Appendix A. Notice of Preparation and Initial Study

Notice of Preparation

To: Distribution List - J&S to coordinate
(Agency)

preparation of the mailing list with the City.
(Address)

From: Community Development Department
(Agency)

990 Palm Street
(Address)

San Luis Obispo, CA 93401

Subject: **Notice of Preparation of a Draft Environmental Impact Report**

Lead Agency:

Agency Name: Community Development
Street Address: 990 Palm Street
City/State/Zip: San Luis Obispo, CA 93401
Contact: Mr. John Mandeville

Consulting Firm (if applicable)**:**

Firm Name: Jones & Stokes
Street Address: 2600 V Street
City/State/Zip: Sacramento, CA 95818
Contact: Mr. Richard Rust

The City of San Luis Obispo 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 ([X] 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 Mr. John Mandeville at the address shown above. We will need the name for a contact person in your **agency**.

Project Title: Airport Area and Margarita Area Specific Plans and Related Facilities Master Plans

Project Location: San Luis Obispo County

Project Description: (brief)

Please see the attached project description.

Date: _____ Signature: _____

Title: _____

Telephone: _____

Reference: California Administrative Code, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375. *Revised October 1989*

Initial Study for the Airport Area and Margarita Area Specific Plans and Related Facilities Master Plans

Prepared for:

City of San Luis Obispo
Community Development Department
990 Palm Street
San Luis Obispo, CA 93401
Contact: John Mandeville
Long-Range Planning Manager
805/781-7187

Prepared by:

Jones & Stokes
2600 V Street
Sacramento, CA 95818-1914
Contact: Richard Rust
916/737-3000

April 2000

Jones & Stokes. 2000. Initial Study for the Airport Area and Margarita Area Specific Plans. (J&S 97-360) April. Sacramento, CA. Prepared for the City of San Luis Obispo, San Luis Obispo, CA.

Table of Contents

List of Tables and Figures

List of Acronyms

CEQA	California Environmental Quality Act
City	City of San Luis Obispo
DFG	California Department of Fish and Game
EIR	Environmental Impact Report
Farmland	prime farmland, unique farmland, or farmland of statewide importance
FHWA	Federal Highway Administration
SLOCAPCD	San Luis Obispo County Air Pollution Control District
Urban Area	San Luis Obispo Urban Area

Chapter 1. Introduction

PURPOSE OF THE INITIAL STUDY

The City of San Luis Obispo's (City's) General Plan designates the Airport Area as a location for commercial, industrial, public, and recreational uses, and calls for its annexation before substantial additional development occurs. The City's General Plan shows the Margarita Area as a location for residential and related uses, and open space protection, with annexation and adoption of a specific plan to occur before it is developed. A specific plan provides more detailed guidance on land use, design, and public facilities than the General Plan. The City is preparing the Airport Area Specific Plan and Margarita Area Specific Plan to facilitate desired development and resource protection in those areas. The specific planning effort has led to some recommendations to revise the General Plan in the Airport Area and the Margarita Area. Partly in support of the specific planning effort, the City is also preparing water, wastewater, and drainage facilities master plans that extend beyond those areas.

The City, acting as the lead agency under the California Environmental Quality Act (CEQA), must evaluate the environmental impacts of the plans in considering whether to adopt them. Under CEQA, adoption of such plans is considered a project for which an environmental determination must be made. This initial study has been prepared to help define the scope of an environmental impact report (EIR) on the specific plans and facilities plans. This initial study is a public document that outlines potential environmental effects of the plans and how the EIR will evaluate them. It complies with requirements established by the State CEQA Guidelines. The initial study and the EIR are intended to provide information that the City and other agencies will use in making decisions, but it is not the role of either document to recommend adoption or rejection of the plans.

The City will use this initial study to identify the environmental topics for which no impacts are expected and for which impacts will not be significant, allowing the EIR to focus on the topics that involve potentially significant impacts. The initial study also outlines how further analysis will be done. The initial study can, and the EIR must, discuss ways to reduce potentially significant impacts to acceptable levels (mitigation) and alternatives that may reduce or avoid potentially significant impacts. The initial study helps identify the range of mitigation and alternatives that will be considered.

This initial study uses information from the 1994 EIR on updates of the Land Use Element and the Circulation Element of the City's General Plan. Reliance on conclusions of the 1994 EIR that remain valid will allow the forthcoming EIR to focus on evaluating impacts that are expected to be different from those previously described.

SCOPE OF THE INITIAL STUDY

This initial study evaluates the proposed specific plans' and facilities master plans' impacts in the following topic areas, and concludes that further evaluation in the EIR will be needed as indicated:

Topic	Further evaluation needed in EIR
aesthetics (including views and community character)	yes
agricultural resources	yes
air quality	yes
biological resources (including plants, wildlife, and their habitats)	yes
cultural resources (archaeological and historical resources)	yes
geologic hazards	no
hazardous materials	yes
hydrology (flooding) and water quality	yes
land use planning (including consistency with community goals and policies)	yes
mineral resources	yes
noise	yes
population and housing	no
public services	yes
recreation	yes
transportation and traffic	yes
utilities	yes

IMPACT TERMINOLOGY

The following terminology is used to describe the impacts' level of significance:

- A finding of *no impact* is appropriate if the analysis concludes that implementation of the proposed project would not affect the particular resource area in any way.

- An impact is considered *less than significant* if the analysis concludes that it would cause no substantial adverse change to the environment and requires no mitigation.

- An impact is considered *less than significant with mitigation incorporated* if the analysis concludes that it would cause no substantial adverse change to the environment with the inclusion of specific features not originally proposed as part of the project.

- An impact is considered *potentially significant* if the analysis concludes that it may have a substantial adverse effect on the environment.

ORGANIZATION OF THE INITIAL STUDY

The content and format of this report are designated to meet the requirements of CEQA. The report contains the following sections:

- The "Notice of Preparation."
- Chapter 1, "Introduction and Summary", identifies the purpose and scope of the initial study and the terminology used in the report. This chapter also identifies potentially significant impacts associated with implementation of the specific plans.
- Chapter 2, "Project Description", identifies the location, background, and planning objectives of the specific plans; describes the proposed specific plans in detail; and presents the four planning alternatives evaluated in the initial study. This chapter also identifies the circulation and infrastructure master plans that are covered by the environmental assessment in the initial study.
- Chapter 3, "Environmental Checklist", presents the checklist responses for each resource area.
- Chapter 4, "Citations", identifies all printed references and individuals cited in the initial study.
- Chapter 5, "List of Preparers", identifies the individuals who prepared this report and their areas of technical specialty.

Chapter 2. Project Description

INTRODUCTION AND PROJECT PURPOSE

The San Luis Obispo planning area covers about 26,500 hectares (65,500 acres) in the central part of San Luis Obispo County, California (Figure 2-1). In the planning area, the much smaller San Luis Obispo Urban Area (Urban Area) contains the greatest concentration of urban development, including residential, commercial, and industrial uses, and areas designated for additional development. The Urban Area includes land outside the San Luis Obispo city limits that is divided into several individual planning areas, including the Airport Area and the Margarita Area.

The City is preparing the Airport Area Specific Plan and the Margarita Area Specific Plan to implement its General Plan. Adoption of the specific plans will facilitate desired development and resource protection in those planning areas. A key step is annexing the areas, making them subject to City land use regulations and eligible for City services. The City has initiated annexation of the areas. However, only limited annexation may proceed until the specific plans are adopted. Supporting facilities master plans for water, wastewater, and storm drainage are being also prepared.

Project Location

The Airport and Margarita Areas are in the southern part of the Urban Area. Resident population in the Airport and Margarita Areas is estimated to be about 100, although the number of workers is much higher. Each planning area is further described below.

Airport Area

The 450-hectare (1,100-acre) Airport Area comprises most of the land in the Urban Area that is located outside the city limits. This planning area is located generally north of Buckley Road, east of South Higuera Street, and west of Broad Street. In addition to the airport, existing land uses are primarily commercial and industrial, such as offices, contractors' supply, concrete products manufacturing, and distribution and storage. The only substantial residential use is a mobile home park located in the northeast part the area.

A substantial portion of the planning area consists of the Unocal Tank Farm property. This approximately 150-hectare (368-acre) site, located both north and south of Tank Farm Road, was established by Union Oil of California in 1910 for the storage and distribution of San

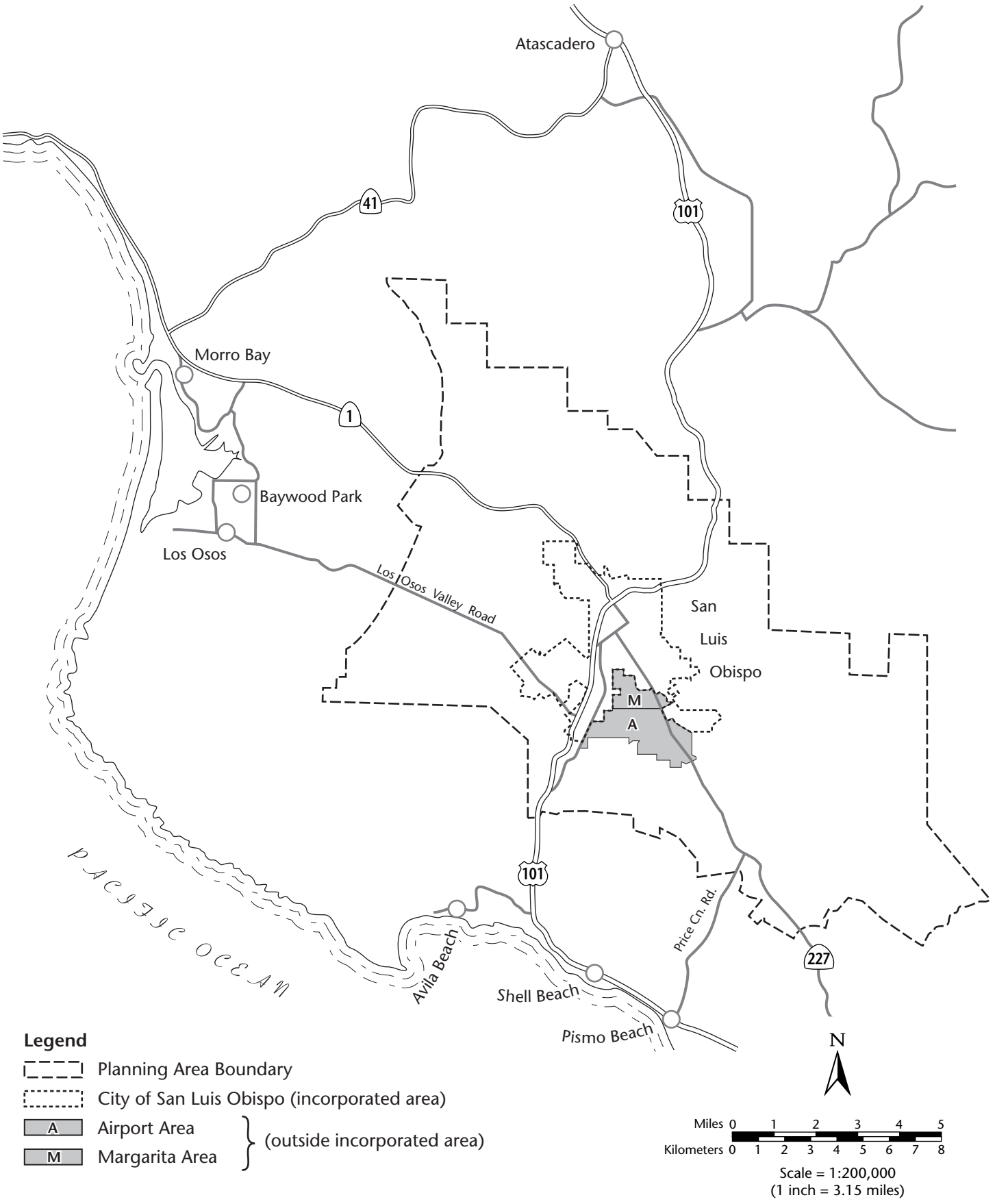

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Figure 2-1
Regional Location

Joaquin Valley crude oil. Crude oil was stored in several large concrete-lined reservoirs set into the ground and in aboveground steel tanks. In 1926, a lightning strike ignited a major fire, resulting in the deposition of large amounts of oil and tar across much of the site. During the 1990s, operations at the site were decommissioned and most of the tanks were dismantled. Currently, the local headquarters for a successor to Unocal is located on a small part of the property. Small creeks and low places on the site have reverted to the marshy conditions that probably existed before the tank farm.

Margarita Area

The 170-hectare (420-acre) Margarita Area extends from the Airport Area's northern boundary to the ridge of the South Hills, with Broad Street to the east and existing development along South Higuera Street to the west. Existing land uses are primarily open rangelands with a few residences.

Project Background and Objectives

As required by the City's General Plan, each of the specific plans is intended to contain policies and standards that will facilitate appropriate development of land, the protection of open space, and provision of adequate public facilities. The specific plans are more detailed than the General Plan but less precise than subdivision maps or construction plans.

The objectives of the Airport Area Specific Plan include:

- identifying the infrastructure needed to provide city services to the area;
- facilitating the City's eventual annexation of the Airport Area;
- ensuring that planned land uses are compatible with airport operations;
- ensuring consistency with San Luis Obispo County's Airport Land Use Plan; and
- accommodating businesses identified in the City's Targeted Industry Cluster Study that provide household-supporting incomes for San Luis Obispo residents.

The objectives of the Margarita Area Specific Plan include:

- accommodating a wide range of housing types, with an emphasis on housing affordable to those working in San Luis Obispo;
- protecting substantial natural habitats, including creeks, hills, wetlands, and corridors between these habitats;

- providing convenient access for residents to employment, basic shopping, recreation, and education through both the location of land uses and the design of circulation features; and

- accommodating research and light manufacturing jobs that can support local households, in forms that are compatible with airport safety and neighboring residences.

