existing temporary HHWCF at the site is located about 450 feet north of the landfill entrance, northwest of the scale house. The facility is a one-floor prefabricated metal building measuring approximately 70 feet long by 60 feet wide, with roll-up steel doors at each end to allow drive through drop-off of the HHW and SQG wastes. During a HHW event the floor is covered with thick plastic sheeting. The flammables handling area is located on the east side of the building and on the west side of an area is provided for bases and poisons and another is provided for acids and oxidizers.

DIWM will not commence operation prior to receiving written authorization from the CUPA as required under Title 22. The County also will make arrangements to familiarize police, fire departments, emergency response teams and the state Office of Emergency Services with the operation and layout of the facility, and comply with all other requirements of Title 22 and other applicable federal, state, and local laws and regulations. Considering the specific requirements imposed on permanent HHWCF facilities and operators in Title 22 and the County's 10 years of experience operating a temporary facility and conducting collection events at the YCCL site, adherence to existing regulations would ensure that impacts of operating the proposed permanent HHWCF at the YCCL site would be less than significant.

Mitigation: None required.

Impact 3.8.7: Implementation of a composting operation at YCCL could result in increases in gulls and other scavenging birds at the site, thus increasing the risk of bird strikes for aircraft approaching or departing from the Sacramento International Airport in Sacramento or the University Airport in Davis. (Less than Significant)

To reduce the potential for bird/aircraft strike hazard, the Federal Aviation Administration (FAA), U.S. EPA, and state CIWMB and SWRCB have regulations limiting development or expansion of solid waste facilities in proximity to airports. FAA Order 5200.5 considers solid waste disposal facilities within 10,000 feet of an airport runway used by turbojet aircraft, or within 5,000 feet of an airport runway used only by piston-type aircraft, to be an incompatible land use, and FAA Order 5200.5A requires operators of a proposed new or expanded landfills within a radius of five miles of any airport runway end to notify the affected airport and the FAA. U.S. EPA (in RCRA regulation 40 CFR § 258.10) and the California SWRCB and CIWMB (in 27 CCR § 20270) have adopted regulations consistent with these FAA orders. Although these regulations pertain specifically to solid waste disposal facilities, because the proposed expansion of the composting facility has the potential to attract birds to the site, these regulations were considered in evaluating the project.

The Sacramento International Airport is approximately 7 miles northeast of the site and the University Airport is approximately 7.5 miles west of the site. Because both airports are outside the distance of concern identified in federal and state regulations, and the existing bird control program would continue to be implemented at YCCL, this impact would be less than significant.

Mitigation: None required.

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3.9 PUBLIC SERVICES, UTILITIES, AND ENERGY

3.9.1 SETTING

INTRODUCTION

This section evaluates potential impacts on public services and utilities that could result from the project, including fire protection, police services, water, wastewater, and power suppliers. Because of the nature of the project, the project is assumed not to have an impact on schools or parks and so these elements are not discussed further. Storm drainage at the site is addressed in Section 3.5, Hydrology and Water Quality.

PUBLIC SERVICE PROVIDERS

Fire Protection

The Davis Fire Department provides fire protection for the Yolo County Central Landfill (YCCL). The Fire Station is approximately 3.5 miles from the landfill at 530 5th street in Davis. All buildings, vehicles, and equipment are equipped with portable fire extinguishers. The main building is also equipped with a sprinkler system for fire protection. One water truck with a capacity of 4,000 gallons, stockpiled soil cover, and a 1,000-gallon water tank are used for dust control and a 1,500,000-gallon water storage pond also are available for fire suppression. The Davis Fire Department inspected YCCL on July 30, 2002 for compliance with California Public Resources Code flammable clearance provisions (PRC 44151) and found that all areas met or exceeded the minimum clearance requirement from exposed flammable solid waste and/or flammable material, and that the facility was in compliance with applicable sections of the California Public Resources Code.

The YCCL is situated in an area dominated by agriculture, which in general is not prone to wildfires. Agricultural uses predominate for several miles in each direction from the project site. The site has agricultural cropland to the north, open fields to the west (formerly used for spray disposal of cannery wastewater), City of Davis wastewater treatment ponds and wastewater reclamation fields to the east, and the Willow Slough Bypass Channel, an engineered waterway, located across road 28H to the south of the landfill. On the other side of the Willow Slough Bypass Channel is additional agricultural cropland.

History of Surface Fires on or Near the Site

Records of fires occurring at the site from 1998 through 2003 indicate that 10 surface fires have occurred the last six years. Four of these fires occurred in 1999. The incidences, based on City of Davis Fire Department records (for years 1998 through 2001) and YCCL Daily Activity Reports (for 2002 and 2003) are as follows:

1,2) On August 14, 1998, there was a grass fire found along the roadside. The fire consumed two acres of annual grasses and other vegetation before the flames were extinguished. Later the same day, there was a 2-foot x 2-foot area smoking on the previous grass fire site.

3) In January 1999, the fire department was dispatched to a flammable gas condition. A full size pick-up truck and attached trailer crashed into a ditch. A fuel line was broken off of the tank and was leaking a small amount of propane into the air. The crew used vise grips to stop the leak.

4) In February 1999, the engine area of a heavy equipment vehicle caught fire. Employees of the construction company used mobile water sources to contain the fire.

5) In April 1999, a large pile of wood chips spontaneously caught fire. The fire crew pumped three lines to extinguish the fire. YCCL personnel used a bulldozer to level out the large pile of wood chips.

6) In October 1999, a grass fire was discovered and extinguished at the north end of the landfill.

7) In August 2001, a grass fire, approximately 500 feet by 50 feet in size, along the west fenceline of the landfill property was reported.

8) In July 2002, a fire (5-foot x 5-foot) was discovered at the working face. It was separated from other materials by site personnel and extinguished.

9) In August 2003, a fire outside the landfill fence on adjacent property was reported; a landfill water truck driver contained the fire until the fire department arrived.

10) In September 2003, a customer's truck engine caught fire and was quickly extinguished by site personnel.

Subsurface Fires

Because landfills often contain combustible materials and have insulating characteristics, there is a potential for subsurface combustion in landfills. The ignition and spread of subsurface fires is a function of several factors, including waste composition and moisture content, available oxygen, and ambient pressure in the area of combustion. Subsurface landfill fires occur by the heating of combustible refuse through biological decomposition or chemical oxidation. The process requires a continuous source of oxygen; oxidation of the refuse materials can generate enough heat to cause combustion.

The following mechanisms may trigger subsurface refuse fires:

- Burial of "hot loads" with other refuse materials. Loads are examined as they are received to make sure this is minimized.

- Improper operation of landfill gas recovery or migration control systems. Air can be inadvertently drawn into the refuse mass by overdrawing LFG extraction wells, especially those installed near the landfill perimeter or slope face, or breaks in the subsurface collection header pipe that could occur due to landfill settlement. Open cracks and fissures in the landfill site surface may aid in the pulling of air through the site cover. The introduction of air and resulting fire risk may be of particular concern when using anaerobic bioreactor technology since anaerobic bioreactor cells generate gas at a rate several times higher than a traditional dry landfill, and so require an extensive landfill gas recovery and migration control system. All anaerobic bioreactor units have been and will be covered with a surface geomembrane prior to operations to limit air intrusion and are equipped with an extensive LFG collection system.

- Burial of household hazardous waste. An explosion hazard or subsurface temperature increase could arise from the corrosion and/or rupture of buried containers used to store incompatible or reactive materials. The landfill has a hazardous materials exclusion program in place to reduce the occurrence of such materials in the landfill.

- In the case of aerobic bioreactor technology, the process requires forcing air through the waste mass. The introduction of air and the resulting onset of aerobic activity serve to increase the temperature of the waste mass rapidly and consequently could set off a subsurface refuse fire. However, in addition to the introduction of air, significant amounts of liquid will have already been added and will continue to be added to the refuse during bioreactor operations. This significantly reduces the fire potential.

Generally, there is little concern that a surface fire will ignite a subsurface fire. The potential for a subsurface fire to start from a surface fire is remote for several reasons:

- Cover materials create a barrier, preventing the surface fire from igniting subsurface waste;

- The amount of subsurface waste materials available above the surface is limited to the daily deposit of waste materials; and

- Landfill personnel can utilize earth moving equipment and/or water trucks to quickly extinguish surface fires before there is a high potential for ignition of subsurface materials.

In addition, the bioreactor cells contain substantial monitoring equipment, which allows YCCL staff to respond quickly to conditions that have the potential to lead to fire. According to a Daily Activity Report from November 2003, an exothermic reaction within Module D was quickly cooled with the application of liquid nitrogen.

History of Subsurface Fires on or Near the Site

In the last five years, the City of Davis Fire Department has documented two subsurface fire occurrences, as follows:

- In October of 1999, there was smoke emitting from the ground where garbage had been covered over by dirt. The fire crew used water and soil to extinguish the fire.

- In July of 2000, a subsurface fire occurred on the north side of the landfill. There was a two-foot-square area of the landfill that was smoking from underground. Water was poured on the site and a four–foot-long probe was placed in the ground to monitor the subsurface temperature.

Police Protection

The Yolo County Sheriff's Department provides police services in the unincorporated areas of Yolo County. The Sheriff's Department is located approximately eight miles from the landfill at 41793 Gibson Road in Woodland.

UTILITIES

Water Supply

Sierra Spring delivers bottled potable water to the landfill site. On site, there is one groundwater well that provides water to the four toilets and four hand-wash facilities in the main building. In addition, there are three portable toilets that site personnel use. The water storage pond, containing approximately 1,572,000 gallons of groundwater that has been stripped of VOCs, supplies the water for the 1,000-gallon tank and the water truck. An additional water storage reservoir has a capacity of approximately 100 acre-feet of treated groundwater, which is used for irrigation in the land application area to grow 40-acres of kenaf for use as ADC. Since all the water used on the site, with the exception of the potable water, comes from the groundwater supply, the approximate water usage is unknown.

Wastewater

Domestic wastewater from the site is directed to a septic system consisting of leach lines and one septic tank.

Storm Water

There are four locations for storm water to drain off-site. They include two storm water drains on-site that drain to an off-site storm water ditch. The storm water is monitored at all four locations for potential contamination as required under YCCL's industrial stormwater permit.

Electricity and Natural Gas

PG&E supplies the electricity used on-site. Landfill equipment and vehicles, including compactors, tractors, loaders, water trucks, truck tippers, and the power generators used for portable lighting at the working face, consume energy in the form of diesel fuel.

Communication System

SBC provides telephone service to the site. There are telephones in the front office and gas plant. Otherwise, personnel use cell phones or radios to communicate.

Regulatory Setting

The Yolo County General Plan includes the following policy pertaining to energy, under the energy element:

ENR 3. Energy Conservation: The Yolo County Land Use Element shall be implemented to:

- Require energy efficient development and structures.
- Encourage use of alternate energy sources and energy conservation in all development approvals.

3.9.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

A project would normally have a significant adverse impact on public services, utilities, or energy resources if it:

- Substantially increased risk of wildfire, and demand for fire protection services;
- Exceeded available water supplies, resulting in the need for new or expanded entitlements;
- Required or resulted in the construction of new or expanded water facilities, electrical generation facilities, gas supply or communications infrastructure;
- Encouraged activities that result in the unnecessary use of energy or use of fuel or energy in an inefficient or wasteful manner. While CEQA Guidelines Appendix F underscores the importance of energy conservation, the Guidelines do not establish criteria to determine when fuel use should be considered inefficient or wasteful. For a large landfill project, the absence of energy generation from landfill gas could be construed as wasteful.

Impact 3.9.1: The expanded composting facility could increase the risk of fire occurring at the landfill site. (Significant)

YCCL proposes to expand the existing composting facility to accept up to 500 tons per day of waste. The expanded composting activities would increase the risk of fire occurring at the site because compost feedstock consists of combustible materials, the composting process itself elevates temperatures within the windrows, and potentially produces combustible gases within the piles of feedstock and the windrowed materials. In addition, the landfill can become quite dry, particularly in the summer months. The risk of fire due to the proposed composting operations may substantially increase demand for fire protection services and therefore may be considered a significant impact.

Mitigation Measures Proposed as Part of Project

Mitigation Measure 3.9.1a: Consistent with the currently permitted composting operations, for the expanded composting operation YCCL will continue to comply with the State minimum standards for composting operations as specified in Title 14, California Code of Regulations (CCR).

14 CCR Chapter 3.1, Composting Operations Regulatory Requirements, 17867(b)(1) establishes the following requirements:

> [T]he [composting facility] operator shall provide fire prevention, protection and control measures, including, but not limited to, temperature monitoring of windrows and piles, adequate water supply for fire suppression, and the isolation of potential ignition sources from combustible materials. A fire lane of a minimum of 12 feet in width shall be provided to allow access to all operation areas.

Mitigation Measures 3.9.1b: Consistent with the currently permitted composting operation, YCCL will continue to adhere to composting management practices established by the Yolo County Environmental Health Department. Management practices include:

- The operator shall be in compliance with any requirements of the local fire protection agency.
- The operator shall maintain a log of special/unusual occurrences. Each log entry shall be accompanied by a summary of any actions taken by the operator to mitigate the occurrence. The log shall be available to site personnel and the LEA at all times.
- All incoming materials shall be ground, or windrowed and started composting within 30 days of delivery to the site.

Mitigation Measures 3.9.1c: Consistent with current operations, the County will continue to implement standard composting facility management practices, including the following:

- Windrows will be 7-12 feet high and 10-14 feet wide at the base, the length of each windrow may vary according to site constraints;
- Piles will be turned to keep them aerated, based on temperature and moisture content monitoring;
- Moisture will be added as necessary to maintain optimum moisture conditions; optimum water content for compost piles range from 50 to 60 percent;
- Should a fire occur at the site, the operator shall notify the Davis City Fire Department immediately;
- Compost windrows shall have a thirty- (30) foot firebreak from grassland.

Mitigation Measures Identified in This Report

None required.

Level of Significance after Mitigation

Implementation of measures 3.9.1a, 3.9.1b, and 3.9.1c will reduce the potential impacts related to fire from the proposed composting operations to a less than significant level.

Impact 3.9.2: The proposed height increase could increase the risk of fire occurring at the landfill site. (Significant)

The proposed height increase from an elevation of 80 feet to 140 feet above mean sea level will result in more surface area. The additional surface area may increase the risk of fires. The risk of fire due to the proposed height increase may increase demand for fire protection services and therefore may be considered a significant impact.

Mitigation Measures Proposed as Part of Project

Mitigation Measure 3.9.2a: YCCL will continue to reduce the impact associated with surface fires through the following green waste related procedures:

- Use of chipped yard and green waste within 72 hours of processing.
- Slopes covered with yard and green waste shall only be left exposed for a maximum of 8 days before the next cell covers the chipped green waste slope.
- Application of chipped yard and green waste at variable thickness from 6 to 12 inches.

Mitigation Measure 3.9.2b: YCCL will continue to follow existing operational policies, as follows:

- Landfill personnel are trained to combat refuse fires and to detect trucks with "hot loads." If a hot load is deposited in the active face, personnel are instructed to move all equipment and trucks away form the burning refuse, spread the burning refuse over a large area using dozers, douse the refuse with water from the water truck, cover it with mud, and leave it overnight.
- A water tanker and sufficient cover material are maintained at a convenient location for use in fire suppression.
- Groundwater is used as the main water supply, and there is a sufficient quantity stored on-site.
- Heavy equipment would be called upon for fire suppression.
- A fire extinguisher (trigger in the cab) is located in the cab of each vehicle. All landfill personnel carry cellular phones.

Mitigation Measures Identified in This Report

None required.

Level of Significance after Mitigation

Implementation of measures 3.9.2a and 3.9.2b will reduce the potential impacts related to fire from the proposed height increase to a less-than-significant level.

Impact 3.9.3: The proposed landfill mining operations could increase the risk of fire occurring at the landfill site. (Significant)

The process of landfill mining involves the excavation of landfilled materials. The process will introduce air to the waste mass and consequently may stimulate aerobic decomposition activity that increases the temperature of the waste mass. The potential increase in temperature and gas production coupled with the presence of air augments the potential for landfill fires. Therefore, the risk of fire due to the proposed landfill mining operation may substantially increase the risk of wildfire and the demand for fire protection services and therefore may be considered a significant impact.

Mitigation Measures Proposed as Part of Project

Mitigation Measure 3.9.3a: YCCL will continue to follow existing operational policies, as follows:

- Landfill personnel are trained to combat refuse fires.
- A water tanker and sufficient cover material are maintained at a convenient location for use in fire suppression.
- Groundwater is used as the main water supply, and there is a sufficient quantity stored on-site.
- Heavy equipment would be called upon for fire suppression.
- A fire extinguisher (trigger in the cab) and a two-way radio is located in the cab of each vehicle. All landfill personnel carry cellular phones.

Mitigation Measures Identified in This Report

Mitigation Measure 3.9.3b: The temperature of the excavation face will be monitored and the excavation face will be sprayed with water as needed to control temperatures and prevent the excessive buildup of heat.

Level of Significance after Mitigation

Implementation of measures 3.9.3a and 3.9.3b would reduce the potential impacts related to fire from the proposed landfill mining operations to a less-than-significant level.

Impact 3.9.4: The proposed aerobic bioreactor cells could increase the risk of fire occurring at the landfill site. (Significant)

Aerobic bioreactor technology requires the injection of air into the waste mass. The introduction of air and the resulting onset of aerobic activity serve to rapidly increase the temperature of the waste mass. The microbial processes are capable of significant heat generation, particularly at higher moisture conditions. The elevated temperature in the waste mass combined with the presence of oxygen increase the potential for landfill fires. Therefore, the risk of fire due to the proposed aerobic bioreactor technology may substantially increase the risk of wildfire and the demand for fire protection services and therefore may be considered a significant impact.

Mitigation Measures Proposed as Part of Project

Mitigation Measure 3.9.4a: YCCL will continue to follow existing operational policies, as follows:

- Landfill personnel are trained to combat refuse fires.

- A water tanker and sufficient cover material are maintained at a convenient location for use in fire suppression.
- Groundwater is used as the main water supply, and there is a sufficient quantity stored on-site.
- Heavy equipment would be called upon for fire suppression.
- A fire extinguisher (trigger in the cab) is located in the cab of each vehicle. All landfill field staff carry cell phones.
- DIWM monitors carbon monoxide (CO) levels within the bioreactor cells. A build-up of CO levels is an early indication of excessive heat production.

Mitigation Measure 3.9.4b: Liquid will be introduced to the waste mass after the cell is filled, and before air extraction is begun to keep the waste moist and control temperature.

Mitigation Measure 3.9.4c: Consistent with current operation of the aerobic bioreactor cell, YCCL will monitor and control the temperature of the waste mass. The optimum temperature has been reported to be between 55 and 65 degrees Celsius for aerobic bioreactors.

Mitigation Measure 3.9.4d: Consistent with current bioreactor operations at Module D, YCCL will monitor and control moisture content of the waste mass. Recommended moisture content ranges from a minimum of 25 percent to optimum levels of 40-70 percent.

Mitigation Measure 3.9.4e: Consistent with current bioreactor operations at Module D, YCCL will Monitor and control oxygen and methane levels within the landfill.

Mitigation Measures Identified in This Report

None required.

Level of Significance after Mitigation

Implementation of measures 3.9.4a, 3.9.4b, 3.9.4c, 3.9.4d, and 3.9.4e will reduce the potential impacts related to fire from the proposed aerobic bioreactor cells to a less than significant level.

Impact 3.9.5: The proposed anaerobic bioreactor cells would result in an increased production of flammable landfill gas at the site, which could increase the risk of fire. (Less than Significant)

The use of anaerobic bioreactor technology proposed as part of the project increases landfill gas generation rates. The flammable nature of landfill gas when mixed with air, combined with the inherent potential for fires at or near landfills, may increase the risk of fire occurring at the landfill. However, several aspects of bioreactor design and operation already in place and planned for the future at YCCL will reduce this risk. These include the following:

1) Landfill gas is collected through the gas collection system that is built into each bioreactor cell. Landfill gas capture rates of 98 percent have already been achieved consistently at YCCL. This rate is much higher than in conventional landfills (typically 70-75 percent).

2) YCCL will continue to adhere to the methane gas recovery facility's fire prevention/contingency plan that addresses how personnel should handle emergency situations. The procedures in the plan include:

   - Grassfire on the landfill surface protocol - The plan includes shut down procedures of the gas extraction system and pipelines, and notification of authorities.
   - Major pipe break protocol - The plan includes procedures for gas detection, pipeline repair, authority notification, and closing header valves and pipelines resulting from vehicle impact.
   - Emergency Notification List – The list contains names and phone numbers of persons to be notified in the event of an emergency at the landfill site.
   - Emergency Repair Equipment Inventory- The inventory lists the parts and equipment to keep on site to facilitate immediate repair of collection system components.

3) YCCL will continue to follow existing operational policies, as follows:

   - Landfill personnel are trained to combat refuse fires.
   - A water tanker and sufficient cover material are maintained at a convenient location for use in fire suppression.
   - Groundwater is used as the main water supply, and there is a sufficient quantity stored on-site.
   - Heavy equipment would be called upon for fire suppression.
   - A fire extinguisher (trigger in the cab) is located in the cab of each vehicle. All landfill field staff carry cellular phones.

Because of these operational and design aspects already in place and planned to be continued in the future, this impact is considered less than significant.

Mitigation: None required.

Impact 3.9.6: Relocation of the high-pressure underground natural gas pipeline and above ground power lines to implement the landfill mining operation may temporarily disrupt utility service to the landfill site or to PG&E customers in the vicinity. (Less Than Significant)

In order to implement landfill mining, the applicant would relocate the existing high-pressure underground natural gas pipeline and above ground power lines that currently run through the site. This may result in temporary disruption of utility service to the landfill site or to PG&E's natural gas and electrical customers in the vicinity.

Disruption of power to the site is unlikely since the landfill has a backup generator. This generator is used during power failures, allowing the landfill to stay open without any disruption of operations.

Disruption of natural gas service or electrical service to PG&E customers is unlikely, since electrical power can be re-routed through the grid while the lines are being moved, and since construction of the new natural gas pipeline will be phased to minimize the time the pipeline is shut down. This pipeline does not directly supply customers, but rather leads to a storage facility. Therefore, short-term interruptions in its operation do not affect supply.

Mitigation: None required.

Impact 3.9.7: The proposed landfill mining, composting, and bioreactor cell operations could place burdensome demands on water supplies. (Less than significant)

Substantial amounts of water could be required for the composting and landfill mining operations. Composting and landfill mining operations will require water for dust control during grinding, windrow turning, and sifting through landfill materials. Composting operations will also require water to maintain the appropriate moisture level to sustain optimal levels of microbial activity within the composting materials. The bioreactor cells will also require liquid addition to achieve and maintain the optimal moisture content. The planned rate of liquid addition in the proposed anaerobic bioreactor will be 10 gallons per minute per 10,000 square feet (44 gpm per acre), the same rate as for the pilot cell. Once field capacity is reached, little additional liquid needs to be added to the cell, as most of the liquid demand is satisfied by recirculation of leachate. The liquid addition required for aerobic bioreactor operations will be at a rate three to four times higher than that for the anaerobic cell, 30 to 40 gallons per minute per 10,000 square feet (132 to 176 gpm per acre), due to evaporation losses from air injection. As with the anaerobic cells, once moisture levels reach field capacity, most of the liquid demand will be satisfied through recirculation of leachate.

YCCL currently pumps approximately 150,000 to 200,000 gallons per day (104 to 139 gallons per minute), which is adequate for current and projected future water needs. Therefore, the landfill would not need to increase the groundwater pumping rate to accommodate future water needs under the project.

YCCL plans to use the groundwater in the water storage ponds for landfill mining, composting, and bioreactor cell operations. The groundwater table beneath the site is naturally high and is also elevated from crop irrigation, spray disposal, and wastewater reclamation activities on adjacent lands. Considering the elevated groundwater level that requires pumping to maintain the five feet separation from the landfill liner, it is assumed that there is a sufficient amount of groundwater to accommodate future water needs. The landfill may need to install extraction wells in the expansion area. Currently, YCCL utilizes the water storage pond for all on-site water needs (with the exception of potable water and one on-site well that provides non-potable water for toilets and hand wash basins in the main building). YCCL also has the option of using the processed groundwater in the water storage reservoir. The water storage pond and reservoir hold approximately 1,606,900 gallons and more than 120 acre feet of water, respectively. The County may also purchase water from the neighboring WWTP or from Yolo County Flood Control District that manages an irrigation water canal around the landfill. Since there seems to be sufficient water to accommodate future water demands for the proposed project, the impact is considered less than significant and requires no mitigation.

Mitigation: None required.

Impact 3.9.8: The project may increase the amount of wastewater produced at the site. (Less than Significant)

The proposed project will result in a modest increase in on-site staff. Currently, there are 17 on-site staff members and an average of 3 other staff members visiting the site every day. In addition, there are approximately 17 contractors on site every day. The proposed bioreactor and landfill height increase will not change the current operating practices on-site and thus, will not require additional staffing. The composting operations also will not require additional staff because operations will be incorporated into the existing wood waste facility. The landfill mining operation and materials recovery facility may require several additional on-site personnel. The small increase in staffing levels should not require an additional septic tank for wastewater and thus the impact is considered less than significant.

Mitigation: None required.

Impact 3.9.9: The increased use of equipment for landfill, material recovery facility, and composting operations would increase electricity consumption. (Less than significant)

The project is likely to result in increased use of electricity due to the proposed expansion of the composting facility, landfill mining operations, materials recovery facility, and height expansion. However, the amount of waste accepted would fall within the currently permitted maximum daily tonnage of 1,800 tons per day for all wastes entering the facility. Therefore, it is expected that the consumption of electricity will not change substantially under the proposed project.

Currently YCCL uses approximately 12.5 mega watt days (mwd) per year. YCCL expects that the electricity usage will increase by five percent of the current usage, to 13.13 mwd per year, after the proposed facility expansions. If YCCL receives permission to increase the landfill height another 60 feet to 140 feet, the County expects that electricity usage will increase an additional 15 percent above the increased usage after the proposed facility expansion to 15.10 mwd per year, due to the additional electricity needed to pump the liquid addition an extra 60 feet. The greatest estimated electricity consumption increase is 2.60 mwd of electricity per year. Because this increase will not require the construction of new or expanded electrical generation facilities, the impact is considered less than significant. In addition, the generation of electricity of the bioreactor cells should offset all additional electricity consumption from the proposed project.

Mitigation: None required.

Impact 3.9.10: The operation of the anaerobic bioreactor cells will generate substantial electricity. (Beneficial)

The electricity generated from the bioreactor cell far exceeds the electricity usage on-site. The current bioreactor generates 1,075 mwd per year and is expected to continue at this rate for another 10 years. YCCL expects the proposed anaerobic bioreactor cells to generate approximately 1,462 mwd per year for 44 years. If YCCL is permitted to increase the landfill height to 140 feet and operate these calls as bioreactors, the electricity generation should double to approximately 2,924 mwd per year. Therefore, the cogeneration aspect of the proposed project will generate far more electricity than the landfill operations will consume, which will be a beneficial impact of the project.

Mitigation: None required.

REFERENCES – Public Services, Utilities, and Energy

California Regional Water Quality Control Board Central Valley Region, Order No.R5-2002-118 Waste Discharge Requirements for County of Yolo Planning and Public Works Department Yolo County Central Landfill Class III Landfills & Class II Surface Impoundments Yolo County, June 7, 2002.

EMCON/OWT Solid Waste Services, Report of Facility Information Volume I-C Part XII: Operations and Health and Safety Manual for the Yolo County Central Landfill sorting Operation and Mattress Diversion Program, May, 2000.

EMCON/OWT Solid Waste Services, Study of Current and Alternative Operations Strategies and Solid Waste Disposal Options, September 1999.

Nelson, Wendy, Landfill Supervisor, Yolo County Central Landfill, telephone communication with C. Chang, ESA March 2003.

Reinhard, Debra R. and Timothy G. Townsend, Landfill Bioreactor Design and Operation, Lewis Publisher. New York. 1998.

Sinderson, Linda, Senior Engineer, Yolo County Planning and Public Works Division of Integrated Waste Management, telephone communication with C. Chang, ESA April 2003.

Yolo County. 1992. *Final Environmental Impact Report, Yolo County Central Landfill*, State Clearinghouse Number 91123015. Prepared for Yolo County Community Development Agency. Prepared by SCS Engineers in conjunction with Fugro McClelland. October 1992.

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Yolo County Planning and Public Works Department Division of Integrated Waste Management, EPA Project XL – Final Project Agreement for the Yolo County Accelerated Anaerobic & Aerobic Composting (Bioreactor) Project, September, 2000.

Yolo County Planning and Public Works Department Division of Integrated Waste Management, Yolo County Central Landfill Report of Facility Information Volume I, January, 1998.

Waste Management, Inc., Bioreactor Landfill: The Next Generation of Landfill Management, 2000.

3.10 TRANSPORTATION AND TRAFFIC

This section supplements the analyses from the 1992 EIR by considering changes in the project description, changes in the circumstances under which the project would be undertaken, and any applicable new information of substantial importance that was not known at the time the 1992 EIR was completed. Those evaluations were undertaken to determine whether changes would result in new, or substantially more severe, significant impacts in comparison to those disclosed in the 1992 EIR.

The site's Solid Waste Facility Permit (SWFP) allows acceptance of up to 1,800 tons per day of waste, and up to 1,047 vehicles per day to haul waste/recovered materials to/from the landfill (i.e., 1,000 vehicles carrying waste in, 45 vehicles hauling recovered materials out, and 2 vehicle hauling materials for disposal elsewhere out), neither of which the current project would alter. Proposed changes to the operation of the Yolo County Central Landfill (YCCL) that constitute the project, and which are relevant to transportation and traffic conditions, include the following:

- Construction and operation of a material recovery facility (MRF) at the landfill. The proposal to construct and operate a MRF would not increase the maximum daily allowable waste volume received at the landfill; most of the loads that would be directed to the MRF would be from loads diverted from landfilling at YCCL. The daily number of vehicles hauling recovered material from the landfill would be within the permitted maximum of 45 outgoing material recovery vehicles per day.

- Construction and operation of a composting facility at the landfill. Some composted municipal solid waste would probably be used as alternative daily cover for the landfill, which would decrease the need to import soil or other cover material, but some may be marketed as a soil amendment. Like the MRF, the composting facility's incoming waste would fall within the currently permitted maximum daily tonnage of 1,800 tons per day for all wastes entering the facility; most of the material that would be composted would be from loads diverted from landfilling at YCCL. Also like the MRF, the daily number of vehicles hauling finished compost material from the landfill would be within the permitted maximum of 45 outgoing loaded vehicles per day (as would the sum of the MRF and composting facility vehicles per day).

- Expanded salvaging operations. Salvaged items would be stored in a designated area for distribution to the public or charitable organizations, such as Goodwill or Salvation Army, or for sale. The daily number of vehicles hauling salvaged material from the landfill would be offset, as needed, by a reduction in the number of vehicles hauling waste to the landfill.

- Purchase of additional land for the development of a soil borrow area. YCCL has a shortage of soil for daily, intermediate, and final cover material, and soil is imported from off-site for these purposes. No parcel of land has yet been identified for this purpose, but it is estimated that a 640-acre parcel would be needed. The parcel would either adjoin the existing landfill property, or would be within about five miles of the landfill. Trucks hauling soil from an off-site borrow area (estimated to be a peak of five vehicles per day), if such a site were selected, would be counted against the permitted maximum 1,000 vehicles per day.

METHODOLOGY

Existing (1991) traffic volumes, as well as projected cumulative (2005) traffic volumes that were developed for impact analyses in the 1992 EIR, were compared to traffic volumes counted in 2003 to gauge the degree of changes in the circumstances under which the project would be undertaken.

Changes to the road network serving the landfill were reviewed to determine whether there would be an effect on project trip distribution that would affect the level of service analyses in the 1992 EIR. Also, proposed modifications were reviewed to determine whether there would be an effect on traffic generation to and from the landfill.

3.10.1 SETTING

ROADWAY NETWORK

The existing major roadways serving the project area include County Road 102, County Road 28H, County Road 29, and County Road 105 (see Figure 3.10-1).

County Road 102 is a two-lane north-south roadway that connects the City of Davis (at Covell Boulevard) to the south to State Route 113 (near Knights Landing). CR 102 has an interchange with Interstate 5 near Woodland, and haulers can access the landfill from this road (via CR 28H).

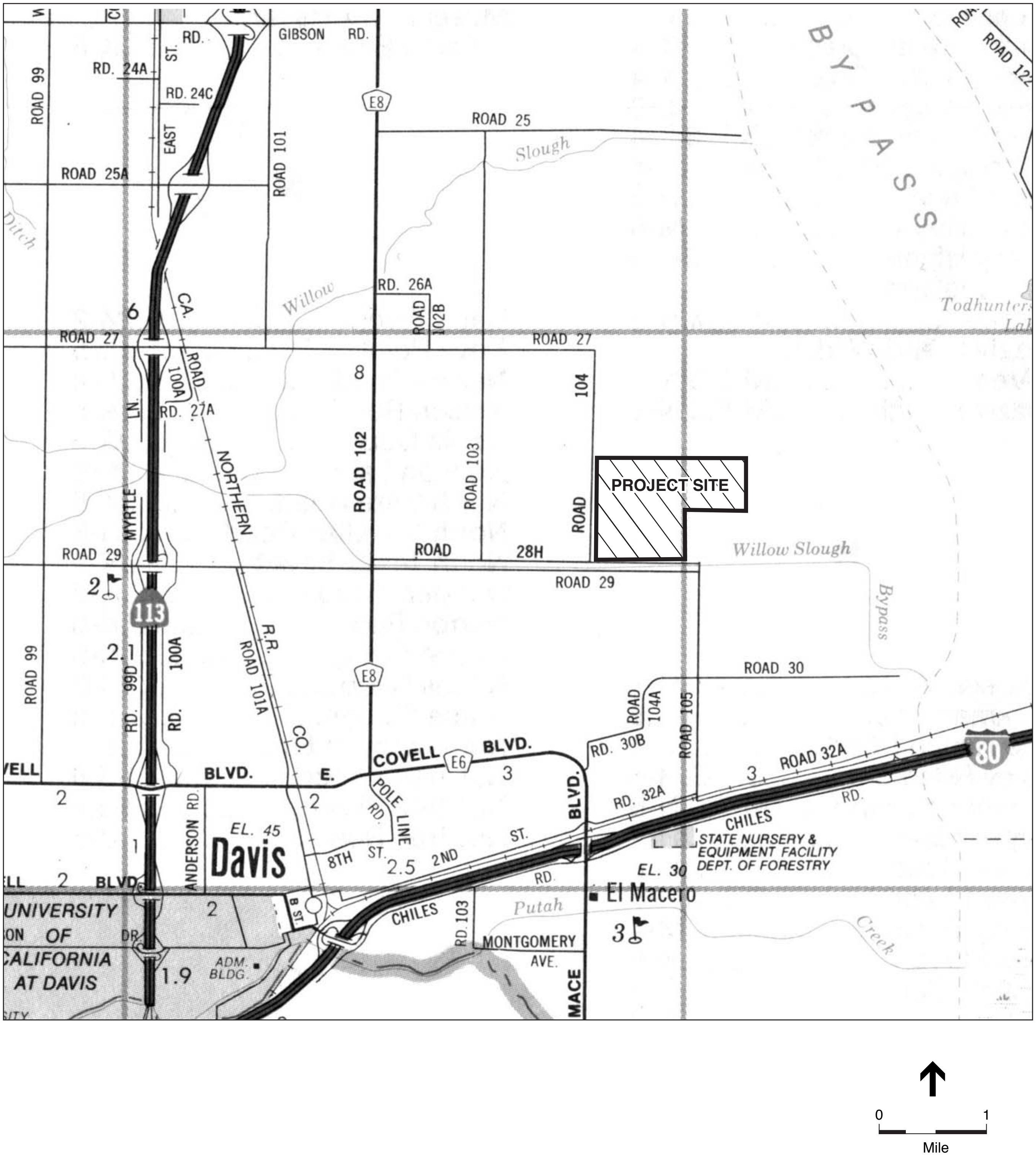
County Road 28H is a two-lane east-west roadway between CR 102 and CR 105. The access driveway for the YCCL is on CR 28H. Traffic west of CR 102 (e.g., to/from the interchange at State Route 113) continues on CR 29, and drivers who wish to travel from SR 113 to the landfill must negotiate turns at the offset intersections of CR 102/CR 29 and CR 102/CR 28H.

County Road 29 is a two-lane east-west roadway between CR 102 and CR 89 near Winters. CR 29 has an interchange with State Route 113, and as described above, haulers that use this road to access the landfill must negotiate turns at the offset intersections of CR 102/CR 29 and CR 102/CR 28H.

County Road 105 is a two-lane north-south roadway between CR 28H and CR 32A. Haulers from West Sacramento and Sacramento generally exit from I-80 onto CR 32A and use CR 105 to CR 28H.

TRAFFIC VOLUMES

Automatic machine traffic counts were conducted over a 72-hour period (Tuesday–Thursday) on roadways in the project vicinity (i.e., the above-described roads and County Road 27 and County Road 32A). The average daily (two-way) traffic volumes, as well as the number of vehicles per



SOURCE: Environmental Science Associates; California State Automobile Association

Yolo County Central Landfill Permit Revisions SEIR / 202102

Figure 3.10-1
Roadways in Project Area

hour during the typical morning commute hours (7:00 to 9:00 a.m.) and the midday hours (12:00 noon to 2:00 p.m.) are presented in Table 3.10-1.