Land Use Categories

Land use designations under the Airport Area Specific Plan are summarized as follows:

- Medium-Density Residential: the mobile home park that was established before preparation of the specific plan, which may be retained or replaced with other uses as provided in the R-2 zone.

- Services and Manufacturing: storage, transportation, and wholesaling, as well as certain retail sales and business services that may be less appropriate in other commercial designations; assembly, fabrication, storage and distribution, and sales activities that have little or no direct trade with local consumers.

- Business Park: research and development, light manufacturing, and business services that are compatible with each other and with airport operations. Business parks are primarily intended for firms and agencies that provide employment opportunities that can support households in the city.

- Open Space: wildlife preservation, low-impact recreation, continued agricultural use, and the airport clear.

- Government Facilities: the airport site and detention basins serving the whole area.

Land use designations under the Airport Area Specific Plan are briefly described as follows:

- Open Space: hills, creek corridors, and wetlands

- Parks: the informal neighborhood green, a neighborhood park, and sports fields

- Low-Density Residential: five to seven dwellings per net acre

- Medium-Density Residential: eight to 12 dwellings per net acre

- Medium-High Density Residential: 12 to 18 dwellings per net acre

- High-Density Mixed Residential: 16 to 24 dwellings per net acre and small-scale businesses such as bed and breakfast inns, artist studios, services, and restaurants

- Neighborhood Commercial: small-scale businesses that would provide goods and services to residents and workers nearby

- Special Use: an existing ranch house that may be used as a small-scale business (such as a bed and breakfast inn)

- Business Park: research and development, light manufacturing, and service businesses that are compatible with airport safety and neighboring residences

- Elementary School

Summary of the Alternatives

For each proposed specific plan, land use and circulation alternatives have been described.

Airport Area Specific Plan Alternatives

The draft Airport Area Specific Plan comprises the proposed project, which is the focus of the environmental review. The proposed project's land uses follow the adopted general plan with some adjustments and annexation of the airport site (Figure 2-2). Three alternatives are presented, as shown in Figures 2-3 through 2-5 and summarized in Table 2-1. The alternatives primarily reflect different approaches to annexing land in the vicinity of the airport site, respond to storm-drainage and road extension options, and address the county's designation of additional urban land in the vicinity of the airport. The airport site itself is not annexed under the alternatives.

Margarita Area Specific Plan Alternatives

The draft Margarita Area Specific Plan comprises the proposed project, which is the focus of the environmental review. An alternative land use pattern and several options for circulation features are presented (Figure 2-2 and Table 2-2). The alternative land use pattern places less emphasis on a high-density, mixed-use "main street" and shifts the neighborhood commercial location to the southern edge of the planning area.

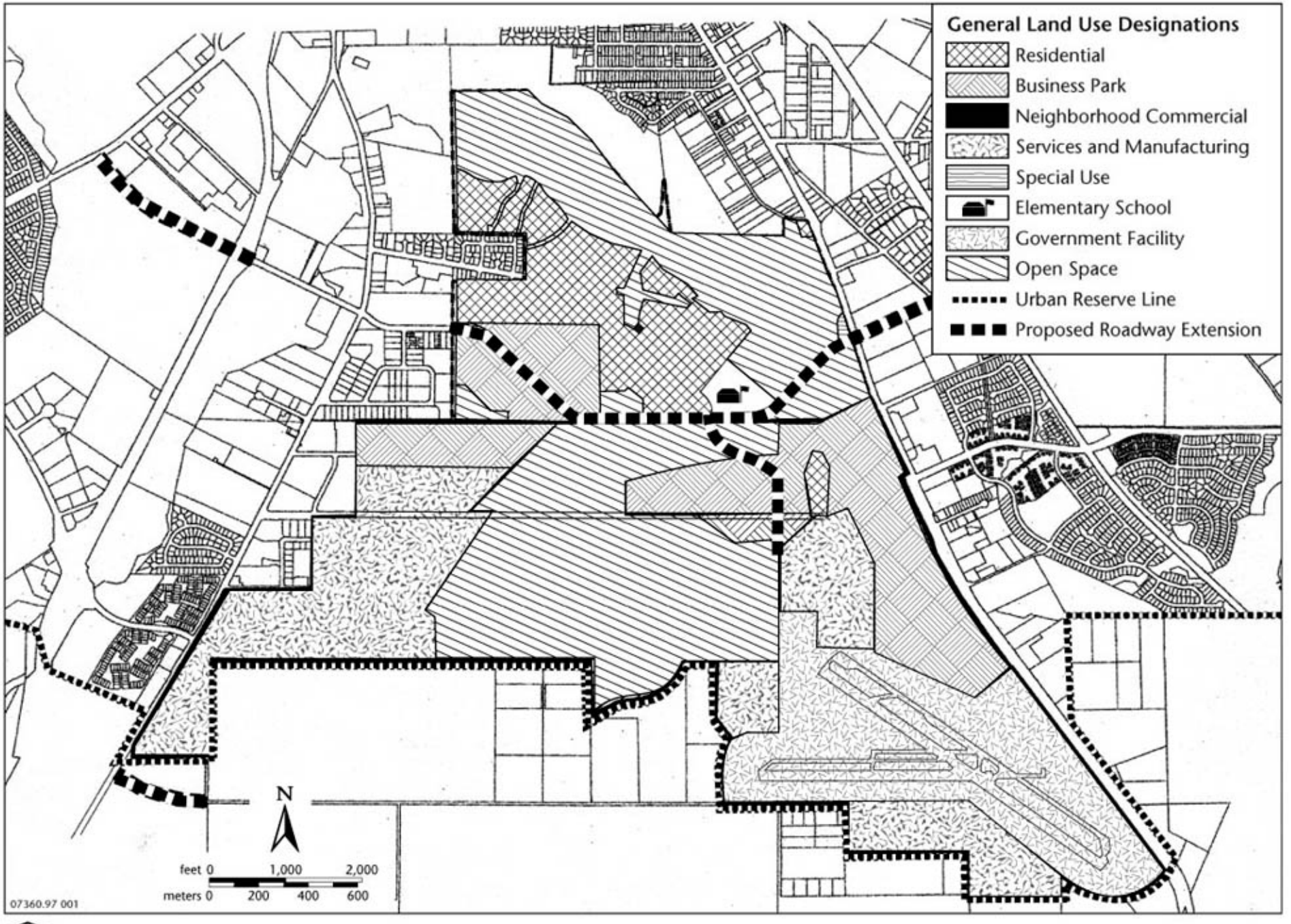

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Figure 2-2
Land Use and Circulation: Proposed Project

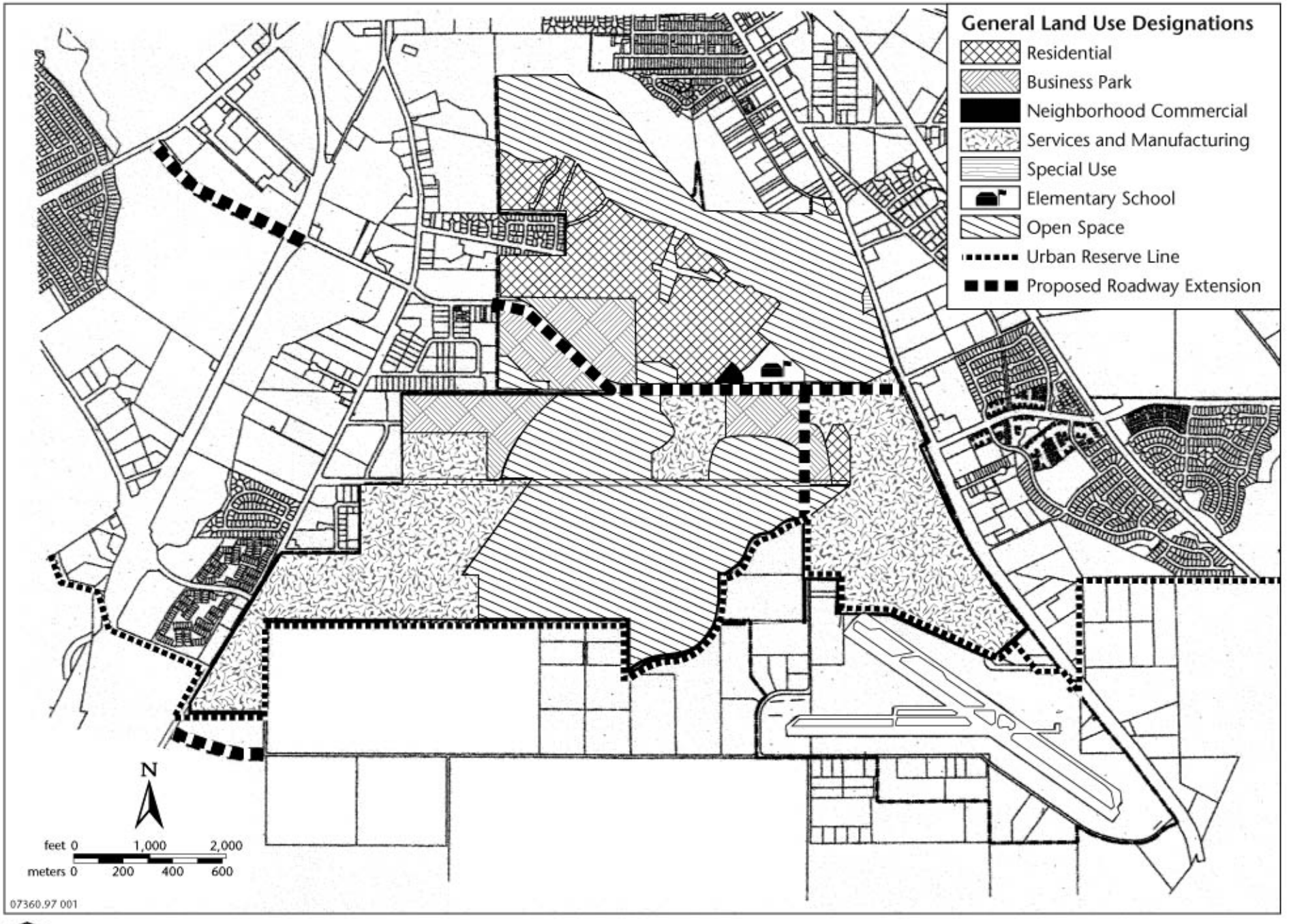

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Figure 2-3
Land Use and Circulation: Alternative 1

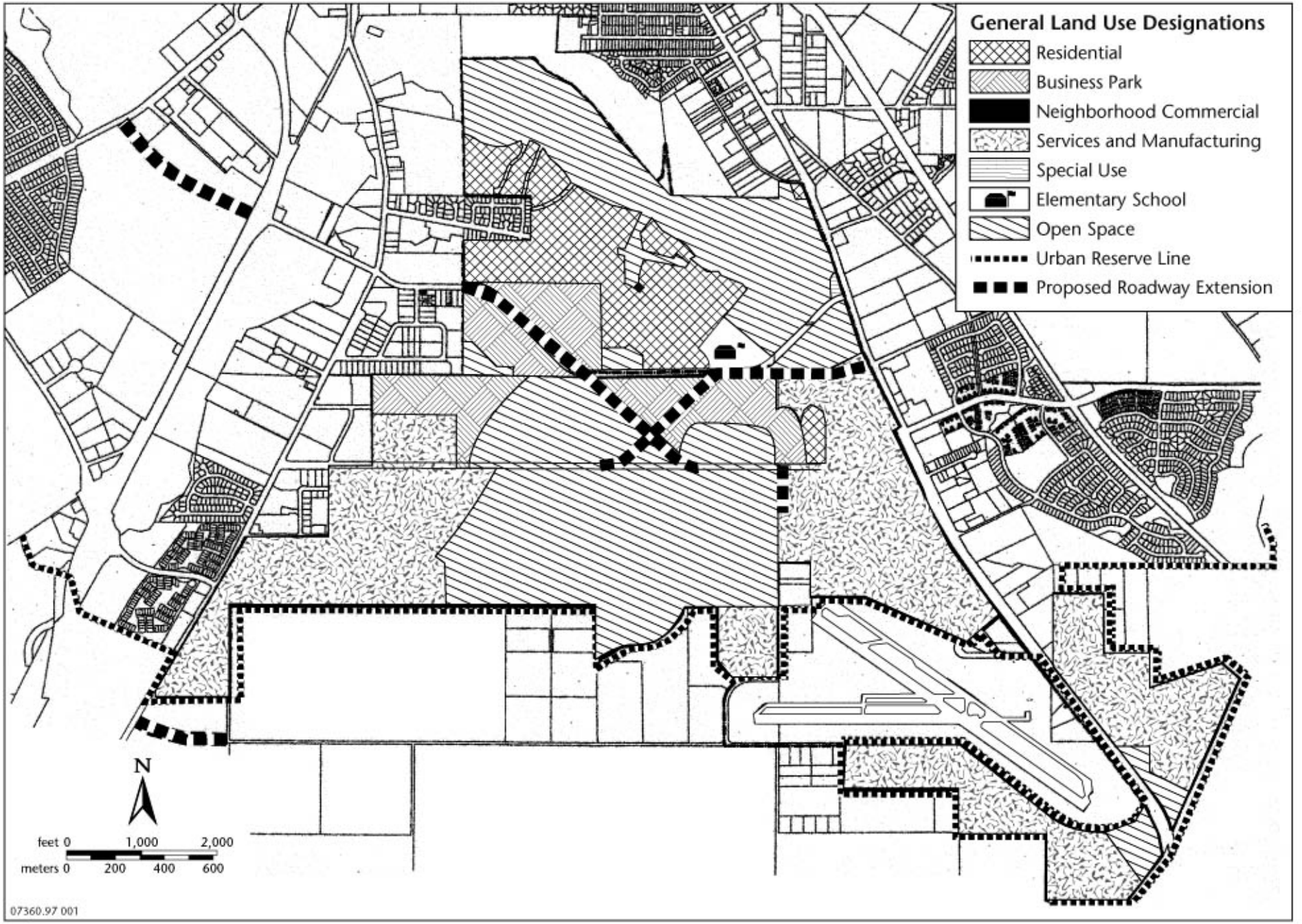

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Figure 2-4
Land Use and Circulation: Alternative 2

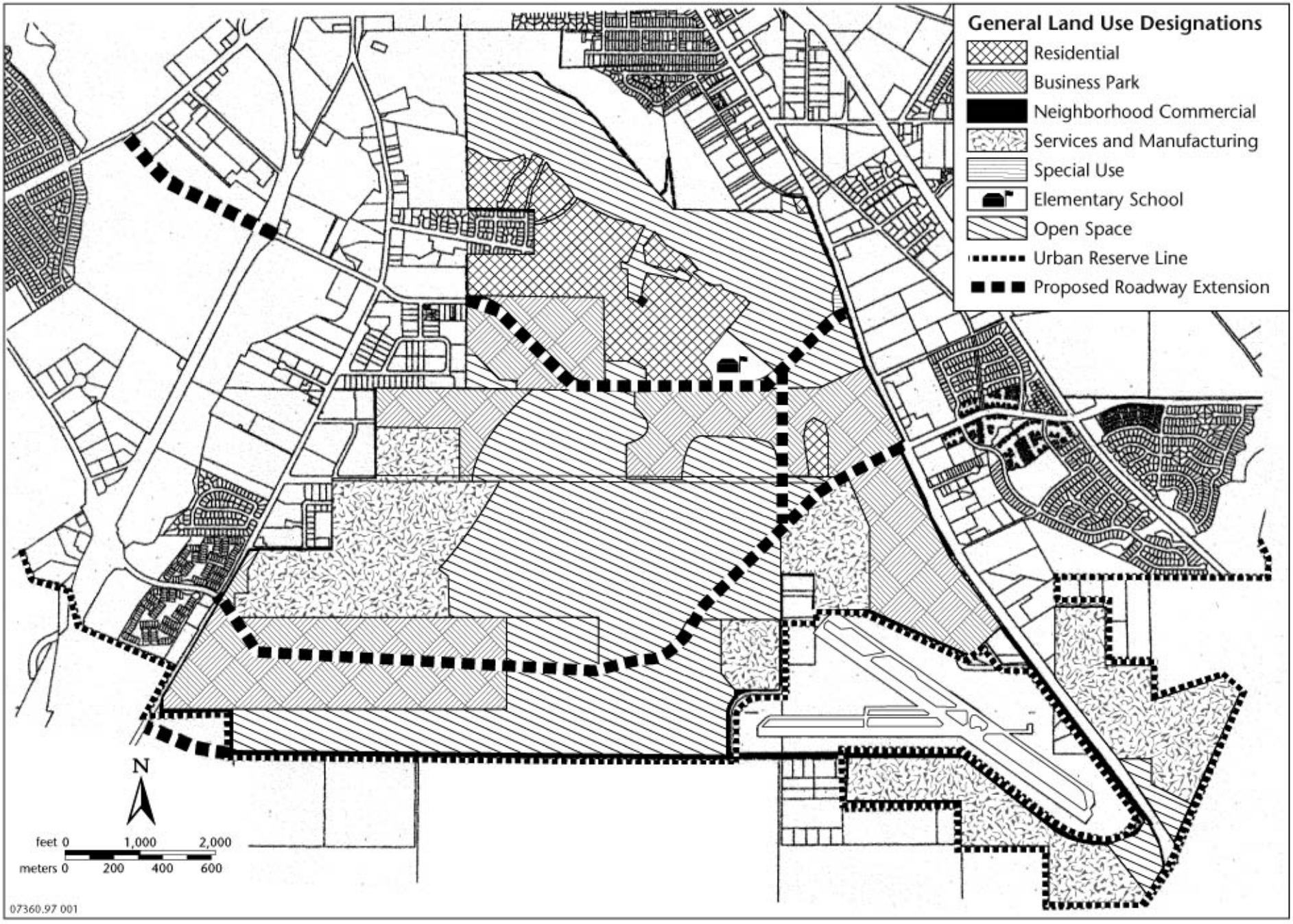

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Figure 2-5
Land Use and Circulation: Alternative 3

Table 2-1. Acreage by Land Use Category for the Airport Area

Land Use Category	Proposed Project Acres (Hectares)	Proposed Project Percent	Alternative 1 Acres (Hectares)	Alternative 1 Percent	Alternative 2 Acres (Hectares)	Alternative 2 Percent	Alternative 3 Acres (Hectares)	Alternative 3 Percent
Medium-Density Residential	7.6 (3.1)	1	7.6 (3.1)	1	7.6 (3.1)	1	7.6 (3.1)	1
Services and Manufacturing	282.3 (114.2)	28	336.4 (136.1)	52	504.2 (204.0)	56	347.2 (140.6)	30
Business Park	169.9 (68.8)	17	51.4 (20.1)	8	72.4 (29.3)	8	326.1 (132.0)	28
Recreation and Open Space	298.0 (120.6)	30	256.6 (103.8)	39	297.3 (120.3)	33	290.6 (117.6)	24
Government Facilities	241.1 (97.6)	24	0 (0)	0	0 (0)	0	0 (0)	0
Agriculture and Open Space	0 (0)	0	0 (0)	0	20.8 (8.4)	2	201.2 (81.4)	17
Total acreage	998.9 (404.3)	100	652.0 (263.1)	100	902.3 (365.1)	100	1,172.7 (474.7)	100

Table 2-2. Acreage by Land Use Category for the Margarita Area

Land Use Category	Proposed Project Acres	Proposed Project (Hectares)	Proposed Project Percent	Alternative 1 Acres	Alternative 1 (Hectares)	Alternative 1 Percent
Open Space	166.2	(67.3)	40	167.2	(67.7)	40
Parks	31.1	(12.6)	8	26.9	(10.9)	6
Residential	94.1	(38.1)	23	99.8	(40.4)	24
Neighborhood Commercial	0.2	(0.1)	<1	1.5	(0.6)	<1
Special Use	1.0	(0.4)	<1	1.0	(0.4)	<1
Business Park	43.2	(17.5)	10	43.2	(17.5)	10
Elementary School	10.1	(4.1)	2	8.4	(3.4)	2
Streets	67.9	(27.5)	16	68.4	(27.7)	17
Total acreage	413.8	(167.6)	100	416.4	(168.6)	100

Grouping for EIR Analysis

The EIR will analyze the two specific plan areas and alternatives for each area in groups, as shown in Table 2-3.

Table 2-3. Alternatives Analyzed in the EIR

EIR Alternative	Airport Area Alternative	Margarita Area Alternative
Proposed project	Proposed project	Proposed project
Alternative 1	Alternative 1	Alternative 1
Alternative 2	Alternative 2	Proposed project
Alternative 3	Alternative 3	Proposed project

Traffic Circulation

The specific plan alternatives reflect several circulation options (Figure 2-6):

- extension of Prado Road from its existing terminus east of South Higuera Street to Broad Street, along various alignments;
- realignment of Santa Fe Road north to connect with Tank Farm Road and an extension of Santa Fe Road north to connect with the Prado Road extension;
- extension of Los Osos Valley Road from South Higuera Street to connect with Tank Farm Road, providing a second high-capacity east-west facility through the Airport Area;
- a new roadway from Tank Farm Road to Prado Road (west of Santa Fe Road); and
- extension of Buckley Road west to connect with South Higuera Street.

Water System Master Plan

The draft Water System Master Plan recommends improvements to the water treatment and distribution systems to meet citywide General Plan development needs, including those needs of the Airport Area. The master plan recommends phased implementation of improvements to the Stenner Canyon water treatment plant as follows:

- Phase I: Perform a seismic evaluation of the existing treated water storage and clearwell facilities.

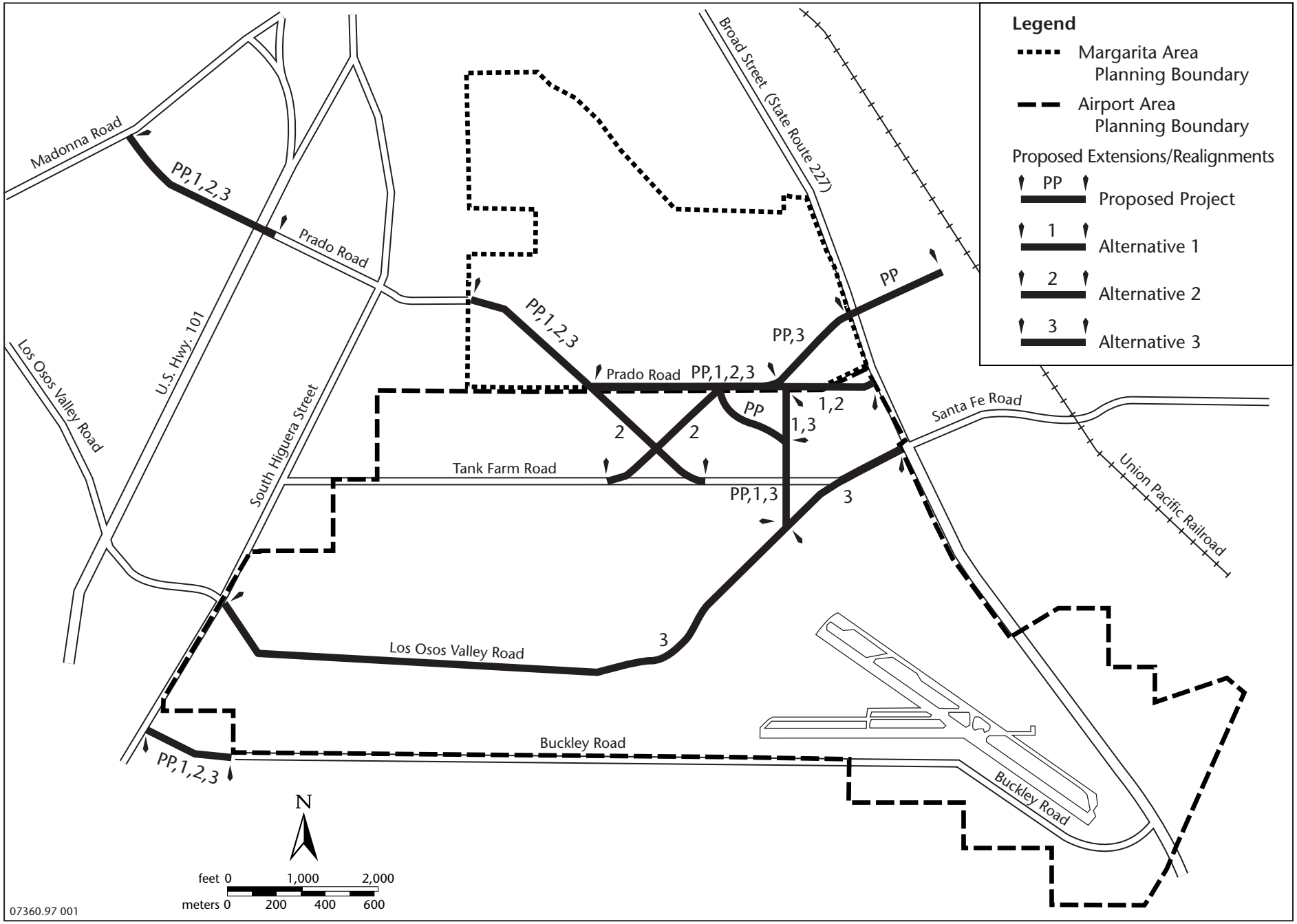

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Figure 2-6
Proposed Circulation Improvements by Alternative

- Phase II: Add facilities to improve filtration rates, treatment processes, and emergency operations.

- Phase III: Monitor water levels at the forebay, improve efficiency of pump motors, evaluate means to protect the water treatment plant from railroad accidents, and improve emergency standby power capacity.

Operational changes for water distribution facilities are also recommended, including improving equipment, raising operating levels in water tanks, and providing additional storage capacity. The master plan also identifies new facilities that would be required for the City to serve the Margarita Area and the Airport Area. These include the following:

- about 122 meters (400 feet) of 16-inch pipe, 9,600 meters (31,600 feet) of 12-inch pipe, and 250 meters (830 feet) of 10-inch pipe;

- a 6-million-liter (1.6-million-gallon) water tank is recommended in the southwestern part of the city. Locations for potential water tanks, including the Irish Hills, Terrace Hills, and Los Osos Valley Road areas, would be evaluated.

Wastewater Master Plan Update

The City's Wastewater Master Plan Update was prepared primarily to address new facilities necessary to serve the Airport Area and Margarita Area and also expansion of the water reclamation facility to accommodate flow anticipated from General Plan build-out, including the Airport and Margarita areas. The master plan recommends:

- replacing the Howard Johnson and Tank Farm pumping stations;

- installing about 3,790 meters (12,400 feet) of new trunk sewer mains in the Airport Area;

- installing 4,000 feet (1,219.2 meters) of 16-inch discharge pipe (required at the new tank farm facility);

- installing about 9,400 meters (30,700 feet) of new trunk sewer mains in the Margarita Area; and

- upgrading existing pump stations within the project area.

Storm Drain Master Plan

The draft Storm Drain Master Plan primarily addresses the Airport Area although it also contains general information about the Margarita Area and upstream areas east of Broad Street. The master plan's features would limit storm drainage flows at build-out, downstream of the Airport Area, to the level estimated for existing conditions; provide 100-year flood protection; provide for environmental enhancement of stream corridors; and use detention facilities serving the whole area rather facilities on individual sites. Proposed major features include:

- replacing bridges across West Fork Tank Farm Creek and Acacia Creek at several locations;

- providing widened corridors with flood terraces or flood channels, in addition to low-flow channels, along West Fork Tank Farm Creek, Acacia Creek, and parts of East Branch San Luis Obispo Creek;

- diverting the flow of Orcutt Creek directly west in a culvert, from a point east of Broad Street; and

- constructing a 150-acre-foot detention basin either near the intersection of Vachell Lane and Buckley Road along Tank Farm Creek (including a diversion channel from the East Branch San Luis Obispo Creek to the detention basin) or along Buckley Road near the intersection of the East Branch San Luis Obispo Creek and Buckley Road as shown on Figure 2-7.