TABLE 3.10-1
EXISTING TRAFFIC VOLUMES ON AREA ROADWAYS

Roadway Segment	Average Daily Traffic (Total)[a]	Average Volume Per Hour	
		7:00 a.m. to 8:00 a.m.	12:00 noon to 1:00 p.m.
County Road 102 south of County Road 29	6,330	470	400
County Road 102 between CR 28H and CR 27	5,350	370	325
County Road 102 north of County Road 27	5,300	335	340
County Road 105 south of County Road 28H	550	55	40
County Road 32A east of County Road 105	830	75	40
County Road 29 west of County Road 102	2,240	195	125
County Road 28H east of County Road 102	840	70	60
County Road 27 west of County Road 102	1,170	115	70

[a] Average daily (two-way) traffic over three days of continuous counting (Tuesday–Thursday, February 25–27, 2003).

SOURCE: Yolo County Planning and Public Works Department

FINDINGS OF THE 1992 EIR

This section summarizes the Traffic and Transportation section from the 1992 EIR for activities at the YCCL. The summary includes a review of the environmental setting described in the 1992 EIR, significance criteria established for determining significant traffic and transportation effects of the previous project, and traffic and transportation impacts and mitigation measures identified in that document.

The 1992 EIR notes that traffic flow conditions in the project area were characterized by minimal delays or congestion (i.e., level of service[1] [LOS] A) on all study roadways.

[1] The concept of level of service qualitatively characterizes traffic conditions (i.e., congestion) associated with varying levels of traffic on a six-level grading system (from LOS A, little or no delays, to LOS F, excessive delays).

For the purposes of the 1992 EIR, traffic was considered a significant impact if the project would cause (1) roadway levels of service to degrade to worse than LOS C (Yolo County's minimum acceptable service level); or (2) the Traffic Index (TI) to increase (indicating a likely increase in required roadway maintenance).

The 1992 EIR found that the increases in roadway traffic volumes caused by transport of waste material up to a maximum of 1,800 tons per day to the YCCL would have a less-than-significant impact on traffic flow conditions on area roadways, in both the near-term and cumulatively. The number of truck trips generated by the proposed maximum permitted waste stream, however, was found to have a potentially significant impact on the roadway pavement on CR 28H, CR 105, and CR 29, leading to the need for increased maintenance and possible road reconstruction. Lastly, the then-narrow Willow Slough Bypass bridge was found to be a constraint to traffic flow on CR 102, which the project-generated increase in traffic volumes would exacerbate.

The 1992 EIR identified mitigation measures to reconstruct (widen) the Willow Slough Bypass Bridge, and to conduct periodic Pavement Studies of CR 28H, CR 105, CR 102, and CR 29 and maintain those roadways on an as-needed basis to reduce damage from increased truck traffic.

CHANGES IN THE ENVIRONMENTAL SETTING SINCE THE 1992 EIR

The roadway network serving the project vicinity is the same as existed at the time the 1992 EIR was prepared, except the bridge on CR 102 over the Willow Slough Bypass has been widened, which eliminated a constraint to traffic flow in that area.

Current (2003) daily traffic volumes on County Road 102 and County Road 29 are higher than the 1991 daily volumes reported in the 1992 EIR, but current peak-hour volumes (i.e., the basis for establishing traffic flow conditions) are similar to, or lower than, those reported in the 1992 EIR. For all other area roadways, the current traffic volumes are lower than those reported in the 1992 EIR for both daily and a.m. peak-hour conditions.

3.10.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

A project would normally have a significant effect on the environment if it would cause a substantial increase in traffic in relation to the existing or future baseline traffic load and capacity of the roadway system. Specifically, a project-generated increase in traffic would be considered significant if it would cause the level of service (LOS) on road segments to degrade from LOS C or better to worse than LOS C (i.e., LOS D or worse).

A significant project-related impact also would occur if the project would:

- Substantially increase heavy truck traffic volumes that would increase the Traffic Index (TI) on area roadways.

- Substantially increase traffic hazards to motor vehicles, bicyclists, or pedestrians due to a roadway design feature that does not comply with Caltrans design standards, incompatible uses, or increases in volumes of motor vehicles, bicyclists, or pedestrians.

Impact 3.10.l: Traffic generated by the project would affect traffic levels of service on roadways in the project area. (Less than Significant)

As described above, the YCCL's Solid Waste Facility Permit (SWFP) allows acceptance of up to 1,800 tons per day of waste, which the current project would not alter. The SWFP allows up to 1,047 vehicles per day to haul waste/recovered materials to/from the landfill (i.e., 1,000 vehicles carrying waste in, 45 vehicles hauling recovered materials out, and 2 vehicle hauling materials for disposal elsewhere out). The daily number of vehicles hauling recovered material (from the MRF and compost facility) from the landfill (estimated to be about 40 vehicles per day) would not exceed the permitted daily maximum. The daily number of vehicles hauling salvaged material from the landfill (estimated to be about 50 vehicles per day) would be offset, as needed, by a reduction in the number of vehicles hauling waste to the landfill. Lastly, trucks hauling soil from an off-site borrow area (estimated to be a peak of five vehicles per day), if such a site were selected, would be counted against the permitted maximum 1,000 vehicles per day. As such, the current project would not generate additional vehicle trips beyond those allowed under the SWFP. To assess potential changes in the circumstances under which the current project would be undertaken, specifically changes in traffic volumes in the vicinity of the landfill, 2003 traffic volumes (ascertained through collection of 72-hour traffic volumes on eight roadway segments in February 2003) were compared to both then-existing traffic volumes and cumulative (2005) traffic volume forecasts developed for the 1992 EIR analysis. This comparison indicates that current (2003) daily traffic volumes are lower than those reported in the 1992 EIR for both daily and peak-hour conditions for all study roadways, except on County Road 102 and County Road 29, on which current daily volumes are higher than 1991, but current peak-hour volumes are similar to, or lower than, those reported in the 1992 EIR. In addition, the 1992 EIR predicted that traffic volumes would almost double over the 13 years to 2005, which as indicated by the above-described 2003 volumes, will not happen. Therefore, the 1992 EIR continues to provide an adequate and conservative basis for impact determination in this SEIR.

The change to the roadway network serving the landfill since preparation of the 1992 EIR resembles the change identified in that document. That is, the bridge over Willow Slough Bypass, identified for widening in the 1992, has in fact been widened. That change to the roadway network improves travel conditions in the area, and does not create a new impact on area roadways.

Trip generation under the current project would be no higher than estimated in the 1992 EIR because this SEIR evaluates the same maximum tons per day allowance as the prior CEQA document, and for reasons explained above.

On the basis of the above-described review, no changes in the conditions of transportation and circulation in the YCCL vicinity were ascertained that would result in any new significant impacts or an increase in severity of the impacts on roadway maintenance requirements previously identified for the project.

Mitigation: None required.

Impact 3.10.2: Operations of the proposed project would increase wear and tear on area roadways. (Significant)

As discussed under Impact 3.10.1, the current project would not generate additional vehicle trips beyond those allowed under the SWFP. As also discussed above, current (2003) daily traffic volumes are lower than those reported in the 1992 EIR for both daily and peak-hour conditions for all study roadways, except on County Road 102 and County Road 29, on which current daily volumes are higher than 1991, but current peak-hour volumes are similar to, or lower than, those reported in the 1992 EIR. Also, the almost doubling of traffic volumes on area roadways predicted in the 1992 EIR will not happen. Therefore, the 1992 EIR continues to provide an adequate and conservative basis for impact determination in this SEIR, and the finding that the number of truck trips generated by the proposed maximum permitted waste stream would have a potentially significant impact on the roadway pavement on CR 28H, CR 105, and CR 29, requiring increased maintenance and possible road reconstruction, would apply to the proposed project.

Mitigation Measures Proposed as Part of Project

None.

Mitigation Measures Identified in This Report

Mitigation Measures 3.10.2: Conduct periodic Pavement Studies of County Road 28H, County Road 105, County Road 102, and County Road 29, and maintain on an as-needed basis to reduce damage from increased truck traffic.

Level of Significance after Mitigation

Mitigation measures identified in the 1992 EIR for periodic Pavement Studies of CR 28H, CR 105, CR 102, and CR 29, and maintenance of those roadways on an as-needed basis to reduce damage from increased truck traffic, would continue to reduce impacts to a less than significant level.

Impact 3.10.3: Traffic generated by the project would affect traffic safety on roadways in the project area. (Less than Significant)

The current project would neither change the physical characteristics of the street network surrounding the landfill, nor generate traffic that is incompatible with existing traffic patterns. The YCCL's Solid Waste Facility Permit (SWFP) allows acceptance of up to 1,800 tons per day of waste, which the current project would not alter. The baseline against which to judge traffic impacts is the current SWFP, and as such, the current project would not generate additional vehicle trips. Based on those determinations, it would be unlikely that the rate of accidents (i.e., accidents per number of vehicles) would increase as a result of the project. Therefore, the project would have a less than significant impact on traffic safety.

Mitigation: None required.

REFERENCES – Transportation and Traffic

Yolo County Planning and Public Works Department, Vehicular Traffic Volume Count Data, collected February 24-28, 2003.

3.11 CULTURAL RESOURCES

This section describes the cultural resources setting, evaluates potential impacts to cultural resources, and recommends mitigation measures to reduce impacts of the proposed project to a less-than-significant level. William Self Associates, Inc. (WSA) implemented a complete record search, archaeological field survey, and assessment of a 40 foot wide by approximately 4 mile long area surrounding the existing Yolo County Landfill parcel that is proposed as a new alignment for utility lines and/or for a paved perimeter access road. The actual width of the construction area would be 20 feet, however a buffer of 10-feet either side (40 feet total) was surveyed. In addition, WSA examined approximately 20 acres of relatively undisturbed land that is proposed for use as a composting facility.

3.11.1 SETTING

PHYSICAL SETTING

The Yolo County Landfill is located northeast of the City of Davis and is situated within the greater Sacramento River Delta region along the northern edge of the Willow Slough Bypass and the western margin of the Yolo Bypass. The Willow Slough Bypass and the Yolo Bypass are part of an elaborate system to control flooding of 101,000 acres of the Sacramento Valley. The Yolo Causeway, constructed in 1916, was the first all-year, all-weather road across what was once a vast expanse of tules (Kyle 1990:538).

Paleoenvironment

Most of the western United States was subjected to a series of climatic fluctuations over the past several millennia; the central interior valley portion of California is no exception. Warm/dry episodes were followed by intermittent cool/moist periods (Moratto *et al.*, 1978). The Holocene or Recent Epoch has seen six cool periods followed by five warm periods. The Altithermal Period, ending about 2,900 years ago, was a warm/dry episode which apparently had wide-ranging implications throughout the west, leading to changes in animal migrations and plant productivity and distribution. A cooler period followed for the next 1,400 years, followed by yet another warm/dry climate starting about 600 years ago, which remains to the present day.

Prior to the introduction of livestock to the region in the early 1800s, native grasses covered the upland environment throughout the area. Although the type of animals inhabiting the Central Valley before the influx of humans is largely known, the type of plants that may have occupied the valley grassland is not as well defined. Purple Needlegrass, a bunchgrass found only in California, may have been the dominant grass species. Truly purple in color, Purple Needlegrass's dried stalks would have lent a distinctive color to the valley grasslands in the summer (Brown 1985:87).

CULTURAL SETTING

Ethnography

The Yolo County Landfill project area was probably occupied, at the time of historic contact by Spanish missionaries and explorers, by the Wintuan-speaking *Patwin* Native American groups in Yolo and Solano Counties. The name Patwin (*patwin* 'people') was introduced by Powers and is synonymous with Southern Wintun (Johnson 1978:358). The Patwin have been the subject of several major cultural descriptions (Kroeber 1970). Scholars have suggested the early California environment offered a large assortment of resources for use by native people, although acorns, fish, and game mammals provided the principal dietary staples (Baumhoff 1963). Some researchers have stressed the acorn, with various seeds, grasses, nuts, berries, and roots were of utmost importance (Bennyhoff 1977:10). Kroeber (1970:814-815), a noted ethnographer, pointed out plant food collection/preparation formed the center of Patwin technology.

Plant, animal and fish resources were available in unlimited quantities in the Sacramento and San Joaquin River Delta area. Tule Elk were common in the marshlands, as were rabbits and small game (Schenck and Dawson 1929:304). The Delta also provided much of the natural resources necessary for production of the day-to-day material goods used by native populations. The Patwin comprised a group of people that were united by language but broken into smaller tribal entities (independent political groups) each occupying defined territories over which they controlled access to natural resources. Although each tribal group had one or more permanent villages, their territory contained numerous smaller campsites used as needed during a seasonal round of resource exploration.

Extended families lived in domed, conical structures built of thatched grass or earthen-covered limbs and branches. Semi-subterranean men's houses were built at the larger village sites, also using grass and earth cover (Kroeber 1970). Given an abundant and continuous subsistence base, ceremony in both Patwin and Miwok life was fairly extensive, and scholars have written much about it based on early ethnographic accounts (Bennyhoff 1977:11; Kroeber 1970:442; Levy 1978). Rituals associated with death were of great importance. Two forms of interment were practiced, and grace goods were often placed into the grave at the time of burial. Cremation was also occasionally practiced.

Regional History

Yolo County, located northwest of Sacramento, is well known for its fertile soil. The county's entire eastern boundary is the Sacramento River. The name Yolo is derived from the Patwin Indian word "Yoloy" which means place of the rushes. The entire west bank of the Sacramento River once had great fields of tule rushes with swamplands, marshes, and sloughs.

The California Gold Rush of 1848 and 1850 brought an increase in population to Yolo County. Although some prospecting for gold was done in the foothills, most immigrants realized that the fortune to be made in Yolo County was through farming and ranching. When California became a state in 1850, Yolo was one of the original 27 counties. Initially, the county seat was located in the town of Fremont (now Knights Landing), but moved to the town of Washington (later called

Broderick and presently West Sacramento). However, the flood of 1862 prompted the voters to move the county seat to Woodland where it remains today (Kyle 1990:532-533).

RESULTS OF THE LITERATURE AND RECORD SEARCH

At the request of WSA, the staff of the California Historical Resources Information System Northwest Information Center (NWIC) at Sonoma State University, Rohnert Park, California, completed a record search of the project area on January 7, 2003 (File No. 02-496). They searched their files for information on previous archaeological surveys and recorded sites within a ¼-mile radius of the project area to identify and evaluate the potential for the presence of cultural resources. Search of their files included a review of the *National Register of Historic Places,* the *California Register of Historical Resources,* the *California Inventory of Historic Resources* (1976), the *California Historical Landmarks* (1990), and the *California Points of Historical Interest* listing (May 1992 and updates), the *Historic Property Directory* (Office of Historic Preservation current computer list, the *Survey of Surveys* (1989), GLO Plats, and other pertinent historic data available at the NWIC for each specific county.

Previous Surveys

A total of 12 previous archaeological surveys have been conducted within or adjacent to the project area (Berg and Bouey 1991; Derr 1991; Edgar and Griset 1991; Glover and Bouey 1990, 1994; Hale et al. 1995; Marvin and Davis-King 1995; Moratto, et al. 1991; Shapiro and Syda 1997; True 1976; Waechter 1993a and b). As a result of the surveys, one prehistoric human burial site (CA-YOL-171) and two isolates consisting of one obsidian, serrated biface and one small, flat-bottomed mortar uncovered during excavation of a trench in 1978 (ISO-2 and ISO-3) were recorded within the western section of the Yolo Landfill site. One historic resource consisting of a ranch house and associated farm buildings constructed in 1867 (HRI 6/188) was recorded by Historic Environment Consultants in 1980 outside of, but nearby, the southern boundary of the project area.

FINDINGS OF THE 1992 EIR

The 1992 EIR evaluated the potential environmental effects of a lateral expansion of the landfill into what are now designated WMU 6 and 7. These areas had previously been used for agriculture, but not as landfill, and they were not as disturbed as the older, western part of the site. The 1992 EIR's cultural resources analysis was based on a records search and on a field survey conducted in November, 1989. The records search revealed the presence of a prehistoric burial site previously located within the now-filled Unit 3, at a depth of 9 feet below the surface. This site was excavated by Anthropology Professor Martin Baumhoff of the University of California at Davis in 1981, who determined a date of 3,895 +/-800 years before present; the resources were thus considered to be early and very significant.

Although it was determined that the burials were part of a patterned cemetery deposit, the U.C. Davis Antrhoplogy Department did not have the time or personnel to commit to excavating the site. Dr. Baumhoff recommended that the landfill operators avoid the area of the burial site in their excavation of Unit 3. No legislation protecting Native American cemeteries was in effect in 1981; the law merely required that the coroner be called to determine whether the body was prehistoric or recent, and if the former, no other action was required. The landfill personnel elected to continue with the project by agreeing to notify the Yolo County coroner if further burials were located.

One historical artifact, a piece of construction or farm equipment apparently dating from World War II, was located in a field on the project property during the 1989 cultural resources survey. No historical sites were located on or immediately adjacent to the property. The survey also located a fragment of ground stone, which was located in a crack in the surface soil at the wood recycling facility, but because of previous disturbance of the area, it could not be determined where this piece came from originally; it was assumed to be prehistoric. The 1989 field survey revealed no additional prehistoric sites or artifacts.

The 1992 EIR used the CEQA guidelines to set significance criteria for impacts on cultural resources. The 1992 EIR found that excavation, grading, and construction activities associated with the project then being evaluated had the potential uncover, disturb, and damage additional ancient archeological sites at a depth of 6 feet or greater.

Mitigation measures included recording the isolated finds of the 1989 survey; monitoring of all subsurface work of 6 feet or greater in “the areas in line with the original find” by a professional archaeologist with authority to halt work in the areas of any subsequent cultural resource find until that resource can be properly assessed, and related mitigation measures; restricting future borrow cuts on the site to a maximum dept of 6 feet; and monitoring by a professional archeologist of construction of future landfill modules where excavation would be below 6 feet depth.

The EIR identified no cumulative impacts on cultural resources, and concluded that the mitigation measures specified in the document would reduce any impacts on cultural resources to a less-than-significant level.

REGULATORY SETTING

Federal Regulations (applicable only if federal permits, funding or approvals is required)

Antiquities Act of 1906, Title 16, United States Code, Sections 431, 432, and 433, and subsequent related legislation, policies, and enacting responsibilities allows for the protection of any historic or prehistoric ruin or monument, or any object of antiquity situated on lands owned or controlled by the Government of the United States.

National Historic Preservation Act (NHPA), Title 16, United States Code, Section 470, establishes a national policy to preserve for public use historic sites, buildings, and objects of national significance for the inspiration and benefit of the people of the United States.

Executive Order 11593, "Protection of the Cultural Environment," May 13, 1971, 36 Code of Federal Regulations, Section 8921 as incorporated into Title 16, United States Code**, **Section 470, orders the protection and enhancement of the cultural environment through providing leadership, establishing state offices of historic preservation, and developing criteria for assessing resource values.

National Environmental Policy Act (NEPA): Title 42 United States Code, Sections 4321-4327; requires federal agencies to consider potential environmental impacts of projects with federal involvement and requires application of appropriate mitigation measures.

American Indian Religious Freedom Act; Title 42 United States Code, Section 1996: protects Native American religious practices, ethnic heritage sites, and land uses.

Native American Graves Protection and Repatriation Act (1990); Title 25, United States Code Section 3001*, et seq*: defines "cultural items", "sacred objects", and "objects of cultural patrimony"; establishes an ownership hierarchy; provides for review; allows excavation of human remains, but stipulates return of the remains according to ownership; sets penalties; calls for inventories; and provides for return of specified cultural items. The Act applies only on Federal or Indian lands.

State Regulations

Title 14, Public Resources Code, Section 5020.1 defines several terms, including the following:

(f) "DPR Form 523" means the Department of Parks and Recreation Historic Resources Inventory Form.

(j) "Historical resource" includes, but is not limited to, any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.

(j) "Local register of historical resources" means a list of properties officially designated or recognized as historically significant by a local government pursuant to a local ordinance or resolution.

(l) "National Register of Historic Places" means the official federal list of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture as authorized by the National Historic Preservation Act of 1966 (Title 16 United States Code Section 470 et seq.).

(q) "Substantial adverse change" means demolition, destruction, relocation, or alteration such that the significance of an historical resource would be impaired.

Title 14, Public Resources Code, Section 5024.1 – establishes a California Register of Historic Places; sets forth criteria to determine significance; defines eligible properties; lists nomination procedures.

Title 14, Public Resources Code, Section 5097.5 – any unauthorized removal or destruction of archaeological, paleontological resources on sites located on public lands is a misdemeanor.

Title 14, Public Resources Code 5097.98 – prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn; sets penalties.

Title 14, Public Resources Code, Section 21083.2 – the lead agency determines whether a project may have a significant effect on unique archaeological resources; if so, an EIR shall address these resources. If a potential for damage to unique archaeological resources can be demonstrated, such resources must be avoided; if they can't be avoided, mitigation measures shall be required; discusses excavation as mitigation; discusses cost of mitigation for several types of projects; sets time frame for excavation; defines "unique and non-unique archaeological resources"; provides for mitigation of unexpected resources; sets limitation for this section.

Title 14, Public Resources Code, Section 21084.1 – indicates that a project may have a significant effect on the environment if it causes a substantial change in the significance of a historic resource; the section further describes what constitutes a historic resource and a significant historic resource.

Guidelines for the Implementation of the California Environmental Quality Act Section 15064.5 – specifically addresses effects on historic and prehistoric archaeological resources, in response to problems that have arisen in the application of CEQA to these resources.

Title 14, Penal Code, Section 622.5 – anyone who damages an item of archaeological or historic interest is guilty of a misdemeanor.

California Environmental Quality Act (CEQA): Public Resources Code Sections 5020.1, 5024.1, 21083.2, 21084.1, et seq. - requires analysis of potential environmental impacts of proposed projects and requires application of feasible mitigation measures.

California Environmental Quality Act (CEQA) Guidelines: California Code of Regulations, Sections 15000, et seq, Appendix G (j) – specifically defines a potentially significant environment effect as occurring when the proposed project will "…disrupt or adversely affect…an archeological site, except as part of a scientific study."

Public Resources Code, Section 5097.5 – any unauthorized removal of archaeological resources or sites located on public lands is a misdemeanor. As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority or public corporation, or any agency thereof.

3.11.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The California Environmental Quality Act (CEQA) guidelines require that the proposed project take into consideration the potential effect of the project on cultural resources. In order to evaluate the potential effect of the project on architectural and historic resources (over 45 years in age) or prehistoric archaeological resources, a record and literature search was conducted at the Northwest Information Center to establish the location of previously conducted cultural resource surveys and known resources within a 1/4 mile radius of all project components. This background record search also provided a basis from which to predict the archaeological potential of the area.

In accordance with CEQA regulations, if the area has not been previously surveyed, or if surveyed and/or documented inadequately, a qualified archaeologist must then conduct a survey of all project components as a means of identifying and assessing the potential impact of the project on known or predicted cultural resources. Site significance criteria are those contained in CEQA Section 15064.5 and 36 CFR 60.4. Literature on the history, prehistory, and ethnography of the area was also consulted as an aid in developing the archaeological potential of the area, and to prepare a setting section for use in evaluating the significance of known or predicted resources.

CEQA contains provisions relative to preservation of historic (and prehistoric) cultural sites. Section 15126.4 of CEQA directs public agencies to “avoid damaging effects” on an archeological resource whenever feasible. If avoidance is not feasible, the importance of the site shall be evaluated to determine impact and develop mitigation measures.

CEQA Section 15064.5 states: Generally, a resource shall be considered by the lead agency to be “historically significant” if the resource meets the criteria for listing on the California Register of Historical Resources (Pub. Res. Code SS5024.1, Title 14 CCR, Section 4852) including the following:

(A) Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage;

(B) Is associated with the lives of persons important in our past;

(C) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

(D) Has yielded, or may be likely to yield, information important in prehistory or history.

Archaeological site evaluation assesses the potential of each site to meet one or more of the criteria for “importance” based upon visual surface and subsurface evidence (if available) at each site location, information gathered during the literature and record searches, and the researcher’s knowledge of and familiarity with the historic or prehistoric context associated with each site.

Impact 3.11.1: Impacts to cultural resources may result either directly or indirectly during the pre-construction, construction, and operational phases of the project. (Significant)

Direct impacts are those which may result from the immediate disturbance of resources, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation or alteration of the setting of a resource. Indirect impacts are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resources due to improved visibility or access.

Exposure of cultural resources during pre-construction site preparation or during construction excavation can also have a beneficial effect by making the data accessible for research. If these resources and their temporal and spatial context receive proper protection and analysis, they can add to the understanding of human adaptation to the environment and their use of the land and its resources. Analysis of cultural resources also can provide a very important key to changes in population and human movement within and throughout a geographic region.

The potential for the project to impact sensitive cultural resources is directly related to the likelihood that such resources are present and whether they are actually encountered during project development and construction activities. Since project development and construction requires surface and subsurface disturbance of the ground, construction within the 20 foot wide by approximately 4 mile long utility/road alignment, as well as the approximately 20 acres of relatively undisturbed area that would be used for the composting facility, has the potential to adversely affect cultural resources. Since one significant prehistoric cultural resource site and two isolated artifacts have been recorded in the vicinity of the project site, there is a likelihood that cultural resources could be encountered during project-related site clearance and excavation. Without mitigation, impacts to important cultural resource sites would be a significant impact.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.11.1a: Although no cultural resources were observed during the focused pedestrian survey conducted on January 22, 2003, sites and objects may yet exist in the project area, but may be obscured by vegetation or buried by fill or natural sediments. If cultural resources are encountered during project implementation, construction (or project actions) shall, in accordance with CEQA Section 15064.5, be halted or diverted to allow an archaeologist an opportunity to assess the resource. Prehistoric archaeological site indicators include chipped chert and obsidian tools and tool manufacturing waste flakes, grinding implements such as mortars and pestles, and darkened soil that contains dietary debris such as bone fragments and shellfish remains. Historic site indicators include, but are not limited to, ceramics, glass, wood, bone, and metal remains.

Mitigation Measure 3.11.1b: Since prehistoric burials (as evidenced by site CA-YOL-171) and associated isolates have been recorded in the immediate vicinity of the project site, there is a likelihood that cultural resources may be encountered during project-related site clearance and excavation. The presence of a qualified archaeological monitor during construction would permit excavated soils to be examined for the presence of archaeological site components. A monitor shall therefore be present whenever subsurface construction excavation occurs within 100 meters (300 feet) of site CA-YOL-171, and on an intermittent basis (as determined by the archaeological Principal Investigator) during all other subsurface construction excavation associated with the project.

Mitigation Measure 3.11.1c: Section 7050.5(b) of the California Health and Safety code should be implemented in the event that human remains, or possible human remains are located. It states:

> In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27492 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of death, and the recommendations concerning treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code.

The County Coroner, upon recognizing the remains as being of Native American origin, is responsible for contacting the Native American Heritage Commission within 24 hours. The Commission has various powers and duties to provide for the ultimate disposition of any Native American remains, as does the assigned Most Likely Descendant. Sections 5097.98 and 5097.99 of the Public Resources Code also call for "…protection of inadvertent destruction". To achieve this goal, it is recommended that the construction personnel on the project be instructed as to the potential for discovery of cultural or human remains, and both the need for proper and timely reporting of such finds, and the consequences of failure thereof.

Mitigation Measures Identified in this Report

None required.

Level of Significance After Mitigation

The combination of Mitigation Measures 3.11.1a, 3.11.1b, and 3.11.1c will ensure that this impact is less than significant.

Impact 3.11.2: Excavation of the off-site borrow area could disturb previously unknown archeological resources or interred human remains. (Significant)

One of the siting criteria for the proposed off-site borrow area is that this facility would not be located in an area that contains prehistoric or historic cultural resources that would be disturbed by soil borrow activities, unless the disturbance of such resources could be mitigated effectively. An archeological survey and records search must therefore be performed prior to selection of a proposed site for the soil borrow area, to determine if such resources exist on site, and if so, what the appropriate mitigation measures would be. However, additional cultural resources could be unearthed and disturbed at the site once mining activities commence. This could potentially result in a significant impact.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure 3.11.2a: A cultural resources survey of the site selected for the soil borrow area, including a site survey and records search, will be conducted by a registered archeologist prior to commencement of soil borrow activities. Any potential disturbance of identified cultural resources on the site will be properly mitigated on-site or through proper recording and removal of the artifacts.

Mitigation Measures Identified in this Report

Mitigation Measure 3.11.2b: If cultural resources are encountered during project implementation, construction (or project actions) shall, in accordance with CEQA Section 15064.5, be halted or diverted to allow an archaeologist an opportunity to assess the resource.

Mitigation Measure 3.11.2c: Section 7050.5(b) of the California Health and Safety code should be implemented in the event that human remains, or possible human remains are located.

Level of Significance After Mitigation

The combination of Mitigation Measures 3.11.2a, 3.11.2b, and 3.11.2c will ensure that this impact is less than significant.

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CHAPTER 4

IMPACT OVERVIEW

4.1 GROWTH-INDUCING EFFECTS OF THE PROPOSED PROJECT

4.1.1 INTRODUCTION

The CEQA *Guidelines* (Section 15126.2[d]) require that an EIR evaluate the growth inducing impacts of a proposed action. A growth-inducing impact is defined by the CEQA *Guidelines* as:

> The way in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth…. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can have direct and/or indirect growth inducement potential. Direct growth inducement would result if a project, for example, involved construction of new housing. A project would have indirect growth inducement potential if it established substantial new permanent employment opportunities (e.g., commercial, industrial or governmental enterprises) or if it would involve a construction effort with substantial short-term employment opportunities that would indirectly stimulate the need for additional housing and services to support the new employment demand. Similarly, a project would indirectly induce growth if it would remove an obstacle to additional growth and development, such as removing a constraint on a public service that otherwise limits growth.

The CEQA *Guidelines* further explain that the environmental effects of induced growth may be indirect impacts of the proposed action. These indirect impacts or secondary effects of growth may result in significant, adverse environmental impacts. Potential secondary effects of growth include increased demand on other community and public services and infrastructure, increased traffic and noise, and adverse environmental impacts such as degradation of air and water quality, degradation or loss of plant and animal habitat, and conversion of agricultural and open space land to developed uses.

Growth inducement may constitute an adverse impact if the growth is not consistent with or accommodated by the land use plans and growth management plans and policies for the area affected, would exceed available services, or otherwise result in an identifiable secondary impact as discussed above. Local land use plans provide for land use development patterns and growth policies that allow for the orderly expansion of urban development supported by adequate urban public services, such as water supply, roadway infrastructure, sewer service and solid waste service. A project that would induce "disorderly" growth (conflict with the local land use plans) could indirectly cause additional adverse environmental impacts and other public services impacts. Thus, to assess whether a growth-inducing project will result in adverse secondary effects, it is important to assess the degree to which the growth accommodated by a project would or would not be consistent with applicable land use plans.

COMPONENTS OF GROWTH

The timing, magnitude, and location of land development and population growth in a community or region are based on various interrelated land use and economic variables. Key variables include regional economic trends, market demand for residential and non-residential uses, land availability and cost, the availability and quality of transportation facilities and public services, proximity to employment centers, the supply and cost of housing, and regulatory policies or conditions. Since the general plan of a community defines the location, type and intensity of growth, it is the primary means of regulating development and growth in California.

GROWTH-INDUCEMENT POTENTIAL

In 2002, 93 percent of the waste disposed at Yolo County landfills originated from within the County, and 87 percent of the waste originating in the County was disposed within the County. (CIWMB, 2004a) 93 percent of waste disposed within Yolo County was disposed at YCCL; the only other permitted, operating landfill in the County is the U.C. Davis Sanitary Landfill.(CIWMB, 2004b). According to the projections in the final SRREs prepared in February of 1993, county-wide permitted MSW disposal capacity is anticipated to run out in 2032 assuming full implementation of SRRE programs.

Because the existing permitted capacity of Yolo County Central Landfill is sufficient for the unincorporated areas of Yolo County for at least the next 15 years, expanding the Landfill's overall capacity and allowable rate of waste acceptance would not, at least in the next few years, induce growth by removing a barrier to development.

GROWTH EFFECTS OF THE PROJECT

The proposed project would have the effect of increasing the ultimate size of Yolo County Central Landfill. The project applicant, Yolo County Department of Planning and Public Works, plans to increase marginally staffing of the landfill if the project is approved; and anticipates that the project will not attract housing or commercial development to the vicinity of the site; on the contrary, few people choose to work or live in close proximity to an active sanitary landfill. Since there is sufficient landfill capacity throughout the region, and since the availability of landfill capacity is not frequently cited as a constraint to the development of new housing or commercial areas, the increase in total capacity cannot be seen as removing a significant constraint to regional development. Thus, the increase in total capacity of he landfill is not anticipated to induce additional growth in the region.

The proposed project would not involve additional expansion or extension of infrastructure facilities or roadways that could induce unplanned growth adjacent to the landfill.

4.2 CUMULATIVE IMPACTS

4.2.1 INTRODUCTION

"Cumulative impacts" refers to two or more individual effects that, when considered together, are considerable or compound other environmental impacts.[1] The CEQA *Guidelines* require that EIRs discuss the cumulative impacts of a project when the project's incremental effects are "cumulatively considerable," meaning that the project's incremental effects are considerable when viewed in connection with the effects of past, current, and probable future projects. The discussion of cumulative impacts must reflect the severity of the impacts and their likelihood of occurrence, but need not provide as much detail as the discussion provided for impacts of the project alone, and should be guided by the standards of practicality and reasonableness.[2]

In addition, the CEQA *Guidelines* identifies that the following three elements are necessary for an adequate cumulative analysis:[3]

- A list of past, present, and reasonably anticipated future projects producing related or cumulative impacts, including those projects outside the control of the agency (list approach), or a summary of projections contained in an adopted general plan or related planning document which is designed to evaluate regional or area-wide conditions. Any such planning document is to be referenced and made available to the public at a location specified by the Lead Agency (plan approach);[4]
- A summary of expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available; and
- A reasonable analysis of the cumulative impacts of the relevant projects. An EIR shall examine reasonable options for mitigating or avoiding any significant cumulative effects of a proposed project.

The cumulative analysis in this EIR uses both Yolo County General Plan projections and specific recent and proposed future developments in Yolo County.

YOLO COUNTYWIDE PLAN

The Yolo County General Plan, adopted in 1983, provides for the long-range direction and development of land within the County. The land surrounding Yolo County Central Landfill is

1 CEQA *Guidelines* §15355
2 CEQA *Guidelines* §15130(b)
3 Ibid.
4 A recent appeals court decision (*Communities For A Better Environment v. California Resources Agency,* Case No. C038844 [10/28/02]) held that in determining probable future projects, lead agencies should not limit consideration to only one category of projects enumerated in CEQA Guidelines Section 15130(b)(1)(B)2 (such as those projects requiring agency approval for which an application has been received; projects included in an adopted capital improvements program, general plan, regional transportation plan, or other similar plan; projects anticipated as a later phase of a previously approved project; or those public agency projects for which money has been budgeted).

utilized for either agricultural activities or wastewater treatment operations. The existing landfill site is zoned as “Agricultural General” (A-1) while the majority of the land around the site is zoned as “Agricultural Preserve” (A-P), with some parcels of land to the west of the landfill site zoned as agricultural general. There are no major changes in land use or planning, under the Yolo County General Plan or the zoning ordinance.

PROJECTS POTENTIALLY HAVING RELATED OR CUMULATIVE EFFECTS

Table 4-1 lists the projects that were considered in the evaluation of cumulative impacts. The sources for this list include information provided by the Yolo County Planning Department (Daly, 2003; Yolo County, 2003, Yolo County 2004) and the City of Davis Waste Water Treatment Plant (Beatty, 2003). The only project that is considered to have the potential to combine with the project to create cumulative effects is the Covell Village Project, which is in the early planning stage.

TABLE 4-1
DEVELOPMENT PROJECTS IN THE
VICINITY OF YOLO COUNTY CENTRAL LANDFILL

Project Name	Planning Jurisdiction	Location/Project Characteristics	Status
Covell Village	Yolo County and City of Davis	Proposed residential and commercial development on 413 acres located north of Covell Boulevard and east of County Road 102. Would include 1,426 dwelling units and 200,000 square feet of commercial space.	NOP for EIR issued 6/17/04. If EIR certified by Davis City Council project still subject to vote in citywide election in accordance with Measure J. Will also require annexation.
Willow Slough Bypass levee upgrade		Water reclamation. Dept of Water resources. 916-375-6006	Completed in 2002
Yolo County Central Landfill Expansion	Yolo County Department of Public Works	Expansion of operations in new disposal areas and the introduction of various operations including an enhanced methane generation demonstration project.	Approved in 1992
Davis WWTP Plant Expansion	City of Davis	Expansion included building a digester and modifying the oxidation pond in order to convert it into an aeration pond. Also, converted 400 acres of land into wetlands.	Approved in 1997
Davis WWTP Overland flow project	City of Davis	Added 180 acres to the WWTP site. The project also included the construction of a secondary treatment plant.	Completed in early 1980s

ON-SITE PROJECTS POTENTIALLY HAVING CUMULATIVE EFFECTS

In addition to off-site projects, previously permitted projects at Yolo County Central Landfill that could contribute to cumulative impacts include the landfill expansion project evaluated in the 1992 EIR.

4.2.2 IMPACT DISCUSSION: CUMULATIVE IMPACTS

Possible cumulative impacts that may result from approval of the project, combined with the development of other approved or reasonably foreseeable projects in the area include the following:

AESTHETICS

Impact CU-1: The project would contribute to the cumulative degradation of the visual character of the surrounding area. (Significant)

As discussed in Section 3.1 of Chapter 3, the impacts of the proposed landfill height increase of 60 feet and the accompanying increased slope and mass of the landfill itself would have a significant project impact on the visual character of the area. The original permitted height of the landfill was 80 feet. The original permitted height in conjunction with the 60 feet increase may be considered a significant and unavoidable cumulative impact on the aesthetics of the area. In addition, if the Covell Village project is approved, more residents will live in the viewshed of the landfill, which would tend to exacerbate this impact.

AIR QUALITY

Impact 3.2.7 in Section 3.2 (Air Quality) states that the project does not meet the primary test for cumulative air quality impacts specified by the Yolo-Solano Air Quality Management District, because it does not require a General Plan Amendment or rezoning. Therefore, the project would not result in a significant cumulative air quality impact.

LAND USE AND PLANNING

The project is not expected to have significant impacts on land use that cannot be mitigated and therefore avoided. The mitigation measures identified in Section 3.6, in Chapter 3, will ensure that the project does not have a considerable contribution to regional impacts on land use. Also, there are no major changes in land use or planning, under the Yolo County General Plan or the zoning ordinance. However, it should be noted that the siting of an off-site soil borrow area may require re-zoning of a parcel of land if the County can not identify a parcel of land that adheres to the restrictions put forth in the land use and planning mitigation measures, and could result in the loss of agricultural land. The Covell Village project would also result in the loss of agricultural land, and could therefore potentially result in a significant cumulative impact. However, it is anticipated that such an impact would be evaluated in the EIR for the Covell Village project and in the site-specific review of the off-site borrow area.

BIOLOGICAL RESOURCES

The project is not expected to have any significant impacts on biological resources that cannot be mitigated and therefore avoided. Any loss of wildlife habitats will be replaced and therefore there would be no net loss of habitat. The mitigation measures identified in Section 3.3, in Chapter 3, will ensure that the project does not have a considerable contribution to regional impacts on biological resources.

GEOLOGY, SOILS AND SEISMICITY

Potential project impacts related to geology, soils, seismicity, and groundwater are site-specific and would not combine with related impacts of other projects to create cumulatively considerable impacts.

HYDROLOGY AND WATER QUALITY

With implementation of the measures identified in section 3.5, Chapter 3, to mitigate project impacts, the potential project impacts related to surface water hydrology and water quality would be site-specific and would not combine with related impacts of other projects to create cumulatively considerable impacts.

NOISE

There are many different aspects of the proposed project at YCCL that would have noise impacts. However, the buffer area to the surrounding receptors would minimize potential noise impacts from construction and operations at the new facilities. In addition, mitigation measures identified in Section 3.7, Chapter 3, have been recommended to reduce the potential noise impacts. There are no other major noise sources in the vicinity of YCCL and therefore the project would not contribute to a cumulative ambient noise impact.

PUBLIC HEALTH AND SAFETY

The project is not expected to have any significant public health and safety impacts that cannot be mitigated and therefore avoided. The mitigation measures identified in Section 3.8, in Chapter 3, will ensure that the project does not have a considerable contribution to regional public health and safety impacts, if such exist.

PUBLIC SERVICES AND UTILITIES

Implementation of the mitigation measure identified in Section 3.9, in Chapter 3, should reduce the risk of fire and thus the potential need for fire protection services to a less-than-significant level. There are no other major developments in the vicinity of YCCL that require additional public services and utilities and therefore the proposed project does not contribute to a cumulative impact on public services and utilities.

TRANSPORTATION AND TRAFFIC

The project is not expected to have any significant impacts on traffic that cannot be mitigated and therefore avoided. The mitigation measures identified in Section 3.10, in Chapter 3, will ensure that the project does not have a considerable contribution to regional impacts on traffic and transportation.

CULTURAL RESOURCES

The project is not expected to have any significant impacts on cultural resources that cannot be mitigated and therefore avoided. The mitigation measures identified in Section 3.11, in Chapter 3, will ensure that the project does not have a considerable contribution to regional impacts on cultural resources.

ENERGY AND MINERAL RESOURCES

The project will not increase the County's or the state's overall energy demand. On the contrary, the project would generate considerable amounts of electricity. The project would not affect mineral resources. Therefore, the proposed project does not contribute to a cumulative impact on energy and mineral resources.

POPULATION AND HOUSING

The project will not result in displacement of existing housing, induce population growth, or create new employment. Therefore, the project does not contribute to a cumulative impact on population and housing.

RECREATION

The project would only affect recreation areas if the County sites the off-site soil borrow area in an area close to recreational uses. There are no other major developments in the vicinity of YCCL that have resulted in recreational impacts. Therefore, the proposed project does not contribute to a cumulative recreational impact.

4.3 UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

The following effects of the project have been found to be significant and unavoidable:

Aesthetic Impacts (Section 3.1)

Impact 3.1.2: Vantage point 1, view from Wildhorse Golf Course, on the Outskirts of the City of Davis, approximately 2 miles southwest of the southern edge of the Landfill site, looking northeast.

Impact 3.1.3: Vantage Point 4, View from Road 103, 1 mile west of the western edge of the landfill site, looking east.

Impact 3.1.5: Vantage Point 6, view from Road 104A, about 1 mile south of the southern boundary of the landfill site, looking North.

Air Quality Impacts (Section 3.2)

Impact 3.2.4: The project could increase the annual emissions of criteria air pollutants and would extend the years of landfilling and composting at the site until the year 2100.

Impact 3.2.5: The project would increase the amount of ROG and PM-10 emissions from expanded composting activities.

Impact 3.2.6: Emissions of toxic air contaminants could pose a risk to human health.

Cumulative Impacts (Chapter 4)

Impact CU-1: The project would contribute to the cumulative degradation of the visual character of the surrounding area.

4.4 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

The aesthetic impacts of the proposed project may be considered significant irreversible environmental changes. It is unlikely that, at some future date, the pre-project visual character of the area will be restored. Most of the air quality impacts – those related to traffic volume and landfill operations – would cease when or soon after landfill operations would cease; others, especially those related to fugitive landfill gas emissions, would decrease over time. None of the other impacts of the project are expected to result in irreversible environmental changes.

4.5 EFFECTS FOUND NOT TO BE SIGNIFICANT

The following issue areas were determined not to have the potential for significant adverse effects and were therefore not discussed in detail in the impact analysis of this EIR, for the following reasons:

4.5.1 POPULATION AND HOUSING

The project will not result in displacement of existing housing. The project will not induce population growth or create new employment.

4.5.2 RECREATION

There is no recreational use of the site, nor any proposed recreational use of the site. Provided the off-site soil borrow area is not located in an area that is close to recreational uses, the project will not affect recreational areas.

REFERENCES – Impact Overview

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Yolo County, Yolo County Zoning Regulations, Title 8, Chapter 2 Zoning, March, 2003.

Yolo County Planning and Public Works Department, Letter to the City of Davis Regarding the Notice of Preparation for the Covell Village Project, July 20, 2004.

CHAPTER 5

ALTERNATIVES TO THE PROJECT

The California Environmental Quality Act (CEQA) requires an evaluation of the comparative effects of alternatives to a project that would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project (CEQA *Guidelines* Section 15126.6(a)). The EIR is to consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation. The nature and scope of the alternatives to be discussed is governed by the “rule of reason.” The discussion of alternatives is to focus on alternatives to the project or its location that are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede, to some degree, the attainment of the project objectives, or would be more costly (*Guidelines* Section 15126.6[b]).

The range of potential alternatives shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the project’s effects. The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency’s determination (*Guidelines* Section 15126.6(c)). The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. (*Guidelines* Section 15126.6(d)). Evaluation of a No Project alternative is required, to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project. The “No Project” analysis shall discuss existing conditions at the time the environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved (*Guidelines* Section 15126.6(e)).

This EIR considers four alternatives, which were selected because of their feasibility, their ability to meet most of the basic objectives of the project, and because they provide a reasonable range of alternatives to the project. The four alternatives are:

1. No Project Alternative
2. Reduced Height Alternative
3. Off-Site Alternative
4. Mitigated Alternative

These four alternatives are described below. Each alternative’s potential environmental impacts and ability to meet basic project objectives are compared with the proposed project.

5.1 ALTERNATIVES CONSIDERED BUT REJECTED

In addition to the four alternatives selected for this analysis, the County considered several other possible alternatives. Upon consideration, however, these alternatives were rejected because of one of three reasons: the alternative failed to meet most of the basic project objectives; the alternative was found to be infeasible; or the alternative did not have the ability to avoid the significant environmental impacts identified for the project. These rejected alternatives are discussed briefly, along with the specific reason for their rejection.

5.1.1 REJECTED ALTERNATIVE 1: DEVELOPMENT OF THE REMAINING WASTE MANAGEMENT UNITS USING TRADITIONAL LANDFILLING METHODS

The development of the remaining waste management units using the conventional dry landfilling method was rejected from further consideration because it did not meet the project objectives of extending the life of the existing site and operating more economically. The traditional dry landfilling method does not increase the density of the waste mass, and thus, the alternative does not extend the life of the existing site. The relatively low density of the waste mass also does not make the best use of the landfill liner and therefore is not the most economical alternative.

5.1.2 REJECTED ALTERNATIVE 2: LATERAL EXPANSION

A lateral expansion would have involved the expansion of landfill operations on land adjacent to the current landfill site. This alternative was rejected from further consideration because it did not meet the project objective of operating more economically. In addition, the alternative would have caused other equally or more severe impacts, such as conflicts with existing land use policies. The continued landfill operation on the existing site is the most cost effective and does not pose potential land use, logistical, or zoning conflicts.

5.1.3 REJECTED ALTERNATIVE 3: BALING WASTE ALTERNATIVE

This option involves the baling of waste prior to disposal to increase compaction and thus extend landfill site life by conserving landfill spaced. The baling waste alternative was rejected because it did not meet the project objectives of extending the life of the existing site and operating more economically. Information gathered for the evaluation of this alternative on waste densities achieved through baling indicated that the densities of baled waste were not substantially higher than waste densities measured at YCCL’s conventional dry landfill, and therefore would not make better use of the landfill liner or extend the life of the site.

5.2 ALTERNATIVES CONSIDERED IN THE EIR

5.2.1 NO PROJECT ALTERNATIVE

ALTERNATIVE DESCRIPTION

The No Project alternative analysis is based on the assumption that the Yolo County Central Landfill would continue to operate under the terms of its existing permits. The existing Solid Waste Facility Permit allows acceptance of up to 1,800 tons per day of waste, seven days per week. The YCCL consists of several discrete areas permitted for waste disposal operations. These include six Class III landfills areas for disposal of municipal solid waste; four Class II surface impoundments for holding liquid wastes; and a bioreactor demonstration project. An additional Class III landfill area has been approved for future construction. The six existing landfill areas are designated Waste Management Units (WMUs) 1 through 6. Of these, WMUs 1, 2, 4 and 5 have been inactive since 1992. In 2002, WMU 3 began receiving additional waste to bring the unit to final grade for closure. Under the U.S. EPA's Project XL program, Yolo County has been permitted to construct and operate full-scale bioreactor cells at YCCL. This allows the County to add liquid only to landfilled waste within Module D of Waste Management Unit 6 where the full-scale bioreactor cells have been constructed, but not to any other areas of the landfill.

The following elements from the proposed project would be eliminated under the No Project alternative: increasing the landfill's final elevation, landfill mining operations, construction and operation of a material recovery facility, expansion of the composting facility, expansion of salvaging operations, conversion of the existing temporary household hazardous waste collection facility to permanent status, purchase of additional land for the development of a soil borrow area, and expansion of landfill gas management and utilization options.

ENVIRONMENTAL IMPACTS

Aesthetics

The No Project alternative would have a less severe aesthetic impact than the project since the project calls for a height increase of 60 feet. This height increase would result in significant and unavoidable impacts to views and the character of the land.

Air Quality

The project would potentially result in significant impacts on air quality. Even after the implementation of the identified mitigation measures, the project would result in more severe air quality impacts than the No Project alternative, due to the mining and transport of soil from the soil borrow area, and increased site operations and extended duration of operations at the landfill site.

Biological Resources

The project would result in more severe biological impacts than the No Project alternative, in the form of regional losses of important foraging habitats and threats to wildlife by project construction activities. The siting criteria that would be used for locating the proposed off-site soil borrow area (identified in the Project Description), which includes the criterion that no potential special-status species habitat would be affected unless appropriately mitigated, and other criteria pertaining to potential species impacts, would reduce project impacts to a less-than-significant level. However, the development of a soil borrow area could result in impacts on habitat, including foraging habitat, that the No Project alternative would entirely avoid. Therefore, the project would, to a limited extent, result in a more severe impact on biological resources than the No Project alternative.

Cultural Resources

The siting criteria that would be used to locate the off-site soil borrow area (see Chapter 2, Project Description) would reduce potential project impacts on cultural resources to a less-than-significant level. Therefore, the potential impacts of the project and the No Project alternative on cultural resources would be approximately the same.

Energy and Mineral Resources

Neither the project nor the No Project alternative is expected to have significant impacts on energy resources. However, the No Project alternative would not have the same beneficial impact as the project on the increased generation of electricity from landfill gas. The siting criteria that would be used to locate the off-site soil borrow area would ensure that the project would not adversely impact identified mineral resource areas. Therefore the project and No Project alternative would have similar less-than-significant impacts on mineral resources.

Geology

Potential geologic impacts of the project are greater than the No Project alternative. These impacts include potential slope seismic and static instability and effects on settlement and differential settlement due to higher slopes and greater landfill mass. However, the geologic impacts of the project can be mitigated to a less-than-significant level. The groundwater impacts of the project are less severe than the No Project alternative. The landfill mining operations would potentially eliminate the leaching of contaminants into the ground water. Therefore, the project and No Project alternative result in comparable levels of geologic impact, while the project has a less severe impact on groundwater than the No Project alternative.

Hydrology and Water Quality

Potential hydrology and water quality impacts of the project are greater than the No Project alternative. However, all hydrology and water quality impacts of the project can be mitigated to a less-than-significant level. Therefore, the severity of hydrology and water quality impacts for the project and the No Project alternative are about the same.

Land Use and Planning

The project would potentially include siting a soil borrow area on a parcel designated and zoned for agricultural use. Therefore, the No Project alternative would potentially have a lesser impact on land use and planning.

Noise

Siting criteria that would be used to locate the off-site soil borrow areas would ensure that sensitive receptors would not be adversely impacted by quarry activities at the site. In addition, mitigation measures identified in this EIR would reduce traffic noise impacts generated by trucks traveling to and from the soil borrow area and YCCL, and potential noise impacts of project operations at the YCCL site, to less-than-significant level. Therefore, the noise impacts associated with the project and the No Project alternative are about the same.

Public Health and Safety

All the significant public health and safety impacts of the project can be reduced to a less-than-significant level through the implementation of the identified mitigation measures. Therefore, the severity of public health and safety impacts for the project and No Project alternative are comparable.

Public Services and Utilities

The potential increase in demand for fire protection services associated with bioreactor technology, landfill height increase, composting operations, and landfill mining operations under the project would be greater than under the No Project alternative. However, these project impacts can be reduced to less-than-significant levels, with the identified mitigation measures. Therefore, the severity of public services and utilities impacts for the project and the No project alternative would be comparable.

Recreation

The siting criteria that would be used to locate the off-site soil borrow area would ensure that the project would not adversely impact recreational land uses. Therefore, the project and No Project alternative would have comparable, less-than-significant impacts on recreation.

Transportation and Traffic

Although the project may potentially result in some additional traffic from the transport of soil from the soil borrow area, the traffic impact can be reduced to a less-than-significant level through the implementation of the mitigation measures identified. Therefore, the project and No Project alternative would have a comparable less-than-significant impact on transportation and traffic.

Population and Housing

There are no population and housing impacts of the project, or of this alternative.

ABILITY OF THE ALTERNATIVE TO MEET PROJECT OBJECTIVES

The No Project alternative does not meet the project objectives; it fails to meet objective one, to decrease the impacts of landfill development and increase environmental benefits, because it does not include development of future landfill cells as bioreactors, which would accelerate decomposition and waste stabilization and allow more efficient capture of landfill gas for use as an energy source, among other attributes, and does not include landfill mining of the older unlined units. This alternative also does not meet objective two, to increase the ability to divert waste from the landfill and maintain the state-mandated diversion goal, because it does not provide any additional ways to increase diversion. It does not meet objectives three because it does not increase the effective use of the costly landfill liner, either by increasing effective landfill capacity by developing future landfill cells as bioreactors or by increasing the landfill height. It does not meet objective four, to extend site life, both because it does not increase the County's ability to divert materials from disposal and does not increase landfill capacity. See Table 5-1.

5.2.2 REDUCED HEIGHT ALTERNATIVE

ALTERNATIVE DESCRIPTION

The Reduced Height alternative will include all elements of the project, except the proposed height increase would be reduced to 110 feet. The elements include: development of future landfill modules as bioreactors, landfill mining operations, construction and operation of a material recovery facility, expansion of the a composting facility, expanded salvaging operations, conversion of the existing temporary household hazardous waste collection facility to permanent status, purchase of additional land for the development of a soil borrow area, and expansion of landfill gas management and utilization options.

ENVIRONMENTAL IMPACTS

Aesthetics

Simulations of the Reduced Height alternative are shown in Figures 5-1, 5-2, and 5-3. These figures may be compared to the simulations of the currently approved final landfill grades and the final grades proposed under the project that appear in Section 3.1 (Aesthetics). Figures 5-1, 5-2, and 5-3 indicate that constructing the landfill to a maximum height of 110 feet, instead of 140 feet, would substantially reduce the bulk of the finished landfill and its dominance of the landscape. Nevertheless, the reduced height increase would still obstruct views and alter the character of the area. Therefore, this alternative would have lesser, aesthetic impacts than the project, but these impacts would remain significant.

Air Quality

The Reduced Height alternative would have a less severe impact than would the project on air quality. The project's proposed landfill height increase would have significant air quality impacts due to emissions of criteria air pollutants and toxic air contaminants (TACs) for many decades

SOURCE: Environmental Science Associates

Figure 5-1
Simulated View from Vantage Point 1:
Reduced Height Alternative Final Contours

SOURCE: Environmental Science Associates

Figure 5-2
Simulated View from Vantage Point 4:
Reduced Height Alternative Final Contours

SOURCE: Environmental Science Associates

Figure 5-3
Simulated View from Vantage Point 6:
Reduced Height Alternative Final Contours

TABLE 5-1
ABILITY OF ALTERNATIVES TO SATISFY PROJECT OBJECTIVES

Project Objective	No Project Alternative	Reduced Height Alternative	Off-Site Alternative	Mitigated Alternative	Project
1. Decrease the environmental impacts of landfill development, operations, and final closure, and increase the environmental benefits that can be derived from certain aspects of landfill operations:	No	Yes. The benefits of bioreactor operation in terms of capture and reuse of landfill gas would not extend as far into the future as the project. This alternative would be superior to the project in terms of future adverse air quality impacts, since this alternative has a shorter site life.	No. Environmental benefits of developing bioreactor cells and diversion operations would likely be offset by adverse impacts of developing a new landfill on currently undeveloped or agricultural land in the region.	Yes. Bioreactor cells increase the ability to capture landfill gas emissions and utilize landfill gas for energy, and landfill mining decreases impacts of unlined units on groundwater. Not increasing the landfill height eliminates the aesthetic impact of the project, and reduces long term air quality impacts.	Yes, although as indicated in the EIR analysis, there are several significant unavoidable impacts associated with the project.
2. Increase the County's ability to divert waste from the landfill, and maintain state-mandated diversion goals.	No	Yes	Yes	Yes	Yes
3. Increase efficiency, operate more economically.	No	Yes, but less then project. Bioreactor cells extend life of liner and additional height also extends life of the liner.	No	Yes, but less than project. Bioreactor cells extend life of liner, but no height increase eliminates cost savings associated with this aspect of the project	Yes
4. Extend landfill site life.	No	Yes, but less than project. Bioreactor cells and landfill mining extend life of site.	No	Yes, but less than project and less than reduced height alternative: Bioreactor cells and landfill mining extend life of site.	Yes

SOURCE: Environmental Science Associates beyond currently permitted levels of operation. Because the Reduced Height alternative would not extend the landfill site life as far into the future, the adverse future impacts of YCCL on air quality in the air basin would be reduced. The Reduced Height alternative and project would have the same impacts resulting from ROG emissions from the expanded composting facility. Criteria for developing the soil borrow area to minimize air quality impacts would apply to both alternatives and both alternatives would include a methane gas recovery system to capture much of the landfill gases. The severity of the air quality impacts for the project and Reduced Height alternative should be the same. In summary, although some air quality impacts of the two project would be similar, the Reduced Height alternative would have less severe future air quality impacts than the project as a result of emissions of criteria air pollutants and TACs.

Biological Resources

The Reduced Height alternative would have the same significant impacts on biological resources as the project since the both alternatives contain the same elements that affect biological resources. Mitigation measures to reduce impacts to biological resources also would apply so that both alternatives, reducing impacts to similar, less-than-significant levels.

Cultural Resources

Both the project and the Reduced Height alternative include an off-site soil borrow area. However, siting criteria identified in the Project Description, which would be used to locate the soil borrow under the project also would be used for this project alternative. Therefore, the less-than-significant impacts on cultural resources for this alternative and the project would be about the same.

Energy and Mineral Resources

Neither the project nor the Reduced Height alternative is expected to have significant adverse impacts on energy resources. Siting criteria to be used in locating the soil borrow area under the project would ensure that no identified mineral resource areas are adversely impacted. These criteria also would be used for this project alternative. Because this alternative would not extend site life as par into the future as would the project, it would result in less generation and recovery of landfill gas. However, both alternatives would use bioreactor technology to enhance landfill gas recovery. Therefore, both this alternative and the project would have similar, less-than-significant impacts on energy and mineral resources.

Geology

Potential geologic impacts of the project are greater than the Reduced Height alternative. The geologic impacts of the project include stability and settlement issues due to the increase in landfill mass from the proposed height increase. The potential severity of stability and settlement impacts would be somewhat reduced with the reduced height alternative. However, all geologic impacts of the project can be mitigated to a less-than-significant level. The groundwater impacts of the project are the same as the Reduced Height alternative since both alternatives include landfill mining, which would potentially eliminate the leaching of contaminants into the ground water. Therefore, the project and Reduced Height alternative result in comparable levels of geologic and groundwater impacts.

Hydrology and Water Quality

The impact on hydrology and water quality for the Reduced Height alternative would be slightly less severe than the project since the reduced surface area of the Reduced Height alternative, as compared to the project, generates less runoff. Precipitation and drainage controls required by state regulations and the mitigation measures identified in this EIR also would apply to this alternative, and in either case would reduce these impacts to a less-than-significant level. Therefore, the project and Reduced Height alternative would result in the same less-than-significant impact on hydrology and water quality.

Land Use and Planning

Both the Reduced Height alternative and the project include development of an off-site borrow area, potentially on land zoned and designated for agricultural use. Therefore, the project and Reduced Height alternative would potentially result in the same land use and planning impact.

Noise

There are similar noise impacts from the project and Reduced Height alternative, including noise from traffic going to and from the soil borrow area and the soil mining operation in the new soil borrow area. These impacts can be reduced to a less-than-significant level through the implementation of the mitigation measures identified in the EIR. Consequently, the project and Reduced Height alternative result in the same less-than-significant noise impacts.

Public Health and Safety

All the significant public health and safety impacts of the project and Reduced Height alternative can be reduced to a less-than-significant level through the implementation of the identified mitigation measures. Therefore, the public health and safety impacts for the project and Mitigated alternative are comparable.

Public Services and Utilities

The project poses a slightly greater risk of fire and thus additional fire protection services than the Reduced Height alternative due to the additional surface area associated with the landfill height increase. However, the public service impacts of both the project and Reduced Height alternative can be reduced to a less-than-significant level through the implementation of the mitigation measures identified. Therefore, the severity of the public service and utilities impacts for the project and Reduced Height alternative are comparable.

Recreation

The siting criteria that would be used to locate the off-site soil borrow area would ensure that the project would not adversely impact recreational land uses. These criteria also would apply to implementation of the Reduced Height alternative. Therefore, the Reduced Height alternative and the project have the comparable, less-than-significant impacts on recreation.

Transportation and Traffic

The transportation and traffic impacts from the project and Reduced Height alternative are about the same since both alternatives include the transport of soil from the soil borrow area. Siting criteria used to locate the soil borrow area and mitigation measures identified in the EIR would apply to this alternative as well, and would reduce these potential impacts to a less-than-significant level. Therefore, the project and Reduced Height alternative result in the same less-than-significant impact on transportation and traffic.

Population and Housing

There are no population and housing impacts of the project, or of this alternative.

ABILITY OF THE ALTERNATIVE TO MEET PROJECT OBJECTIVES

The Reduced Height alternative would better meet the County's first objective than would the project because the aesthetic impacts and future air quality impacts associated with the project would be reduced. The ability of this alternative to meet the second objective would be the same as the project's. This alternative also would meet the County's third and fourth objectives, to operate more economically and extend site life, although it not as much as would the project. See Table 5-1.

5.2.3 OFF-SITE ALTERNATIVE

ALTERNATIVE DESCRIPTION

The Off-Site alternative generally evaluates the environmental impacts of another, unidentified landfill site meeting minimum siting criteria identified in the Yolo County Siting Element, a part of the Yolo County Countywide Integrated Waste Management Plan (Yolo County, 1995a) and in California Code of Regulations, Title 27, Section 20240 et seq. The analysis assumes that such a site would be located in an agricultural area that does not have prime agricultural soil. The analysis generally describes the types of environmental impacts that could be expected from developing and operating a landfill at such a site, and compares them to the project's impacts.

ENVIRONMENTAL IMPACTS

Aesthetics

It is likely that development of a new landfill in an area currently zoned for agriculture would result in significant and unavoidable impacts to views and the character of the land.

Air Quality

Because the new site would be required to comply with landfill gas emissions controls, it is likely that the regional air quality impacts of the Off-Site alternative would be about the same as with the proposed project. However, the Off-Site alternative could result in greater regional impacts if the haul distances from the major waste sources (cities) are greater, and in localized air quality impacts, for example along local roads leading to the landfill. In addition, depending on the proximity of nearby sensitive receptors, the Off-Site alternative could result in more severe odor impacts, and nearby sensitive receptors potentially could be impacted by fugitive emissions of toxic air contaminants. Depending on the proximity of sensitive receptors, the severity of impacts from toxic air contaminants would need to be evaluated based on site-specific conditions using a health risk assessment. The Off-Site alternative would involve a comparable operation in terms of waste intake, processing and landfilling and composting, and therefore would have similar adverse air quality impacts from the emission of criteria air pollutants and toxic air emissions.

Biological Resources

It is likely that development of a new landfill in an area zoned for agriculture would result in significant impacts to biological resources, and that these impacts would be more severe than those associated with the proposed project.

Cultural Resources

Development of a new landfill on relatively undisturbed ground or in an area formerly used for agriculture could result in disturbance or destruction of cultural or historic resources.

Energy and Mineral Resources

If mineral resources existed at the site of the new landfill, these could be impacted by development of the landfill.

Geology

The site for a new landfill would have to comply with the siting criteria for new landfills contained in CCR Title 27, including a location that is outside the 100-year flood plain, having a minimum 5-foot separation between the base of the landfill and underlying groundwater, and that the landfill would be required to meet comparable engineering requirements for seismic and static stability. In addition, the new site would have to be fully lined, in accordance with current regulations for development of landfills. Therefore, the new landfill would have comparable impacts to those of the proposed project.

Hydrology and Water Quality

A new landfill would be required to comply with all applicable state and federal regulations regarding control, collection, and treatment of leachate, contact-water, and non-contact water. However, development of a new landfill would likely alter the hydrology of the site, and could result in a significant impact.

Land Use and Planning

The Off-Site alternative would involve development of a new landfill on land currently zoned for agriculture. The land use and planning impact associated with the Off-site alternative is greater than the project since siting a new landfill area would conflict with the policies set forth in the Yolo County General Plan.

Noise

Any nearby sensitive receptors to the new landfill site or along the haul road to the landfill would likely be significantly and adversely impacted by the development of this alternative.

Public Health and Safety

Hazardous materials and worker safety issues would be about same at a new, off-site landfill as with the proposed project.

Public Services and Utilities

The development of a new landfill at an off-site location could require provision of public services and utilities to an area not currently served with such, and could result in a significant increase in demand on such services locally. This could result in a significant impact.

Recreation

Development of a new landfill in a relatively undeveloped rural area would change the character of the area, and could negatively impact nearby recreational uses, if such exist.

Transportation and Traffic

It is likely that the regional traffic impacts of the Off-Site alternative would be about the same as with the proposed project. However, the Off-Site alternative could result in localized traffic impacts, for example along local roads and intersections leading to the landfill.

Population and Housing

Development of a new landfill in a sparsely populated, agricultural part of the County would not be likely to have impacts on population and housing.

ABILITY OF THE ALTERNATIVE TO MEET PROJECT OBJECTIVES

The Off-Site alternative only meets the applicant's second objective, to increase the ability to divert waste from landfill and maintain state-mandated diversion goals. This alternative does not meet the other three objectives. Please refer to Table 5.1.

5.2.4 MITIGATED ALTERNATIVE

ALTERNATIVE DESCRIPTION

The Mitigated alternative includes all mitigation measures included as part of the proposed project, all of the mitigation measures identified in the EIR, and eliminates the aspect of the project that has the greatest potential to harm the environment, namely the increase in the landfill height from 80 to 140 feet. Elimination of this project component would eliminate the adverse aesthetic impact of the proposed height increase, and reduce the air quality impacts projected for the extended years of landfill operation, while allowing the County considerable flexibility through development of other components of the project including development of future modules as bioreactors, and in the management of municipal solid waste receipts and diversion of reusable, recyclable, and compostable materials.

ENVIRONMENTAL IMPACTS

Aesthetics

The Mitigated alternative would not result in an aesthetic impact, as would the project, since the project calls for a height increase.

Air Quality

Both the project and Mitigated alternative would have a significant impact on air quality. However, because the Mitigated alternative does not include a height increase, air quality impacts would not occur as far into the future as would project impacts.

Biological Resources

The project and Mitigated alternative have similar, less-than-significant, impacts on biological resources.

Cultural Resources

The project and Mitigated alternative have similar, less-than-significant, impacts on cultural resources.

Energy and Mineral Resources

Neither the project nor the Mitigated alternative is expected to have a significant adverse impact on energy or mineral resources.

Geology

Potential geologic impacts of the project are greater than the Mitigated alternative. These impacts include higher slopes and greater landfill mass. It is expected, however, that the mitigation measures specified in this document would reduce these impacts to less-than-significant for the project. The groundwater impacts of the project would be the same as those of the Mitigated alternative since the landfill mining operations would potentially eliminate the leaching of contaminants into the ground water. Therefore, the project and Mitigated alternative would result in comparable groundwater impacts.

Hydrology and Water Quality

The proposed landfill height increase under the project has the potential to result in increased generation of surface water runoff, which, if improperly managed, could cause erosion and contribute to adverse water quality impacts in downstream receiving waters. However, compliance with federal and state precipitation and drainage control requirements, in the engineering design and construction of the extended landfill, would address this potential impact. Therefore, the project and Mitigated alternative have similar, less-than-significant, impacts on hydrology and water quality.

Land Use and Planning

The project and Mitigated alternative would result in similar, less-than-significant impacts on land use and planning, with the possible exception of the siting of an off-site borrow area, which would have a similar impact under this alternative and the project.

Noise

The project and Mitigated alternative both have the potential of creating significant noise impacts from the traffic going to and from the soil borrow area and the soil mining operation in the new soil borrow area. The implementation of the mitigation measures identified should reduce these impacts to a less-than-significant level. Therefore, the project has a comparable level of noise impacts as the Mitigated alternative.

Public Health and Safety

All the significant public health and safety impacts of the project and Mitigated alternative can be reduced to a less-than-significant level through the implementation of the identified mitigation measures. Therefore, the severity of public health and safety impacts for the project and Mitigated alternative are comparable.

Public Services and Utilities

Both the project and Mitigated alternative may potentially increase the need for fire protection services. However, the impact on fire protection services can be mitigated to a less-than-significant level through the implementation of the identified mitigation measures. Therefore, the project and Mitigated alternative would result in less-than-significant impacts that are about the same.

Recreation

Neither the project nor the Mitigated alternative would have an impact on recreational resources.

Transportation and Traffic

The project may potentially result in more traffic from the transport of more soil from the soil borrow area, but the traffic impact can be reduced to a less-than-significant level through the implementation of the mitigation measures identified. Therefore, the project results in a comparable less-than-significant impact on transportation and traffic as the Mitigated alternative.

Population and Housing

There are no population and housing impacts of the project, or of this alternative.

ABILITY OF THE ALTERNATIVE TO MEET PROJECT OBJECTIVES

The Mitigated alternative would have the ability to meet objective one (decrease environmental impacts of landfill development, operations, and final closure and increase environmental benefits) through operation of bioreactor cells, which will accelerate waste decomposition, allowing more effective and efficient capture of landfill gas emissions and collection and use of landfill, and reduce the potential long term, post-closure impacts on groundwater by accelerating the stabilization of landfilled waste. However, because the height of the landfill would not increase the environmental benefits related to bioreactor operation would be less than for the project. This alternative would eliminate the adverse aesthetic impacts associated with the project’s increased height, and would reduce or eliminate some of the significant air quality impacts associated with longer landfill lifespan. Landfill mining of the older unlined waste cells would be conducted under this alternative, which would also decrease the potential environmental impacts on groundwater of those older cells. The Mitigated alternative would have the ability to meet objective two (increase diversion). Although the Mitigated alternative does not call for increasing the landfill height, which would be more cost effective, the objective to operate more economically and extend the life of the site is still met, but at a reduced amount, since the increased rate of decomposition associated with bioreactor technology allows for more waste material to be landfilled in the waste management units than a traditional dry landfill process and thus extends the life of the liner and site. See Table 5.1.

5.3 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Table 5-2 is based on the foregoing analysis. The table indicates that the No Project alternative has the ability to avoid all of the significant unavoidable impacts associated with the project. However, the project would result in notable environmental benefits associated with proposed bioreactor operation, energy recovery, and waste diversion activities; these benefits would not be realized under the No Project alternative. The Reduced Height alternative has the ability to reduce, but not avoid, all of the significant unavoidable impacts of the project, and would still have the ability to achieve most of the environmental benefits of the project. The Off-Site alternative could avoid several of the unavoidable impacts of the project, but would likely result in other, equally or more severe impacts. The Mitigated alternative has the ability to reduce or avoid all of the significant unavoidable impacts of the project. The impacts associated with the Mitigated alternative are the least severe of all the alternatives examined, as compared with the project. In addition, the Mitigated alternative would still have many of the environmental benefits of the project, though the lifespan of the facility would be much shorter than under the project, and therefore these benefits would accrue for a shorter period.

Based on this analysis, the Mitigated alternative is considered the Environmentally Superior Alternative because of its ability to reduce or avoid impacts of the project, while still meeting or at least partly meeting the project objectives (as shown in Table 5-1) and realizing many of the environmental benefits of the project.

TABLE 5-2
ABILITY OF ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT UNAVOIDABLE IMPACTS OF THE PROJECT

Impact	No Project Alternative	Reduced Height Alternative	Off-Site Alternative	Mitigated Alternative
Impact 3.1.2: Vantage point 1, view from Wildhorse Golf Course, on the Outskirts of the City of Davis, approximately 2 miles southwest of the southern edge of the Landfill site, looking northeast.	Avoid	Reduce	Avoid	Avoid
Impact 3.1.3: Vantage Point 4, View from Road 103, 1 mile west of the western edge of the landfill site, looking east.	Avoid	Reduce	Avoid	Avoid
Impact 3.1.5: Vantage Point 6, view from Road 104A, about 1 mile south of the southern boundary of the landfill site, looking North.	Avoid	Reduce	Avoid	Avoid
Impact 3.2.4: The project could increase the annual emissions of criteria air pollutants and would extend the years of landfilling and composting at the site until the year 2100.	Avoid	Reduce	No Reduction	Reduce
Impact 3.2.5: The project would increase the amount of ROG and PM-10 emissions from expanded composting activities.	Avoid	Reduce	No Reduction	Reduce
Impact 3.2.6: Emissions of toxic air contaminants could pose a risk to human health.	Avoid	Reduce	No Reduction	Reduce
Impact CU-1: The project will contribute to the degradation of the visual character of the surrounding area.	Avoid	Reduce	Avoid	Avoid

SOURCE: Environmental Science Associates

REFERENCES – Alternatives to the Project

EMCON/OWT Solid Waste Services, Study of Current and Alternative Operations Strategies and Solid Waste Disposal Options, Yolo Central Landfill, Yolo County, California. Prepared for Yolo County Planning and Public Works Department., September, 1999.

Yolo County Department of Public Works and Transportation Division of Integrated Waste Management, Countywide Siting Element of the Yolo County Integrated waste Management Plan, July 1995(a).

Yolo County Department of Public Works and Transportation Division of Integrated Waste Management, Summary Plan of the Yolo County Integrated waste Management Plan, July, 1995(b).

Yolo County Community Development Agency, Yolo County General Plan Part 1, July, 1983.

CHAPTER 6

EIR AUTHORS, PERSONS AND ORGANIZATIONS CONTACTED

6.1 EIR AUTHORS

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6.3 PERSONS AND ORGANIZATIONS CONSULTED

List of other people and organizations consulted are provided in the references at the end of each section.

CHAPTER 7

GLOSSARY AND ACRONYMS

7.1 GLOSSARY

AB 939 (Assembly Bill 939): enacted the California Integrated Waste Management Act of 1989. California law requiring each city and county to prepare plans detailing how the jurisdiction will meet specified waste diversion goals. The Act establishes a new waste-management hierarchy for the State, emphasizing (in order of importance) source reduction, recycling and composting, and environmentally-safe transformation and environmentally safe landfilling.

Admixture: Materials added to compost at the end of the composting process to improve the characteristics of the compost as a soil amendment or fertilizer.

Anaerobic: living or active in the absence of free oxygen; an environment depleted of free oxygen. In composting the term also applies to low-oxygen environments.

Aquifer: a geological formation, group of formations, or portion of a formation capable of yielding significant quantities of ground water to wells or springs.

Alternative Daily Cover (ADC): ADC is any non-soil material used for covering waste deposited in a landfill at the end of each working day, that meets regulatory requirements (Title 27 CCR, section 20690**)** and the approval of the LEA.