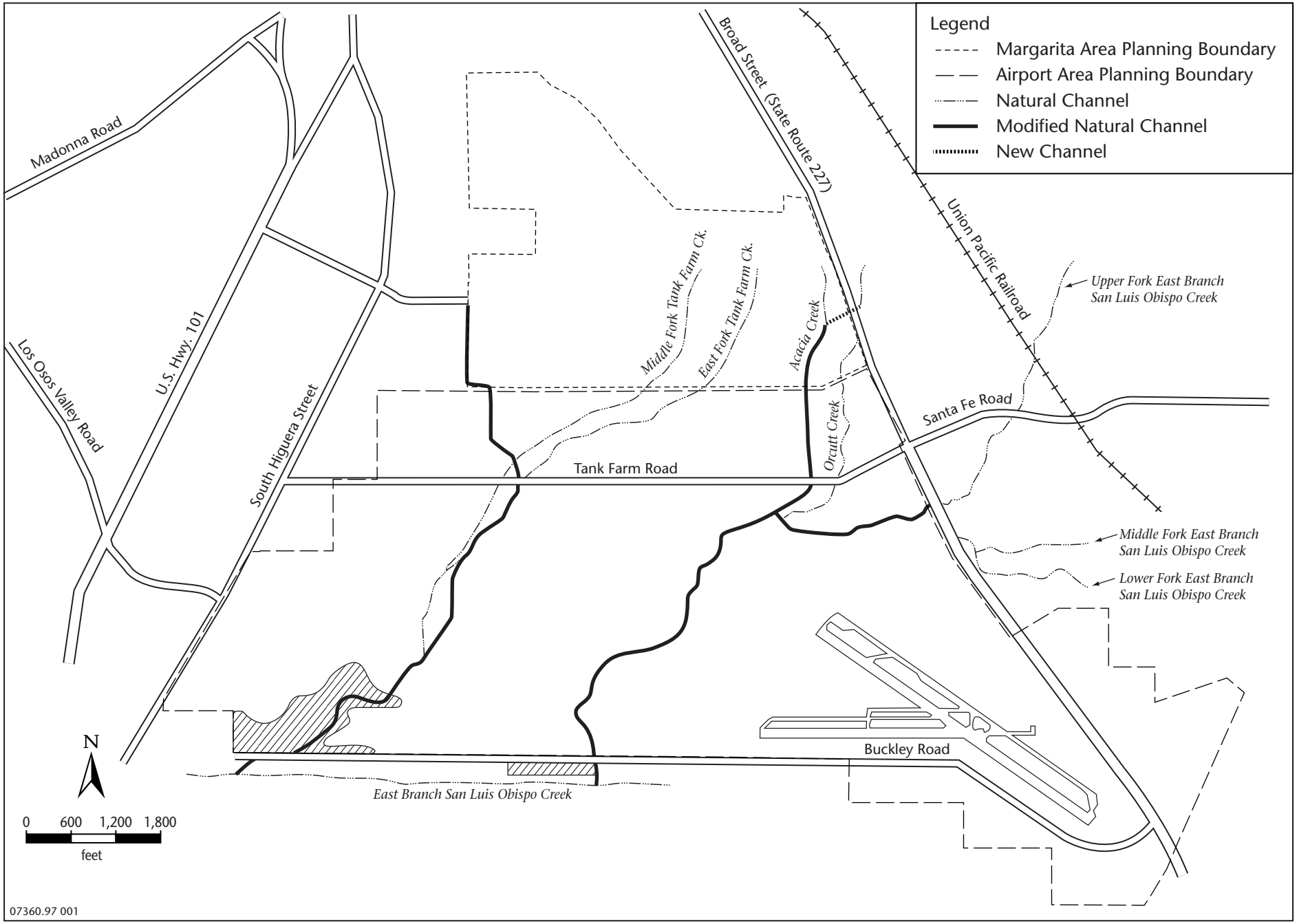

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Figure 2-7
Locations of Streams and Alternative Detention Basin Sites

Chapter 3. Environmental Checklist

ENVIRONMENTAL CHECKLIST FORM

1.	**Project Title:**	Airport Area Specific Plan, Margarita Specific Plan, and Related Facilities Master Plans
2.	**Lead Agency Name and Address:**	City of San Luis Obispo 990 Palm Street San Luis Obispo, CA 93401
3.	**Contact Person and Phone Number:**	John Mandeville Long-Range Planning Manager 805/781-7187
4.	**Project Location:**	Airport Area, Margarita Area, and Other Locations in and near the City of San Luis Obispo San Luis Obispo County, California
5.	**Project Sponsor's Name and Address:**	City of San Luis Obispo 990 Palm Street San Luis Obispo, CA 93401
6.	**General Plan Designation:**	Various
7.	**Zoning:**	Various
8.	**Description of Project:**	See attached project description
9.	**Surrounding Land Uses and Setting:**	See attached project description

10. Other Public Agencies Whose Approval Is Required (e.g., permits, financing approval, or participation agreement): California Department of Fish and Game, U.S. Army Corps of Engineers, Regional Water Quality Control Board, California Department of Transportation, San Luis Obispo County Local Agency Formation Commission.

Environmental Factors Potentially Affected:

The environmental factors checked below would potentially be affected by this project (i.e., the project would involve at least one impact that is a "Potentially Significant Impact"), as indicated by the checklist on the following pages.

[X] Aesthetics	[X] Agricultural Resources	[X] Air Quality
[X] Biological Resources	[X] Cultural Resources	[ ] Geology/Soils
[X] Hazards and Hazardous Materials	[X] Hydrology/Water Quality	[X] Land Use/Planning
[X] Mineral Resources	[X] Noise	[ ] Population/Housing
[X] Public Services	[X] Recreation	[X] Transportation/Traffic
[X] Utilities/Service Systems	[X] Mandatory Findings of Significance	

Determination *(to be completed by the lead agency)*:

On the basis of this initial evaluation:

[ ] I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

[ ] I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions to the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

[ ] I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

[X] I find that the proposed project MAY have an impact on the environment that is "potentially significant" or "potentially significant unless mitigated" but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards and (2) has been addressed by mitigation measures based on

[ ] I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the project, nothing further is required.

Signature _____ Date _____

Printed Name _____ For _____

EVALUATION OF ENVIRONMENTAL IMPACTS

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
I. <u>AESTHETICS</u> - Would the project:				
a. Have a substantial adverse effect on a scenic vista?		"	"	"
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings along a scenic highway?		"	"	"
c. Substantially degrade the existing visual character or quality of the site and its surroundings?		"	"	"
d. Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?		"	"	"

a-d. The Airport Area and Margarita Area Specific Plans will contain design standards to ensure that the appearance of new development is acceptable, that new buildings will not block scenic views, and that new lighting will not create glare. They will also guide landscape changes, such as creek modifications and drainage basins, aiming for compatibility with the natural landscape.

Concerning the overall effect of changing the character of the areas from rural to urban, the City made a finding of overriding considerations when the 1994 Land Use Element was adopted. However, two of the alternatives to be evaluated in the EIR would extend urban development into areas that the General Plan shows as Open Space. Also, the draft Water Master Plan proposes a new water tank to serve the southern part of the city. The resulting visual impacts will be evaluated.

Analysis Methodology

The EIR will provide a qualitative assessment of the changes to the rural-to-urban interface under the two proposed alternatives that differ from the areas evaluated in the 1994 Land Use Element update. The analysis conducted in the 1994 Land Use Element update will be incorporated by reference for areas of similar visual change. The EIR will also provide a qualitative assessment of potential water master plan facilities, such as the proposed water tank, and include mitigation pertaining to placement and design of these facilities to reduce visual impacts to a less-than-significant level.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
II. AGRICULTURAL RESOURCES - In determining whether impacts on agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation. Would the project:				
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?		"	"	"
b. Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?		"	"	"
c. Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use?		"	"	"

a-c. Consistent with the strategy of the General Plan, the specific plans aim to accommodate urban development inside the urban reserve line while protecting land outside the urban area for open space, agricultural, and rural uses. The proposed project would not affect agricultural zoning or Williamson Act land, except through the development of the detention basin.

Two of the alternatives in the Airport Area Specific Plan would extend urban designations to land that the City now shows as Open Space. This would directly affect these lands. The resulting extension of the boundary between urban and agricultural uses could directly affect newly adjacent lands as well.

Analysis Methodology

The EIR will identify impacts of implementing the specific plans and master plans, including effects on prime agricultural land and agricultural production. Any potential conversions from agricultural to nonagricultural uses will be estimated and evaluated under each of the land use alternatives. Problems of adjacency and adequate buffers also will be discussed.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
III. AIR QUALITY - When available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a. Conflict with or obstruct implementation of the applicable air quality plan?		"	"	"
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?		"	"	"
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?		"	"	"
d. Expose sensitive receptors to substantial pollutant concentrations?		"	"	"
e. Create objectionable odors affecting a substantial number of people?	"	"		"

a-d. The 1994 EIR found that development capacities consistent with the 1994 Land Use Element update were consistent with the County Clean Air Plan. However, the element's capacity for nonresidential development is larger than its capacity for residential development. This situation is expected to cause increased commuting, vehicle-miles traveled, and air pollution, despite efforts to reduce the share of trips made in single-occupant motor vehicles. The proposed Airport Area Specific Plan would increase the nonresidential development capacity further by designating more land as Business Parks and by assuming more intense development in that designation, as well as the in Services and Manufacturing designation. The 1994 capacity is compared with the estimated capacities of the proposed project and the three alternatives in the following table.

Comparison of Development Capacities

Source	1994 Update	Proposed Project	Alternative 1	Alternative 2	Alternative 3
Gross building area (million sq. ft.)	3.24	4.83	3.65	5.25	7.54
Change from 1994 capacity	--	+49%	+13%	+62%	+133%

e. The proposed specific plans are associated with normally acceptable development. Therefore, they would not generate objectionable odors that would affect a substantial number of sensitive receptors, such as residential areas, schools, and churches.

Analysis Methodology

Construction and operational emissions will be projected for the specific and master plans. All emissions will be based on emission factors provided by the California Air Resources Board and the U.S. Environmental Protection Agency.

The air quality analysis will be consistent with the requirements of the San Luis Obispo County Air Pollution Control District's (SLOCAPCD's) California Environmental Quality Act Air Quality Guidelines. The air quality chapter will include the following:

- existing air quality conditions, regulations, policies, and plans as they relate to the proposed project;
- criteria used to identify significant air quality impacts, based on the air quality significance criteria developed by the SLOCAPCD and consistency with the County Clean Air Plan;
- projected air quality impact resulting from project-related construction activities, including both fugitive dust and construction equipment tailpipe emissions;
- projected amounts of ozone precursors and inhalable dust (mainly particulate matter 10 microns or less in diameter) due to the additional traffic resulting from the project and alternatives; and
- mitigation measures to reduce or avoid any significant air quality impacts, developed in close consultation with the SLOCAPCD.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES				
- Would the project:				
a. 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 California Department of Fish and Game or U.S. Fish and Wildlife Service?		"	"	"
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		"	"	"
c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means?		"	"	"
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		"	"	"
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?		"	"	"
f. Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?	"	"	"	

a-d. The specific plans and master plans could have significant effects on biological resources, including loss or disturbance of native grassland, serpentine hillside, wetland, and riparian habitats.

e. The proposed specific plans will respond to federal, state, and local policies and regulations intended to protect biological resources (such as creek preservation policies); the EIR will assess the proposed specific plan's compliance with those policies and regulations.

f. No habitat conservation plans, natural community conservation plans, or other approved local, regional, or state habitat conservation plans are in effect for the planning areas. Therefore, there would be no conflict.

Analysis Methodology

An effort has been made to integrate the biological resources information and protection policies into the specific plans to avoid or minimize impacts on sensitive biological resources. The impacts of the proposed specific plans and master plans on biological resources will be evaluated in terms of the extent and quality of habitat types that would be degraded and the species that would be affected. Field reconnaissance surveys will be conducted to identify botanical, wetland, and wildlife resources within the project areas. The California Department of Fish and Game (DFG) Natural Diversity Data Base will be reviewed, and the local DFG and U.S. Fish and Wildlife Service offices will be contacted for biological information if necessary. Proposed mitigation will be described.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
V. CULTURAL RESOURCES				
- Would the project:				
a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?		"	"	"
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?		"	"	"
c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		"	"	"
d. Disturb any human remains, including those interred outside of formal cemeteries?		"	"	"

a-d. The specific plans and master plans could have potentially significant effects on cultural resources in the planning area. This issue will be analyzed in the EIR as described below.

Analysis Methodology

The cultural resources impact analysis will focus on known cultural resource sites and areas that have potential to contain cultural resources. Using existing information sources, such as the California Historical Resources Information System, knowledge of the area, and land information from recently prepared EIRs, the analysis will describe the effects associated with implementation of the land use alternatives on important cultural resources.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
VI. GEOLOGY AND SOILS - Would the project:				
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
1. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	"	"		"
2. Strong seismic groundshaking?	"	"		"
3. Seismic-related ground failure, including liquefaction?	"	"		"
4. Landslides?	"	"		"
b. Result in substantial soil erosion or the loss of topsoil?	"	"		"

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
c. Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?	"	"		"
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	"	"		"
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?	"	"		"

a-e. The specific plans and master plans would require that development conform to all applicable regulations, including the Uniform Building Code and relevant seismic safety standards. Therefore, geologic, soils, and seismic effects of the specific plans would be less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
VII. <u>HAZARDS AND HAZARDOUS MATERIALS</u> - Would the project:				
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?		"	"	"
b. 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?		"	"	"

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
c. Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?		"	"	"
d. Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?		"	"	"
e. Be located within an airport land use plan area or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area?		"	"	"
f. Be located within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the project area?	"	"	"	
g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	"	"		"
h. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?		"	"	"

a-e, h. The specific plans and master plans could have potentially significant effects with regard to hazards and hazardous materials in the planning area. The primary issue to be addressed involves hydrocarbon contamination on portions of the Airport Area related to past uses at the Unocal tank farm. This issue will be analyzed in the EIR as described below.

f. The proposed planning areas are not located in the vicinity of a private airstrip; therefore, no adverse impacts are expected.

g. The proposed specific plans are intended to conform to locally applicable safety regulations and would not interfere with an adopted emergency response or emergency evacuation plan.