Beneficial Use: beneficially using a waste instead of disposing of it in a landfill. Examples include agricultural land application of ash or dewatered sludge for soil amendment purposes.

Bioreactor Landfill: A landfill in which biological decomposition of waste is encouraged, rather than discouraged. This is accomplished by adding liquid as necessary to attain optimal moisture conditions for decomposition. If a bioreactor is operated aerobically (in the presence of oxygen), then air is also added to the waste mass.

California Environmental Quality Act (CEQA): California law requiring the disclosure of environmental effects of proposed projects before discretionary approval can be issued.

Cell: that portion of compacted solid wastes in a landfill that is enclosed by natural soil or cover material during a designated period.

Certified Unified Program Agency (CUPA): the local agency, generally a part of the county or city Fire Department or Environmental Health Department, certified by DTSC to conduct DTSCs Unified Program; the Unified Program consists of hazardous waste generator and onsite treatment programs, aboveground and underground storage tank programs, Hazardous Materials Management and Business Plans and Inventory Statements, and the Risk Management and Prevention Program.

Class II Landfill: landfill permitted to accept MSW and designated wastes. Class II landfill construction design and operation requires more stringent groundwater protection than Class III landfills.

Class III Landfill: sanitary landfill typically permitted to accept only MSW.

Clay Liner: a continuous layer of clay installed beneath or on the sides of a waste management unit, which acts as a barrier to vertical or lateral movement of fluid, including waste and leachate.
Commercial Solid Wastes: commercial solid wastes include all types of solid wastes generated by stores, offices, and other commercial sources.

Composite Liner: as defined in 40 Code of Federal Regulations Part 258 [Criteria for Municipal Solid Waste Landfills], a liner system consisting of two components; the upper component must consist of a minimum 30-mil flexible membrane liner (FML), and the lower component must consist of at least a two-foot layer of compacted soil with a hydraulic conductivity of no more than $1x10^{-7}$ centimeters per second. FML components consisting of high density polyethylene (HDPE) shall be at least 60-mil thick. The FML component must be installed in direct and uniform contact with the compacted soil component..

Composting: the process by which discarded organic materials -- including (for example) tree trimmings, grass clippings, yard waste, agricultural wastes, leaf debris and sewage sludge -- are converted to usable products through controlled biological decomposition.

Co-composting: Composting of biosolids (sewage sludge) with yard waste or other materials.

Containment System: the portion of the disposal cell that is comprised of the liner and leachate collection and removal system.

County Integrated Waste Management Plan (CoIWMP): plan submitted by each county to the California Integrated Waste Management Board consisting of the following:

- all city Source Reduction and Recycling Elements (SRREs) and Household Hazardous Waste Elements (HHWEs);
- SRRE and HHWE prepared for the unincorporated areas of the county;
- the Countywide Siting Element; and
- the Nondisposal Facility Element.

County Solid Waste Management Plan (CoSWMP): waste management plan required prior to passage of AB939. Under AB 939, the plan is to be superseded by the CIWMP.

Countywide Siting Element (Countywide Solid Waste Facility Siting Element): under AB 939, each county must prepare a Countywide Siting Element which includes a description of the area to be used for development of adequate transformation or disposal capacity consistent with the development and implementation of the county and city SRREs.

Cover Material: material (usually soil) used at a landfill to cover compacted waste at specific, designated intervals. Its purpose is to serve as a barrier to: the emergence or attraction of vectors, the progress of fires within the landfill, the escape of odor, and excess infiltration of surface water runoff.

Certified Unified Program Agency (CUPA): the local agency, generally a part of the county or city Fire Department or Environmental Health Department, certified by DTSC to conduct DTSCs Unified Program; the Unified Program consists of hazardous waste generator and onsite treatment programs, aboveground and underground storage tank programs, Hazardous Materials Management and Business Plans and Inventory Statements, and the Risk Management and Prevention Program.

Daily Cover: cover material spread and compacted on the entire surface of the active face of the sanitary landfill at least at the end of each operating day in order to control vectors, fire, water infiltration, erosion, and to prevent unsightliness and scavenging.
Designated Waste: can be either 1) non-hazardous waste that consists of or contains pollutants that, under ambient environmental conditions at the landfill, could be released at concentrations in excess of applicable water quality objectives, or that could cause degradation of waters of the state; or 2) hazardous waste that has been granted a variance from hazardous waste management requirements pursuant to Section 66310 of Title 22 of the California Code of Regulations (CCR).

Dewatered Sludge: residual semi-solid waste from which free liquid has been evaporated, or otherwise removed.

Double Composite Liner: Required in YCCL's WDRs for the trenches and sump areas of the bioreactor landfill. As described in Federal Register for the Module D bioreactor, the double composite liner within the collection trenches and sump areas of Module D consists of the following, from top to bottom: a minimum of 2 feet of gravel drainage material, a protective geotextile layer, a blanket geocomposite drainage layer, a primary 60-mil HDPE liner, a geosynthetic clay liner (with hydraulic conductivity less than $5x10^{-9}$ cm/sec), a secondary 60-mil HDPE liner, 2 feet of compacted clay (hydraulic conductivity less than $6X10^{-9}$ cm/sec) a minimum 0.5 feet of compacted earth fill (hydraulic conductivity < $2x10^{-8}$ cm/sec) , and a 40-mil HDPE vapor barrier.

Double Liner: liner system that is constructed of two clay liners, two synthetic liners or one clay liner and one synthetic liner, with a drainage medium placed between the liners.

Field Capacity: In a landfill, the quantity of water or liquid held by the waste material against the pull of gravity. **"**Equilibrium field capacity" is the point at which amount of leachate coming out (i.e., through a leachate collection system) equals the amount of moisture being added. Landfills are generally filled with waste that has an average moisture content of 20 to 25 percent (based on wet weight).

Fill: compacted solid waste and cover material.

Final Cover: the cover material that represents the permanently exposed final surface of a fill.

Flexible Membrane Liner (FML): a thin liner commonly 60 thousandths of an inch thick (60 mil) made of plastic material, often high-density polyethylene (HDPE). Used in landfills as part of the base liner both as a barrier to protect groundwater from landfill-generated leachate and as a flow surface for leachate. Currently required by federal law for all new MSW landfills and lateral extensions of existing landfills.

Flood Plain: the land area which is subject to flooding in any year from any source.

Generator: the source of materials discharged into the wastestream: the household, commercial establishment, or factory.

Geomembrane — see "Geosynthetic(s)"

Geosynthetics: flexible materials in planar form manufactured to meet specific engineering purposes. The term includes, but is not limited to: “geomembrane”, an essentially impermeable membrane used as a barrier to waste solids and fluids, and synonymous with “synthetic liner” and “flexible membrane liner (FML)”; “geocomposite liner (GCL),” a manufactured material using geotextiles, geogrids, geonets, and/or geomembranes in laminated or composite form; “geotextile” (including “geonet”), any permeable textile used with foundation, soil, rock, earth, or any other geotechnical engineering-related material as an integral part of a constructed project, structure, or system.

Groundwater: water below the land surface.

Hazardous Wastes: wastes that pose a hazard to human health or the environment due to their flammability, corrosiveness, reactivity, or toxicity to living things.

HDPE (High Density Polyethylene): plastic material commonly used in Flexible Membrane Liners.

Heavy Metals: elements including cadmium, mercury, lead, and arsenic which tend to accumulate in the food chain.

Hydrostatic head: The height of a vertical column of water, the weight of which, if of unit cross section, is equal to the hydrostatic pressure at a point. The pressure at a given point in a liquid measured in terms of the vertical height of a column of the liquid needed to produce the same pressure. [Source: *WordNet ® 1.6, © 1997 Princeton University*, via dictionary.com]

Incinerator: a facility that burns waste (usually MSW, but also hazardous waste) for the purpose of volume reduction.

Intermediate Cover: cover material that is applied on areas where additional cells are not to be constructed for extended periods of time, and therefore, must resist erosion for a longer period of time than daily cover.

Land Application: the application of ash, sludge or sludge products such as compost to agricultural and nonagricultural lands. Agricultural lands include land used for food crops, feed crops, range, and pasture lands. Nonagricultural lands include forest, reclaimed or disturbed lands, and lands with potential public contact such as ball fields and golf courses. Land application is an alternative to landfill disposal.

Leachate: liquid that has come in contact with or percolated through waste materials and has extracted or dissolved substances therefrom.

LCRS (Leachate Collection and Removal System): a system for collecting and conveying leachate to a central collection point where it can be properly managed.

Leachate Treatment and/or Disposal Facilities: since an efficient liner and LCRS have potential to collect large quantities of leachate, the landfill owner must have an immediate means to dispose of it. Options for disposing of leachate include: 1) on-site treatment and discharge, 2) discharge of untreated leachate to a publicly or privately owned wastewater treatment facility, or 3) pretreatment of the leachate prior to discharge into a wastewater treatment facility.

Lift: a series of daily cells, placed contiguous to each other, typically along a uniform elevation or height. Once a lift has been completed, the operation moves up on top of the previous lift and begins a new series of daily cells.

Local Enforcement Agency (LEA): county or city agency (other than the government department or agency that is the operating unit for a solid waste facility) given authority to oversee implementation of CIWMB regulations. The LEA may be certified under four categories:

1) permitting, inspection, and enforcement at solid waste landfills
2) incineration
3) transfer and processing stations
4) inspection and enforcement of litter, odor, and nuisance regulations at landfills.

Maximum Credible Earthquake: the maximum earthquake that appears capable of occurring under the presently known geologic framework. In determining the maximum credible earthquake, little regard is given to its probability of occurrence except that its likelihood of occurring is great enough to be of concern.

Maximum Probable Earthquake: the maximum earthquake that is likely to occur during a 100-year interval.

Monofill: a landfill, or part of a landfill for one type of waste only.

Municipal Solid Waste (MSW): solid waste from residential, commercial, and institutional sources that is generally disposed of in Class III landfills.

NPDES (National Pollutant Discharge Elimination System): federal requirement under the Clean Water Act (CWA) that any discharge of a non-point source of pollution into waters of the United States be in conformance with any established water quality management plan developed under the Clean Water Act.

Operator: the person responsible for the overall operation of a landfill facility or part of a landfill facility.

Owner: the person who owns a landfill facility or part of a landfill facility.

Permeability: the measurement of a material's ability to allow the passage of moisture. For landfill applications, it is usually expressed in centimeters per second.

Post Closure Maintenance Period: the period after closure during which the waste could have an adverse effect on the environment.

POTW (Publicly Owned Treatment Work): municipal wastewater treatment plant.

Recycling: the process of collecting, sorting, cleansing, treating, and reconstituting materials that would otherwise become solid waste, and returning them to the economic mainstream in the form of raw material for new products. Does not include the conversion of waste into energy.

Report of Disposal Site Information (RDSI): functions as part of a permit application to obtain the Solid Waste Facility Permit from the Local Enforcement Agency (LEA) with concurrence of the California Integrated Waste Management Board.

Report of Waste Discharge (RWD): functions as part of a landfill's permit application to the Regional Water Quality Control Board to receive a Waste Discharge Requirement.

Resource Conservation and Recovery Act (RCRA): federal law that specifies (among other things) how municipal solid waste, designated waste, and hazardous wastes are to be properly landfilled. RCRA Subtitle D establishes the federal solid waste program, Subtitle C establishes the hazardous waste program, and Subtitle I establishes the underground storage tank program. The Subtitle D requirements are codified in the Code of Federal Regulations (CFR), Title 40, Subparts 257 and 258. Subtitle D encourages states to develop comprehensive plans to manage nonhazardous industrial solid waste and municipal solid waste and sets criteria for municipal solid waste landfills, among other provisions.[1] .

Resource Recovery: the reclamation or salvage of wastes for reuse, conversion to energy, or recycling.

Run-off: any rainwater, leachate, or other liquid that drains over land *from* any part of a facility.

Run-on: any rainwater, leachate, or other liquid that drains over land *onto* any part of a facility.

Sanitary Landfill: a disposal site employing an engineered method of disposing of solid wastes in a manner that minimizes environmental hazards by spreading, compacting to the smallest practical volume and applying cover material over all exposed wastes at the end of each operating day.

Saturation Zone: that part of the earth's crust in which all voids are filled with water.

Sludge: any solid, semi-solid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility exclusive of the treated effluent from a wastewater treatment plant. CCR Title 27 specifies that for co-disposal of sludges in landfills, the sludge must contain at least 20 percent solids if primary sludge, or at least 15 percent solids if the sludge is secondary sludge, mixtures of primary and secondary sludges, or water treatment sludge.

Source Reduction and Recycling Elements (SRREs): In accordance with the California Integrated Waste Management Act of 1989, SRREs are plans for cities and counties to divert 25 percent of solid wastes from landfill disposal by 1995 and 50 percent by the year 2000.

Special Waste: Special waste is waste which is a hazardous waste only because it contains an inorganic substance or substances which cause it to pose a chronic toxicity hazard to human health or the environment and which meets all of the criteria and requirements of CCR Title 22 section 66261.122 and has been classified a special waste pursuant to CCR Title 22 section 66261.124.

Surface Impoundment: a facility that is a natural topographic depression, human-made excavation, or diked area formed primarily of earthen materials (although it may be lined with human-made materials), that is designed to hold an accumulation of liquid wastes or wastes containing free liquids and that is not an injection well. Examples include: holding storage, settling and aeration pits, ponds, and lagoons.

SWFP (Solid Waste Facility Permit): permit issued by the Local Enforcement Agency (LEA) authorizing a landfill to operate.

Unit risk value: the probability of incurring cancer if exposed to 1 microgram per cubic meter (ug/m^3) of the pollutant of concern.

[1] USEPA, RCRA Orientation Manual, January 2003. EPA530-R-02-016. www.epa.gov/epaoswer/general/orientat/

Unstable Areas: locations that are susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of the landfill structural components responsible for preventing releases from a landfill. Unstable areas are characterized by localized or regional ground subsidence, settling (either slowly, or very rapidly and catastrophically) of over burden, or by slope failure.

Vadose Zone: sub-surface zone between the ground surface and the groundwater level (water table) within the unsaturated zone. Soil voids in this zone contain air and water.

Waste Cell: at a landfill, compacted solid wastes covered with a thin, continuous layer of soil.

Waste Discharge Requirements (WDRs): the permit issued by Regional Water Quality Control Board for the discharge of waste to land (i.e., a landfill).

Waste Management Unit: area of land, or a portion of a waste management facility, at which waste is discharged. The term includes containment features and ancillary facilities for precipitation and drainage control and monitoring, and can be applied to landfills or surface impoundments.

Waste Shed: area in which a waste stream is generated.

Waste stream (or wastestream): the body of material composed of discards, by-products, and obsolete objects that is generated by industry, government, and the private commercial and residential sectors. The "wastestream" does not always end up wasted *per se* in landfills or incinerators: some of it will be recycled, composted, salvaged for re-use, or sent to waste-to-energy facilities.

Wetland: those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include, but are not limited to, swamps, marshes, bogs, and similar areas (as defined by the U.S. Army Corps of Engineers and the U.S. EPA).

Working Face: the area where daily disposal operations are conducted at a landfill: it is usually on a slope, where waste is deposited and compacted with landfill equipment.

7.2 ACRONYMS USED IN EIR

AB: assembly bill

AB 939: Assembly Bill 939

ACOE: United States Army Corps of Engineers

ADC: alternative daily cover

AF: acre-feet

ASWAT: Air Quality Solid Waste Assessment Test

BACT: best available control technology

BAT: best available technology

BCT: best conventional technology

bgs: below ground surface

BMPs: best management practices

Cal/OSHA: California Occupational Safety and Health Administration

Cal-EPA: California Environmental Protection Agency

Caltrans: California Department of Transportation

CAP: Clean Air Plan

CARB: California Air Resources Board

CCAA: California Clean Air Act

CCR: California Code of Regulations

CDFG: California Department of Fish and Game

CEQA: California Environmental Quality Act

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

CESA: California Endangered Species Act

CFR: Code of Federal Regulations

CH_4: methane

CHP: California Highway Patrol

CIWMB: California Integrated Waste Management Board

CIWMP: County Integrated Waste Management Plan

CNDDB: California Natural Diversity Data Base

CNPS: California Native Plant Society

CNEL: Community Noise Equivalent Level

CO: carbon monoxide

CO_2: carbon dioxide

CUP: conditional use permit

CUPA: Certified Unified Program Agency

CWHR: California Wildlife Habitat Relationships

CY: cubic yards

dBA: decibels (measured on the "A" scale of frequency)

DIWM: Division of Integrated Waste Management of the Yolo County Planning and Public Works Department

DOT: U.S. Department of Transportation

DTSC: California Department of Toxic Substances Control

DWR: California Department of Water Resources

EAD: engineered alternative design

EHS: Environmental Health Services Division of the Yolo County Health Department

EIR: Environmental Impact Report

EPA: U.S. Environmental Protection Agency

Fed/OSHA: Federal Occupational Safety and Health Administration

FEMA: Federal Emergency Management Administration

FESA: Federal Endangered Species Act

FIRM: Flood Insurance Rate Map

FML: flexible membrane liner

FY: fiscal year

gcl: geosynthetic clay liner

gds: groundwater disposal system

gpm: gallons per minute

HAP: hazardous air pollutant

HDPE: high density polyethylene

HHW: household hazardous waste

HHWCF: Household Hazardous Waste Collection Facility

JTD: Joint Technical Document

LAA: land application area

LCRS: Leachate Collection and Removal System

LEA: local enforcement agency

LEL: lower explosive limit

LFG: landfill gas

LNG: liquefied natural gas

LOS: level of service

MOP: maintenance and operations plan

mph: miles per hour

MRF: materials recovery facility

MRP: Monitoring and Reporting Program

msl: mean sea level

MSW: municipal solid waste

NAAQS: National Ambient Air Quality Standards

NESHAPs: National Emission Standards for Hazardous Air Pollutants

NIOSH: National Institute of Occupational Safety and Health

NMOC: non-methane organic compounds

NO_2: nitrogen dioxide

NO_x: nitrogen oxides

NOP: Notice of Preparation

NPDES: National Pollutant Discharge Elimination System

O_3: ozone

OSHA: Occupational Safety and Health Administration

P_b: lead

PEL: Fed/OSHA Permissible Exposure Limit

PM_{10}: particulate matter

PTO: Permit to Operate

PVC: polyvinyl chloride

RCRA: Resource Conservation and Recovery Act

RCSI: Report of Composting Site Information

RD&D: Research, Development, and Demonstration (permit)

RDSI: Report of Disposal Site Information

ROG: reactive organic gases

ROWD: Report of Waste Discharge

RWQCB: Regional Water Quality Control Board

SCADA: Supervisory Control and Data Acquisition

SMARA: Surface Mining and Reclamation Act of 1975

SO_2: sulfur dioxide

SRRE: Source Reduction and Recycling Element

SWAT: Solid Waste Assessment Test

SWFP: Solid Waste Facility Permit

SWANCC: Solid Waste Agency of Northern Cook County [vs. U.S. Army Corps of Engineers]

SWPPP: Storm Water Pollution Prevention Plan

SWRCB: State Water Resources Control Board

TAC: toxic air contaminant

TDS: total dissolved solids

TI: Traffic Index

TMDL: Total Maximum Daily Load

TPD: tons per day

UBC: Uniform Building Code

U.S. EPA: United States Environmental Protection Agency

USGS: United States Geological Survey

VOC: volatile organic compounds

WDRs: Waste Discharge Requirements

WET: Waste Extraction Test

WMU: waste management unit

WTP: wastewater treatment plant

YCCL: Yolo County Central Landfill

YSAQMD: Yolo-Solano Air Quality Management District

APPENDIX A

NOTICE OF PREPARATION (NOP) AND
AGENCY COMMENTS ON NOP

County of Yolo

PLANNING AND PUBLIC WORKS DEPARTMENT
292 West Beamer Street Woodland, CA 95695-2598 530-666-8775 FAX (530) 666-8728
www.yolocounty.org

JOHN BENCOMO
DIRECTOR

March 1, 2002

SUBJECT: **Subsequent Environmental Impact Report for Yolo County Central Landfill Expansion**

To Whom It May Concern:

The Yolo County Department of Planning and Public Works, Division of Integrated Waste Management has developed a proposal to make design and operational changes at the Central Landfill. Some parts of the proposal were not covered in the 1992 Environmental Impact Report (EIR) prepared for the facility. Therefore, the County has contracted with a consulting firm, Environmental Science Associates, to prepare a Subsequent Environmental Impact Report (SEIR). This report will be prepared under the guidelines of the California Environmental Quality Act and will address all potentially significant impacts arising from the proposed changes.

We would like your comments on the project, particularly regarding any environmental issues that should be covered in the SEIR, and reasonable alternatives to the proposed project. Please note that no Initial Study checklist has been or is planned to be completed for the project. To help you understand the project, we have attached the following:

- Notice of Preparation
- Description of the Project
- Map showing the project location
- List of probable environmental effects

We invite all interested parties to attend one of two public meetings to discuss the scope of the project and any environmental issues. At these meetings, everyone in attendance will have an opportunity to comment on the scope of the SEIR. The meetings will be held at the following times and locations:

- **Thursday, March 21 at 4:30 PM, in the Cache Creek Room at the Yolo County Planning and Public Works Department, 292 West Beamer Street, Woodland.**
- **Tuesday, March 26 at 4:30 PM, at the Central Landfill, located on County Roads 104 and 28H, southeast of Woodland and northeast of Davis. This meeting will be preceded by a tour of the landfill facility. If you plan to take the tour, we suggest wearing sturdy shoes and jeans, as landfills can be dusty or muddy, depending on the weather.**

We ask that all written comments on preparation of the SEIR be mailed to us by April 8, 2002. Please address correspondence to Linda Sinderson at the address above.

Thank you for your interest in this matter. We will keep you informed of meetings and comment periods for the Draft SEIR, which we expect to publish in July 2002.

Sincerely,

Ramin Yazdani

Ramin Yazdani, P.E.
Assistant Director

Appendix I

NOTICE OF PREPARATION

To: Whom it may concern,

(Address)

From: Yolo County,Planning & Public Works Dept.
Division of Integrated Waste Management
292 West Beamer St.
(Address)
Woodland, CA 95695

Subject: **Notice of Preparation of a Draft Environmental Impact Report**

Yolo County Planning & Public Works Dept. will be the Lead Agency and will prepare an environmental impact report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study (☐ is ☒ is not) attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to Linda Sinderson, P.E. at the address shown above. We will need the name for a contact person in your agency.

Project Title: SEIR for Yolo County Central Landfill Permit Revisions

Project Applicant, if any: Yolo County

Date 3/5/02

Signature Ramin Yazdani

Title Assistant Director

Telephone (530) 666 - 8775

Reference: California Code of Regulations, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375.

HEALTH DEPARTMENT
Environmental Health Services

COUNTY OF YOLO

BETTE G. HINTON, M.D., DIRECTOR/HEALTH OFFICER
THOMAS Y. TO - DIRECTOR OF ENVIRONMENTAL HEALTH

10 COTTONWOOD ST. - WOODLAND, CA 95695
(530) 666-8646 FAX (530) 666-8664

April 19, 2002

RECEIVED
APR 19 2002
Yolo County Division of Integrated Waste Management

Linda Sinderson
Planning and Public Works Department
292 West Beamer Street
Woodland, CA 95695-2598

Subject: Comments to Subsequent Environmental Impact Report (SEIR) for Yolo County Central Landfill (YCCL)

Dear Ms. Sinderson,

The proposed changes will require YCCL to submit an application for Permit Revision to the Yolo County Environmental Health Division which is the Local Enforcement Agency. The Report of Facilities Information (RFI) should be revised to reflect the operational changes. The proposed changes may not be implemented unless the application and the RFI are approved by this agency and California Integrated Waste Management Board (CIWMB) or already covered by the current permit and RFI.

In the Notice of Preparation, probable environmental effects were listed. Additional considerations regarding the SEIR, the proposed changes and permit revisions will follow below:

1. <u>BIOREACTOR</u>

COMMENTS:

- Leachate Control: There is an increased risk of leachate seepage. SEIR needs to address how the seepage will be controlled on a regular basis and establish a backup plan.
- Backup plan should include procedure if there is a prolonged power outage, etc.

2. <u>INCREASE IN FINAL FILL ELEVATION FROM 80 FEET MEAN SEA LEVEL (MSL) TO 140 FEET</u>

COMMENTS:

- Effect of lighting: Due to the height, the lighting, especially in the morning and evening hours during winter months, will be visible and affect neighbors.
- Noise: The height will add considerably to the noise level. SEIR needs to address more thoroughly the issue of noise.

3. LANDFILL MINING

COMMENTS:

- Public Health and Safety: The presence of hazardous waste in the old landfill is undetermined. Poisonous liquids, incompatible mixtures, pesticides, and even explosives may be found in the waste. The SEIR and Report of Facilities Operation should fully address the operation.
- Noise and Traffic: SEIR needs to address more thoroughly the issues of additional traffic and noise.

4. MATERIAL RECOVERY FACILITY (MRF)

COMMENTS:

- Geology/Hydrology: SEIR needs to address methods of controlling run-off to prevent impact.
- Address the issues of noise and traffic more thoroughly.

5. COMPOST FACILITY

COMMENTS:

- SEIR needs to address odor and vector (flies) minimization, as well as, fire safety and other health and safety issues associated with composting. Compost facility odors may spread for miles.

6. SALVAGE

COMMENTS:

- SEIR should include more information on types of materials collected for salvaging. Will vehicles be included? Will the items be visible from the outside? It is preferred that salvaging items are not observable from outside as this will create a visual blight.

7. PERMANENT HOUSEHOLD HAZARDOUS WASTE COLLECTION FACILITY (HHW)

COMMENTS:

- Will need to meet the Permit By Rule (PBR) requirements. An emergency plan is required.

8. ADDITIONAL LAND AREA FOR SOIL BORROW

COMMENTS:

- If the area is next to or close to neighbors, there may be a blight issue.

9. EXPANDING LANDFILL GAS MANAGEMENT AND UTILIZATION

COMMENTS:

- Need to address the fire safety and health issues.

Sincerely,

Felix Yeung
Solid Waste Program Staff
LEA

cc: Bruce Sarazin
Trisha Christensen

Yolo SEIR

California Regional Water Quality Control Board

Central Valley Region

Robert Schneider, Chair

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

Sacramento Main Office
Internet Address: http://www.swrcb.ca.gov/rwqcb5
3443 Routier Road, Suite A, Sacramento, California 95827-3003
Phone (916) 255-3000 • FAX (916) 255-3015

RECEIVED
APR 22 2002
Yolo County Division of Integrated Waste Management

18 April 2002

Linda Sinderson
Department of Planning and Public Works,
County of Yolo
292 West Beamer Street
Woodland, CA 95695-2598

SUBSEQUENT ENVIRONMENTAL IMPACT REPORT, YOLO COUNTY CENTRAL LANDFILL, YOLO COUNTY

We have reviewed the proposed operational changes that will require the preparation of a Subsequent Environmental Impact Report (SEIR) for Yolo County Central Landfill in Yolo County. It is our understanding that County of Yolo, Planning and Public Works Department (County) is proposing the following nine changes to their facility:

1) Operation of future landfill modules as bioreactor landfills;
2) Increase in the landfill's final elevation from 80 feet above mean sea level (MSL) to 140 feet;
3) Landfill mining of all waste units;
4) Construction and operation of a material recovery facility (MRF);
5) Construction and operation of a composting facility;
6) Expanded salvaging operations;
7) Conversion of the existing temporary household hazardous waste collection facility to permanent status;
8) Purchase of additional land for the development of a soil borrow area; and
9) Expanded landfill gas management and utilization options.

Based on our review of the information, in addition to the probable environmental effects you provided, our comments are as follows:

Operation of Future Landfill Modules as Bioreactor Landfills

The County is requesting that future landfill modules be operated as bioreactor landfills. These operations include leachate recirculation, the addition of supplementary liquid (such as groundwater), and acceptance of wet wastes to enhance biodegradation. In addition to the probable leachate effects, the SEIR must address the different sources and availability of liquid. For example, if more groundwater must be extracted for the bioreactors, then the increase in groundwater usage must be evaluated as it pertains to dewatering.

The County also mentions the disposal of wet wastes such as septic and food processing wastes. The SEIR should address how wet wastes will be handled and discharged so free liquids do not drain away from the landfill and impact surface water. Note that operating the landfill as a bioreactor will require a revision to the WDRs because currently, only the demonstration projects are authorized.

Increase in Landfill's Final Elevation

The County is proposing to increase the final elevations of the landfill from 80 feet above MSL to 140 feet above MSL to increase the landfill's capacity and scale of operations. The SEIR should address the design and operational issues related to this vertical expansion. A fill-sequencing plan should be prepared showing the various stages of the landfill and how leachate, groundwater and surface water will be stored, handled, monitored and/or disposed. Also, as a worst case scenario, please discuss the provisions for handling leachate if future modules are not built as bioreactors.

In addition, with an increase in height and mass, the following geotechnical issues should be evaluated: seismic stability analysis; slope stability analysis; potential foundation or liner settlement issues; and the effects of static (overburden) pressures on native soils in conjunction with groundwater dewatering.

Landfill Mining of All Waste Management Units

The County is proposing to mine both the older, unlined cells as well as the bioreactors. Please note that mining of the unlined units will require the County to submit a revised Final Closure Plan for WMUs 1 through 5. Mining operations may include processing equipment to recover soil and other recyclables. Storage and location of mining equipment must be addressed and how it affects surface water and storm water drainage.

Construction and Operation of a Material Recovery Facility (MRF)

The County is proposing to develop a permanent MRF building within the permitted property boundary and will occupy approximately 45,000 square feet. The MRF would process selected self-haul, debris box, and commercial loads to recover marketable materials. The MRF is considered an industrial facility. The wastewater produced from this facility could be a combination of domestic and industrial wastewater. The SEIR must address how wastewater will be stored and disposed of so it does not pose a threat to water quality.

The SEIR must also discuss the surface water quality impacts associated with the MRF. Please address any surface water quality impacts and mitigation measures. The facility's Stormwater Pollution Prevention Program may also require amending.

Construction and Operation of a Composting Facility

The County is proposing to construct and operate a composting facility that would accept up to 500 tons per day of waste. It is unclear what type of composting process will be employed at the site (i.e. windrow, static piles, bags, etc.). Once a process is selected, the County must then submit a Report of Waste Discharge for Composting to the Regional Board.

If you have any questions, please contact me at (916) 255-3124.

Stephanie J. Young

STEPHANIE J. YOUNG
Water Resources Control Engineer
Land Disposal Unit
Lower Sacramento River Watershed

cc. Beatrice Poroli, California Integrated Waste Management Board, Sacramento
Felix Yeung, Yolo County Department of Environmental Health, Woodland
Dan Sicular, Environmental Science Associates, San Francisco

CIR —

California Integrated Waste Management Board

Linda Moulton-Patterson, Chair
1001 I Street • Sacramento, California 95814 • (916) 341-6000
Mailing Address: P. O. Box 4025, Sacramento, CA 95812-4025
www.ciwmb.ca.gov

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

RECEIVED
APR 19 2002
STATE CLEARING HOUSE

April 10, 2002

Linda Sinderson, P.E.
County of Yolo Public Works Department
292 West Beamer Street
Woodland, California 93517

Subject: SCH No.1991073040: Notice of Preparation (NOP) of a Subsequent Environmental Impact Report (SEIR) for revision of the Solid Waste Facility Permit No. 57-AA-0001, Yolo County Central Landfill (YCCL), Yolo County.

Dear Ms. Sinderson:

California Integrated Waste Management Board (CIWMB or Board) Environmental Review Section (ERS) staff have reviewed the NOP cited above for the Yolo County Central Landfill (YCCL or Landfill). ERS staff offer the following project description and analysis of the proposed project based on ERS staff's understanding of the project as described in the above document, and in consultation with the Lead Agency. If the CIWMB project description varies substantially from the project as understood by the Lead Agency, ERS staff request clarification of any significant differences in the draft SEIR.

PROJECT DESCRIPTION

The Yolo County Planning and Public Works Department, acting as Lead Agency, has prepared and circulated a NOP of a SEIR that will tier from the 1992 Environmental Impact Report (EIR) (SCH No. 1991073040) in order to consider and evaluate potential environmental impacts related to the proposed design and operational changes at the YCCL. The proposed project will require revision of SWFP No. 57-AA-0001, and may require other federal, state and local approvals.

Existing Solid Waste Facility Permit

The YCCL facility is located northeast of the intersection of County Road 28H and County Road 104, approximately 2 miles northeast of the City of Davis. The facility is owned and operated by the Yolo County Planning and Public Works Department. The YCCL facility is currently permitted for solid waste disposal per the August 1995, SWFP No. 57-AA-0001, under the following specifications and limitations:

The YCCL is a 724.54-acre, non-hazardous, Class III landfill that has a permitted landfill disposal footprint area of 473 acres. The facility is permitted to receive a maximum of 1800 tons per day (tpd) of non-hazardous mixed municipal solid waste (MSW), agricultural waste, sludge, construction and demolition (C&D) debris, treated medical waste, non-friable asbestos, and tires. Permitted hours and days of operation are 6:00 a.m. to 5:00 p.m., Monday through Saturday; and 7:00 a.m. to 6:00 p.m. on Sunday. Permitted traffic volume is 1,047 vehicles per day. The maximum permitted elevation of the landfill is 80 feet above Mean Sea Level (MSL) and the estimated closure date is 2021.

Existing uses within the landfill site also include a landfill methane gas recovery and energy generation facility, a drop-off area for recyclables, a metal recovery facility, a wood and yard waste recovery area and two Class II surface impoundments for disposal of non-hazardous liquid wastes. In 1994, construction of two pilot-scale test cells began for the purpose of conducting research into bioreactor landfill technology. In 1995, YCCL was permitted to conduct a study on methane enhancement by Accelerated Anaerobic Composting in an enhanced cell and a control cell. Filling of these cells began in May 1995 and ceased in October 1995. Leachate was re-circulated and decomposition parameters monitored. In March 2000, YCCL was approved by the Board to construct and operate a 20-acre controlled landfill bioreactor demonstration project within the existing YCCL.

The landfill site is zoned A-1 (Agricultural), and the land use designation in the General Plan is Agricultural. Adjacent land uses include a wastewater disposal area (spray irrigation fields) operated by Hunt-Wesson to the west of the site (which was scheduled to close in December 1999); the City of Davis Wastewater Treatment Plant to the south and east; and agricultural uses in the remaining adjacent areas. The Willow Slough by-pass runs parallel to the southern boundary of the site. There are 28 residences within a 2-mile radius of the facility, with the nearest approximately 1,600 feet south of the landfill.

Proposed Changes

The proposed project will include changes to the design and operation of the YCCL, which will be analyzed in the SEIR, and will require revisions to the (SWFP). The proposed changes include:

- **Operation of all future landfill modules as bioreactor modules.**
  The project description in the NOP states that operating the YCCL as a bioreactor landfill would; accelerate decomposition of waste, stabilize the modules, allow up to 33 percent additional waste within the same modules, increase remaining capacity from 16.9 million

to 20.9 million cubic yards and achieve at least a 25 percent reduction in fill height within 5 to 10 years.

- **A 60 foot increase of the landfill's elevation - from 80 feet above MSL to 140 feet MSL.**
- The purpose of proposed vertical expansion is to approximately double the remaining site capacity and reduce costs by utilizing existing cells in lieu of the cost of constructing a new base liner for other modules.

- **Landfill mining of Waste Management Units (WMUs).**
  The Yolo County Department of Integrated Waste Management (DIWM) proposes mining waste from completed portions of the Landfill. Priority would be given to mining the older WMUs. The County is seeking approval to conduct mining on any waste modules at the YCCL. Mined wastes would be sorted by size and type: metals and other recyclables removed; smaller inert matter and soil would be utilized as daily and intermediate cover at YCCL and the over-sized fraction would be landfilled. WMUs 1 through 5 were constructed prior to the Code of Federal Regulations, Subtitle D, and therefore not lined with a modern composite liner. Due to a high water table, there are times when the bottom of these older units may be below the elevation of surrounding groundwater. These modules will be mined at least two feet below the bottom of refuse, and an engineered fill would be then be installed to increase the elevation of the base in order to meet the requirements of a 5 foot separation between waste and groundwater.

- **Construction and operation of a Material Recovery Facility (MRF).**
  DIWM is proposing to develop a permanent MRF building approximately 45,000 square feet in size within the Landfill's property boundaries. The MRF would process self-haul, debris box and commercial loads of marketable materials. These would include greenwaste for mulch and compost, clean lumber, concrete and other inert materials, soil, metal, cardboard and other recyclable or reusable material. The recovery process would use both automated equipment and manual labor. The proposed project would not increase daily tonnage of waste at YCCL but would divert materials normally disposed in the Landfill. The MRF would be designed to handle up to 800 tons per day with a projected recovery rate of approximately 50 percent.

- **Expand the salvaging operations/proposed development of a buy-back area for the public.**
  DIWM is proposing revising the SWFP to allow salvaging of waste at the Landfill. Re-usable items will be salvaged from the tipping area and active landfill face. Salvaged items would be stored in a designated area for distribution and sale to the public and charitable organizations. Materials targeted for salvage would include building supplies, lumber, usable furniture and recyclable materials.

- **Construction and operation of a Composting Facility (CF).**
  DIWM is proposing to construct and operate a composting facility that would accept up to 500 tons per day of green waste, food waste, agricultural crop residues, manure and biosolids (sewage sludge). DIWM also proposes to accept mixed MSW for composting.

Composted MSW would be used only for alternative daily cover (ADC). This would reduce the need to import soil or other cover material. The facility would be located at the current site of the wood recycling operation or elsewhere within the Landfill's property boundary. The composting facility would likely not increase the maximum daily tonnage for the site and would divert waste away from the Landfill.

- **Construct a permanent household hazardous waste (HHW) collection facility.** Plans are to replace the temporary HHW facility currently operating at the site with a permanent HHW facility at the YCCL. The facility is currently permitted through the Department of Toxic Substances Control. Implementing the proposed project would require revisions to the permit for additional collection hours, and longer waste storage prior to shipment to an off-site HHW facility.

- **Purchase of additional land for a "soil-borrow" area.** YCCL has a shortage of soil for daily, intermediate, and final cover material. YCCL is proposing to purchase property for the development of an off-site soil-borrow area. The parcel of land has not yet been identified. YCCL estimates that a 640-acre parcel will be needed and should be located within 5 miles of the YCCL property. Any potential properties would be surveyed for any important biological, archeological, or historical resources and appropriate mitigation measures would be developed and employed prior to commencement of borrow operations. The project may also require re-zoning of the parcel to allow soil borrow operations.

- **Expanded landfill gas management and utilization options.** Currently YCCL has a landfill gas collection system, and the collected gas fuels on-site electric generators. DIWM proposes to expand the existing landfill gas collection and utilization system and to diversify the landfill gas energy products. This might include an increase in electrical generation and transmission capacity, production of steam or alternative fuels such as methanol and liquid natural gas (LNG), commercial production of carbon dioxide (CO_2), or other uses.

CIWMB ROLE AS A RESPONSIBLE AGENCY

The CIWMB is a Responsible Agency for the environmental review of this proposed project, and for concurrence on the issuance of a revised SWFP. The CIWMB operates in cooperation with local government to assure protection of the public health and environment from the potentially detrimental effects of improper solid waste management. The CIWMB concurs in the issuance, revision or modification of a SWFP with Local Enforcement Agencies (LEAs) to assure that a solid waste facility operates in a manner consistent with all applicable laws and regulations.

CIWMB ERS STAFF CEQA REVIEW

CIWMB's Environmental Review Section (ERS) staff review and comments on an environmental document (ED) are intended to assist the Lead Agency in developing a document that will be as complete and adequate as possible for use by the Lead Agency and all other Responsible Agencies. CIWMB staff comments are intended to help decision-makers:

1) identify potential impacts from proposed projects; 2) determine whether any such impacts are significant; and 3) ascertain whether significant impacts can be mitigated to a level of insignificance in compliance with the CEQA statutes and guidelines.

When evaluating the adequacy of an ED for purposes of SWFP concurrence, ERS staff must compare the project as described and evaluated in the ED with the design and operation of the facility as specified in the proposed SWFP. In order for ERS staff to evaluate whether or not the ED is adequate for use in the CIWMB permitting process, the proposed project must be described in sufficient detail for ERS staff to understand and evaluate the proposed project, the potential environmental impacts, proposed mitigation measures, and findings.

In the review of an ED for CIWMB concurrence purposes, the first question ERS staff must ask is: "Does the CEQA document clearly describe all phases of the project and assess the potential primary and secondary impacts to the environment and/or public health and safety that could occur if the project is implemented?" The second question asked when the proposed SWFP is received is: "Does the CEQA evaluation in the ED support the requested specifications, revisions, limitations, and/or conditions of the proposed SWFP?" For instance, does the ED describe and assess the potential traffic, noise, dust, vector and other health and safety impacts that can be associated with a significant increase in permitted throughput tonnage, or facility expansion requested in a SWFP? When this type of information is included and addressed in the ED, the SWFP concurrence process is greatly facilitated.

After comparison of the CEQA document with the proposed SWFP, ERS staff makes a recommendation to the CIWMB regarding the adequacy of the CEQA document for CIWMB SWFP concurrence purposes. The CIWMB makes the final determination of the adequacy of the CEQA document and SWFP concurrence as required in CEQA Guidelines, California Code of Regulations (CCR) Section 15025.

In order for a CEQA document to be considered adequate for use in the SWFP process, the document must provide: complete project description, detailed environmental setting, clear and effective mitigation measures, and supporting data and documentation. This must be of a factual basis substantiating reasons to support the finding that the proposed project will not have a significant effect on the environment, or public health and safety. In order for a Responsible Agency to make meaningful comments, the Responsible Agency must be able to fully understand and evaluate the scope, setting, and potential effects of a given project or projects in order to allow the Responsible Agency to determine that Agencies responsibilities and authority in approving, implementing, and mitigating of the project.

ERS STAFF QUESTIONS AND COMMENTS

ERS staff will need further information regarding the project description, analysis, and findings to be included in the SEIR in order to complete our review and to make our recommendation to the CIWMB as to the adequacy of the SEIR for CEQA compliance purposes when the proposed SWFP revision is officially received for review and comment. Without the following questions and comments being addressed in the SEIR, it may not be possible for ERS staff to recommend that the SEIR will be adequate for CIWMB concurrence purposes.

ERS staff recommends that the SEIR evaluate the proposed projects *as a whole*, with analysis reflecting all of the proposed projects developed and operating *concurrently*, and not as "separate" or "subsequent" projects. The SEIR should contain complete and detailed descriptions and analysis of all proposed projects including but not limited to the following:

- Site plan maps (to scale) identifying all buildings, operations, facilities and features.
- Proposed physical changes required for site preparation, construction, implementation, operation, as well as waste handling, transfer, diversion, and disposal from each proposed project.
- Types of preparation of the land and the infrastructure required for the projects.
- Will the project require excavation, demolition, grading, installation of major utilities, road alterations, etc?
- Any additional or new operations that will affect community noise levels.
- The proposed use of each planned building.
- The sizes and types of buildings proposed to be constructed.
- A description of each phase as well as the projected dates of the individual phases for each of the projects.
- Tonnage estimates for the entire site with all of the proposed projects operating at once as well as the distribution of tonnage attributed to each individual project.
- A complete and detailed traffic study for all proposed projects described separately and operating together as a whole; including numbers of expected vehicles per day for each project; traffic from individual projects for other on-site projects, how traffic flow will be managed on-site, what improvements will be made to on–site roads to handle traffic for proposed projects safely.
- Permitting of the proposed projects, combined or separate.
- Analysis of the significant impacts of the projects on surface and subsurface water quality, public health and safety, air quality, noise, traffic, aesthetics and any other potential impacts which were not completely described or considered in the NOP.

Project Phasing and operation of Modules as Bioreactor Landfills

It is not clear in the project description what all the proposed phases of this project will be. The SEIR should have a complete and detailed description for each phase of this proposed project. This should include the number of landfill modules at the site that will be operated as bioreactors, when each of these will be under operation, whether all landfill modules will be utilized for this purpose (or only future modules), and if current/existing modules will ever be utilized as bioreactor modules.

Increase in Final Fill Elevation

Please provide a detailed description of the proposed increase in maximum landfill elevation. Describe the final elevation, slopes and contours of the landfill, and if the final height of 140 feet MSL will be the highest elevation the landfill will reach during the project, or if the proposed height will be the maximum height after the landfill is capped and settled.

This is a very aesthetically sensitive area with high levels of concern for the skyline views of the surrounding area from the community. Therefore, please provide photos showing views of the area from the north, south, east and west prior to, and digital representations of the views after the proposed increase in elevation.

Landfill Mining

Please describe in detail the following:

- How cells will be mined.
- Where the on-site mined waste will be sorted.
- How long the mined waste will be exposed.
- Identify the training the workers mining the waste will receive.
- Provisions for the security, protection, and safety of workers mining waste such as measures that will ensure stability of working area/face, eliminate exposure to hazardous waste and materials, and any other human health and safety issues relating to the proposed mining operation (i.e., the possibility of contact with pockets of methane, etc).
- Will mining be performed in non-daylight hours, and if so, when and how.
- Where materials separated from waste, (i.e., metals and recyclables, inert matter and soils, over-sized fraction) will be stored.
- Describe how each of the materials will be used daily, or stockpiled on-site.
- What will be done with waste after sorting.
- How cover, odor and vector issues will be addressed.

Material Recovery Facility (MRF)

Please describe in detail the following:

- If the County will be applying for a separate permit for the MRF.
- Location and site plan maps as well as descriptions of the site showing exactly where the MRF will be located.
- Descriptions and maps showing detailed traffic flow for the MRF and how it relates to the traffic flow of the landfill, and the proposed compost, HHW, and salvage facilities.

Attached is the Environmental Review Document Preparation Guidelines for Transfer and Processing Stations. This was developed by ERS staff as a guide to lead agencies in the preparation of CEQA documentation, and to responsible agencies for their review of documentation for the construction and/or operation of a solid waste facility requiring a full solid waste facility permit (SWFP).

The complete checklist of information can be accessed over the Internet at: http://www.ciwmb.ca.gov/PermitToolbox/CheckItems/CEQA/default.htm#Guidelines.

Expansion of Salvaging Operations

Please provide detailed analysis of the following:

- Descriptions of all types and estimated quantities of waste to be salvaged.

- Who will be allowed to salvage waste?
- Will salvaging be performed in non-daylight hours, and if so, how and for how long per day
- Plans for salvaging operations performed during evening hours such as night lighting and glare.
- Training workers will receive.
- Provisions for the security, protection, and safety of salvage workers such as measures that will ensure stability of working face, eliminate exposure to hazardous waste and materials, and any other human health and safety issues relating to the proposed salvaging operation.
- Where salvaged materials will be stored.
- How salvaged material will be distributed to the public or organizations as proposed.
- Is a public buy-back area planned, and if so, where this area will be located on-site.
- Whether or not the salvaged goods will be sold.
- If there be workers monitoring salvage material storage area.

Composting Facility (CF)

In order for ERS staff to understand the scope of the project and determine the adequacy of the SEIR for this proposed project, the SEIR should contain a complete and detailed description of the composting facility operations. This should include, but not be limited to, detailed descriptions of the proposed composting processes such as:

- If County will be applying for a separate SWFP for the CF.
- Types of feedstocks.
- Composting methods (i.e., windrows, static pile, in-vessel).
- Average and maximum peak quantities of each individual type of feedstock to be received daily (in tons and cubic yards).
- Maximum volume of feedstocks and active compost on-site at any time, etc.

The environmental document would also need to include consideration of potential environmental, public health and safety impacts from all phases of the proposed project. Please be advised that when this aspect of the project is better defined, additional CEQA analysis may be required.

Attached is the Environmental Review Document Preparation Guidelines for Composting Facilities. This was developed by ERS staff as a guide to Lead Agencies in the preparation of CEQA documentation, and to responsible agencies for their review of documentation for the construction and/or operation of a composting facility requiring a full SWFP. The complete checklist of information can be accessed over the Internet at:
http://www.ciwmb.ca.gov/PermitToolbox/CheckItems/CEQA/default.htm#Guidelines

Permanent Household Hazardous Waste Collection Facility

Due to inadequate information and analysis in the project description, ERS staff is unable to adequately determine the scope of this project, or evaluate findings or potential impacts upon the SWFP for YCCL from the proposed project. The SEIR should describe in detail design and operational features of the HHW facility that may have an effect on the YCCL. The analysis should include issues such as the possible effects from the HHW facility on material flow to YCCL, traffic impacts, dangers to human health and safety and the environment.

Expanded Landfill Gas Management and Utilization

Please provide a detailed description of proposed LFG systems, their operation and the location. What will be the expected gas volumes? What provisions are in place to deal with the possibility of system failure? The SEIR should include specific information on the environmental effects of proposed systems for use and management of landfill gas, proposed operating methods and limits. Additional CEQA documentation may be needed once this aspect of the project is better defined.

Purchase of Additional Land for Soil-Borrow Use

When the location of the property for this proposed project is identified, additional environmental documentation may need to be prepared in accordance with CEQA in order for ERS staff to evaluate potential environmental impacts from proposed project. ERS staff request notification of any information pertaining to the identification and location of property for this proposed project as soon as information is available.

Consideration and Discussion of Alternatives to the Proposed Project

The SEIR should include a detail discussion of alternatives to the proposed project that would also achieve the Counties objectives. It is unclear in the NOP exactly what objectives the County hopes to meet from the implementation of these projects. The County needs to clarify exactly what they hope to accomplish from the proposed projects as a whole. After these objectives are defined, the County must include in the SEIR, detailed alternatives to the proposed projects. Public Resources Code (PRC) §15126.6 (c) states; "The range of potential alternatives to the proposed project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or lessen one or more of the significant effects." This analysis should include a "No Project" alternative.

One of the alternatives that should be considered in the SEIR in order to comply with the waste reduction and recycling mandates of AB 939, are measures for waste reduction. In addition, an analysis of the significant aesthetic effects on the surrounding community from the proposed increase in the YCCL height should be addressed. The County states that many of the proposed projects (i.e., MRF, CF, mining waste, recycling waste, and bioreactor modules) will increase remaining capacity, reduce fill height, divert waste and lengthen the life of the landfill. Taking into consideration these statements by the County, as well as the significant impacts on the aesthetics of the area, ERS staff request an assessment as to whether the County's objectives (when defined) would be feasibly attained, and significant effects avoided or lessened by the implementation of the proposed projects, *without* the vertical expansion of the site.

Cumulative Impacts

The SEIR for the proposed project should include detailed discussion of the cumulative impacts from implementation of the proposed project. This analysis should take into account any planned development that may modify the effect of aesthetics, composting and landfill odors, vectors, traffic and noise impacts.

SWFP for Construction and Demolition (C&D) Projects

Please be advised that C & D regulations are currently in the rule-making process. The LEA will need to make a determination regarding the level of regulatory authority required for the project as proposed in the environmental document. For information related to the development of these regulations, please see the Proposed Regulations page of the Board's web site, http://www.ciwmb.ca.gov/Rulemaking/CDMater/.

SUMMARY

ERS staff thanks the Lead Agency for the opportunity to review and comment on this NOP. ERS staff request copies of, and consultation on, all environmental documents, and any Notices of Determination (NODs) for this project. If the document is to be certified during a public hearing, CIWMB staff requests notice of this meeting at least two weeks in advance. If the document is certified without a public hearing, CIWMB staff request notification of the date of the adoption and project approval by the decision-making body.

If you have any questions regarding these comments, please contact me via telephone: (916) 341-6727, or e-mail: dpost@ciwmb.ca.gov.

Sincerely,

Diana Post

Diana Post
Environmental Review Section
Permitting and Inspection Branch
Permitting and Enforcement Division
California Integrated Waste Management Board

cc: Beatrice Poroli
Permitting and Inspection Branch, Region 1
Permitting and Enforcement Division
California Integrated Waste Management Board

Mary Madison-Johnson, Supervisor
Permitting and Inspection Branch
Permitting and Enforcement Division
California Integrated Waste Management Board

Sue O'Leary, Supervisor
Environmental Review Section
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292 West Beamer Street
Woodland, CA 95695

RECEIVED
APR 0 8 2002
Yolo County Division of Integrated Waste Management

SUBJECT: YOLO COUNTY LANDFILL EXPANSION

As owners of property located very close to the Yolo County Central Landfill (YCCL), (APN #042-1300-041), my wife and I have the following concerns and objections to the two following proposed changes to the operation of the YCCL:

(#2) Increase in the landfills final elevation from 80 feet to 140 feet above sea level.

(#8) Purchase of additional land for the development of a soil borrow area.

After a tour of the YCCL with you and other land owners on March 26, 2002, I feel that the other proposed changes are well designed to increase efficiency and environmental friendliness, as well as a sincere effort to be a better neighbor to the surrounding home owners.

Proposal #2: Increase in the landfill's final elevation from 80 feet to 140 feet above mean sea level and thus increasing its total volume, appears to be unnecessary for the following reasons:

1. YCCL has been in operation twenty-eight years. During that time, only six of the available eighteen cells have been used.

2. In the past, a cell was expected to take 50 to 75 years to break down. In contrast, currently a "bio-reactive cell" (ie: one that is injected with air and/or water will break down in only five to seven years at which point they can be mined and put back into use.

Proposal #8: Purchase of additional land (640 acres) for the development of a soil borrow area, appears to be unnecessary for the following reason:

1. Soil and any remaining inert material after "mining" used cells, will be available to cover cells currently being filled.

Proposals #2 and #8 are not in the best interests of the residents of Yolo County. Both appear to be over expansion and are unnecessary to the present projected need, even for the next fifty years!

Our concern is that YCCL may be compelled to expand their operations by bringing in waste from other areas. to create revenue to finance their unnecessary increase in operational size and capacity .

We are also concerned that to utilize the expanded facility, truck traffic on the existing roads leading to YCCL would be substantially increased.

The height increase to 140 feet would mean that our town will look at a huge pile of refuse, rather than beautiful mountains.

While I doubt that most people want to live near "the dump", we consider the present YCCL a good neighbor. The proposed changes—increased height and land acquisition, would substantially depreciate the quality of life of our area, making it a place no one would want to live.

Sincerely,

Billie Dersen Martin

Barry Martin

Barry and Billie Martin
2509 Amapola Drive
Davis, CA 95616-0254
Telephone: (530) 753-0509
FAX 530) 753-0423

April 6, 2002

APPENDIX B

TRANSCRIPT OF PUBLIC SCOPING MEETING,
HELD MARCH 21, 2002

PRESENTATION BY DAN SICULAR, ENVIRONMENTAL SCIENCE ASSOCIATES (ESA), CONSULTANT HIRED BY THE COUNTY FOR THE ENVIRONMENTAL IMPACT REPORT FOR THE YOLO COUNTY CENTRAL LANDFILL

Mr. Sicular: I will make comments regarding the project, but will try to keep my comments brief. I will probably take about 15-20 minutes, as there are a couple of things, I am planning to cover. I hope what I cover is by way of clarification for you all so you understand better the project that is being proposed. The process is just now beginning to evaluate the potential environmental impact of the project.

Mr. Sicular referred to the overhead and the handouts to go with it. Mr. Sicular began by stating there are nine proposed changes to the design and operation of the Landfill.

The first major aspect of the project is to operate future landfill modules, in other words, future development of the landfill, as bioreactor landfills. To understand bioreactor landfills you first need to have a basic understanding of conventional landfills.

A conventional landfill is constructed as a dry tomb. It is built with an impermeable liner system, which we hope will last for 100 years or longer. The impermeable liner system consists of a thick layer of compacted clay, overlain by plastic materials, and finally some gravel, Yolo County Landfill uses shredded tires, for drainage. You can run equipment on top of that so the liner will not be damaged. The gravel and shredded tire layers are part of the leachate collection system. The underlying linersystem is sloped to a perimeter sump, to allow any liquid, which either gets into the landfill directly or has been produced from decomposition of the waste, drains to this sump, where it can then be pumped out.

On top of the liner and shredded tires, waste is piled up and piled up, eventually reaching final grade. Final grade is the maximum allowable height of the landfill, which is written into the landfill's permit. The current maximum height of the landfill is 80 feet above sea level. The County is not allowed to landfill any higher than that.

When final grade is reached, a cap is placed over the waste. The cap covers the sides and top. The cap will be four to five-feet-thick, and consist of an impermeable layer of clay, plastic and soil and planted for erosion control. Within the waste is a piping system to collect the landfill gas. The gas is produced from decomposition of the waste. One component of landfill gas is methane. At Yolo County this gas is collected and used beneficially. Yolo County produces 2 megawatts of energy at the site energy facility.

As I said, its sort of a tomb designed so that no water can get into it and the liquid it produces due to decomposition drains down and is collected then extracted for leachate collection system. What happens is that because garbage is packed in there so tight and there is very little water, the garbage decomposes very slowly.

The purpose of a bioreactor is to encourage decomposition. The basic design of a bioreactor landfill is about the same as a conventional landfill, except that instead of extracting the leachate and disposing of it off site, it is recirculated into the pile. In some instances you may even add additional water and let that trickle down into the mass to be collected down at the bottom and recirculated again. This is why bioreactor landfills are also called recirculating landfills. This process increases the moisture throughout the waste and encourages faster decomposition. In a bioreactor landfill, you get 5 or 10 years of very rapid decomposition instead of 50 or 100 years of slow decomposition. Instead of producing gas at a slow rate you produce gas very quickly, at a higher rate, which makes it more economical to capture and use beneficially.

Question by member of the Public. "If the leachate is a toxic substance and you are recirculating through the waste isn't that going to intensify the concentration of the toxins?"

Answer from Mr. Sicular, "You might think so, but because of the bioreactor process within the mass, it is the bacteria that are in there that are digesting everything. The toxins are digested into stable elements. You actually see a reduction in toxicity in leachate over time."

"There is some literature on Bioreactor Landfills. Bioreactors have been operating in Europe for 20 years or so; there is also limited experience with them in the United States. At Yolo County Central Landfill, there has been a pilot project operating since 1995 on a small scale. The County is about to begin operations of larger bioreactors, which are within their existing permits. So there is quite a bit of operational experience."

Question from Andrew Hurst (WAC Chair). "Can you talk about the economics of how much more material we can put in there?"

Answer from Mr. Sicular, "Decomposition decreases the waste volume in a landfill, whether it be operated conventionally or as a bioreactor. You've probably seen something maybe in your backyard decomposing, what happens is it loses volume and moisture. Any landfill will settle over time. You might build it 80 feet above sea level, but a conventional landfill will settle after about 20 years and would probably be down to 70 or 65 feet. In a bioreactor that occurs much more rapidly, again that happens over a period of 5 to 10 years."

Question from Mr. Hurst, "Does that occur while it is still being filled?"

Answer from Mr. Sicular stated, "If the landfill is still open then you have the opportunity to place more waste on top. That is the economic aspect of this process."

Question by member of the public, "Do you have any problems with over compaction by making it too dense for the bacteria? Is it less efficient if you keep piling it up?"

Answer from Mr. Sicular, "Bioreactors can be run as aerobic or anaerobic cells. The difference between these is aerobic cells are with the presence of oxygen and anaerobic cells are without the presence of oxygen. They are run with different kinds of bacteria. The pilot project the County ran involves an anaerobic cell, no oxygen. The need for space is not a problem, as you don't need any oxygen. There can be a problem though with impermeable layers within the mass. That is why the County has designs for both types of processes in the future. The County plans to use the native impermeable soil as final cover and permeable substances like ground up green waste and ground up wood waste for daily cover."

Question by member of the public, "Aren't you doing that now? By utilizing a more permeable layer aren't you allowing a lot more odor for the residents that live nearby?"

Answer from Mr. Sicular, "Using green waste there is the possibility of more odor. The way conventional landfills currently operate is that there are wells or a pipe system within the waste mass to collect the gas, which is then collected and flared off. In this landfill, the gas is utilized beneficially."

Question from a member of the public, "I would have to think if your daily cover is grass clippings it would produce quite an odor."

Answer from Mr. Sicular, "Ground green waste and ground wood waste are pretty effective odor barriers. They contain a compound that eats the elements, which cause odors."

Question from a member of the public, "In comparison to the way the landfill is currently been run and to what the proposal is for the bioreactor, what is the odor level in comparison to what we have now? Do they find that it increases with this type of process with the bioreactor?"

Answer by Mr. Sicular, "We would have to look at the history of odor control at the landfill. Odors are a major concern with regard to the bioreactor and other aspects of the proposed changes. We will be doing a thorough odor analysis. Will be doing some monitoring and odor analysis at the source and atmospheric conditions. You can put your concerns in writing and submit them to Linda Sinderson. You can get feedback from the analysis.

Question from a member of the public, "What is the cumulative impact and has it been documented."

Answer by Mr. Sicular, "The documentation they have so far is extremely preliminary, as the environmental analysis has not started yet. What we are doing here is scoping the project, to figure out what we need to analyze. We are already aware we do need to analyze odors."

Question from a member of the public, "You are asking us to scope a project that has no details whatsoever?"

Answer from Mr. Sicular, "The project description that is presented in that document is preliminary, and will be refined. There will be a draft EIR that will circulate and will have a more refined project description; you will also have the opportunity to comment on that. There will be a final EIR and you will have the opportunity to comment on that as well."

Statement by a member of the public, "The game is the studies will be completed by the time the draft EIR comes out. By the time the draft EIR comes out, the game will be over. It will be too late for us to have any input in those studies with concerns about what is going on here."

Answer by Mr. Sicular, "That is not how the EIR process works. We will look at that process in a little while. Every comment on a draft EIR within the circulation period has to be looked at and responded to.

Question from a member of the public, "What is the time frame before this comes before the Board of Supervisors?"

Answer by Mr. Sicular, "As we are basically starting from scratch. The final EIR will probably go before the planning commission as well as the Board of Supervisors about a year from now."

Question from member of the public, "How about cost issues?

Answer from Mr. Sicular, "Economic issues are not considered environmental impacts."

Answer from Linda Sinderson, "One of the project's goals is to run the landfill more economically. One of the reasons we are proposing the bioreactor option, is that based on our experience, the landfill will be more economic to run."

Question from a member of the public "You have water circulating through the cell. If for some reason the landfill has a problem, and the water stops circulating, has there ever been a problem with that as you are taking one of the main ingredients out? Could water be diverted from somewhere else?

Answer from Mr. Sicular, "I suppose you could convert it to a conventional cell because it has the same liner system and gas collection system. You could collect all the leachate and discharge it to dry out.

Question from a member of the public, "He would be interested in seeing the study failure rates on the liner systems for greater than 20 years."

Answer from Mr. Sicular, "Even though, there has been limited use of bioreactors in this country, they are less hazardous than conventional landfills but because the waste in bioreactor landfills stabilize more quickly."

Statement from WAC member, Mr. Hurst, "Regarding item #3, the landfill mining and subsequent redevelopment of the waste management units, what is proposed is that the County will mine the landfill, clean it out, and put a new high technology liner in the unlined units to bring them up to current technology."

Question from a member of the public, "If mining the landfill is a requirement under current legislation."

Answer from Mr. Sicular and Ms. Sinderson, "Yes, there is limited experience on doing it on the East Coast and some in California."

Statement from a member of the public, "The project's purpose is to cleanup an existing problem, or possible problem, if they exist, by moving to a more scientific model, produce energy, and thereby create some kind of payment for some of these things."

"Please discuss what we are currently doing with the fresh garbage as I am not convinced we are diverting 50 percent in any way, shape or manner. I need to be convinced we are not creating an easy way of dumping, and then go back and cleanup the problem when the only thing you can extract is sludge. I'm looking at the front end of this, I think everybody here can understand why we want to go back and take care of a problem that may occur because of only a clay liner. But to continue to build and request another 60 feet of elevation, to the folks that live around there and really have a problem with it. I need to be convinced that you are going to work on the front end of the problem, before you work on the back end of the problem."

Answer from Mr. Sicular, "The reason I was hired was to analyze the potential environmental impacts of the proposed project. Convincing you as a decision-maker is not my job. My job is to disclose to you what the potential environmental impacts of the project may be. I think it is probably Linda Sinderson's job to convince you that the project is worthwhile."

Statement from a member of the public, "I see the worthwhile part of this project, yet I want to see the proof that we are recycling and diverting 50%. I believe we should be doing far better then that."

Answer from Ms. Sinderson, "One of the goals of the project is to increase recycling. We are not just diverting what we can from what comes to the landfill. Our diversion numbers include many other programs, which when combined together show that we are meeting the 50% diversion goal. We do many things to divert materials before they reach the landfill. There are a lot of projects you are probably not aware of that we are doing."

Answer from Mr. Sicular, "There are a couple more aspects of the project, which are particularly related to diversion."

Statement from Mr. Hurst, "We are forward thinkers. We are moving on."

Answer from Mr. Sicular, "Part of the EIR report is a project alternatives section. Part of the EIR is to look at alternatives to the proposed project. One of those could be instead of increasing the landfill's capacity is diverting more materials."

Question from a member of the public, "Is the city of Sacramento and some of those doing more sorting then 50%? I know they built three major separation facilities in the last year and a half. Has there been any information coming out of that operation yet?"

Statement from a member of the public, "Sacramento is claiming a greater production number in recycling. Then again, I am one of those people who will dig through a pile I find glass, aluminum, drywall and other things that are not going to produce gas. So they shouldn't be in that pile. We are in the 21st Century and we should do something appropriate. If we're not going to take it out of the garbage stream, then this project is just creating a problem for me with all these inert materials. To get this passed at the Board of Supervisors level we need to cleanup the front end of this and there is no time left. This is a very expensive project and the citizens cannot be expected to bail it out years down the road.

Question from Mr. Hurst; "Are there any more questions on the Bioreactor portion."

Statement from a member of the public, "He strongly disagreed with some of the future projects and presented a written list of the items to be researched and responded to.

Mr. Sicular stated, "That the next item which was increasing the landfill final elevation from the current permitted level maximum height of 80 feet above mean sea level to140 feet. The obvious reason for this is to increase capacity."

Question for m a member of the public, "If within the report would issues regarding significant impacts like smoke, smell would be covered."

Answer from Mr. Sicular, stated required by "The EIR process requires that once things that have significant impact are identified, we have to come up with mitigation measures for those impacts. We also look at the aesthetics, such as, will it block someone's view of the Sierra's on a clear day, be visible from the city of Davis or from any scenic byways or highways. The conclusion might be for any of these impacts that there is no way we can mitigate it. In that case, it will be documented as a significant, unmitigatible impact. When the project goes to the Board of Supervisors, they need to know the all impacts, so that if they approve the project, they know if there will, or will not, be unmitigatable impacts. If they are going to approve the project with unmitigatable impacts, then they need a document called a statement of overriding conditions. That would be if the benefits of the project override the environmental impacts."

Question from a member of the public, "Did ESA or the County prepare the Probable Environmental Effects?"

Answer from Mr. Sicular, "I prepared it."

Statement from a member of the public, "It seems odd to him that it makes predictions on impacts or no impacts before studies have even been done. The case of the doubling the height of the landfill, which has an equivalence of a 14 story building, which I suspect would make the landfill the tallest manmade structure outside of the Radio tower in all of Yolo County. The viewshed is going to be effected. A 140-foot pile is going to affect my view of Sierra Nevada and my view of downtown Sacramento. It will affect my neighbors' as well. You could see it from Davis and Sacramento. Also, if we are going to double the height of these piles, what is it going to do to the base dimensions?"

Answer from Ms. Sinderson, "We are not proposing to increase the base dimensions. They are flat on top, like a very short, wide, truncated pyramid, so if we go higher there will be a little less surface area at the top. We are doubling the height, but 60 feet is not significant in relation to the footprint which is much larger."

Statement from Mr. Sicular, "This is just the proposal, no decision has been made, as the project has not been analyzed yet. We will be doing photo simulations of the viewshed."

Statement from a member of the public, "I invite you (Mr. Sicular), to come have a cup of coffee in my front room on a nice clear day."

Answer from Mr. Sicular, "I would be happy to use this gentleman's front yard as one of the photo points."

Statement from a member of the public, "The same things repeat throughout the handout, the noise, the traffic. The truck traffic on County Road 105 has done such damage to the road and the County has a poor record of maintaining it. There are potholes, which it has taken the County six months to get fixed, that are two feet across and a foot deep."

Statement from another member of the public, "County Road 103 is not going to get fixed because it is not in the budget. So you increase the traffic but you don't maintain the quality of the roads. And obviously there will be more noise if you increase the traffic on the roads."

Answer from Ms. Sinderson, "In terms of traffic, we are not proposing to increase the inflow of waste at all, so the proposed traffic shouldn't change."

Statement from a member of the public, "If you're adding functions to the facility, you're adding recycling components, and a hazardous waste facility, that's going to increase traffic in and out. You also have a responsibility to maintain the roads, which are already impacted. Requirements, which are currently in place, are just not being done."

Answer by Mr. Sicular, "There is a difference between existing conditions and those conditions brought about by the proposed project. Existing conditions are sometimes difficult to define. At this time, existing permit conditions are assumed to be the existing conditions. We are not proposing more traffic at this time."

Statement by a member of the public, "With the increase of growth in Yolo County, we're still on the up curve of garbage production, three times what is happening today, is the permit level."

Answer by Ms. Sinderson, "We are only looking at what is above our current permit level."

Statement by Mr. Sicular, "The current permit level was analyzed in a previous EIR in 1992."

Statement by a member of public, "Which we did not have any input on either."

Statement by another member of the public, "Your permit could be denied at this particular point, or even reduced at this point, if the comments or complaint is loud enough, which brings us back to we need to do this right. You cannot mitigate this person's front window, you cannot mitigate the disturbance he has to live with, unless you pay for his property and move him somewhere else. I know the County is not prepared to do that, so your report must include increased traffic."

Answer from Mr. Sicular, "We will look at the old EIR traffic projections versus the way it is now. There has been an increase in overall traffic in the last 10 years. We'll look at it even if the County isn't proposing an increase in permitted level of traffic into the facility. The permitted level may have a greater impact now then it did then."

Statement from Mr. Sicular, "The next section is on Landfill Mining. The idea is to mine the waste units, including the new ones, which are already lined, and the ones, which would be run as bioreactors and it may be that the bioreactor units be mined more than the old ones. Mining won't just be used to alleviate the problems of the old unlined areas, but also to recover the landfill capacity in the bioreactor units after there stabilized. They stabilize very quickly, so there will be inert material left to mine, screen, and recover the soil and compost. The soil and composted waste will be used as cover material for the new areas in the landfill. The County also will collect the metals and other recyclables, and then landfill the materials you cannot utilize. So that is a possibility, as well as, mining the old clay lined units. Here again we'll look at odor issues, noise, and dust."

Question from a member of the public, "When you evaluate the noise do you take into account exactly what equipment is being used?"

Answer from Mr. Sicular, "We have a list of the particular activities and machines are used for this type of project. Also, we consider what the conditions are, for example, are the machines working on top of the landfill or back behind; how many machines are running, two noisy machines will make more noise than one noisy machine."

Question from a member of the public, "How many bioreactors are permitted at the Landfill?"

Answer from Mr. Sicular, "Currently, the County is permitted to construct bioreactors on one 20-acre area. They have already constructed three cells, one is anaerobic, which is tarped and has the tires on it and another aerobic. There is another 12-acre area adjacent to that, which will be constructed this summer and filled over the next few years, which is already permitted."

Answer from Ms. Sinderson, "If our proposal is adopted and a new permit is issued, then there will be a total of 16 lined units at the landfill. The additional 12, 20-acre units that are not yet constructed would be utilized as bioreactors in addition to the current unit. The 25% reduction in waste is just in volume during the biodegradation process. The 140-foot elevation would be at final height after completion of that process."

Question from a member of the public, "Does any of this include expansion of the footprint of the overall boundary?"

Answer from Mr. Sicular, "The only thing that is proposed for offsite is the development for additional area for soil borrow."

Question from a member of the public, "During the landfill mining process, would the County be digging down into areas that have not been disturbed until now? Would the County be responsible for any disturbance of the groundwater?"

Answer from Mr. Sicular, "The County has the abilities to treat it based on requirement from the Water Board."

Question from a member of the public, "Is there going to be accumulative assessments of all these projects, if they were to be approved."

Answer from Mr. Sicular, "We will look at the worst case scenario."

Question from a member of the public, "Who to talk to about water quality issues regarding the groundwater?"

Answer from Ms. Sinderson, "Anyone concerned about groundwater issues should talk to me."

Statement from Mr. Sicular, "Anyone can also go to the Regional Water Quality Board."

Mr. Sicular went on to discuss the proposed operation of an onsite Materials Recovery Facility, which would be primarily self-funding. "This would be like a recycling facility where they would sort the materials. This would be an enclosed facility for the most part."

Question from a member of the public, "Are there are any other facilities like this within the County?"

Answer from Ms. Sinderson, "There are some facilities that sort recyclables, but there aren't any other MRF's facilities like this."

Mr. Sicular moved on to the proposed construction and operation of a Composting Facility. "Currently there is a wood recycling facility. The proposal is instead of just grinding wood, to take a variety of materials and compost them to produce marketable compost, to sell or to be used as alternative daily cover. There are many types of materials used for daily cover. One of those is compost. The proposal is to produce 500 tons a day at the composting facility including potentially composting mixed garbage from the garbage trucks, which would entail using an enclosed cell. The composted waste materials would not be marketable but could be used as cover material. The impacts would be analyzed for this type of operation."

Statement from a member of the public, "It doesn't appear this has been planned out as to how the composting facility would function."

Answer from Mr. Sicular, "It is early in the project. The County has not refined their proposal, and may not finish with that until they get into the EIR. They will analyze generally the kinds of impact that might be experienced by this specific type of operation. We may have to do a subsequent document of the details of that operation."

Question from a member of the public, "Would this project decrease the use of tarps as daily cover?"

Answer from Ms. Sinderson, "We could use some of the composted material for daily cover instead of tarps."

Answer from Mr. Sicular, "That is not firm in the project description at this point. We may be looking at composting municipal solid waste and mixed garbage in a vessel for use as ADC, but that may change over the next few weeks when we actually get into the analysis.

Question from a member of the public, "Is site ground water is just water you are getting out of your well?"

Answer from Ms. Sinderson, "We have a deep supply well. Currently that water is what we are using. The water is from the lower aquifer. She also stated the landfill does not use much water. The well is about 400 feet deep."

Mr. Sicular stated the sixth element is an expanded salvaging operation. "Currently the landfill's permit restricts or prohibits salvaging the materials at the active face of the landfill. The proposal is to allow salvaging. Trucks with salvages in their loads would deposit those materials at a designated area of the landfill. A particular load would be directed by personnel on the site who could recognize recyclables and reusable materials which could be pulled out of the loads and either recycled, given away or sold. Again, the purpose is to reduce the amount of material landfilled, and increase the profits.

Statement from Ms. Sinderson, "The County would like to run the landfill in the most economical way."

Statement from Mr. Sicular, "Item number seven is the proposed permanent household hazardous waste collection facility. The proposal is to allow the current temporary facility to become a permanent facility and have regular hours. This would allow the public to drop off their household hazardous waste at additional and more convenient times and allow the landfill to store the materials longer.

Question from a member of the public, "What environmental impact analysis do you do related to that? Do you use Hazmat related to that?

Answer from Mr. Sicular, "We look at the design of the facility, if storage is double-contained, then we look at the floor design and the groundwater situation and the potential impacts of a possible spill at the site."

Comment from a member of the public, "The landfill and the surrounding residents are in no man's land and sometimes the Fire department from Davis comes out, sometimes the Fire department from Woodland comes, sometimes neither, sometimes both. That needs to be addressed from your HAZMAT point. I have experienced fires that burnt for a mile and a half before the Fire department arrived because they went to the other end of Davis to locate it.