Analysis Methodology

The hazardous materials chapter of the EIR will be based on the following:

- accurate descriptions of the use and generation of hazardous materials at the airport site, water treatment facility, wastewater treatment facility and other areas associated with existing industrial uses, and

- information describing petroleum residue and other hazardous materials related to the Unocal operations on Tank Farm Road.

A hazardous materials specialist will critically review this information, along with federal, state, and local rules and regulations regarding the storage, handling, and transport of hazardous materials, and incorporate appropriate information into the EIR. Landfills and hazardous materials treatment, storage, and disposal sites in the region will also be identified.

The qualitative assessment of potential impacts associated with the proposed specific and master plans will include the following:

- potential for release of hazardous materials into natural water courses and soil during construction;

- potential for release of hazardous materials during a catastrophic natural event, such as an earthquake or flood;

- potential to accumulate toxic substances in detention basins that may pose a threat to either human or environmental health;

- potential for release of hazardous materials into groundwater; and

- potential for human health hazards due to hydrocarbon contamination in soil or groundwater.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
VIII. <u>HYDROLOGY AND WATER QUALITY</u> - Would the project:				
a. Violate any water quality standards or waste discharge requirements?		"	"	"
b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?		"	"	"
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite?		"	"	"
d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite?		"	"	"
e. Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	"	"		"
f. Otherwise substantially degrade water quality?		"	"	"
g. Place development within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	"		"	"
h. Place within a 100-year flood hazard area structures that would impede or redirect floodflows?	"	"		"

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
i. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	"	"		"
j. Contribute to inundation by seiche, tsunami, or mudflow?	"	"	"	

a-d, f. The specific plans and master plans could have potentially significant effects on hydrology and water quality in the planning area. This issue will be analyzed in the EIR as described below.

e. Water, wastewater, and storm drainage master plans have been prepared for the planning areas to ensure adequate infrastructure to accommodate development under the proposed plans. The proposed specific plans incorporate recommendations outlined in the storm drain master plan prepared for the City; therefore, no adverse impacts are expected.

g-i. Development proposed under the specific plans would need to avoid or modify 100-year flood hazard areas; compliance with flood avoidance policies and the secondary impacts of modifying flood plains will need to be evaluated.

j. According to the City's General Plan, the project sites are not subject to these types of hazards; therefore, no further evaluation is necessary.

Analysis Methodology

The primary water resources issues for this project are:

- availability of a long-term, reliable water supply (addressed under the topic heading "Utilities and Services");
- degradation of water quality; and
- degradation of aquatic habitat that may support several special-status species, including the California red-legged frog, southwestern pond turtle, and steelhead trout (South-Central California Coast ESU).

The water-related issues to be addressed in the EIR include the following:

- Expansion of groundwater pumping as part of City water supply or as a private alternative to City water supply may reduce streamflow and have secondary adverse effects on aquatic, riparian, and wetland habitats associated with San Luis Obispo Creek and other streams in the planning area.

- Increased land use intensity may increase stormwater runoff volume and rate by increasing the amount of impervious area. Increased runoff may contribute to flooding, channel erosion, and degradation of water quality and aquatic habitats.

- Water quality degradation may result from construction of plan-specific features and increased urban development. Construction and grading activities would expose bare soil to wind and water erosion that may degrade the water quality of San Luis Obispo Creek by increasing the concentration of sediments or sediment-borne contaminants.

- Implementation of the plans may contribute to urban pollutant loading of groundwater and surface water.

The methodology for completing the water resources chapter will include reviewing and using existing data, conducting a focused site visit to identify sensitive resources, and integrating the preliminary findings into the specific plans to avoid or minimize impacts.

The water resources discussion will:

- describe the existing drainage patterns, groundwater resources, flooding conditions, and background water quality characteristics of San Luis Obispo Creek and other significant drainages;

- summarize the relevant portions of local, state, and federal regulations as they relate to flooding, water quality, and drainage;

- describe precipitation patterns;

- summarize existing water quality data from the Regional Water Quality Control Board, California Department of Water Resources, U.S. Geological Survey, and other sources;

- qualitatively discuss the effects of onsite water development on existing groundwater levels, streamflows, and associated habitats;

- evaluate changes in drainage as a result of grading and creating additional impervious areas;

- evaluate changes in floodflows or floodplain encroachment;

- qualitatively discuss water quality effects of construction activities;

- qualitatively discuss water quality effects related to urban pollutant loadings from the facilities; and
- evaluate the specific plans and master plans for consistency with existing laws, rules, and regulations.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
IX. LAND USE AND PLANNING				
- Would the project:				
a. Physically divide an established community?	"	"	"	
b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?		"	"	"
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?	"	"	"	

a. The specific plan areas span largely undeveloped land between developed parts of a community.

b. The Airport Area Specific Plan may revise some land use designations as shown in the General Plan Land Use Element, and it may show changes to creek designations of the Open Space Element. Project effects on the job/housing balance within the City will need to be evaluated.

c. No habitat conservation plans, natural community conservation plans, or other approved local, regional, or state habitat conservation plans are in effect for the planning areas. Therefore, there would be no conflict.

Analysis Methodology

The land use analysis will include a description of existing land use patterns on the site and in surrounding areas, including agricultural resources, based on site and context surveys. Impacts on these uses associated with development permitted under the proposed plans, as well as any mitigation measures proposed, will be described. The land use analysis will focus on the two specific plans' consistency with existing plans and policies and on the land use compatibility

of proposed specific plan improvements and uses with existing uses in the specific plan areas and with surrounding land uses. Land use will also be assessed by reviewing the City's 1994 Land Use and Circulation Elements Update and other applicable planning information gained during conversations with knowledgeable staff members of City agencies.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
X. MINERAL RESOURCES				
- Would the project:				
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?		"	"	"
b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?		"	"	"

a-b. The location of any mineral resources in the planning area will be identified and the impacts of potential development on such resources will be evaluated. Currently, the only known mineral resource in the planning area is the inactive gravel quarry.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
XI. NOISE - Would the project:				
a. Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?		"	"	"
b. Expose persons to or generate excessive groundborne vibration or groundborne noise levels?		"	"	"
c. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?		"	"	"

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
d. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		"	"	"
e. Be located within an airport land use plan area, or, where such a plan has not been adopted, within two miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?		"	"	"
f. Be located in the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?	"	"	"	

a-e. The specific plans and master plans could have potentially significant effects on noise in the planning area. This issue will be analyzed in the EIR as described below.

f. The proposed planning areas are not located in the vicinity of a private airstrip; therefore, no adverse impacts are expected.

Analysis Methodology

Noise impacts of the project will be evaluated by comparing noise anticipated with implementation of the specific plans and master plans to noise under existing and future no-project conditions. Criteria for determining the significance of noise impacts will be defined based on potential increases in noise and exposure of existing and proposed noise-sensitive land uses to noise levels exceeding the criteria established in the City's General Plan Noise Element. Potential sources of noise include construction, surface traffic, and aircraft. The Federal Highway Administration (FHWA) Traffic Noise Prediction Model (FHWA-RD-77-108) will be used to assess traffic noise impacts. Aircraft noise impacts will be evaluated using aircraft noise contours.

The noise chapter of the EIR will contain the following:

- a summary of relevant portions of the local, state, and federal noise regulations, including the General Plan Noise Element and noise regulations for the City;
- a description of noise-sensitive land uses in the planning area, such as residential areas, senior centers, schools, and health care facilities, and significant existing sources of noise in the planning area, such as traffic, rail lines, aircraft, and industry;

- an evaluation of future build-out traffic noise conditions on sensitive receptors at as many as 30 roadway segments in and near the specific planning areas using the FHWA traffic noise prediction model;
- a description of future noise conditions based on the traffic noise modeling results contained in the 1994 General Plan Updates EIR, existing noise data, and future aircraft noise contours;
- program-level noise impact thresholds related to construction activity; and
- an evaluation of aircraft noise impacts at noise-sensitive uses.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
XII. POPULATION AND HOUSING - Would the project:				
a. Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	"	"		"
b. Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere?	"	"		"
c. Displace a substantial number of people, necessitating the construction of replacement housing elsewhere?	"	"		"

a. The proposed specific plans and master plans would provide a consistent framework within which growth and development in the planning areas could be evaluated and adverse effects avoided. Implementation of the proposed project would result in land use types, intensities, and distribution that will remain similar to those land use and circulation concepts evaluated in the 1994 General Plan Update and associated program EIR. Therefore, population growth planned under the proposed project is expected to be similar to that analyzed in the 1994 General Plan Update. The City has adopted a finding of overriding considerations for population and housing. Because the proposed project is in keeping with the City's General Plan, the City has assessed population and housing impacts. The impact of inducing substantial population growth to the planning area would be less than significant.

Two of the project alternatives expand development into areas shown in the current General Plan as Open Space. These alternatives would modify the population and

housing balances reported in the 1994 Land Use Element update. The effect of the proposed project and alternatives on the City's jobs/housing balance will be evaluated in the Land Use section of the EIR.

b-c. A few individual dwellings within areas shown for nonresidential use would be displaced as a result of development consistent with the specific plans; issues related to changes in land use on existing housing will be discussed in the Land Use section.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
XIII. PUBLIC SERVICES - Would the project:				
a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:				
Police protection?		"	"	"
Fire protection?		"	"	"
Schools?		"	"	"
Other public facilities?		"	"	"

a. The specific plans and master plans could have significant effects on public services and utilities in the planning area.

Analysis Methodology

Criteria for determining significance will be defined and impacts will be described, including needed changes in facilities and extensions or modifications of systems serving the planning area.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
XIV. RECREATION - Would the project:				
a. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?		"	"	"
b. Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?		"	"	"

a-b. The specific plans show substantial space for recreational uses, the issues of recreational demand, supply, and type will be discussed in the Public Services/Utilities section of the EIR.

Analysis Methodology

As described in the Public Services section, issues related to recreation will be addressed in the Public Services chapter of the EIR.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
XV. TRANSPORTATION/TRAFFIC - Would the project:				
a. Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections)?		"	"	"
b. Cause, either individually or cumulatively, exceedance of a level-of-service standard established by the county congestion management agency for designated roads or highways?		"	"	"

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	"	"	"	
d. Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	"	"		"
e. Result in inadequate emergency access?	"	"		"
f. Result in inadequate parking capacity?	"	"	"	
g. Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	"	"		"

a-b. The specific plans would have significant effects on traffic and roadways in and near the planning area. Though they are intended to be self-mitigating within the context of the General Plan, there may be residual and secondary impacts.

c. The specific plans would require that development conform to all applicable safety regulations associated with the airport; therefore, no adverse impacts are expected.

d-g. The specific plans would allow roadway design and development in the planning area only in accordance with applicable city standards regarding safety. Additionally, local transportation policies regarding parking capacity and alternative transportation programs will be incorporated into the proposed specific plans. Therefore, no significant adverse impacts are expected.

Analysis Methodology

The transportation and circulation analysis will contain the following information:

- existing setting (including nonmotorized and transit modes of transportation);
- the project's trip generation;
- traffic impact analysis of year 2020 conditions without the specific plans to establish future baseline conditions;

- traffic impact analyses of year 2020 with the specific plans, evaluated separately to differentiate between the impacts of the two plans;
- traffic impact analyses for 2020 with both specific plan areas and other General Plan build-out to identify cumulative impacts;
- identification of specific traffic impacts on all modes of travel for each of the specific plans; and
- analysis of circulation and land use alternatives (up to four quantitative analyses).

The EIR analyses will be based on the transportation plans presented in the project description and will evaluate the plan's offsite traffic impacts. Alternative mitigation measures will be evaluated to minimize the adverse impacts of road extensions or road widening. Measures will include those recommended in the specific plan to reduce project traffic as well as innovative methods to minimize neighborhood intrusion and impacts on pedestrians and bicyclists.

The alternatives analysis will include quantitative trip generation and qualitative description of resulting impacts. The alternatives analysis will identify alternative land use and development patterns that could reduce traffic impacts. Circulation alternatives will be part of the development of the comprehensive transportation plan and road extension analysis, resulting in a detailed comparison and a recommended circulation system.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
XVI. UTILITIES AND SERVICE SYSTEMS - Would the project:				
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	"	"		"
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?		"	"	"
c. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?		"	"	"

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or would new or expanded entitlements be needed?		"	"	"
e. Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?		"	"	"
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?		"	"	"
g. Comply with federal, state, and local statutes and regulations related to solid waste?	"	"		"

a-f. The specific plans and master plans could have significant effects on utilities and service systems in the planning area. This issue will be analyzed in the EIR as described below. The primary utility features that would have secondary impacts are a new hillside water tank and a drainage detention basin.

g. The specific plans would incorporate applicable federal, state, and local statutes and regulations related to solid waste and recycling; therefore, no significant adverse impacts are expected.

Analysis Methodology

The utilities discussion will focus on water supply and distribution and wastewater collection and treatment. This chapter will define criteria for determining significance of impacts and identify impacts of the plans, including changes in onsite facilities and extensions or modifications of systems serving the planning area.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
XVII. MANDATORY FINDINGS OF SIGNIFICANCE				
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?		"	"	"
b. Does the project have impacts that are individually limited but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)		"	"	"
c. Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?		"	"	"

a. While the project is intended to contain features that will avoid or mitigate potentially significant impacts, those features are not clearly defined now. Therefore, at this time, there is a potential for the project to reduce the number or restrict the range of rare or endangered plants or animals.

b. The General Plan update, which the specific plans will largely follow, involved cumulative impacts for which findings of overriding considerations were made. The current EIR will discuss any differences in the magnitude of cumulative impacts due to General Plan changes needed for consistency with the proposed specific plans and their alternatives. The EIR will need to evaluate cumulative impacts from land uses on the airport property and those that could be developed consistent with the County General Plan, whether or not these areas would be within the City's urban reserve line.

c. While the project is intended to contain features that will avoid or mitigate potentially significant impacts, those features are not clearly defined now. Therefore, at this time, there is a potential for the project to expose people to hazards, including aircraft overflight and hydrocarbon contamination.