Question from a member of the public about deep subflooring.

Statement from Ms. Sinderson, "Because the local groundwater levels rising and dropping so much during the year, it is better environmentally to use something self-contained, or with double containment, rather then build a deep subfloor that might encounter groundwater."

Question from a member of the public, "What is the benefit of placing something that is considered household hazardous material in a permanent facility if there is the potential to contaminate the groundwater?

Statement from Ms. Sinderson, "The benefit is that it will be open more frequently to accept hazardous materials from residence, so people can get turn it in to our facility where it will be stored safely, and not have it sitting around their house. Also, the material is not stored at the facility permanently. It can only be stored for a limited amount of time."

Question from a member of the public, "They are taking these things to a place that already has issues in terms of groundwater contamination and you want to build a permanent facility there."

Statement from Ms. Sinderson, "You will have these types of issues where ever you chose to build this facility. The mitigating issues will be discussed in the EIR."

Statement from Mr. Sicular, "What this suggests is that in the analysis we be particularly cognizant of the danger of groundwater contamination. The EIR is to look at the specifics of the site and the potentials are for possible environmental impacts. We try to depend on our engineering to protect us with all sorts of environmental problems, sometimes they work and sometimes they don't."

Question from a member of the public, "She is not sure the placement of the landfill was based on the best available data at the time. Her concern is having an increased amount of use of a landfill site, which maybe was not appropriate from the beginning. Adding to something that was not appropriate and now you want to do more and maybe any use of this isn't appropriate in terms of groundwater, in terms of location. We also, have a levee road we've been told that is one of the worst. If there was any flooding it would come as a four-foot wall and would come through the landfill first, so what am I going to have all over?

Question from a member of the public, "Is there anything in the EIR for a potential flood problem and what would happen if the levee were to break? There is a 12-foot-high levee next to the landfill, so shouldn't this be addressed?

Answer from Mr. Sicular, "The stability of the levee should be looked into and potential flooding is something the EIR would be taken into account also."

Statement from Mr. Sicular, "The 8th item in the proposal, which is purchase of land, and development of an off-site soil borrow area. As mentioned earlier, no site has yet been identified. There are other aspects of the proposal, which may reduce the need for off-site soil, such as landfill mining, composting, but there is the potential necessity for off-site soil borrow."

Question from a member of the public, "If we would need to purchase additional land for soil borrow even if the other proposed projects are not approved?"

Answer from Ms. Sinderson, "There will be a need for additional soil, especially, if we don't do some of these projects. We would need less soil if we don't go to the full height, because we would need less cover. We will need more soil if we don't do some of these projects. We don't absolutely have to have the additional land, but we could purchase the soil from someone who wants to sell it to us."

Statement from Mr. Sicular, "He pointed out that bringing soil from off-site would mean impacts in noise and traffic by trucking it in. When a site is located you would need to report any impacts on that site."

Statement from Mr. Sicular, "The last item is the expanded landfill gas management and utilization, proposed use of a more efficient and less noisy system. Condensed gas and a liquefied natural gas project to be used on and off site, as well as other options."

Statement from a member of the public, "There has been a consistent lack of communication in the past by the County, not necessarily yourselves, but in other issues where we were either not notified, not gotten the information or very belatedly notified after the fact or given only a few days notice about something happening nearby and would directly impact us by the County. Having a landfill in your backyard is not what anyone wants. That generates enough hostility just in itself. Let alone to get notice in the mail and a pile of papers to go through, which many of us never received."

Statement by Ms. Sinderson, "It was our understanding that the Assessors office would have all the landowners listed and we apologize if someone was left off the list and did not receive notification of this meeting and the paperwork they should have."

Question from a member of the public, requesting a little more notice to be better prepared for any meeting regarding issues that may concern them.

Answer from Mr. Sicular, "The draft EIR will circulate for 90 days. The notification will tell you this. There is also a 30-day notice for a public hearing, which comes at the end of the circulation period of the draft. This meeting isn't even required of the WAC. This is something that the County wanted to do, to hold a couple of scoping meetings. There is nothing in the law that requires it. I apologize for the short timeline, we tried to get the documents in as good a shape as we could and to get everyone involved to what was going to go out publicly."

Statement from a member of the public, who reemphasized that to understand when you hear the landfill is going to go twice as high, twice as long and twice as deep. A lot of us never assumed that this landfill was going to go on for the rest of our lifetime or our childrens lifetime. Public stated the landfill moved into our area not the other way around. Most of the landowners have been there for over a hundred years. The fact that in another hundred years there is still going to be a landfill there. We feel the groundwater issue has never been addressed satisfactorily.

Statement from Mr. Sicular, reminding that the project description isn't finalized and this is what we call probable affects, is very preliminary. "The idea here was to eliminate the points that we think really don't have the potential for any kind of impact. Do you want to hear about that process?

Mr. Sicular began to explain the CEQA/EIR process. The California Environmental Quality Act has been around for over 30 years and every year it gets revised, sometimes it gets strengthened, sometimes it gets weakened it depends on what is going on in Sacramento. The process has not really changed that much over the years. After the lead agency that is primarily in charge of the project decides an EIR is required. Stated various agencies and landowner lists need to be maintained to issue current information and public meetings. It will take about 3 months to draft the EIR and will circulate for 90 days for public review. For the draft, written or oral comments may be taken at a hearing with the Supervisors. Comments should be made as what is or isn't covered in the draft EIR. Comments need to be addressed specifically and not just the landfill is a bad idea, we don't want it here.

WAC member Denise Kotko emphasized that these documents will be available at public agencies, library, public works and even online for people to have access to and concerned need to utilize these agencies to familiarize themselves with the issues being proposed and be knowledgeable about questions to ask.

Mr. Sicular stated it might take weeks to respond to many questions asked by one individual because of the research involved in seeking the proper answer. Projects have been known to be changed to accommodate concerns that arose.

Mr. Sicular described the final EIR as the responses to the comments and any changes. You don't actually rewrite the original draft EIR. After that is completed by the County goes through the planning commission, the Board of Supervisors will consider the certification of the EIR, once it is certified it is basically accepted as the Counties document. The purpose of the EIR is to inform the decision makers of the potential impacts of the project so they can decide whether to approve the project or not. The EIR also has to come up with mitigation measures and whether they will fix the problem. If they cannot come up with those it becomes significant unavoidable impacts. If they are going to approve the project they have to come up with a statement of overriding mitigation. They must state publicly if they are going to approve the project that it will cause unavoidable impacts. There are two things going on at those meetings. One is to approve the documents and one is to approve the project. Another thing that happens concurrently is called the mitigation monitoring plan, which states who is in charge of making sure those mitigation measures are carried out, including should we approve the project at all. Comments are welcome. WAC member Andrew Hurst stated comments in writing would be great. He also thanked Mr. Sicular for the presentation.

APPENDIX C

DESCRIPTION OF PROJECT XL

Yolo County has been at the forefront of assessing the technical feasibility and the impacts of managing a landfill as a bioreactor for ten years. Bioreactor landfilling consists basically of adding liquid to the landfilled waste to optimize conditions for biological stabilization of organic components. This concept is based on the idea that liquid addition and management is the single most important and cost-effective operational modification available for enhancement of microbial decomposition processes in landfills. Bioreactor landfills, if properly designed and operated, can significantly reduce the long-term risks of environmental impacts associated with landfilling wastes.

State and federal regulations governing landfill design, operations, and closure require that landfills are kept in a relatively dry condition to minimize the production of leachate and generation of landfill gas from the waste mass. This approach limits the quantities and types of wet waste that may be accepted. It usually prohibits liquid wastes, requires placement of relatively impervious daily and intermediate covers over the top of refuse lifts, and requires the placement of final cover that equals the performance of the landfill's liners. This *dry* theory of landfilling has the impact of creating a moderate to slow stabilization (decomposition) process of the landfill mass during the active filling and the post-closure stages. Transmission of leachate to the collection system may be minimized but the biodegradation timeframe is considerably lengthened.

A dry landfill may cease to biodegrade altogether, and remain as a potential environmental threat for decades, or even past 100 years. Of concern is the very long-term environmental liability of the organic waste components, salts, and heavy metals within conventional dry landfills. These landfills provide environmentally secure initial containment and the geosynthetic membrane containment systems are predicted to last many years. However, it would be preferable to stabilize these containment systems in as short a timeframe as possible.

The bioreactor concept is to rapidly stabilize/biodegrade the waste mass under controlled conditions. Dry landfills are generally filled with waste having an average moisture content of 20 to 25 percent (based on wet weight). The most important management aspect for achieving maximized biodegradation is to increase the moisture content within the waste mass to slightly above equilibrium field capacity (within a range of 35 to 50 percent moisture content on a wet-weight basis), without the release of significant leachate quantities. Equilibrium "field capacity" is the point at which leachate out equals moisture in. Liquids are added as an amendment to optimize and significantly shorten the landfill stabilization process time. Liquid management is achieved through leachate recirculation, water addition, and the managed inclusion of wet wastes (sludges and cannery wastes). For the bioreactor landfill, water is clearly not a waste, but an amendment. Other potential bioreactor additions such as sludge and nutrients may also be categorized as amendments. On August 13, 2001, US EPA published final approval of a rule that allows for supplemental liquid (groundwater, gray water, septic waste, and food processing wastes) to be added to the bioreactor cells (in addition to leachate).

At the YCCL, incoming waste has a wet-weight basis moisture content in the range of 20 to 25 percent. At this moisture content the waste exhibits a considerable capacity to absorb additional moisture before it reaches field capacity. Various tests and demonstration projects have shown that this moisture content can be as high as 45 percent. This information, as corroborated by the Yolo County Pilot Project, requires about 15 percent additional moisture to reach a steady state, optimum moisture condition. Expressed as a volume per mass of solid waste, the range of liquid addition to reach field capacity is 25 to 50 gallons per ton of municipal solid waste (MSW).

During the summer of 1994, the DIWM began construction of two pilot-scale test cells (about 9,000 tons of waste each) to conduct research into bioreactor landfill technology. The YCCL bioreactor pilot project has successfully demonstrated many of the benefits that are attributed to the bioreactor concept. Compared to conventional landfills, waste stabilization was accelerated; this stabilization was exhibited as increased and accelerated settlement, and landfill gas generation increased. The bioreactor is estimated to achieve at least a 25 percent reduction in fill height within 5 to 10 years after initiation of the process. Landfill gas generation is increased significantly; most of the gas is generated within 5 to 10 years after initiation of the bioreactor process. Gas production peaks at about 5 times that of the drier landfill, and gas generation stabilizes decades earlier. The third result is the ability to treat leachate within the landfill mass. Prior results, including the YCCL Pilot Project, have shown a considerable decrease in pollutant constituents with leachate recirculation.

Yolo County is a participant in the USEPA's Project XL Program. The project has received site-specific flexibility from the federal regulations governing landfills (40 CFR 258.28 Liquid Restriction), permitting the addition of useful bulk or non-containerized liquid amendments that would otherwise be prohibited. Selection for participation in this program included the solicitation of input from the public, regulatory agencies, and other stakeholders. This program allows the construction and operation of a full-scale bioreactor module. The module is located in Waste Management Unit 6, Module D (referred to as Module 6D), Phase 1. It was constructed during the summer of 1999, and is currently being filled. This 12-acre module contains a 6-acre cell and a 3.5-acre cell, which will be operated anaerobically, and a 2.5-acre cell, which will be operated aerobically. The County will construct the second phase of Module 6D in two years and depending on the results of the first phase of Module 6D, Yolo County may operate the second phase either anaerobically or aerobically. The northeast anaerobic cell and the southeast aerobic cell have been filled with waste and the instrumentation, leachate injection, and gas collection and air injection systems have been installed. The west-side anaerobic cell is still in the process of being filled with waste.

As part of the extensive monitoring program, data is collected from all installed instrumentation and will continue to be monitored as filling progresses. As new instrumentation is installed it is added to the monitoring program. The instrumentation shed that will house the electronics for the data collection system is currently in place. An electrical engineering consultant has been retained to install the electronic equipment and program the software used to download information from the sensors, store them in a database, and transmit them to a computer located in the Woodland Planning and Public Works office. Manual data collection is currently being performed prior to installation of the computer system.

The base liner for the aerobic cell was installed July 23 through July 27, 2001. This schedule allowed waste placement to begin in the aerobic cell as soon as the northeast anaerobic cell was filled. The installation of the surface membrane liner over the northeast cell was completed in November 2001. Installation of the membrane cover over the southeast aerobic cell has been eliminated. The revised cover for the southeast aerobic cell consists of 12-inches of soil covered by 12-inches of greenwaste alternative daily cover (ADC). The aerobic reaction will now be maintained by drawing air through the waste by a high vacuum blower. Drawing air through the waste will eliminate the difficulties associated with excessive pressure buildup under the liner and allow more accurate gas composition measurements from the aerobic reaction. The cover system includes a biofilter for treatment of the aerobic off-gas. Filling has begun in the westside bioreactor cell and the wet weather pad was constructed in this area. The west-side surface liner will be placed after it is filled during the summer of 2002.

APPENDIX D

AIR QUALITY CALCULATIONS

Appendix AIR-1 Estimate of year 2002 YCCL Fugitive Landfill Gas (LFG) Emissions and Increased Cancer Risks

YCCL Landfill Area=	473	acres
	1,914,231	Square Meters
	1384	Length of Equidistant Landfill Side

2002 YCCL Estimated LFG	914,500,000	scf/year
2002 YCCL Estimated LFG	228,625,000	scf/year
2002 YCCL Estimated LFG	6,472,374	m3/year
2002 YCCL Estimated LFG	0.21	m3/sec
2002 YCCL Estimated LFG	1.0722E-07	m3/m2/sec

Substance	MW	ppmv	mg/m3	mg/m2/sec	g/m2/sec	ug/m3 Maximum 1 hou Concentration	ug/m3 Maximum Annual	ug/m3 OEHHA 2004 Unit Risk Value	Cancer Risk
Unit Calculation for Screen3					1.00E-09	0.1580			
1,1,1-Trichloroethane (methyl chlo	133.42	0.048	0.26	2.80664E-08	2.81E-11	0.0044	3.55E-04	0	0
1,1,2,2-tetrachloroethane	167.85	1.11	7.62	8.16524E-07	8.17E-10	0.1290	1.03E-02	0.000058	5.9861E-07
1,1,2-Trichloroethane	133.41	0.1	0.55	5.84673E-08	5.85E-11	0.0092	7.39E-04	0.000016	1.18244E-08
1,1-Dichlorethene (vinylidene chlo	96.94	0.2	0.79	8.49684E-08	8.50E-11	0.0134	1.07E-03	0	0
1,1-Dichloroethane	98.6	2.35	9.47	1.01548E-06	1.02E-09	0.1604	1.28E-02	0.0000016	2.0537E-08
1,2-Dichloroethane (Ethylene dichl	98.96	0.41	1.66	1.77815E-07	1.78E-10	0.0281	2.25E-03	0.000021	4.71992E-08
1,2-Dichloropropane (propylene di	112.98	0.18	0.83	8.91248E-08	8.91E-11	0.0141	1.13E-03	0.00001	1.12654E-08
Acrylonitrile	53.06	6.33	13.73	1.47196E-06	1.47E-09	0.2326	1.86E-02	0.00029	5.39561E-06
Benzene	78.12	1.91	6.10	6.53913E-07	6.54E-10	0.1033	8.27E-03	0.000029	2.39698E-07
Carbon disulfide	76.13	0.58	1.80	1.93512E-07	1.94E-10	0.0306	2.45E-03	0	0
Carbon tetrachloride	153.84	0.004	0.03	2.69683E-09	2.70E-12	0.0004	3.41E-05	0.000042	1.43169E-09
Carbonyl sulfide	60.07	0.49	1.20	1.28997E-07	1.29E-10	0.0204	1.63E-03	0	0
Chlorobenzene	112.56	0.25	1.15	1.23324E-07	1.23E-10	0.0195	1.56E-03	0.00051	7.94998E-07
Chloroethane (ethyl chloride)	64.52	1.25	3.30	3.53451E-07	3.53E-10	0.0558	4.47E-03	0.000097	4.33359E-07
Chloroform	119.39	0.024	0.12	1.25575E-08	1.26E-11	0.0020	1.59E-04	0.0000053	8.41253E-10
Chloromethane	50.49	1.21	2.50	2.67741E-07	2.68E-10	0.0423	3.38E-03	0	0
Dichlorobenzene	147	0.21	1.26	1.35289E-07	1.35E-10	0.0214	1.71E-03	0	0
Dichloromethane (methylene chlor	84.94	14.3	49.65	5.3232E-06	5.32E-09	0.8411	6.73E-02	0.000001	6.72853E-08
Ethylene Dibromide	187.88	0.001	0.01	8.23389E-10	8.23E-13	0.0001	1.04E-05	0	0
Ethylbenzene	106.16	4.61	20.00	2.1448E-06	2.14E-09	0.3389	2.71E-02	0	0
Hexane	86.18	6.57	23.14	2.4814E-06	2.48E-09	0.3921	3.14E-02	0.0011	3.45014E-05
Mercury	200.61	0.000253	0.00	2.22432E-10	2.22E-13	0.0000	2.81E-06	0	0
Methyl ethyl ketone	72.11	7.09	20.90	2.24061E-06	2.24E-09	0.3540	2.83E-02	0	0
Methyl isobutyl ketone	100.16	1.87	7.66	8.20844E-07	8.21E-10	0.1297	1.04E-02	0	0
Perchloroethylene (tetrachloroethy	165.83	3.73	25.28	2.71079E-06	2.71E-09	0.4283	3.43E-02	0.0000059	2.0216E-07
Toluene	92.14	39.3	148.01	1.58696E-05	1.59E-08	2.5074	2.01E-01	0	0
Trichloroethylene (trichloroethene)	131.38	2.82	15.14	1.62369E-06	1.62E-09	0.2565	2.05E-02	0.000002	4.10469E-08
Vinyl Chloride	62.5	7.34	18.75	2.01048E-06	2.01E-09	0.3177	2.54E-02	0.000078	1.98218E-06
Xylenes	106.16	12.1	52.51	5.62951E-06	5.63E-09	0.8895	7.12E-02	0	0
								Increased Cancer Risk=	4.43494E-05

Distance from Landfill Feet	Meters	LFG (ug/m3) Maximum 1 hou Concentration	Increased Cancer Risk in a million
3278	999	0.158	44
600	182.88	0.1213	34
1400	426.72	0.1307	37
3400	1036.32	0.1518	43
4300	1310.64	0.1057	29
5200	1584.96	0.0801	22

APPENDIX E

LIST OF VASCULAR PLANTS IDENTIFIED AT THE PROJECT SITE

Appendix E. Vascular Plants Identified for The Yolo County Landfill Expansion

(Species identified during two site visits on December 12, 2002 and April 29, 2004; should not be considered a comprehensive list of all species occurring at the site)

Trees:

Eucalyptus globulus	Blue gum
Salix lasiolepis	Arroyo willow
Tamarix ramosissima	Tamarisk

Herbs:

Aira caryophyllea	European hairgrass
Amaranthus sp.	Pigweed
Arundo donax	Giant reed
Avena barbata	Slender wild oats
Avena fatua	Wild oats
Bellis perennis	European daisy
Brassica nigra	Black mustard
Bromus diandrus	Ripgut brome
Bromus hordeaceus	Soft chess
Bromus madritensis	Red brome
Cardaria chalepensis	Hoary cress
Centaurea solstitialis	Yellow star-thistle
Cirsium vulgare	Bull thistle
Convolvulus arvensis	Bindweed
Cuscuta sp.	Dodder
Crypsis schoenoides	Swamp grass
Cynara cardunculus	Artichoke thistle
Cynosurus echinatus	Dogstail
Daucus pusillus	Queen Anne's lace
Distichlis spicata	Saltgrass
Epilobium angustifolium	Fireweed
Epilobium ciliatum	Fireweed
Eremocarpus setigerus	Turkey mullein
Erodium cicutarium	Filaree
Foeniculum vulgare	Fennel
Hemizonia fitchii	Tarweed
Hirschfeldia incana	Field mustard
Holcus lanatus	Velvet grass
Hordeum murinum ssp. *leporinum*	Wild barley
Hypochaeris glabra	Smooth cat's ear
Hypochaeris radicata	Rough cat's ear
Lactuca biennis	Prickly lettuce
Lactuca serriola	Prickly lettuce

Lolium multiflorum	Annual ryegrass
Lolium perenne	Perennial ryegrass
Ludwigia peploides	Water primrose
Lupinus sp.	Lupine
Lythrum hyssopifolium	Hyssop loosestrife
Malvella leprosa	Alkali mallow
Medicago polymorpha	California burclover
Meliotis indica	Indian sweetclover
Mimulus guttatus	Common monkeyflower
Phalaris aquatica	Harding grass
Phalaris lemmonii	Lemmon's canarygrass
Picris echioides	Ox-tongue daisy
Plagiobothrys stipitatus var. *micranthus*	Slender popcornflower
Plantago lanceolata	English plantain
Polygonum persicaria	Smartweed
Polypogon monspeliensis	Rabbits-foot grass
Raphanus sativus	Wild radish
Rumex crispus	Curly dock
Salsola tragus	Tumbleweed
Scirpus acutus	Hard-stemmed bulrush
Scirpus microcarpus	Small-flowered bulrush
Silybium marianum	Milk thistle
Sonchus oleraceus	Sow thistle
Stephanomeria exigua	Stephanomeria
Trifolium sp.	Clover
Typha latifolia	Broadleaf cattail
Xanthium strumarium	Cocklebur

APPENDIX F

WETLAND DELINEATION

YOLO COUNTY
CENTRAL LANDFILL PROJECT

Wetland Delineation Report

August 2004

Prepared for:

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ESA Environmental Science Associates

202102

TABLE OF CONTENTS

YOLO COUNTY CENTRAL LANDFILL PROJECT
WETLAND DELINEATION REPORT

LIST OF TABLES

LIST OF FIGURES

APPENDICES

SECTION 1.0
SUMMARY

On behalf of Yolo County (the County), Environmental Science Associates (ESA) conducted a wetland delineation for an approximately 375-acre study area within the non-active portion of the Yolo County Central Landfill (YCCL) site. The purpose of the delineation was to identify and map all "Waters of the United States (U.S.)," including wetlands, that may be subject to regulation by the U.S. Army Corps of Engineers (Corps) under Section 404 of the Clean Water Act.

The YCCL is a municipal solid waste landfill located in an unincorporated part of the County about four miles northeast of Davis, and three miles southeast of Woodland, near the intersection of Roads 28H and 104. The entire site covers 725 acres. The landfill has been in operation since 1975, receiving waste from both incorporated and unincorporated areas of the County.

Approximately **61 acres** of wetlands and "other waters," including **10,638 linear ft.** (**2.23 acres**) of drainage ditches, were identified within the study area. Features within the Study Area consist of **seven (7) wetland areas, four (4) ponds, and five (5) drainage ditches**. All of the wetland and pond features were created from former upland areas by excavation between approximately 2 and 12 feet (ft.) below original elevation, for the purpose of obtaining borrow soil for active landfill operations. Borrow activities occurred between 1993 to current date. **Table 4-1** provides a summary of acreage calculations, linear lengths and average widths of ditches, and notes ditch channel lengths contained in culverts. **Figure 4-4** depicts the 375-acre delineation study area and shows all delineated features.

Four of the identified drainage ditches (**Ditches B, C, D and E**) function as part of the site's stormwater drainage system, ultimately discharging off-site to surface waters that are hydrologically linked to navigable waters of the U.S. (Willow Slough Bypass and Yolo Bypass). Although these ditches were constructed in former uplands for the purpose of site drainage, they are potentially subject to Corps jurisdiction based on hydrologic linkage to navigable surface waters. One ditch (**Ditch A**) is isolated from navigable waters and is likely not jurisdictional based on recent case law (Solid Waste Agency of Northern Cook County [SWANCC] decision).

Several of the identified wetlands and ponds have been created within the last five years (2002 to current) and would likely not be jurisdictional based on recent creation and conditions that have not attained "New Normal." Moreover, none of the identified wetlands or ponds is hydrologically linked via ditches or swales to other surface waters, and would therefore be considered "isolated" from navigable waters vis-à-vis the SWANCC decision. The project site is nearly level with a less than 10-foot elevational difference, therefore direct groundwater linkage to navigable waters is unlikely. Since the wetlands appear to be isolated waters, they are not likely to be regulated by the Corps.

This report documents the wetland boundary delineation and best professional judgment of ESA investigators. All conclusions presented should be considered preliminary and subject to change pending official review and verification in writing by the Corps.

SECTION 2.0
INTRODUCTION

2.1 PROJECT SITE AND STUDY AREA DESCRIPTION

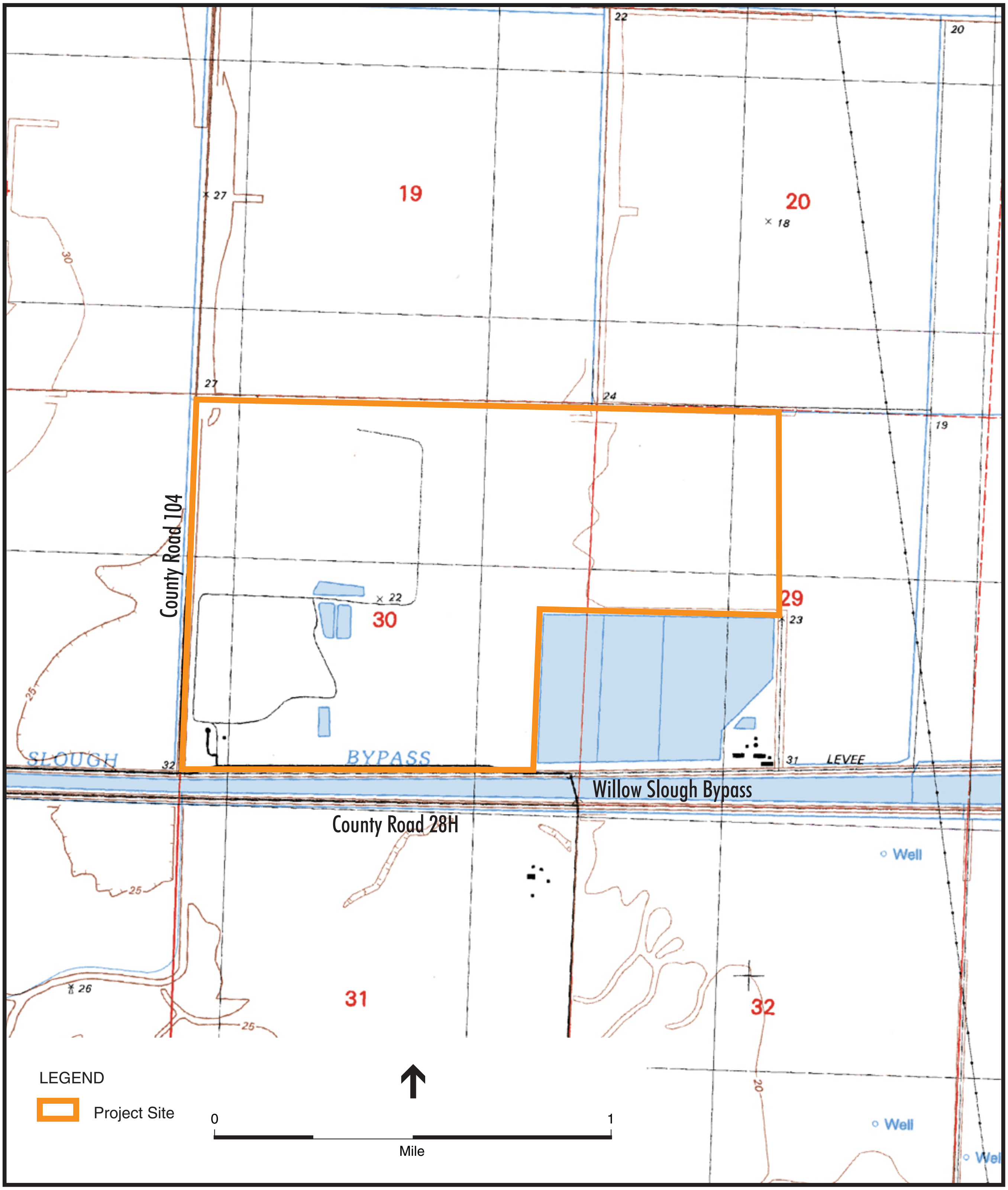
The YCCL is a municipal solid waste landfill located in an unincorporated part of the County about four miles northeast of Davis, and three miles southeast of Woodland, near the intersection of Roads 28H and 104 (**Figure 2-1**). The site covers 725 acres in Sections 29 and 30, T9N, R3E of the Davis, CA U.S. Geological Survey (USGS) 7.5 minute topographic quadrangle map. The site is nearly level with elevations ranging from 20 to 30 feet above mean sea level, excluding the existing waste modules.

The landfill has been in operation since 1975, receiving solid wastes classified as "inert" and "nonhazardous" from both incorporated and unincorporated areas of the County. Approximately 160,000 tons per year is disposed at the site. The YCCL is owned by the County of Yolo and operated by the Planning and Public Works Department, Division of Integrated Waste Management (DIWM). DIWM is proposing several major changes to the design and operation of the YCCL. Several of these changes will require revisions to the facility's existing permits, and may also require obtaining additional permits. Because of revisions and the potential requirement for new permit approvals, the proposed project is subject to the California Environmental Quality Act (CEQA). An Environmental Impact Report (EIR) is being prepared for the project.

In association with the Project EIR, this wetland delineation report focuses on inactive areas of the 725-acre YCCL site that may be subject to future alteration, including the alignment for an existing pipeline in the western area of the landfill. The 375-acre study area for the delineation is shown on the Delineation Map, **Figure 4-4**.

2.2 PURPOSE OF ASSESSMENT

The purpose of this investigation is to describe and delineate all Waters of the U.S. that are subject to Section 404 of the Clean Water Act within in the Study Area. Information from this report may be used in preparing permit applications, if necessary, for future actions proposed on the project site. This report will be reviewed by the Corps to verify their jurisdiction over wetlands and other Waters of the U.S.



SOURCE: USGS 7.5' Quadrangle (Davis); and Environmental Science Associates, 2004

Figure 2-1
Project Site Map

SECTION 3.0
METHODOLOGY

3.1 DEFINITION OF "WATERS OF THE U.S."

The term "Waters of the U.S." is defined as:

- All waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- All interstate waters; including interstate wetlands that have a hydrologic link to other Waters of the U.S.; or
- All other waters such as intrastate lakes, navigable rivers, streams, mudflats, sandflats, sloughs, or playa lakes. It also includes all intermittent and ephemeral streams and wetlands that have a demonstrated hydrologic link (surface or subsurface) to navigable Waters of the U.S.

"Wetlands" are defined for regulatory purposes as those Waters of the U.S. that "are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas" (Federal Register, 1980).

"Navigable waters" of the U.S. are defined as those subject to the ebb and flow of the tide shoreward to the mean high water mark and/or presently used, or have been used in the past, or are susceptible for use to transport interstate or foreign commerce. The term includes coastal and inland waters, lakes, rivers and streams that are navigable, and the territorial seas.

In January 2001, the U.S. Supreme Court issued a decision in the case of the Solid Waste Agency of Northern Cook County vs. U.S. Army Corps of Engineers that altered the Corps' regulatory authority over wetlands that are isolated from navigable waters[1].

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1 Since the SWANCC decision, waters covered solely by this definition by virtue of their use as habitat by migratory birds are no longer considered "waters of the United States." The Supreme Court's opinion did not specifically address what other connections with interstate commerce might support the assertion of CWA jurisdiction over "nonnavigable, isolated, intrastate waters" under this definition, and the Corp is recommending case by case consideration. A factor that may be relevant to this consideration includes, but is not limited to, the following: Jurisdiction of isolated, intrastate, and nonnavigable waters may be possible if their use, degradation, or destruction could affect other "waters of the United States," thus establishing a significant nexus between the water in question and other "waters of the United States" (Corps, undated memorandum).

3.2 PRE-FIELD REVIEW

Prior to conducting the field investigation, the following background tasks were conducted:

- Review of USGS 7.5' topographic quadrangle of Davis, CA (USGS, 1981);
- Review of Soil Survey of Yolo County, California (Andrews, 1972), for information about soils and climate regime in the area of the project;
- Review of Hydric Soils of California (USDA, 1995), to determine if any soils mapped within the project area have been listed as hydric;
- Consultation with the Natural Resources Conservation Service (NRCS), Yolo County Service Center, regarding properties including hydric components of soil units mapped within the project area. Review of report produced by NRCS on soil interpretations for the project site (USDA NRCS, 2004)
- Review of National Wetland Inventory (NWI) mapping (USFWS, 2002);
- Review of color aerial photography (AirPhotoUSA, 2002), for vegetative and hydrologic signatures.

3.3 FIELD INVESTIGATION

A wetland delineation was conducted within the YCCL study area by ESA Biologists Mary Pakenham-Walsh and Joshua Boldt on April 29, 2004. The delineation used the "Routine Determination Method" as described in the *1987 Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987), hereafter called the "1987 Manual."

Three positive wetland parameters must be present for an area to be wetland: 1) a dominance of wetland vegetation, 2) presence of hydric soils, and 3) presence of wetland hydrology. Presence or absence of positive indicators for wetland vegetation, soils and hydrology was assessed per the 1987 Manual guidelines. Data points were taken within suspected wetlands and a paired point taken (where applicable) in nearby uplands. Data points were recorded on standard ESA wetland delineation forms, contained in **Appendix A**. Waterways, including ditches with obvious bed and banks were characterized by noting vegetation and hydrologic observations and measuring cross-sections of channel banks to obtain average width of "Waters of the U.S." other than wetlands.

At each data point, a visual assessment of the dominant plant species within a six-foot radius was made. Dominant species were assessed using the recommended "50/20" rule per the 1987 Manual. Plants were identified to species using the *Jepson Manual: Higher Plants of California* (Hickman, 1993). The *National List of Plant Species that Occur in Wetlands* (Reed, 1988) was used to determine the wetland indicator status of the plants. Soils at each data point were characterized by texture; color was described using Munsell soil color charts (1990). Representative photographs were taken throughout the Project area.

Presence of wetland hydrology was determined at each data point by presence of one or more of the following indicators: visual observation of inundation, observation of soil saturation within

12" of the surface, oxidized root channels, algal matting, sediment deposits, flow or drift accumulations at channel margins, channel flow marks in beds, scouring, surface cracking, water staining, and topography ("wetland drainage patterns"). Evidence of wetland hydrologic characteristics in channels utilized primary visual observation, focusing on drainage patterns, drift lines, sediment deposits, and watermarks within the channel.

3.4 MAPPING AND ACREAGE CALCULATIONS

All features including data points, wetland boundaries and channels, were hand-recorded on a color aerial photograph (AirPhotoUSA, 2002; 1 inch = 700 ft.) field map, with measurements on ditch widths recorded into a field notebook. Data points and wetland boundaries were recorded using a Global Positioning System (GPS) unit (Trimble GeoXT) with real-time differential correction and an instrument-rated mapping accuracy of +/- 3 meters. All data were downloaded into ArcMap 8.3 and overlaid onto the geo-referenced aerial photograph (AirPhotoUSA, 2002). Visual checking of Geographic Information System (GIS)-mapped features in relation to known landmarks visible on aerial photography (e.g., roads and ditches) indicate that mapping accuracy is closer to +/- 1 meter. This is additionally supported by consistent satellite reception and open (non-canopy) conditions under which the GPS data were collected. Calculation of wetland area and linear feet (e.g., ditches) calculations were performed in ArcMap.

SECTION 4.0
RESULTS

4.1 DOCUMENT REVIEW

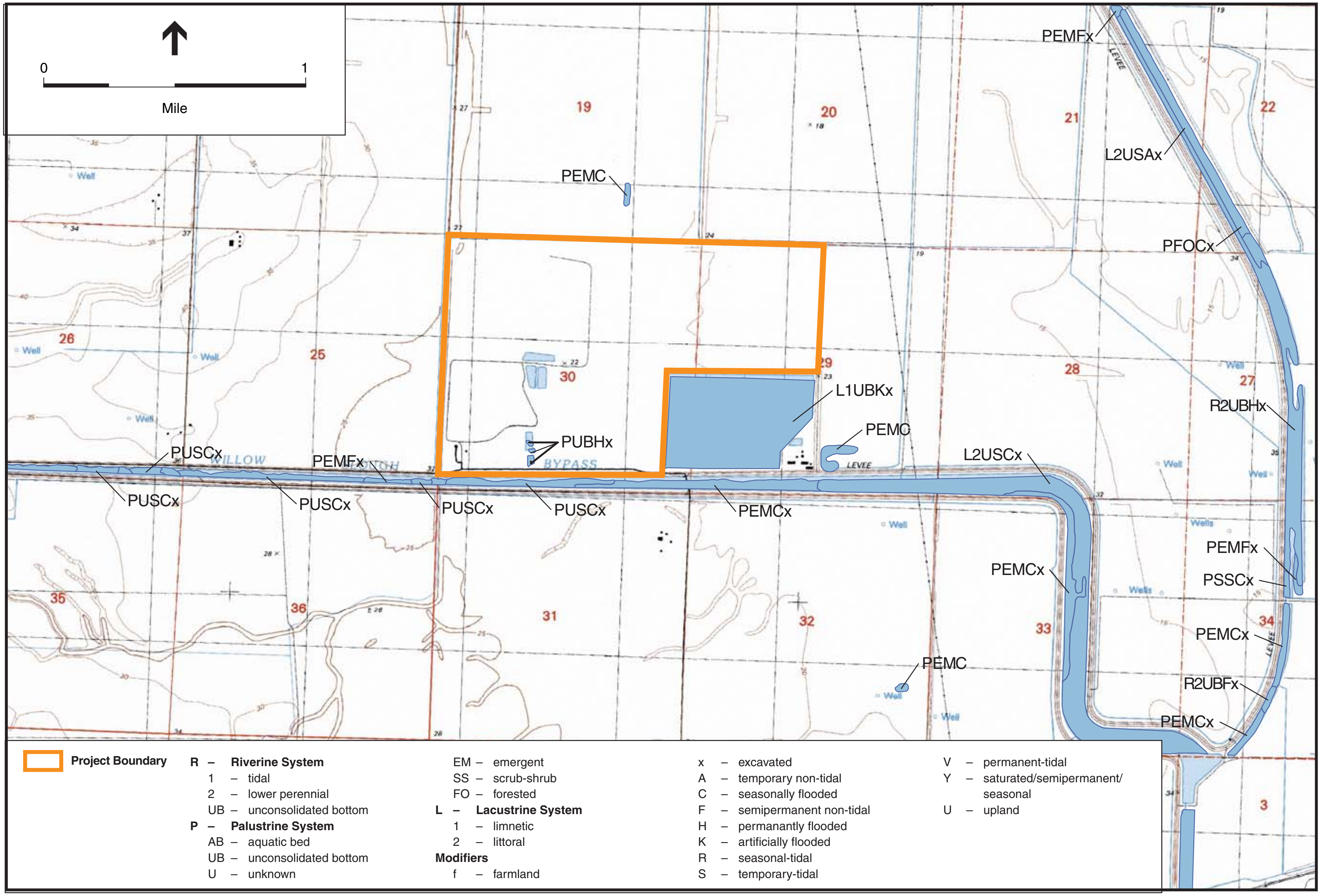
4.1.1 NATIONAL WETLAND INVENTORY MAPPING

National Wetland Inventory (NWI) mapping (USFWS, 2002) indicates only excavated (man-made) pond features within the YCCL site (**Figure 4-1**). Perimeter ditches are depicted on the USGS base mapping (USGS) along the western and northern boundaries of the site. Willow Slough Bypass, a branch of Willow Slough, is shown bordering the south side of County Road 28H south of the site.

4.1.2 SOIL MAPPING

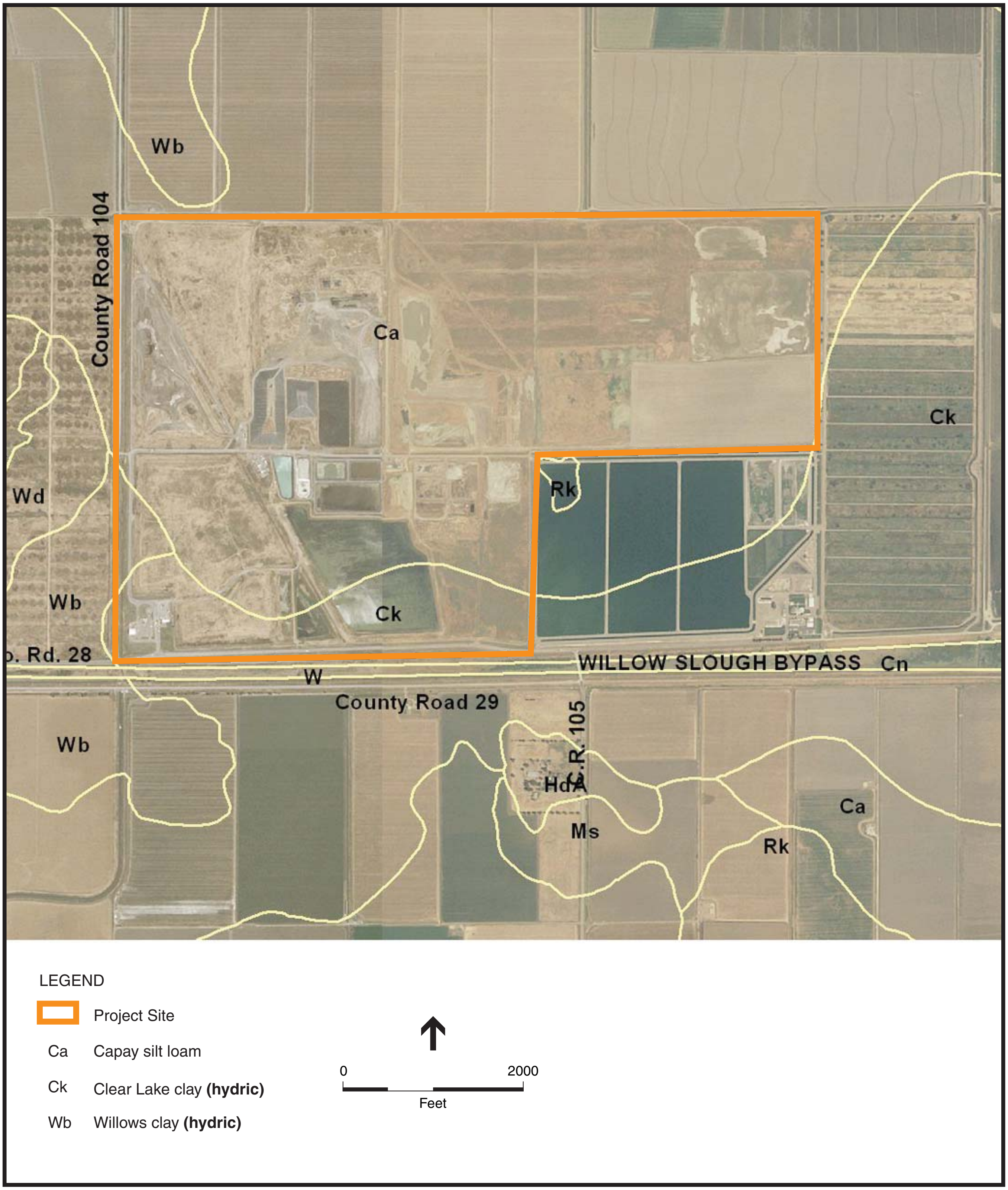
The *Soil Survey of Yolo County, California* (Andrews, 1972) shows three soil series within the Project area (**Figure 4-2**). Two of the soil series are considered hydric (NRCS, 2004). The following is a listing and brief description of soils mapped in the Project area:

> **Capay silt loam** (Ca), is not listed as hydric by NRCS (2004). **Hydric inclusions may occur** where small areas of hydric soil units (e.g., Clear Lake clay) exist. The soil formed in alluvium from sedimentary rock sources and is moderately well drained. It occurs on basin rims with slopes ranging from 0 to 2 percent. In a typical profile, from 0–11 inches the soil is grayish-brown (2.5Y 5/2) silty clay, with common, fine, distinct mottles (7.5YR 4/4). From 11 to 18 inches, the soil has the same matrix color and texture, with common, fine distinct mottles (10YR 4/3).
>
> **Clear Lake clay** (Ck) is a **hydric** soil (NRCS, 2004). The poorly drained clay soil occurs in basins, where it formed in alluvium primarily from sedimentary rock sources. In a typical profile, from 0–3 inches the soil is dark gray (5Y 4/1) clay, with few, fine, prominent, dark-brown (7.5YR 4/4) mottles. From 3–15 inches, the soil has the same matrix color and texture, with common, fine, prominent, reddish-brown (5Y 4/4) mottles.
>
> **Willows clay** (Wb) is a **hydric** soil (NRCS, 2004). The poorly drained clay soil occurs in basins, where it formed in alluvium from mixed sources. In a typical profile, from 0–14 inches the soil is gray (5Y 5/1) clay, with many, fine, prominent, strong-brown (7.5YR 5/6) mottles.



SOURCE: USGS 7.5' Quadrangle (Davis); National Wetland Inventory, 2002; and Environmental Science Associates, 2004

Figure 4-1
National Wetland Inventory Mapping



SOURCE: Soil Survey of Yolo County, California (Andrews, 1972); NRCS Yolo County Service Center (Phil Hogan, 2004); and Environmental Science Associates, 2004

Figure 4-2
Soil Mapping

4.2 FIELD INVESTIGATION

4.2.1 PROJECT AREA SETTING AND VEGETATION COMMUNITIES

The project site is located approximately three miles northeast of the City of Davis. Average annual temperatures range from 50–62° F while average rainfall ranges between 16–24 inches. The site is nearly level with less than a 10-foot difference in elevation (excluding the existing waste modules) across the site. The site is surrounded by agricultural land use, with the exception of the City of Davis Wastewater Treatment Plant (WWTP) ponds and overland flow treatment areas adjacent to the YCCL on the east and southeast boundaries.

Non-native annual grasses and herbaceous weed species dominate the upland vegetation at the site. Approximately 90 acres in the eastern portion of the site are used for agricultural production of kenaf. The two approximately 45-acre kenaf fields are irrigated as part the site's groundwater management program.

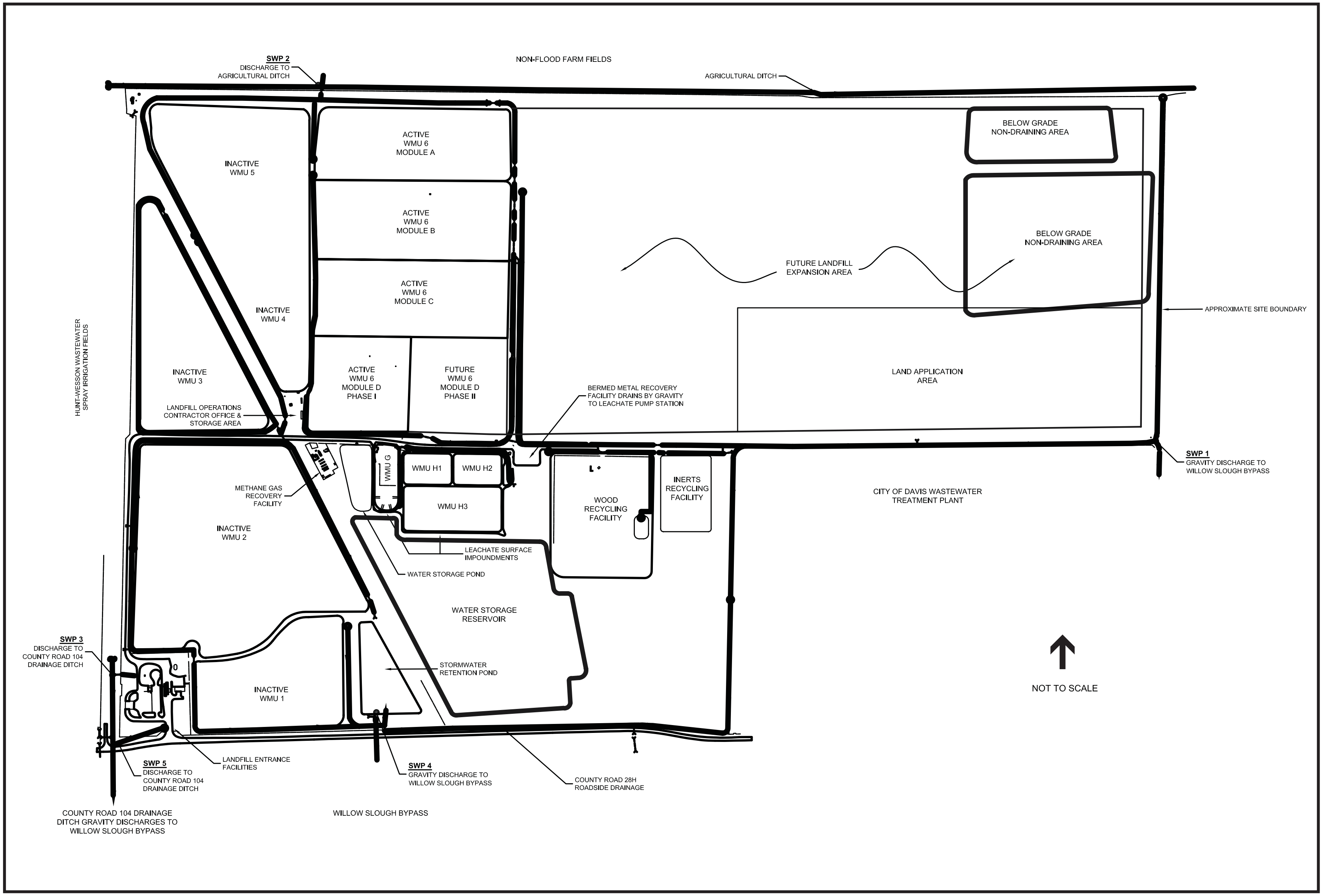
4.2.2 OVERVIEW OF SITE HYDROLOGY

Surface waters in the immediate project vicinity include the Willow Slough Bypass channel, which borders the site to the south, and the City of Davis WWTP ponds immediately south of the site. The southern part of the YCCL site drains toward the Willow Slough Bypass, and a portion of the northern area of the site drains into an unnamed irrigation ditch located adjacent to (outside) the site's north boundary. This ditch drains eastward and eventually into the Yolo Bypass. Both bypass tributaries ultimately flow to the Sacramento River, which is located approximately six miles east of the site.

Hydrologic features within the study area include five drainage ditches, four open water ponds, and seven seasonal wetlands. **Figure 4-3** depicts the YCCL drainage network, showing five stormwater discharge locations (labeled "SWP") to off-site waters. **Figure 4-4** depicts the five ditches (A – E) identified within the study area, as well as all identified wetland and open water features. Most of the water conveyed off-site flows into the Willow Slough Bypass, however runoff from a portion of the north area of the site flows into an agricultural ditch that borders the site to the north. This off-site ditch eventually drains into the Yolo Bypass, as noted above.

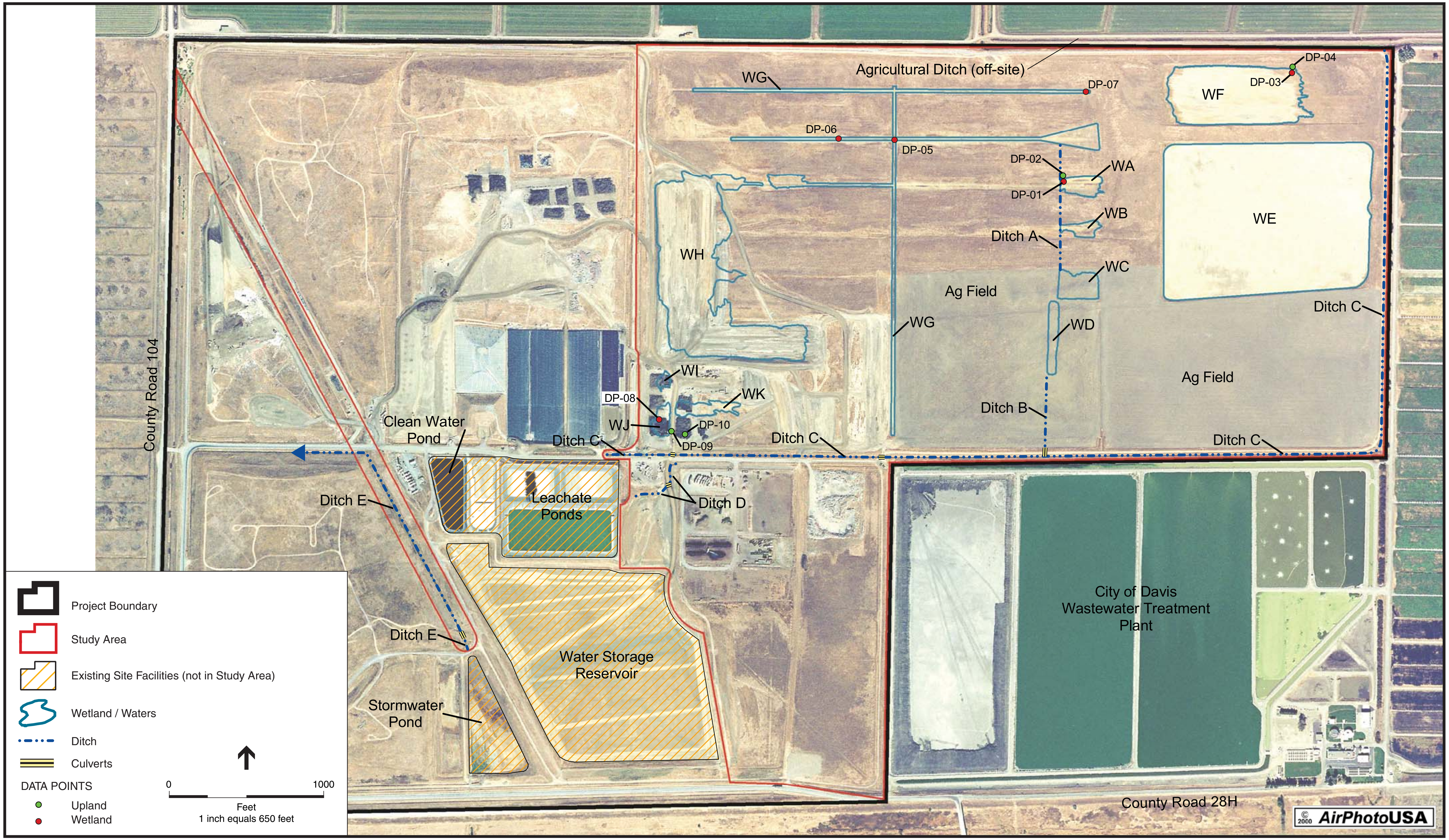
4.2.3 POTENTIAL JURISDICTIONAL WATERS OF THE U.S.

Approximately **61 acres** of wetlands and "other waters," including **7.95 acres** of wetlands, **50.70 acres** of open water/ponds, and **2.23 acres** of drainage ditches, were identified within the study area. Features within the Study Area consist of seven (7) wetland areas, four (4) ponds, and five (5) drainage ditches. All of the wetland and pond features were created from former upland areas by excavation between approximately 2 and 12 feet below original grade, for the purpose of obtaining borrow soil for active landfill operations. Borrow activities occurred between 1993 to current date. **Table 4-1** provides a summary of acreage calculations, linear lengths and average widths of ditches, and notes ditch channel lengths contained in culverts. **Figure 4-4** depicts the



SOURCE: Yolo County, 2002; and Environmental Science Associates, 2004

Figure 4-3
Project Site Stormwater Drainage



SOURCE: AirPhotoUSA, 2002; and Environmental Science Associates, 2004

Yolo County Landfill Wetland Delineation / 202102

Figure 4-4
Delineated Features

TABLE 4-1
DELINEATED FEATURES WITHIN THE STUDY AREA

Feature ID	Type of Feature	Linear Ft. Open Stream	Average Channel Width	Ft^2	Acres	Linear Ft. Culvert*
Open Water (Ponds)						
WD	Agricultural pond	N/A	N/A	28,427	0.65	N/A
WE	Pond – excavated 1997	N/A	N/A	1,287,263	29.55	N/A
WF	Pond – excavated 1997	N/A	N/A	308,884	7.09	N/A
WH	Pond – excavated 2002	N/A	N/A	583,717	13.40	N/A
	Open Water Subtotal	**N/A**	**N/A**	**2,208,292**	**50.70**	**N/A**
Drainage Ditches						
A	Drainage ditch	799	5	4,060	0.09	N/A
B	Drainage ditch	456	5	2,300	0.05	58
C	Drainage ditch	7,508	10	75,246	1.73	68
D	Drainage ditch	411	3	1,228	0.03	31
E	Drainage ditch	1,463	8	14,205	0.33	50
	Ephemeral Subtotal	**10,638**	**N/A**	**97,039**	**2.23**	**207**
Wetlands						
WA	Seasonal wetland	N/A	N/A	29,089	0.67	N/A
WB	Seasonal wetland	N/A	N/A	17,515	0.40	N/A
WC	Seasonal wetland	N/A	N/A	42,584	0.98	N/A
WG	Seasonal wetland	N/A	N/A	202,432	4.65	N/A
WI	Seasonal wetland	N/A	N/A	6,665	0.15	N/A
WJ	Seasonal wetland	N/A	N/A	18,561	0.43	N/A
WK	Seasonal wetland	N/A	N/A	29,651	0.68	N/A
	Wetland Subtotal	**N/A**	**N/A**	**346,498**	**7.95**	**N/A**
	TOTAL	**10,638**	**N/A**	**2,651,828**	**60.88**	**207**

Source: ESA, 2004
* Culvert lengths should be added to stream channel lengths for total waterway lengths.

375-acre delineation study area and shows all delineated features. Data sheets are provided in **Appendix A**. Representative photographs of delineated features are provided in **Appendix B**.

SEASONAL WETLANDS

Seven seasonal wetlands totaling **7.95 acres** were identified within the study area (**Table 4-1**). Six of these (WA, WB, WC, WI, WJ and WK) are irregular polygons in shape, while feature WG consists of a series of straight, wide swales that average 20 feet in width throughout (**Figure 4-4**). Photographs of WA and WG are provided in **Appendix B**. All of these wetlands are depressional (approximately 2–5 ft. lower) in relation to the upland annual grassland that surround them, and all of them were created by topsoil scraping to obtain borrow material for active landfill operations. Based on documentation provided by Yolo County Planning and Public Works Department, the area containing wetlands WA, WB, WC and WG was actively borrowed from in 1993. The area containing wetlands WI, WJ and WK is designated as a current borrow area. At the time of the site visit, fresh excavation from this area was not observed, however County documentation indicates that excavation has occurred within the last five years.

These seasonal wetlands are dominated by one or more of the following species: swamp pricklegrass (*Crypsis schoenoides*, OBL), rough cocklebur (*Xanthium strumarium*, FAC+), rabbits-foot grass (*Polypogon monspeliensis*, FACW+) and hyssop loosestrife (*Lythrum hyssopifolium, FACW*). Species diversity is generally low. Hydric soils, silty clay in texture, underlay the wetlands. Soils exhibited low chroma coloration (e.g., 5Y 4/2) and in many cases, distinct mottling. Wetland hydrology is provided by a combination of high seasonal groundwater and surface-driven precipitation. The groundwater table beneath the site is naturally high and is additionally elevated from crop irrigation, spray disposal, and wastewater reclamation activities on adjacent parcels. The water table ranges seasonally between 4 and 15 feet below ground surface, and excavation of the seasonal wetlands to approximately 2–5 ft. below surrounding upland elevation decreases the distance between the wetland surface elevations and seasonally high groundwater.

None of the seasonal wetlands are likely to be jurisdictional based on one or both bases of recent creation and/or hydrologic isolation vis-à-vis the SWANCC decision. "New Normal Conditions" may apply to wetlands WA, WB, WD and WG since they were created in 1993. Wetlands WI, WJ and WK, however, were created less than five years ago and would not be considered "New Normal Conditions."

More significantly, none of the wetlands are hydrologically linked via ditches or swales to other surface waters. Wetland WG generally drains toward the central north-south swale, however there is no culvert outlet at the southern end of the central swale, nor any other drainage connections to the on-site drainage network. **Appendix B** provides a photograph of the southern end of Wetland WG. Wetland WG is hydrologically linked to Wetlands WA, WB, WC and Ditch A. However, Ditch A terminates at its connection to Wetland WC, and there is no hydrologic connection between Wetland WC and other surface waters. Given the flat nature of the site, there is also no apparent sub-surface hydrologic connection to nearby surface waters. As isolated waters, the created seasonal wetlands are most likely non-jurisdictional based on recent case law (SWANCC).

OTHER WATERS OF THE U.S.

Ponds/Open Water

Four open water ponds occur (WD, WE, WF and WH) within the study area, totaling **50.70** acres (**Table 4-1**). Photographs of ponds WE and WF are provided in **Appendix B**. Ponds WE, WF and WG are up to 10 feet deep, and are primarily open water with minimal emergent wetland vegetation. Throughout the course of the season, these ponds likely "draw down" to expose wetland habitat along the perimeter. At the time of the site visit, minimal wetland areas were observed along the northeastern portion of WF, and around portions of the WH pond perimeter. Rabbits-foot grass, swamp pricklegrass, and rough cocklebur dominate wetland areas fringing the ponds. Data point DP-03 provides a typical representation of pond-fringing wetlands around ponds WE, WF and WH.

Ponds WE, WF and WH were artificially created by excavation for borrow soil used in construction of existing waste modules. Excavation of ponds WE and WF occurred in 1997, and occurred in 2002 for pond WH. Ponds WE and WF may be considered “New Normal Conditions” for jurisdictional purposes under Section 404. Pond WH was created less than five years ago from an area that was most likely previous upland, and is likely not jurisdictional as it was created approximately two years ago. Moreover, none of the ponds is hydrologically linked via ditches or swales to other surface waters. Given the flat nature of the site, there is also no apparent sub-surface hydrologic connection to nearby surface waters. As isolated waters, the ponds are most likely non-jurisdictional based on recent case law (SWANCC decision).

Pond WD is an artificial irrigation tail water pond that collects irrigation return water from the currently planted kenaf field, which occurs adjacent to WD on the west (**Figure 4-4**). The pond was recently constructed for agricultural purposes in association with the landfill’s groundwater management program, as described earlier. Water from the pond is pumped into surface PVC piping via a portable pump, and re-routed through a closed drainage network. This pond is likely non-jurisdictional on the bases that it was recently created out of uplands for the sole purpose of agricultural practices, additionally in the context of a groundwater treatment system for landfill operations. The pond is also part of a closed hydrologic system and would dry up without the input of returned irrigation water.

Drainage Ditches

Five drainage ditches (A – E) occur in the study area, totaling **2.23 acres** and **10,638 linear feet** (**Table 4-1**). Average width and linear feet of channel contained in culverts are provided in **Table 4-1**. All ditches in the study area were constructed in areas likely to have been former uplands for the purpose of providing stormwater drainage on the site. Ditch A (see photo **Appendix B**) originates at the southeastern corner of Wetland G, and slopes gently toward the south, crossing the western ends of Wetlands A and B such that the ditch bed is contiguous with these wetlands. The ditch terminates at the northwestern corner of Wetland C. Ditch A is unvegetated, and was dry at the time of the site visit. The ditch is hydrologically isolated from other surface waters and is likely non-jurisdictional based on recent case law (SWANCC decision).

Ditches B, C, D and E are part of the site’s stormwater drainage network, discharging off-site to surface waters that are hydrologically linked, ultimately, to navigable waters of the U.S. (Willow Slough and Yolo Bypasses). A photograph of Ditch C (**Appendix B**) provides a typical view of site perimeter ditches. Ditch banks are fairly steep, and vegetated with perennial ryegrass (*Lolium perenne*, FAC*), black mustard (*Brassica nigra*, NL), and additional non-native upland grasses (e.g., *Bromus diandrus*, NOL). Ditches B, C and D lack wetland vegetation and were dry at the time of the site visit, with the only exception of Ditch C in the far southeast and northeast corners of the study area. Bulrush (*Scirpus acutus*, OBL) occurs in these restricted areas. Ditch C has an open hydrologic connection to both the off-site agricultural ditch to the north, and to the a ditch that runs southward along the east side of the Davis WWTP ponds. Ditch E contained about 1 ft. of water at the time of the site visit. No wetland vegetation was observed within the steep-sided channel.

Ditches B, C, D and E are hydrologically linked to off-site surface waters that are ultimately linked to navigable waters of the U.S. (Willow Slough Bypass and Yolo Bypass). Although the ditches were constructed in former uplands for the purpose of site drainage, they are potentially subject to Corps jurisdiction based on hydrologic linkage to navigable surface waters.

4.2.4 CONCLUSIONS

With the exception of four perimeter drainage ditches that may be subject to jurisdiction under Section 404 of the Clean Water Act, the remaining delineated pond, wetland and ditch features are unlikely to be regulated by the Corps on the basis of either recent creation (within the last five years) and/or “isolated” hydrology from navigable waters, vis-à-vis the SWANCC decision.

This report documents the wetland boundary delineation and best professional judgment of ESA investigators. All conclusions presented should be considered preliminary and subject to change pending official review and verification in writing by the Corps.

SECTION 5.0
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APPENDIX G

SWAINSON'S HAWK TECHNICAL ADVISORY COMMITTEE (2000) GUIDELINES

RECOMMENDED TIMING AND METHODOLOGY FOR SWAINSON'S HAWK NESTING SURVEYS IN CALIFORNIA'S CENTRAL VALLEY

Swainson's Hawk Technical Advisory Committee

May 31, 2000

This set of survey recommendations was developed by the Swainson's Hawk Technical Advisory Committee (TAC) to maximize the potential for locating nesting Swainson's hawks, and thus reducing the potential for nest failures as a result of project activities/disturbances. The combination of appropriate surveys, risk analysis, and monitoring has been determined to be very effective in reducing the potential for project-induced nest failures. As with most species, when the surveyor is in the right place at the right time, Swainson's hawks may be easy to observe; but some nest sites may be very difficult to locate, and even the most experienced surveyors have missed nests, nesting pairs, mis-identified a hawk in a nest, or believed incorrectly that a nest had failed. There is no substitute for specific Swainson's hawk survey experience and acquiring the correct search image.

METHODOLOGY

Surveys should be conducted in a manner that maximizes the potential to observe the adult Swainson's hawks, as well as the nest/chicks second. To meet the California Department of Fish and Game's (CDFG) recommendations for mitigation and protection of Swainson's hawks, surveys should be conducted for a ½ mile radius around all project activities, and if active nesting is identified within the ½ mile radius, consultation is required. In general, the TAC recommends this approach as well.

Minimum Equipment

Minimum survey equipment includes a high-quality pair of binoculars and a high quality spotting scope. Surveying even the smallest project area will take hours, and poor optics often result in eye-strain and difficulty distinguishing details in vegetation and subject birds. Other equipment includes good maps, GPS units, flagging, and notebooks.

Walking vs Driving

Driving (car or boat) or "windshield surveys" are usually preferred to walking if an adequate roadway is available through or around the project site. While driving, the observer can typically approach much closer to a hawk without causing it to fly. Although it might appear that a flying bird is more visible, they often fly away from the observer using trees as screens; and it is difficult to determine from where a flying bird came. Walking surveys are useful in locating a nest after a nest territory is identified, or when driving is not an option.

Angle and Distance to the Tree

Surveying subject trees from multiple angles will greatly increase the observer's chance of detecting a nest or hawk, especially after trees are fully leafed and when surveying multiple trees in close proximity. When surveying from an access road, survey in both directions. Maintaining a distance of 50 meters to 200 meters from subject trees is optimal for observing perched and flying hawks without greatly reducing the chance of detecting a nest/young: Once a nesting territory is identified, a closer inspection may be required to locate the nest.

Speed
Travel at a speed that allows for a thorough inspection of a potential nest site. Survey speeds should not exceed 5 miles per hour to the greatest extent possible. If the surveyor must travel faster than 5 miles per hour, stop frequently to scan subject trees.

Visual and Aural Ques
Surveys will be focused on both observations and vocalizations. Observations of nests, perched adults, displaying adults, and chicks during the nesting season are all indicators of nesting Swainson's hawks. In addition, vocalizations are extremely helpful in locating nesting territories. Vocal communication between. hawks is frequent during territorial displays; during courtship and mating; through the nesting period as mates notify each other that food is available or that a threat exists; and as older chicks and fledglings beg for food.

Distractions
Minimize distractions while surveying. Although two pairs of eyes may be better than one pair at times, conversation may limit focus. Radios should be off, not only are they distracting, they may cover a hawk's call.

Notes and Species Observed
Take thorough field notes. Detailed notes and maps of the location of observed Swainson's hawk nests are essential for filling gaps in the Natural Diversity Data Base; please report all observed nest sites. Also document the occurrence of nesting great homed owls, red-tailed hawks, red-shouldered hawks and other potentially competitive species. These species will infrequently nest within 100 yards of each other, so the presence of one species will not necessarily exclude another.

TIMING

To meet **the minimum level** of protection for the species, surveys should be completed for **at least** the two survey periods immediately prior to a project's initiation. For example, if a project is scheduled to begin on June 20, you should complete 3 surveys in Period III and 3 surveys in Period V. However, it is always recommended that surveys be completed in Periods II, III and V. **Surveys should not be conducted in Period IV.**

The survey periods are defined by the timing of migration, courtship, and nesting in a "typical" year for the majority of Swainson's hawks from San Joaquin County to Northern Yolo County. Dates should be adjusted in consideration of early and late nesting seasons, and geographic differences (northern nesters tend to nest slightly later, etc). If you are not sure, contact a TAC member or CDFG biologist.

Survey dates **Justification and search image**	**Survey time**	**Number of Surveys**
I. *January-March 20 (recommended optional)*	*All day*	*1*

Prior to Swainson's hawks returning, it may be helpful to survey the project site to determine potential nest locations. Most nests are easily observed from relatively long distances, giving the surveyor the opportunity to identify potential nest sites, as well as becoming familiar with the project area. It also gives the surveyor the opportunity to locate and map competing species nest sites such as great homed owls from February on, and red-tailed hawks from March on. After March 1, surveyors are likely to observe Swainson's hawks staging in traditional nest territories.

II. *March 20 to April 5*	*Sunrise to 1000* *1600 to sunset*	*3*

Most Central Valley Swainson's hawks return by April 1, and immediately begin occupying their traditional nest territories. For those few that do not return by April 1, there are often hawks ("floaters") that act as place-holders in traditional nest sites; they are birds that do not have mates, but temporarily attach themselves to traditional territories and/or one of the site's "owners." Floaters are usually displaced by the territories' owner(s) if the owner returns.

Most trees are leafless and are relatively transparent; it is easy to observe old nests, staging birds, and competing species. The hawks are usually in their territories during the survey hours, but typically soaring and foraging in the mid-day hours. Swainson's hawks may often be observed involved in territorial and courtship displays, and circling the nest territory. Potential nest sites identified by the observation of staging Swainson's hawks will usually be active territories during that season, although the pair may not successfully nest/reproduce that year.

III. *April 5 to April 20*	*Sunrise to 1200* *1630 to Sunset*	***3***

Although trees are much less transparent at this time, 'activity at the nest site increases significantly. Both males and females are actively nest building, visiting their selected site frequently. Territorial and courtship displays are increased, as is copulation. The birds tend to vocalize often, and nest locations are most easily identified. This period may require a great deal of "sit and watch" surveying.

IV. *April 21 to June 10*	*Monitoring known nest sites only* ***Initiating Surveys is not recommended***

Nests are extremely difficult to locate this time of year, and even the most experienced surveyor will miss them, especially if the previous surveys have not been done. During this phase of nesting, the female Swainson's hawk is in brood position, very low in the nest, laying eggs, incubating, or protecting the newly hatched and vulnerable chicks; her head may or may not be visible. Nests are often well-hidden, built into heavily vegetated sections of trees or in clumps of mistletoe, making them all but invisible. Trees are usually not viewable from all angles, which may make nest observation impossible.

Following the male to the nest may be the only method to locate it, and the male will spend hours away from the nest foraging, soaring, and will generally avoid drawing attention to the nest site. Even if the observer is fortunate enough to see a male returning with food for the female, if the female determines it is not safe she will not call the male in, and he will not approach the nest; this may happen if the observer, or others, are too close to the nest or if other threats, such as rival hawks, are apparent to the female or male.

V. ***June 10 to JuIy 30 (post-fledging)*** ***Sunrise to 1200*** ***3***
1600 to sunset

Young are active and visible, and relatively safe without parental protection. Both adults make numerous trips to the nest and are often soaring above, or perched near or on the nest tree. The location and construction of the nest may still limit visibility of the nest, young, ‘and adults.

DETERMINING A PROJECT'S POTENTIAL
FOR IMPACTING SWAINSON'S HAWKS

LEVEL OF RISK	REPRODUCTIVE SUCCESS (Individuals)	LONGTERM SURVIVABILITY (Population)	NORMAL SITE CHARACTERISTICS (Daily Average)	NEST MONI-TORING
HIGH	Direct physical contact with the nest tree while the birds are on eggs or protecting young. (Helicopters in close proximity)	Loss of available foraging area. Loss of nest trees.	Little human-created noise, little human use: nest is well away from dwellings, equipment yards, human access areas, etc. *Do not include general cultivation practices in evaluation.*	MORE
	Loss of nest tree after nest building is begun prior to laying eggs.	Loss of potential nest trees.		
	Personnel within 50 yards of nest tree (out of vehicles) for extended periods while birds are on eggs or protecting young that are < 10 days old.	Cumulative: Multi-year, multi-site projects with substantial noise/personnel disturbance.		
	Initiating construction activities (machinery and personnel) within 200 yards of the nest after eggs are laid and before young are > 10 days old.	Cumulative: Single-season projects with substantial noise/personnel disturbance that is greater than or significantly different from the daily norm.		
	Heavy machinery only working within 50 yards of nest.			
	Initiating construction activities within 200 yards of nest before nest building begins or after young > 10 days old.		Substantial human-created noise and occurrence: nest is near roadways, well-used waterways, active airstrips, areas that have high human use. *Do not include general cultivation practices in evaluation.*	
LOW	All project activities (personnel and machinery) greater than 200 yards from nest.	Cumulative: Single-season projects with activities that "blend" well with site's "normal' activities.		LESS

APPENDIX H

CDFG BURROWING OWL RECOMMENDATIONS

State of California

M e m o r a n d u m

: "Div. Chiefs - IFD, BDD, NED, & WMD
Reg. Mgrs. - Regions 1, 2, 3, 4, & 5

Date : October 17, 1995

From : Department of Fish and Game

Subject : Staff Report on Burrowing Owl Mitigation

I am hereby transmitting the Staff Report on Burrowing Owl Mitigation for your use in reviewing projects (California Environmental Quality Act [CEQA] and others) which may affect burrowing owl habitat. The Staff Report has been developed during the last several months by the Environmental Services Division (ESD) in cooperation with the Wildlife Management Division (WMD) and regions 1, 2, and 4. It has been sent out for public review and redrafted as appropriate.

Either the mitigation measures in the staff report may be used or project specific measures may be developed. Alterative project specific measures proposed by the Department divisions/regions or by project sponsors will also be considered. However, such mitigation measures must be submitted to ESD for review. The review process will focus on the consistency of the proposed measure with Department, Fish and Game Commission, and legislative policy and with laws regarding raptor species. ESD will coordinate project specific mitigation measure review with WMD.