Chapter 4. Citations

County of San Luis Obispo. 1995. Draft Environmental Impact Report for the Land Use Element. San Luis Obispo Area Plan. San Luis Obispo, CA.

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Appendix B. Water System Master Plan Recommended Improvements

WATER TREATMENT PLANT IMPROVEMENTS

Recommended Capital Improvements Along Whale Rock Pipeline

Consider addressing the more vulnerable portions of the pipeline (the Panay and Nevis Landslides) to protect the reliability of the Whale Rock Pipeline.

Recommended Forebay Improvements

Install a security fence with gates around the forebay to preclude unauthorized access or animals from entering the forebay reservoir.

Repair the expansion joints to limit potential leakage from the reservoir.

Provide a new ladder to improve egress from the forebay.

Provide forebay level monitoring for coordination of plant shutdown and control of overflow to Cal Poly's agricultural ponds.

Recommended Ozonation Improvements

Provide flow meter or some other means of verifying flow rate and impact from this system on hydraulic filter loading.

Consider future modification to the ozone cooling system to incorporate a closed loop system with a cooling tower. The system should include blowdown and makeup water provisions.

Recommended Flocculation Improvements

Continue practice of modifying variable frequency drives (VFDs).

Recommended Conventional Treatment Improvements

Consider modifying the existing sedimentation basin clarifier drive to facilitate addition of a brush system on the sedimentation basin mechanism to clean the launders on the overflow weir.

Add a second sedimentation basin to provide conventional filtration capability for Salinas Reservoir and future surface water supplies. Addition of a second sedimentation basin will also provide the flexibility to service one unit and maintain conventional treatment.

Recommended Filtration Improvements

Modify controls to maintain constant filtration rates through individual filters during backwash cycles.

Consider future implementation of granular activated carbon (GAC) filter media to reduce trihalomethanes (THMs) in the treated water.

Recommended Washwater Tank Evaluation

Consider performing seismic analysis for existing Washwater Tank No. 1.

Recommended Washwater Recovery System Improvements

The washwater inlet control structure should be heightened approximately 6 feet (10 feet above grade) to prevent overflowing the control structure.

Consider future relocation of the plate steeler structure to a higher elevation so that water can return to the ozonation basin by gravity.

Recommended Secondary Disinfection System Improvements

Perform tracer study of the clearwell to evaluate emergency disinfection capabilities using liquid sodium hypochlorite for contact time (CT) compliance.

Recommended Treated Water Storage Improvements

Construct a second 4-million gallon (MG) clearwell.

Take the existing clearwell offline for repair and recoating.

Perform seismic analysis for the existing clearwell.

Recommended Residuals Removal/Handling Improvements

Consider future modifications to include one additional drying bed to increase drying capacity if enhanced coagulation is required.

Recommended Pumping Facility Improvements

Replace old pumps.

Replace old drip-proof motors on the pumps with high-efficiency motors which are enclosed and fan cooled for motors that have not yet been replaced.

Consider a study to further evaluate modifications which would interconnect the plant water piping to Reservoir No. 2 piping that is routed along the Stenner Creek Road, which fronts the treatment plant.

Recommended Chemical Feed Facility Improvements

Consider using a hypochlorite feed system to provide disinfection when the facility is operating on standby power to save energy and minimize standby power requirements during emergency operations.

Consider coating the existing black hypochlorite storage tanks with a white paint system to reduce temperature-induced decay.

Recommended Standby Power/Reliability Improvements

Consider transfer switches and rewiring to provide emergency standby power capacity to operate the water treatment plant during a power failure.

Utilize hypochlorite for disinfection and Reservoir No. 2 to provide fire protection during emergency plant operations rather than pumping water from the clearwell.

Ensure that further investigation for precise power requirements is conducted to verify that the existing generator has sufficient capacity to operate the treatment plant if these changes are made.

Recommended Improvements, Other Plant Reliability

The City may want to consider measures to protect the water treatment plant from a potential train derailment. These improvements should be either a retaining wall or a berm, sized to prevent a train from rolling down onto the treatment facilities or from leaking materials that could contaminate the water.

Recommended Improvements, Intermittent Operation for Off-Peak Power Cost Savings

Consider performing a cost analysis to compare benefits of off-peak operation with continuous 24-hour operation, particularly as demand increases.

Recommendations, CT Compliance

Conduct a tracer study to verify adequate contact time for emergency disinfection with hypochlorite providing backup CT compliance.

Recommendations, Water Supply Limitations

Pursue alternate surface water sources to supplement future water demand needs of the City.

RECOMMENDED WATER SYSTEM IMPROVEMENTS

Provide a new 1.6-MG reservoir in the Prefumo Canyon area to meet fire flow and part of operating storage requirements of the Edna Saddle Zone. Connect the new reservoir to the existing 16-inch main in Los Osos Valley Road with a new 12-inch main.

Open Broad/Caudill pressure regulating valve (PRV).

Install a PRV on the main in Patricia Avenue between Clover and Wastmont Avenues connecting the Patricia Zone and Highland Zone.

Use the pipeline on Verde Avenue to supply the Serrano Zone, looping the zone.

Abandon the Alrita hydopneumatic tank and pump station and replace it with a new 1,600-gallon per minute (gpm) fire pump plus two duty pumps. Provide a new hydropneumatic tank with SCADA controls at the pump station.

Reduce fire flow in Edna Saddle Zone to 3,000 gpm.

Reduce fire flow in Downtown Zone to 3,000 gpm.

Maintain the City's current policy of 8-inch minimum pipe size as pipelines are replaced in the Foothill Zone.

Upsize to 10-inch mains as necessary as pipelines are replaced in the Reservoir No. 1 Zone.

Connect the Highland Zone with the Patricia Zone with a PRV at the north end of Patricia between Westmont and Clover Avenues.

Raise the operation level in Edna Saddle Tank to approximately 1 to 2 feet below the overflow.

Plan for a future 0.20-MG tank with a maximum water surface elevation of 344 feet in Prefumo Canyon Area.

Connect Reservoir No. 1 to Terrace Hill Zone via a PRV at Ella and Swazey Avenues.

Provide a new 1.2-MG Bishop storage tank at the same location and elevation as the Bishop Tank.

Abandon the Alrita Pump Station and hyropneumatic tank and install a new pump station, including a 1,600-gpm fire pump with auxiliary power and a larger hydropneumatic tank.

Increase the McCollom Pump Station capacity to 1,600 gpm.

Raise operating levels in Reservoir No. 1 and No. 2 to approximately 1 to 2 feet below the overflows.

Provide 0.25 MG additional storage in Ferrini Zone and provide PRV bypass valves to allow flows to Highland and Patricia Zones.

Abandon the Highland Tank.

Add a 1,600-gpm fire pump with auxiliary power to the Rosemont Pump Station.

Add a 1,600-gpm fire booster pump with auxiliary power at the Highland Pump Station.

Provide 0.25 MG additional storage to the Ferrini Zone.

Provide two PRV bypass valves at Patricia and Passtiempo Avenues.

Bressi Pump Station: Replace pumps in the next 3 years because of leaky packing and age. Provide phone line connection between Serrano Tank and Bressi Pump Station. Provide automatic dialer alarm or SCADA system to alert operators of pump failure and to better regulate pumps with tank levels. Equip with 1,600-gpm fire booster pump with auxiliary power or provide additional storage at Serrano Tank. Provide flow meters and pressure gauges at new pumps.

Transfer Pump Station: Replace pumps within the next 7 years because of leaky packing and age. When pumps are replaced, increase pumping capacity by approximately 1,000 gpm to meet criteria for maximum day demand, refilling fire, and operational storage within five days at buildout demands. Provide new meters on pumps, pressure gauges, and SCADA connections to Reservoirs No. 2 and 3 and the treatment plant.

McCollum Pump Station: Provide automatic dialer alarm or SCADA connection to alert operators of pump failure. Replace flow meter in vault. Equip with 1,600-gpm fire booster pump with portable auxiliary power or provide additional storage at Slack Street Tank.

Ferrini Pump Station: Add storage tank to Ferrini Zone to supply Ferrini, Highland, and Patricia Zones.

Alrita Hydropneumatic Pump Station: Abandon this pump station because of age and condition. Build a new pump station with two 150-gpm duty pumps and a 1,600-gpm fire pump with auxiliary power. Provide a larger hydropneumatic tank with SCADA controls. As an alternative, consider installation of a 0.20-MG elevated storage tank.

Rosemont Pump Station: Rebuild pump station at a new site at a lower elevation, with new pumps of equal size plus a 1,600-gpm fire pump with portable auxiliary power. Provide meters on pumps and a SCADA system to control pumps based on Rosemont Tank levels and for data collection and reporting.

Bishop Pump Station: Replace pumps as needed because of age and condition. Provide meters on pumps and a SCADA system to control pumps based on Bishop Tank levels and for data collection and reporting.

Provide 0.4 MG additional storage to the Serrano Zone.

Appendix C. Wastewater Master Plan Recommended Improvements

RECOMMENDED WATER RECLAMATION FACILITY IMPROVEMENTS

Table 8-1. Water Reclamation Facility Priority 1 Projects

Project No	Project	Description
1	Flow Equalization Return Flow Pumping Station	Build a new pumping station to replace the existing pump and controls. Install two vertical turbine solids handling (VTSH) pumps with variable frequency drives. The pumping station is old and modifications were not made to the facility in the last plant upgrade. Pumping station replacement will improve process control and reduce future operation and maintenance.
2	Preliminary Treatment Area Improvements	Modify headworks air agitation system. Modify channel agitation air blower to ensure sufficient capacity to operate all shearfusers simultaneously. Modify grit agitation blower. Relocate extraneous supports in the aerated grit chambers that create bridging problems. Construct an upward flow/overflow weir distribution box at the grit chamber slide gates with individual discharges to each side of the slide gate location to assure even flow distribution between the two aerated grit removal tanks. Improve accuracy of the distribution parshall flumes at the discharge from the aerated grit removal tanks—upstream baffling and side wall straightening to increase flow accuracy.
3	Primary Sedimentation Area Improvements	Eliminate bottlenecks that reduce process effectiveness and capacity.
4	Rebuild Secondary Clarifier Sludge Pump	Rebuild existing secondary clarifier sludge pump to reduce operation and maintenance requirements and improve process control.
5	Replace Trickling Filters 1 and 2 Turntable and Arms	Replace trickling filters 1 and 2 turntables and distribution arms to improve equipment reliability and reduce operation and maintenance requirements.

6	Relocate Return Activated Sludge Flow and the Dissolved Air Flotation Thickener (DAFT) Underflow Discharge to Aeration Basins and or Primary Clarifier Influent Splitter Box	Relocate piping to achieve equal distribution of return solid flows to both aeration basins. Consider returning these flows to the secondary effluent pipeline at least 10 feet upstream of where this pipeline discharges into the aeration basin distribution channel. Consider agitation air mixing in this pipeline downstream from this feed point to further assure adequate mixing of all the aeration basin incoming solids. Recommended to improve process control. Evaluate the value and feasibility of installing a pipeline for the DAFT underflow to the primary clarifier influent splitter box.
7	Modify Filter Modulating Valves	Modify filter modulating control valve controllers to reduce operation and maintenance requirements and modify filter backwashing procedures.
8	Replace Digester Boiler	Replace digester heating boilers, piping and appurtenances to reduce operation and maintenance requirements and improve heat transfer.
9	Construct Covers over Sludge Drying Beds	Install a cover system over the sludge drying beds that is similar to that provided for the bed adjacent to the water reclamation facility (WRF) belt filter press. The cover should extend far enough in the east and west directions to keep rainwater out of the beds as much as possible, and the beds should have drain systems which allow them to keep dry under all conditions.
10	Sludge Dewatering Equipment Evaluation	To reduce operation and maintenance requirements, improve sludge dryness and process reliability, conduct study that compares replacement of the existing filter press with two new presses, retaining the existing press and installing a second press, or retaining the existing press and installing a centrifuge.
11	Vacuum Truck Waste Receiving Facility	Construct a vacuum truck waste-receiving and snail shell dump facility for handling collection system cleaning wastes and snail shells in an odor free and safe manner.
12	Cothickening Sludge Tests	Test plant backup cothickening system (in the primaries) to determine effectiveness.
13	Biosolids Storage Evaluation	Study alternatives to store plant generated biosolids. Compare onsite versus offsite storage. Evaluate alternatives to protect dewatered biosolids from weather and occasional liquefaction problems
14	Modifications to Auxiliary Piping Systems	Modify existing service air system to create a looped system; and to install isolation valves to ease system maintenance. Install isolation valves in instrument air system piping; and provide a standby instrument air compressor to provide a reliable system and ease maintenance requirements. Replace pumps and appurtenances to reduce maintenance required. Tie abandon water well piping into auxiliary 3W system.
15	Deenergize Old Dual Power System	Deenergize the old dual power electrical supply.

16	Ocean Outfall Evaluation	Evaluate the capital and operational costs of installation, maintenance and operation of ocean outfall. Compare findings to same costs of current Water Reclamation Facility operation and maintenance, and additional upgrades and related operation and maintenance required to comply with more stringent stream discharge requirements.
17	Replace No. 1 Water Air Gap Equipment	Replace the No. 1 water airgap and air cushion for the Water Reclamation Facility.
18	Odor Control Evaluation	Evaluate capital and operation and maintenance costs for installation of biofilters or chemical scrubbing systems (including covers, ductwork, and appurtenances) to remove odor emanating from the headworks grit and screening dewatering from the headworks grit, the screening dewatering area, and the sludge drying beds.
19	UV Disinfection Evaluation	Evaluate the capital and operation and maintenance costs for ultraviolet disinfection and compare to existing disinfection system costs to determine if there would be any cost savings by installing a UV system. Assess UV technology to determine ability to comply with receiving water effluent limitation requirements.