If you have any questions regarding the report, please contact Mr. Ron Rempel, Supervising Biologist, Environmental Services Division, telephone (916) 654-9980.

COPY Original signed by C.F Raysbrook

C. F. Raysbrook
Interim Director

Attachment

cc: Mr. Ron Rempel
Department of Fish and Game
Sacramento

STAFF REPORT ON BURROWING OWL MITIGATION

Introduction

The Legislature and the Fish and Game Commission have developed the policies, standards and regulatory mandates to protect native species of fish and wildlife. In order to determine how the Department of Fish and Game (Department) could judge the adequacy of mitigation measures designed to offset impacts to burrowing owls *(Speotyto cunicularia;* A.O.U. 1991) staff (WMD, ESD, and Regions) has prepared this report. To ensure compliance with legislative and commission policy, mitigation requirements which are consistent with this report should be incorporated into: (1) Department comments to Lead Agencies and project sponsors pursuant to the California Environmental Quality Act (CEQA); and (2) other authorizations the Department gives to project proponents for projects impacting burrowing owls.

This report is designed to provide the Department (including regional offices and divisions), CEQA Lead Agencies and project proponents the context in which the Environmental Services Division (ESD) will review proposed project specific mitigation measures. This report also includes preapproved mitigation measures which have been judged to be consistent with policies, standards and legal mandates of the Legislature,. the Fish and Game Commission and the Department's public trust responsibilities. Implementation of mitigation measures consistent with this report are intended to help achieve the conservation of burrowing owls and should compliment multi-species habitat conservation planning efforts currently underway. The *Burrowing Owl Survey Protocol and Mitigation Guidelines* developed by The California Burrowing Owl Consortium (CBOC 1993) were taken into consideration in the preparation of this staff report as were comments from other interested parties.

A range-wide conservation strategy for this species is needed. Any range-wide conservation strategy should establish criteria for avoiding the need to list the species pursuant to either the California or federal Endangered Species Acts through preservation of existing habitat, population expansion into former habitat, recruitment of young into the population, and other specific efforts.

California's burrowing owl population is clearly declining and, if declines continue, the species may qualify for listing. Because of the intense pressure for urban development within suitable burrowing owl nesting and foraging habitat (open, flat and gently rolling grasslands and grass/shrub lands) in California, conflicts between owls and development projects often occur. Owl survival can be adversely affected by disturbance and foraging habitat loss even when impacts to individual birds and nests/burrows are avoided. Adequate information about the presence of owls is often unavailable prior to project approval. Following project approval there is no legal mechanism through which to seek mitigation other than avoidance of occupied burrows or nests. The absence of standardized survey methods often impedes consistent impact assessment.

Burrowing Owl Habitat Description

Burrowing owl habitat can be found in annual and perennial grasslands, deserts, and arid scrublands characterized by low-growing vegetation (Zarn 1974). Suitable owl habitat may also include trees and shrubs if the canopy covers less than 30 percent of the ground surface. Burrows are the essential component of burrowing owl habitat. Both natural and artificial burrows provide protection, shelter, and nests for burrowing owls (Henny and Blus 1981). Burrowing owls typically use burrows made by fossorial mammals, such as ground squirrels or badgers, but also may use man-made structures such as cement culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement.

Occupied Burrowing Owl Habitat

Burrowing owls may use a site for breeding, wintering, foraging, and/or migration stopovers. Occupancy of suitable burrowing owl habitat can be verified at a site by detecting a burrowing owl, its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance. Burrowing owls exhibit high site fidelity, reusing burrows year after year (Rich 1984, Feeney 1992). A site should be assumed occupied if at least one burrowing owl has been observed occupying a burrow there within the last three years (Rich 1984).

CEQA Project Review

The measures included in this report are intended to provide a decision-making process that should be implemented whenever-there is potential for-an action or project to adversely affect burrowing owls. For projects subject to the California Environmental Quality Act (CEQA), the process begins by conducting surveys to determine if burrowing owls are foraging or nesting on or adjacent to the project site. If surveys confirm that the site is occupied habitat, mitigation measures to minimize impacts to burrowing owls, their burrows and foraging habitat should be incorporated into the CEQA document as enforceable conditions. The measures in this document are intended to conserve the species by protecting and maintaining viable’ populations of the species throughout their range in California. This may often result in protecting and managing habitat for the species at sites away from rapidly urbanizing/developing areas. Projects and situations vary and mitigation measures should be adapted to fit specific circumstances.

Projects not subject to CEQA review may have to be handled separately since the legal authority the Department has with respect to burrowing owls in this type of situation is often limited. The burrowing owl is protected from “take” (Section 3503.5 of the Fish and Game Code) but unoccupied habitat is likely to be lost for activities not subject to CEQA.

Legal Status

The burrowing owl is a migratory species protected by international treaty under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 C.F.R. Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. 21). Sections 3505, 3503.5, and 3800 of the California Department of Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs. To avoid violation of the take provisions of these laws generally requires that project-related disturbance at active nesting territories be reduced or eliminated during the nesting cycle (February 1 to August 31). Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) may be considered "take"' and is potentially punishable by fines and/or imprisonment.

The burrowing owl is a Species of Special Concern to California because of declines of suitable habitat and both localized and statewide population declines. Guidelines for the Implementation of the California Environmental Quality Act (CEQA) provide that a species be considered as endangered or "rare" regardless of appearance on a formal list for the purposes of the CEQA (Guidelines, Section 15380, subsections b and d). The CEQA requires a mandatory findings of significance if impacts to threatened or endangered species are likely to occur (Sections 21001 (c), 2103; Guidelines 15380, 15064, 15065). To be legally adequate, mitigation measures must be capable of "avoiding the impact altogether by not taking a certain action or parts of an action"; "minimizing impacts by limiting the degree or magnitude of the action and its implementation"; "rectifying the impact by repairing, rehabilitating or restoring the impacted environment"; "or reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action" (Guidelines, Section 15370). Avoidance or mitigation to reduce impacts to less than significant levels must be included in a project or the CEQA lead agency must make and justify findings of overriding considerations.

Impact Assessment

Habitat Assessment

The project site and a 150 meter (approximately 500 ft.) buffer (where possible and appropriate based on habitat) should be surveyed to assess the presence of burrowing owls and their habitat (Thomsen 1971, Martin 1973). If occupied habitat is detected on or adjacent to the site, measures to avoid, minimize, or mitigate the project's impacts to the species should be incorporated into the project, including burrow preconstruction surveys to ensure avoidance of direct take. It is also recommended that preconstruction surveys be conducted if the species was not detected but is likely to occur on the project site.

Burrowing Owl and Burrow Surveys

Burrowing owl and burrow surveys should be conducted during both the wintering and nesting seasons, unless the species is detected on the first survey. If possible, the winter survey should be conducted between December 1 and January 31 (when wintering owls are most likely to be present) and the nesting season survey should be conducted between April 15 and July 15 (the peak of the breeding season). Surveys conducted from two hours before sunset to one hour after, or from one hour before to two hours after sunrise, are also preferable.

Surveys should be conducted by walking suitable habitat on the entire project site and (where possible) in areas within 150 meters (approx. 500 ft.) of the project impact zone. The 150-meter buffer zone is surveyed to identify burrows and owls outside of the project area which may be impacted by factors -such as noise and vibration (heavy equipment, etc.) during project construction. Pedestrian survey transects should be spaced to allow 100 percent visual coverage of the ground surface. The distance between transect center lines should be no more than 30 meters (approx. 100 ft.) and should be reduced to account for differences in terrain, vegetation density, and ground surface visibility. To effectively survey large projects (100 acres or larger), two or more surveyors should be used to walk adjacent transects. To avoid impacts to owls from surveyors, owls and/or occupied burrows should be avoided by a minimum of 50 meters (approx. 160 ft.) wherever practical. Disturbance to occupied burrows should be avoided during all seasons.

Definition of Impacts

The following should be considered impacts to the species:

- Disturbance within 50 meters (approx. 160 ft.) Which may result in harassment of owls at occupied burrows;
- Destruction of natural and artificial burrows (culverts, concrete slabs and debris piles that provide shelter to burrowing owls); and
- Destruction and/or degradation of foraging habitat adjacent (within 100 m) of an occupied burrow(s).

Written Report

A report for the project should be prepared for the Department and copies should be submitted to the Regional contact and to the Wildlife Management Division Bird and Mammal Conservation Program. The report should include the following information:

- Date and time of visit(s) including name of the qualified biologist conducting surveys, weather and visibility conditions, and survey methodology;
- Description of the site including location, size, topography, vegetation communities, and animals observed during visit(s);
- Assessment of habitat suitability for burrowing owls;
- Map and photographs of the site;
- Results of transect surveys including a map showing the location of all burrow(s) (natural or artificial) and owl(s), including the numbers at each burrow if present and tracks, feathers, pellets, or other items (prey remains, animal scat);
- Behavior of owls during the surveys;
- Summary of both winter and nesting season surveys including any productivity information and a map showing territorial boundaries and home ranges; and
- Any historical information (Natural Diversity Database, Department regional files? Breeding Bird Survey data, American Birds records, Audubon Society, local bird club, other biologists, etc.) regarding the presence of burrowing owls on the site.

Mitigation

The objective of these measures is to avoid and minimize impacts to burrowing owls at a project site and preserve habitat that will support viable owls populations. If burrowing owls are detected using the project area, mitigation measures to minimize and offset the potential impacts should be included as enforceable measures during the CEQA process.

Mitigation actions should be carried out from September 1 to January 31 which is prior to the nesting season (Thomsen 1971, Zam 1974). Since the timing of nesting activity may vary with latitude and climatic conditions, this time frame should be adjusted accordingly. Preconstruction surveys of suitable habitat at the project site(s) and buffer zone(s) should be conducted within the 30 days prior to construction to ensure no additional, burrowing owls have established territories since the initial surveys. If ground disturbing activities are delayed or suspended for more than 30 days after the preconstruction survey, the site should be resurveyed.

Although the mitigation measures may be included as enforceable project conditions in the CEQA process, it may also be desirable to formalize them in a Memorandum of Understanding (MOU) between the Department and the project sponsor. An MOU is needed when lands (fee title or conservation easement) are being transferred to the Department.

Specific Mitigation Measures

1. Occupied burrows should not be disturbed during the nesting season (February 1 through August 3 1) unless a qualified biologist approved by the Department verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

2. To offset the loss of foraging and burrow habitat on the project site, a minimum of 6.5 acres of foraging habitat (calculated on a 100 m {approx. 300 ft.} foraging radius around the burrow) per pair or unpaired resident bird, should be acquired and permanently protected. The protected lands should be adjacent to occupied burrowing owl habitat and at a location acceptable to the Department. *Protection of additional habitat acreage per pair or unpaired resident bird may be applicable in some instances.* The CBOC has also developed mitigation guidelines (CBOC 1993) that can be incorporated by CEQA lead agencies and which are consistent with this staff report.

3. When destruction of occupied burrows is unavoidable, existing unsuitable burrows should be enhanced (enlarged or cleared of debris) or new burrows created (by installing artificial burrows) at a ratio of 2:1 on the protected lands site. One example of an artificial burrow design is provided in Attachment A.

4. If owls must be moved away from the disturbance area, passive relocation techniques (as described below) should be used rather than trapping. At least one or more weeks will be necessary to accomplish this and allow the owls to acclimate to alternate burrows.

5. The project sponsor should provide funding for long-term management and monitoring of the protected lands. The monitoring plan should include success criteria, remedial measures, and an annual report to the Department.

Impact Avoidance

If avoidance is the preferred method of dealing with potential project impacts, then no disturbance should occur within 50 meters (approx. 160 ft.) of occupied burrows during the nonbreeding season of September 1 through January 31 or within 75 meters (approx. 250 ft.) during the breeding season of February 1 through August 31. Avoidance also requires that a minimum of 6.5 acres of foraging habitat be *permanently* preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls (with or without dependent young) or single unpaired resident bird. The configuration of the protected habitat should be approved by the Department.

Passive Relocation - With One-Way Doors

Owls should be excluded from burrows in the immediate impact zone and within a 50 meter (approx. 160 ft.) buffer zone by installing one-way doors in burrow entrances. One-way doors (e.g., modified dryer vents) should be left in place 48 hours to insure owls have left the burrow before excavation. Two natural or artificial burrows should be provided for each burrow in the project area that will be rendered biologically unsuitable. The project area should be *monitored daily for one* week to confirm owl use of burrows before excavating burrows in the immediate impact zone. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe should be inserted into the tunnels during excavation to maintain an escape route for any animals inside the burrow.

Passive Relocation - Without One-Way Doors

Two natural or artificial burrows should be provided for each burrow in the project area that will be rendered biologically unsuitable. The project area should be *monitored daily until the owls have relocated to the new burrows.* The formerly occupied burrows may then. be excavated. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe should be inserted into burrows during excavation to maintain an escape route for any animals inside the burrow.

Projects Not Subject to CEQA

The Department is often contacted regarding the presence of burrowing owls on construction sites, parking lots and other areas for which there is no CEQA action or for which the CEQA process has been completed. In these situations, the Department should seek to reach agreement with the project sponsor to implement the specific mitigation measures described above. If they are unwilling to do so, passive relocation without the aid of one-way doors is their only option based upon Fish and Game Code 3503.5.

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Eyas 1O(1):38 Spring 1987

Reproductive Success of Burrowing Owls Using Artificial Nest Burrows in Southeastern Idaho

by Bruce Olenick

Artificial nest burrows were implanted in southeastern Idaho f'or burrowing owls in the spring of 1986. These artificial burrows consisted of a 12" x 12" x 8" wood nesting chamber with rernovable top and a 6 foot corrugated and perforated plastic drainage pipe 6 inches in diameter (Fig. 1). Earlier investigators claimed that artificial burrows must provide a natural dirt floor to allow burrowing owls to modify the nesting tunnel and chamber. Contrary to this, the artificial burrow introduced here does not allow owls to modify the entrance or tunnel. The inability to change the physical dimensions of the burrow tunnel does not seem to reflect the owls' breeding success or deter them from using this burrow design.

In 1936, 22 artificial burrows were inhabited. Thirteen nesting attempts yielded an average clutch size of 8.3 eggs per breeding pair. Eight nests successfully hatched at least 1 nestling. In these nests, *67 of 75* eggs hatched (59.3%) and an estimated 61 nestlings (91.0%) fledged. An analysis of the egg laying and incubation periods showed that incubation commenced well after egg laying bega. Average clutch size at the start of incubation was 5.6 eggs. Most eggs tended to hatch synchronously in all successful nests.

Although the initial cost of constructing this burrow design may be slightly higher than a burrow consisting entirely of wood, the plastic pipe burrow offers the following advantages: (1) it lasts several field seasons without rotting or collapsing; (2) it may prevent or retard predation; (3) construction time is minimal; (4) it is easy to transport, especially over long distances; and (5) the flexible tunnel simplifies installation. The use of this artificial nest burrow design was highly successful and may prove to be a great resource technique for future management of this species.

For additional information on constructing this artificial nest burrow, contact *Bruce Olenick, Department of Biology, Idaho State University, Pocatello, ID 83209.*

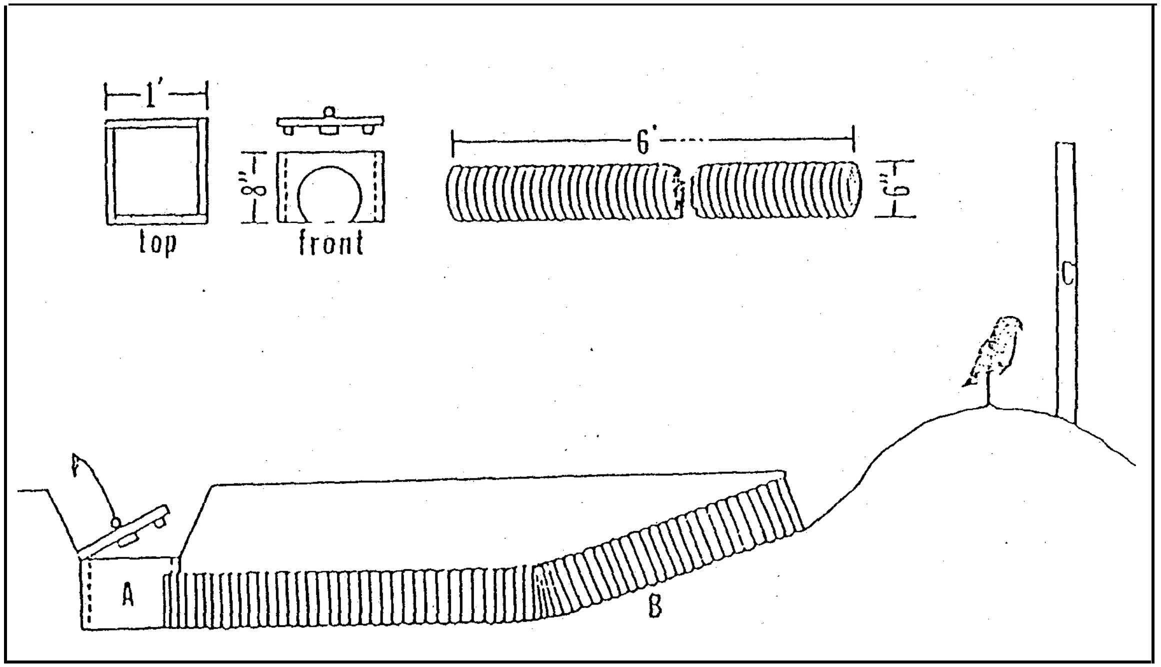

fig. 1 Artificial nest burrow design for burrowing owls Entire unit (including nest chamber) is buried 12" -- 18" below ground for maintaining thermal stability of the nest chamber. A= nest chamber, B = plastic pipe. C = perch.

ATTACHMENT A

APPENDIX I

USFWS GUIDELINES FOR ACTIVITIES IN GIANT GARTER SNAKE HABITAT

Appendix C. Guidelines for Procedures and Timing of Activities Related to the Modification or Relocation of Giant Garter Snake Canal or Stream Habitat.[1]

Background

These procedures were developed to minimize adverse impacts to the giant garter snake (*Thamnophis gigas*) during construction activities in and around giant garter snake (GIANT GARTER SNAKE) habitat. The timing is based on present knowledge of the GIANT GARTER SNAKE seasonal activity cycle which may vary somewhat from year to year depending upon the weather.

GIANT GARTER SNAKE Activity Cycle

* GIANT GARTER SNAKE begin emerging from winter retreats around April 1.

* By April 15, most GIANT GARTER SNAKE are active and beginning to search for food.

* By May 1, all GIANT GARTER SNAKE have usually emerged and are actively foraging.

* Around October 1, GIANT GARTER SNAKE begin seeking winter retreats. Foraging and other activities are sporadic at this time and dependent upon weather conditions.

* By November 1, most GIANT GARTER SNAKE are in winter retreats and will remain there until spring.

Habitat Relocation Procedures and Timing

* No grading, excavating, or filling may take place in or within 30 feet of GIANT GARTER SNAKE habitat between October 1 and May 1 unless authorized by the Department of Fish and Game.

* Construction of replacement habitat may take place at any time of the year, but summer is preferred.

* Water may be diverted as soon as the new habitat is completed, but placement of dirt dams or other diversion structures in the existing habitat will require on-site approval by the DFG.

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[1] Prepared by John M. Brode, Department of Fish and Game, Inland Fisheries Division, October 1990.

* The new habitat will be revegetated with suitable plant species as directed by DFG or as stipulated in the environmental documents.

* Dewatering of the existing habitat may begin any time after November 1, but must begin by April 1.

* Any GIANT GARTER SNAKE surveys required by the DFG will be completed to the satisfaction of the DFG prior to dewatering.

* All water must be removed from the existing habitat by April 15, or as soon after as weather permits, and the habitat must remain dry (no standing water) for 15 consecutive days after April 15 and prior to excavating or filling the dewatered habitat.

* DFG will be notified when dewatering begins and when it is completed. DFG will inspect the area to determine when the 15-day dry period may start.

The above procedures are subject to revision and may be modified by DFG to accommodate special situations.

Appendix D. Protocols for Pre-project Surveys to Determine Presence or Absence of the Giant Garter Snake and to Evaluate Habitats (California Department of Fish and Game Inland Fisheries Division).

1. Qualifications of surveyors:

   A. Surveyors must demonstrate previous field experience with GIANT GARTER SNAKE or ecologically similar species. The Department shall evaluate and approve all surveyors. Persons lacking appropriate related field experience shall not be authorized to conduct pre-project surveys for GIANT GARTER SNAKE.

2. All surveyors must possess a valid Scientific Collecting Permit and appropriate Endangered Species permits.

3. Survey Protocols:

   A. Time of year: April 15 - June 1.

   B. Minimum effort: Ten surveys shall be conducted per mile of canal, slough or marsh edge *or* until GIANT GARTER SNAKE are positively identified (captured and photographed).

   C. Methodology: Surveys shall be conducted on foot between 0900 and 1400 hours. Surveyors shall carry binoculars to aid in detecting GIANT GARTER SNAKE. Surveys shall be conducted on different days with alternating starting points. GIANT GARTER SNAKE survey logs will be completed for each survey. Surveys shall not be conducted during rain or winds of 20 mph or greater.

   D. Surveys may be conducted during other times of year, but absence of GIANT GARTER SNAKE will not be accepted if-habitat evaluation indicates suitability.

   E. Trapping may be used to augment foot surveys upon prior written approval of the Department. Approval shall be based upon demonstrated previous trapping experience with GIANT GARTER SNAKE or ecologically similar species or proof of training by another person authorized by the Department to trap GIANT GARTER SNAKE. Trap design and methodology must be approved by the Department.

NOTE: The placement of boards or other artificial cover to facilitate capture of GIANT GARTER SNAKE is considered trapping.

4. Supporting information:

   A. Submit completed GIANT GARTER SNAKE Field Survey Report Form, Habitat Evaluation form, and GIANT GARTER SNAKE Survey Logs for each site surveyed.

Prepared by: John M. Brode, Department of Fish and Game, Inland Fisheries Division, March, 1993.

Appendix D. con't. Giant Garter Snake (GIANT GARTER SNAKE)
Habitat Evaluation Form 1/

Site Name:____

Surveyor's Name and Affiliation:__________________________

____

____

Factor	Present (+) or Absent (-)
1. Still or slow--flowing water over a mud or silt-substrate.	( )
2. Flowing water over sand, gravel, rock, or cement substrate.	( )
3. Water available:	
a) April through October only (irrigation).	( )
b) All year.	( )
c) During winter only (runoff).	( )
4. Banks are sunny.	( )(%)
5. Banks are shaded by overstory vegetation (large trees, willow thickets)	( )(%)
6. Aquatic or emergent vegetation present.	( )
7. Terrestrial vegetation present:	
a) On banks.	( )
b) In adjacent uplands.	
8. Subterranean retreats (broken concrete or animal burrows) present:	
a) in banks.	( )
b) In adjacent uplands.	( )
9. Small fish present.	( )
10. Introduced gamefish are present.	( )
11. Amphibians present.	( )
12. Site is subject to severe seasonal flooding.	( )
13. Site receives polluted runoff.	( )

Notes and Comments (attached additional pages if necessary):

____

____

____

____

1/ Complete this form for each site surveyed. If site has been recently disturbed (channel maintenance, bank repair), survey the nearest undisturbed similar site, preferably on the same water course.

Appendix D. con't. Giant Garter Snake (GIANT GARTER SNAKE)
Field Survey Report Form I/

Surveyor's Names and Affiliations:______________________________________
____

Site Name: ____
Location: County _______________ Directions_______________________________
____
____

Quad Name:______________7 ½_____ 15 min___ T___ R ___ 1/4 sec________
Estimated Size: Acres of Marsh ____________

Miles of Canal/Slough ____________________

Land Uses (include 1/8 mile radius): ______________________________________
____

Habitat Description (general) 2/: ____
____
____
____

Dominant Plant Species Present: ____
____

Prey Species Present: ____
____

Intro. Gamefish Present (basses, catfishes, sunfishes):________________________
____

Dates of Surveys (attached survey logs): 1__________ 2___________
3__________4 __________ 5 _________ 6 ________ 7 _________ 8 _________
9________ 10 __________

Notes and Comments (attached additional pages if necessary): ________________
____
____
____

1/ Fill out this form for each site surveyed.
2/ Include at least three color photos of habitat and general area.

Appendix D. con't. Giant Garter Snake (GIANT GARTER SNAKE) Survey Log

Site Name: ______________________________

Surveyor's Name and Affiliation: ______________________________

____

Survey No.: __________ Date: __________ Start Time: __________

End Time: __________ Air Temp. at Start: ______ Finish: __________

% Cloud Cover: ________ Wind:__________ MPH from: __________

No. GIANT GARTER SNAKE Captured: ________

No. other Garter Snakes Captured: ____________

Photographs 1/: Yes ____ No. _____

Other Observations 2/: ______________________________

____

____

____

____

Survey No.:_________ Date: __________ Start Time: __________

% Cloud Cover: ______ Wind: __________ MPH from: __________

No. GIANT GARTER SNAKE Captured: _____

No. Other Garter Snakes Captured: __________

Photographs 1/: Yes _____ No. ______

Other observations 2/: ______________________________

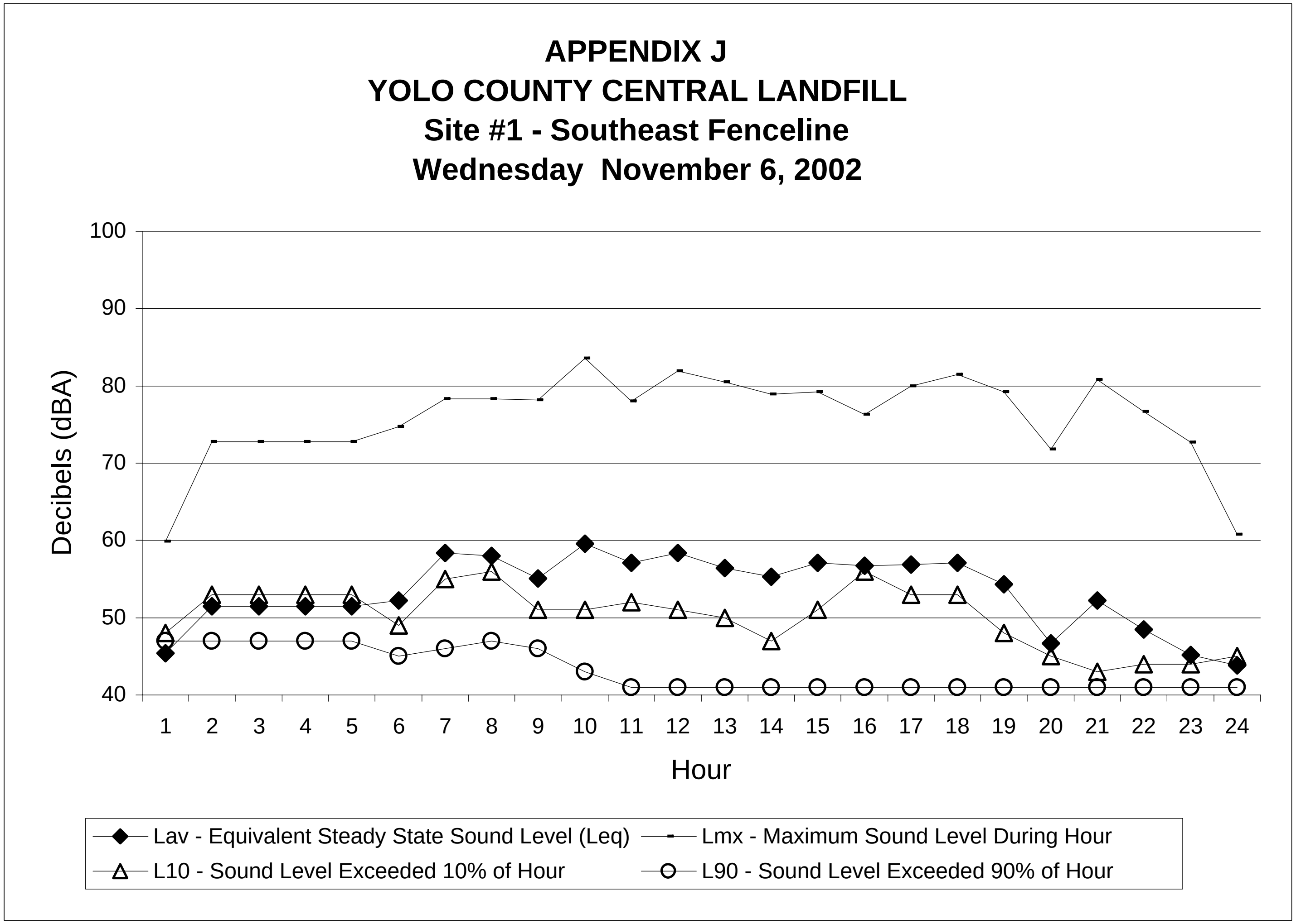
____

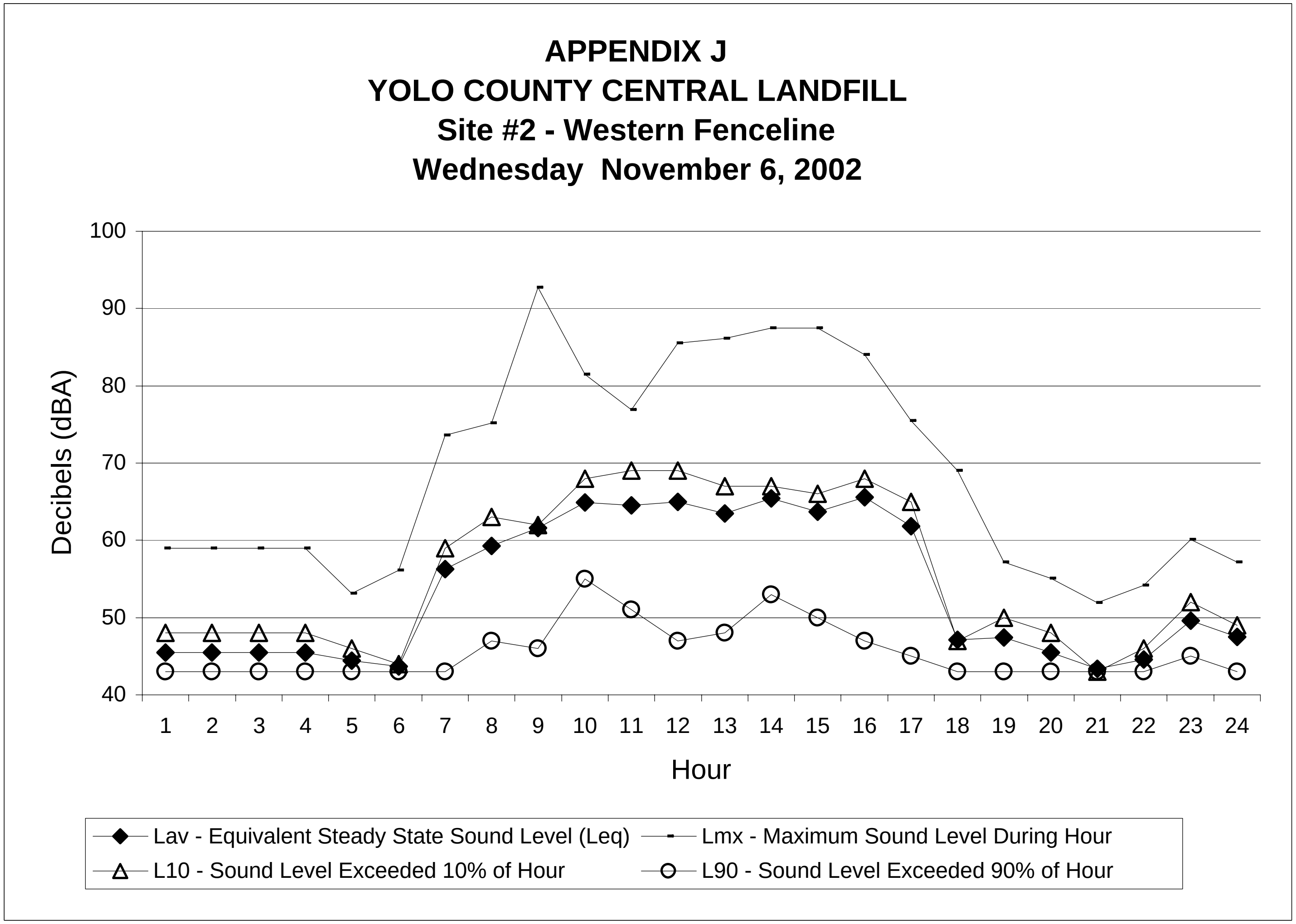
1/ All garter snakes captured shall be color photographed as follows: 1) close-up of the head and anterior 1/3 of the body, 2) close-up of the left side of the head, and 3) dorsal view of the entire snake.

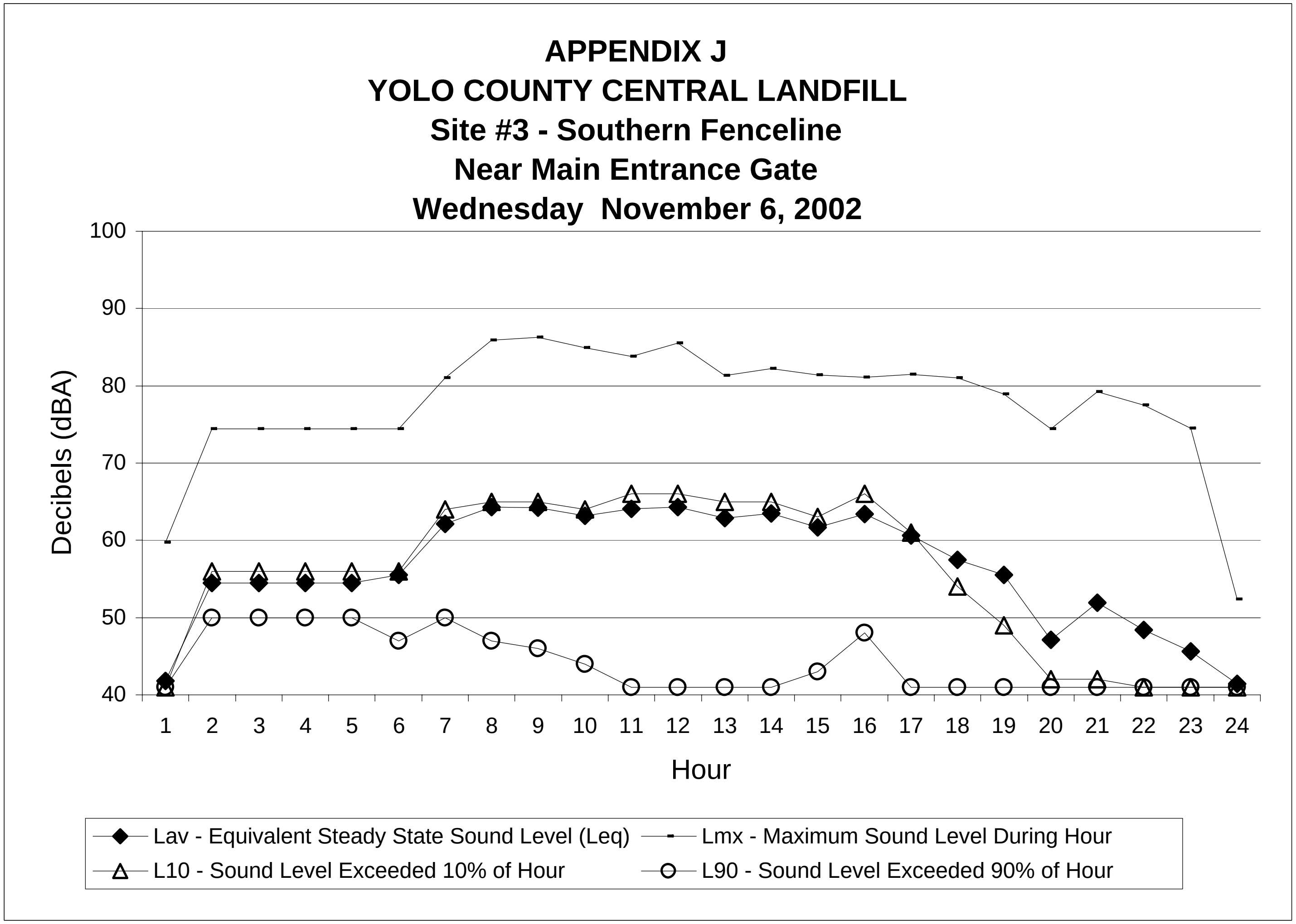
2/ Include number of snakes observed but not captured.

APPENDIX J

LONG-TERM NOISE MONITORING GRAPHS


APPENDIX J
YOLO COUNTY CENTRAL LANDFILL
Site #1 - Southeast Fenceline
Wednesday November 6, 2002
Decibels (dBA)
100
90
80
70
60
50
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour
Lav - Equivalent Steady State Sound Level (Leq)
Lmx - Maximum Sound Level During Hour
L10 - Sound Level Exceeded 10% of Hour
L90 - Sound Level Exceeded 90% of Hour


APPENDIX J
YOLO COUNTY CENTRAL LANDFILL
Site #2 - Western Fenceline
Wednesday November 6, 2002
Decibels (dBA)
100
90
80
70
60
50
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour
Lav - Equivalent Steady State Sound Level (Leq)
Lmx - Maximum Sound Level During Hour
L10 - Sound Level Exceeded 10% of Hour
L90 - Sound Level Exceeded 90% of Hour


APPENDIX J
YOLO COUNTY CENTRAL LANDFILL
Site #3 - Southern Fenceline
Near Main Entrance Gate
Wednesday November 6, 2002
Decibels (dBA)
100
90
80
70
60
50
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour
Lav - Equivalent Steady State Sound Level (Leq)
Lmx - Maximum Sound Level During Hour
L10 - Sound Level Exceeded 10% of Hour
L90 - Sound Level Exceeded 90% of Hour