Table 8-2. WRF Priority 2 Projects

Project No	Project	Description
1	Preliminary Treatment Dewatering Equipment	Install screening dewatering facility to squeeze excess water from the screening, and improve screening process performance. Compare this method of operation to installation of screw and ram type presses downstream of the dewatering operation to produce drier screenings.
2	Secondary Clarifier Sluice Gates/Filter Feed Pumps	Replace, as needed, the existing sluice gates within the secondary clarifier and related recirculation pump chamber. Rebuild biofilter feed pumps to improve operation and maintenance.
3	Modify Final Clarifier RAS Pumps	For each final clarifier RAS pump, install variable speed drives, a flow meter in discharge pipe and a feed-back loop to new RAS variable speed drives to improve process control and equalize flow distribution.
4	Modify Nitrified Effluent Cooling Influent Pumps	Install variable speed drives on nitrified effluent cooling influent pumps to ease startup and continuous operation under all conditions.
5	Chlorine Contact Sluice Gates	Install sluice gates in chlorine contact tank influent channels that will allow passes of chlorine contact tank to be isolated for maintenance.
6	Anaerobic Digester Auxiliary System Modifications	Install a sludge preheating system, replace digester gas piping and waste gas burner.
7	Install Sludge Dewatering Equipment	Install additional sludge dewatering equipment.
8	Construct Biosolids Storage	Construct new biosolids storage facility.

9	Modify Sludge Drying Beds	Modify sludge drying beds 9 and 9A to include sloping, resurfacing, underdrains, and bank stabilization.
10	Construct a Supernatant Drainage Pumping Station	Construct a new drainage pumping station between the newer drying beds and the supernatant lagoon. Include an upgraded decanting system for the drying beds, which is adjustable over the full range of bed sludge depths.
11	Odor Control Facilities	Construct odor control facilities recommended in Priority 1 study.

RECOMMENDED COLLECTION SYSTEM IMPROVEMENTS

Sewer System

Airport Area

Brown and Caldwell recommends that new flows from this area be routed to a new Howard Johnson Pumping Station and a new Tank Farm Pumping Station. Airport Annexation is divided into two catchment areas because of the existing grade. The southwest portion of the Airport Annexation areas is at a lower elevation than the rest of the area. Hence it is cost effective to route flow from the southwest portion to a new Howard Johnson Pumping Station. The existing grade allows the remaining areas flow to be routed by gravity to a new Tank Farm Pumping Station. It is estimated that 147,000 gallons per day (gpd) from this area will require conveyance to a new Tank Farm Pumping Station.

Brown and Caldwell recommends that flow to the Howard Johnson Pumping Station pass through approximately 6,500 feet of new 8-inch pipe to an existing 8-inch pipe on Los Osos Valley Road. The existing 8-inch pipe has adequate capacity to carry future flows.

The new Tank Farm Pumping Station will pass through approximately 3,400 feet of new 8-inch pipe and 2,600 feet of new 10-inch pipe. This new 10-inch pipe will connect to a new 16-inch pipe recommended on Tank Farm Road.

Dalidio/Madonna/McBride Area

Brown and Caldwell recommends new flows from the Dalidio/Madonna/McBride area be routed to a new Laguna Pumping Station. It is estimated that 111,000 gpd of flow will require conveyance piping to the new Laguna Pumping Station.

Brown and Caldwell recommends that flow to the pumping station pass through approximately 7,600 feet of new 8-inch pipe. The recommended 8-inch pipe will discharge to an existing 15-inch pipe on Oceanire Drive. The existing 15-inch pipe has adequate capacity to convey future projected flow.

Edna Islay Area

Brown and Caldwell recommends new flows from the Edna Islay area to be routed to the new Tank Farm Pumping Station. It is estimated that 132,000 gpd of flow will require conveyance pipe to carry flow to the new Tank Farm Pumping Station. Flow estimates include flow from the Fuller Road annexation area.

Brown and Caldwell recommends that flow to the pumping station pass through approximately 3,000 feet of new 8-inch pipe proposed along the railroad and 2,400 feet of new 8-inch pipe proposed along Fuller Road and Broad Street. The new 8-inch pipe adjacent to the railroad will discharge to an existing 10-inch pipe on Tank Farm Road. Flow from the Fuller Road annexation area will flow to an existing 12-inch pipe located at the intersection of Broad Street and El Capitan. Both the existing 10-inch and 12-inch pipes accepting Edna Islay area flows were determined to have adequate capacity to handle projected future flows.

Irish Hills Area

Brown and Caldwell recommends new flows from the Irish Hills area to be routed to the new Howard Johnson Pumping Station and the new Laguna Pumping Station. The Irish Hills area is divided into two catchment areas because of the existing grade. The existing grade does not allow routing of flow from the souther portion of the area to the new Laguna Pumping Station by gravity. The southern portion is at a lower elevation than the sewer on Garcia Drive. Hence Brown and Caldwell recommends that flow from the northern portion be routed to the new Laguna Pumping Station and flows form the southern portion be routed to the new Howard Johnson Pumping Station. It is estimated that 45,000 gpd of flow from this area will require conveyance piping to the new Howard Johnson Pumping Station and that 70,000 gpd will require conveyance pipe to the new Laguna Pumping Station.

Brown and Caldwell recommends that flow to the new Howard Johnson Pumping Station pass through approximately 1,300 feet of new 8-inch pipe. The new 8-inch pipe will convey flow to an existing 8-inch pipe on Los Osos Valley Road. The existing 8-inch pipe has adequate capacity to convey future projected flows.

Brown and Caldwell recommends flow to the new Laguna Pumping Station pass through approximately 2,150 feet of new 8-inch pipe. The new 8-inch pipe will discharge to an existing 8-inch pipe on Garcia Drive. The existing 8-inch pipe was determined to have adequate capacity to convey future projected flows.

Margarita Area

Brown and Caldwell recommends that new flows from the Margarita area be routed to the Margarita Pumping Station, the Silver City Pumping Station, and the new Tank Farm Pumping Station. It is estimated that 50,000 gpd will require conveyance pipe from this area to the

Margarita Pumping Station, that 111,000 gpd will need to be piped to the Silver City Pumping Station, and that 99,000 gpd will need to be piped to the new Tank Farm Pumping Station.

Brown and Caldwell recommends flow to the Margarita Pumping Station pass through approximately 9,400 feet of new 8-inch pipe. The new 8-inch pipe will discharge to an existing 10-inch pipe on Margarita Avenue. The existing 10-inch pipe was determined to have adequate capacity to convey future projected flows.

Flow to the Silver City Pumping Station will pass through approximately 10,700 fee of new 8-inch pipe. The new 8-inch pipe will discharge to an existing 10-inch pipe on Prado Road. The existing 10-inch pipe was determined to have adequate capacity to convey future projected flows.

Flow to the new Tank Farm Pumping Station will pass through approximately 10,400 feet of 8-inch pipe. Flow will discharge from the 8-inch pipe to the new proposed 16-inch pipe on Tank Farm Road.

Orcutt Area

Brown and Caldwell recommends that new flows from the Orcutt area be routed to the new Tank Farm Pumping Station. It is estimated that 78,000 gpd of flow will require conveyance pipe to the pumping station.

Brown and Caldwell recommends flow to the pumping station pass through approximately 6,300 feet of new 8-inch pipe. The new 8-inch pipe will connect to an existing 10-inch pipe on Tank Farm Road. The existing 10-inch pipe was determined to have adequate capacity to convey future projected flows.

Northern Area

No physical improvements are recommended at this time in the northern portion of the City.

Pumping Stations

To accommodate flow from future annexations, improvements will be needed at six of the City's eight pumping stations. The station that require improvements are: Howard Johnson, Laguna, Margarita, Rock View, Silver City, and Tank Farm. Brown and Caldwell recommends three pumping stations be demolished and replaced, one station be taken out of service, and two stations be modified. Brown and Caldwell also recommends that a county operated pumping station be taken out of service. Installation of a deep gravity sewer can eliminate the County pumping station located at Fiero Lane and Broad Street. The new gravity pipe can be laid along

Broad Street from the upstream manhole of the lift station to the new proposed 16-inch pipe at the intersection of Broad Street and Tank Farm Road.

Howard Johnson

Flows from the Airport annexation area will be conveyed to the Howard Johnson Pumping Station, as will flows from the Irish Hills Annexation. Because of increased flows from the Airport area and Irish Hills area, Brown and Caldwell recommends that the Howard Johnson's Pumping Station be taken out of service, demolished, and replaced with a new station that will be able to handle future flows.

Brown and Caldwell recommends the new pumping station feature two submersible pumps, where one pump is in operation and one is standby. It is estimated that each pump would be sized to pump 900 gpm with a TDH of 60 feet. The pumps should be provided with variable frequency drives and automated controls. For this rating, motors will need to be a minimum of 75 horsepower. The existing 8-inch force main will be sufficient to convey flow from the Howard Johnson Pumping Station to the Laguna Pumping Station.

Laguna

The existing Laguna Pumping Station presently receives approximately 234,000 gpd from the Silver City Pumping Station and approximately 215,000 gpd from the Howard Johnson Pumping Station. The existing flow to the pumping station from the Laguna service area, the Howard Johnson service area, and the Silver City service area is approximately 1,064,000 gpd. After the completion of the Airport, Margarita, Irish Hills, and Dalidio-McBride-Madonna area annexations, the Laguna Pumping Station flow is expected to increase from 1,064,000 gpd to 1,550,000 gpd.

Because of the significant increase in projected flow to the Laguna Pumping Station, Brown and Caldwell recommends that the existing pumping station be taken out of service, demolished, and replaced with an entirely new station. New pumps are already needed because the existing pumps currently have insufficient capacity to pump flow during wet weather and in the future will be insufficient to pump both dry and wet weather flows.

Brown and Caldwell recommends that the new pumping station feature three pumps, where two pumps are in operation and one is standby. It is estimated that each pump needs to pump 1,600 gpm with a TDH of 40 feet. The pumps should be provided with variable frequency drives and automated controls. For this rating, motors will need to be a minimum of 1,170 RPM. To convey flow from the Laguna Pumping Station to the treatment plant, a new 16-inch force main extending approximately 2,300 feet is required.

Madonna Inn

This pumping station services only the Madonna Inn. Brown and Caldwell recommends that the operation and maintenance of this pumping station be transferred from the City back to the owner of the Madonna Inn.

Margarita

Flows from Margarita Annexation will be directed to the existing Margarita Pumping Station. No upgrades are recommended for this pumping station since the existing pumping station has adequate capacity to handle the future flows.

Rock View

Brown and Caldwell recommends that this pumping station be taken out of service, demolished, and that a new 8-inch pipe approximately 3,750 feet long be constructed to reroute flows to the new Tank Farm Pumping Station. The existing pump capacity is inadequate to handle present wet weather flows and is insufficient to handle future flows anticipated from new annexations. The existing pumping station frequently floods causing nearby residents and businesses to complain about the flooding and odors that emanate from the station. Because this station presents operation problems and a large percentage of the flow comes from the Tank Farm Pumping Station, Brown and Caldwell recommends this station be taken out of service and its catchment area flow be rerouted to the new Tank farm Pumping Station.

Silver City

Flows from Margarita Annexation will be conveyed to the Silver City Pumping Station through new sewer lines. Brown and Caldwell recommends the Silver City Pumping Station pumps be upgraded from 450 gpm to 750 gpm in order to handle flows from future annexations. When the pumps are upgraded it is recommended that new controllers also be installed.

Tank Farm

The existing Tank Farm Pumping Station pumps approximately 436,000 gallons per day and is presently near capacity. In the future, flows from the Airport, Edna Islay, Margarita, and Orcutt Annexations—approximately 907,000 gallons per day—will also be routed to the pumping station. When any one of these areas is annexed to the City, the existing Tank Farm Pumping Station will have insufficient pumping capacity and require upgrading. Since the Rockview Pumping Station has insufficient design capacity, and the majority of the flow to the Rock View comes from the Tank Farm Pumping Station, Brown and Caldwell recommends that the Rock

View and Tank Farm pumping stations be combined and a new pumping station be constructed to replace the two existing ones.

Brown and Caldwell recommends the new Tank Farm Pumping Station be constructed on Tank Farm Road approximately 7,000 feet west of the existing Tank Farm Pumping Station. A wet pit/dry pit–submersible pump arrangement is recommended, which would be similar to the design recommended for the proposed Laguna Pumping Station. The station should include three pumps, where two pumps are in operation and one is on standby. Each pump should be capable of pumping 1,350 gpm with the TDH of 50 feet. The pumps should be specified with variable frequency drives and automated controls. Pump motors should be a minimum of 25 horsepower. Lighting and ventilation systems and stairs should be provided in the design to maximize operator safety.

Flow from the Rock View Pumping Station could be conveyed to the new station through a new 8-inch sewer pipe. Existing flow from old Tank Farm Pumping Station could be conveyed to the new Tank Farm Pumping Station through new 8-inch, 12-inch, and 16-inch pipes. Flows from the Orcutt Annexation area could be conveyed through new 8-inch pipes constructed along Bullock Road and Industrial Way. Flows from the Edna Islay area could be conveyed through new 8-inch pipe along Broad Street, Fuller Road, and Bullock Road. Flows from the Margarita Annexation could be connected to the new 16-inch pipe that connects to the new pumping station. The new pipes could be constructed along Tank Farm Road. Flows from the Airport Annexation could be conveyed through a new 8-inch, 10-inch, and 16-inch pipe that connects to the new pumping station.

Other Pumping Stations

Brown and Caldwell recommends that flow from the County Pumping Station located at Fiero Lane and Broad Street be routed to the Tank Farm Pumping Station through an 8-inch sewer along Broad Street. The existing grade and the invert of the proposed 16-inch sewer at the intersection of Broad Street and Tank Farm Road will allow laying an 8-inch 1,300 foot-long sewer to convey the flow from the County Pumping Station.

Proposed Project (Airport Area) Collection System Improvements

Brown and Caldwell recommends new flows from the Airport area be routed to a new Howard Johnson Pumping Station and a new Tank Farm Pumping Station. It is estimated that 147,000 gpd from Project alternative will flow to the Howard Johnson Pumping Station and that 598,000 gpd will flow to the new Tank Farm Pumping Station. The Howard Johnson Pumping Station pumps would be sized to lift 900 gpm. The Tank Farm Pumping Station pump would be sized to lift 2,700 gpm.

Flow to the Howard Johnson Pumping Station will pass through approximately 6,500 feet of new 8-inch pipe. In this arrangement the new 8-inch pipe will discharge to an existing 8-inch pipe on Los Osos Valley Road. The existing 8-inch pipe has adequate capacity to carry this future flow.

Flow to the new Tank Farm Pumping Station will pass through approximately 3,400 feet of new 8-inch pipe and 2,600 feet of new 10-inch pipe.

Appendix D. Storm Drain Master Plan Recommended Improvements

1. A new concrete box culvert will be constructed under Broad Street to convey the Orcutt Creek 100-year general plan flow of 9.0 m^3/s (320 cfs) to the Acacia Creek channel on the west side of Broad Street. The box culvert will be 1.2 meters (4 feet) high by 4 meters (13 feet) wide by 28 meters (90 feet) long. The box culvert will have concrete headwalls at the upstream and downstream ends of the culvert.

~~2. A new channel alignment will be constructed to divert Orcutt Creek 100-year general plan flow of 9.0 m^3/s (320 cfs) into Acacia Creek channel. The channel will be 140 meters (460 feet) long, 32 meters (100 feet) east of Broad Street and 108 meters (360 feet) west of Broad Street. The channel reach west of Broad Street will have a typical modified natural channel configuration. The channel reach east of Broad Street is not typical of the modified natural channel section since the low-flow channel will have a 100-year peak flow capacity. East of Broad Street, the bottom width of the channel will be 4 meters (13 feet) and the depth will be 2.4 meters (8 feet). West of Broad Street, the bottom width of the channel will be 4 meters (13 feet) and the depth will vary from 1.8 meters (6 feet) at the upstream end to 1.2 meters (4 feet) at Acacia Creek. The right-of-way width of the improved channel west of Broad Street will be 46 meters (150 feet). The right-of-way will be environmentally enhanced.~~

~~3. The existing conveyance capacity of the Acacia Creek channel will be improved from the Orcutt Creek junction to Tank Farm Road. The improved section will be a typical modified natural channel with an overall length of 700 meters (2,300 feet). The low-flow channel will have a 10-year flow capacity of 25.2 m^3/s (890 cfs). The bottom width of the low-flow channel will be 6 meters (20 feet) and the depth will vary from 1.2 meters (4 feet) at the upstream end to 2.4 meters (8 feet) at Tank Farm Road. The right-of-way width will vary from 42 meters (140 feet) at the upstream end to 46 meters (150 feet) at Tank Farm Road. The location of the low-flow channel will vary from side to side within the overall right-of-way width to simulate the sinuosity of a natural stream. The right-of-way will be environmentally enhanced.~~

4. The existing Acacia Creek Bridge at Tank Farm Road will be removed and replaced with a standard Caltrans 2-span concrete slab bridge. The bridge will be 16 meters (52 feet) long by 12 meters (40 feet) wide. At the center of the bridge, the two spans will be supported by piers 0.6 meter (2 feet) in diameter. The channel beneath the bridge will have a bottom width of 6 meters (20 feet) and a depth of 2.4 meters (8 feet). The banks of the channel beneath the bridge will be protected with rock rip-rap.

~~5. The existing conveyance capacity of the Acacia Creek channel will be improved from Tank Farm Road to the confluence with East Branch San Luis Obispo Creek. The overall length~~

~~of the improved channel will be 260 meters (850 feet). The bottom width of the low-flow channel will vary from 6 meters (20 feet) at Tank Farm Road to 12 meters (40 feet) at the confluence and the depth will vary from 2.4 meters (8 feet) at Tank Farm Road to 3.0 meters (10 feet) at the confluence. The 10-year capacity of the low-flow channel will be 25.2 m^3/s (890 cfs). The right-of-way width will vary from 46 meters (150 feet) at Tank Farm Road to 55 meters (180 feet) at the junction with East Branch San Luis Obispo Creek. The right-of-way will be environmentally enhanced.~~

6. The existing East Branch San Luis Obispo Creek Bridge at Santa Fe Road will be removed and replaced with a standard Caltrans 2-span concrete slab bridge. The bridge will be 20 meters (70 feet) long by 12 meters (40 feet) wide. At the center of the bridge, the two spans will be supported by piers 0.6 meter (2 feet) in diameter. The channel beneath the bridge will have a bottom width of 6 meters (20 feet) and a depth of 3 meters (10 feet). The banks of the channel beneath the bridge will be protected with rock rip-rap.

~~7. The existing conveyance capacity of the East Branch San Luis Obispo Creek channel between Broad Street and Santa Fe Road will be improved to convey the estimated 100-year general plan peak flow of 103 m^3/s (3,650 cfs) without flow in the overbank areas. Due to existing development along the creek, this channel improvement does not follow the typical modified natural channel section. The main flow channel along this stream reach will be cleared of existing heavy brush and widened by 3 meters (10 feet) along the entire length of 730 meters (2,400 feet). The side slopes of the channel will be 2:1. Environmental enhancement will be provided along the top-of-banks of the improved channel for a width of only 3 meters (10 feet) along each side. The right-of-way width will be 25 meters (80 feet) for the entire length.~~

~~8. The existing conveyance capacity of the East Branch San Luis Obispo Creek channel between Santa Fe Road and Buckley Road will be enlarged and environmentally enhanced in order to convey the 100-year general plan peak flow of 147 m^3/s (5,200 cfs). The enlarged channel and overbank conveyance area will be a typical modified natural section. The capacity of the low-flow channel will be 71.1 m^3/s (2,510 cfs). The bottom width will vary from 12 meters (40 feet) at Santa Fe Road to 15 meters (50 feet) at Buckley Road. The depth of the low-flow channel will be 3 meters (10 feet) for the entire length. The right-of-way width will vary from 55 meters (180 feet) at Santa Fe Road to 58 meters (190 feet) at Buckley Road. The right-of-way will be environmentally enhanced and the location of the low-flow channel will vary from side to side within the overall right-of-way width to simulate the sinuosity of a natural stream.~~

9. A diversion facility to reduce peak flow on East Branch San Luis Obispo Creek will be constructed along the west side of the channel north of Buckley Road. The facility will divert flow from East Branch San Luis Obispo Creek to the Buckley Road Detention Basin located at the northeast corner of the Buckley Road and Vachell Lane intersection. The inlet structure will consist of a concrete box weir covered with a sloped grate. The inflow to the structure will be controlled by a broad-crested weir inlet with the top of the weir located parallel to the design water surface profile. The maximum inflow diversion facility is

estimated to be 8.1 m^3/s (290 cfs), the difference in peak flow between existing development conditions and post-development conditions.

10. The flow diversion of 8.1 m^3/s (290 cfs) from East Branch San Luis Obispo Creek will flow through a circular conduit located along the north side of Buckley Road from East Branch San Luis Obispo Creek to the Buckley Road Detention Basin. The conduit will be reinforced concrete pipe 1.8 meters (6 feet) in diameter and 945 meters (3,100 feet) in length. The right-of-way width will be 8 meters (26 feet) for the entire width and will be revegetated after construction.

11. The existing culvert facilities at Tank Farm Road, consisting of two smooth steel culverts on Tank Farm Creek and twin reinforced concrete box culverts on East Fork Tank Farm Creek will be removed and replaced with a standard Caltrans 2-span concrete slab bridge. The bridge will be 22 meters (72 feet) long by 12 meters (40 feet) wide. At the center of the bridge, the two spans will be supported by piers 0.6 meter (2 feet) in diameter. The channel beneath the bridge will have a bottom width of 6 meters (40 feet) and a depth of 1.5 meters (5 feet). The banks of the channel beneath the bridge will be protected with rock rip-rap.

~~12. The conveyance capacity of Tank Farm Creek from Tank Farm Road to Buckley Road will be improved to convey 100-year general plan peak flows. The 100-year general plan peak flows vary from 25.1 m^3/s (890 cfs) at Tank Farm Road to 38.6 m^3/s (1,360 cfs) at Buckley Road. The improved and realigned channel will be a typical modified natural channel section. The 10-year flow capacity of the low-flow channel will vary from 14.1 m^3/s (500 cfs) at Tank Farm Road to 20.6 m^3/s (730 cfs) Buckley Road. The bottom width of the low-flow channel will vary from 6 meters (20 feet) at Tank Farm Road to 9 meters (30 feet) just prior to Buckley Road. The depth of the low-flow channel will be 1.2 meters (4 feet) for the entire length of 1,450 meters (4,760 feet). Approximately 460 meters (1,500 feet) of the existing channel near the south border of the project area will be abandoned and a new channel alignment constructed. The realignment is necessary because of insufficient channel and culvert capacity through the commercial area along Horizon Lane east of the Unocal Tank Farm Property. The right-of-way width will vary from 42 meters (140 feet) at Tank Farm Road to 45 metes (150 feet) at Buckley Road. The right-of-way will be environmentally enhanced.~~

~~13. A single, large detention basin will be constructed to prevent an increase in peak flow downstream of the Airport area. The basin will be located either on the East Branch San Luis Obispo Creek at Buckley Road or on Tank Farm Creek in the Avila Ranch property north of Buckley Road and east of Vachell Lane. The detention basin will have a design capacity of 185,000 cubic meters (150 acre-feet). The storage area, embankments, and right-of-way area surrounding the basin will be landscaped with grass. Planting of trees will not be allowed in the storage area or on the embankments. The detention basin, as currently proposed, does not include the establishment of a wetland area and, therefore, should be maintained in order to prevent a wetland area from forming. If maintenance will not be performed as scheduled or a wetland area is desired for environmental purposes, the detention basin should be re-evaluated to assess the impacts of a wetland area on the~~

~~operation of the detention basin. Because the embankment is higher than 1.8 meters (6 feet) and the storage capacity is greater than 62,000 cubic meters (50 acre-feet), the California Department of Water Resources Division of Safety of Dams will have jurisdictional control of the structure and the permitting process for design and construction of the facility.~~

~~14. The conveyance capacity of the existing channel and overbank area of West Fork Tank Farm Creek between Prado Road and Tank Farm Road will be improved to carry the estimated 100-year general plan peak flow of 14.0 m^3/s (490 cfs). The improved channel will be a typical modified natural channel section. The 10-year capacity of the low-flow channel will be 8.0 m^3/s (280 cfs). The bottom width will be 6 meters (20 feet) and the depth of the low-flow channel will vary from 1 meter (3 feet) at Prado Road to 1.2 meters (4 feet) just upstream of Tank Farm Road. The right-of-way width will be about 43 meters (140 feet) and will be environmentally enhanced. The West Fork intercepts the Middle Fork and diverts all flow to the East Fork north of Tank Farm Road.~~

Appendix E. Background Information on Acoustics

Sound Terminology

Sound travels through the air as waves of minute air pressure fluctuations caused by some type of vibration. In general, sound waves travel away from the sound source as an expanding spherical surface. The energy contained in a sound wave is consequently spread over an increasing area as it travels away from the source. This results in a decrease in loudness at greater distances from the sound source. The following terms are commonly used in acoustics.

Decibel

Sound-level meters measure the pressure fluctuations caused by sound waves. Because of the ability of the human ear to respond to a wide dynamic range of sound pressure fluctuations, loudness is measured in terms of decibels (dB) on a logarithmic scale. This results in a scale that measures pressure fluctuations in a convenient notation and corresponds to our auditory perception of increasing loudness.

A-Weighted Decibels

Most sounds consist of a broad range of sound frequencies. Because the human ear is not equally sensitive to all frequencies, several frequency-weighting schemes have been used to develop composite decibel scales that approximate the way the human ear responds to sound levels. The "A-weighted" decibel scale (dBA) is the most widely used for this purpose. Typical A-weighted sound levels for various types of sound sources are summarized in Figure 1.

Equivalent Sound Level

Time-varying sound levels are often described in terms of an equivalent constant decibel level. Equivalent sound levels (L_{eq}) are used to develop single-value descriptions of average sound exposure over various periods of time. Such average sound exposure values often include additional weighting factors for annoyance potential attributable to time of day or other considerations. The L_{eq} data used for these average sound exposure descriptors are generally based on A-weighted sound-level measurements.

Day-Night Average Sound Level

Average sound exposure over a 24-hour period is often presented as a day-night average sound level (L_{dn}). L_{dn} values are calculated from hourly L_{eq} values, with the L_{eq} values for the nighttime period (10:00 p.m.-7:00 a.m.) increased by 10 dB to reflect the greater disturbance potential from nighttime noises.

Community Noise Equivalent Level

The community noise equivalent level (CNEL) is also used to characterize average sound levels over a 24-hour period, with weighting factors included for evening and nighttime sound levels. L_{eq} values for the evening period (7:00 p.m.-10:00 p.m.) are increased by 5 dB, while L_{eq} values for the nighttime period (10:00 p.m.-7:00 a.m.) are increased by 10 dB. For given set of sound measurements, the CNEL value will usually be about 1 dB higher than the L_{dn} value. In practice, CNEL and L_{dn} are often used interchangeably.

Percentile-Exceeded, Maximum, and Minimum Sound Level

The sound level exceeded during a given percentage of a measurement period is the percentile-exceeded sound level (L_x). Examples include L_{10}, L_{50}, and L_{90}. L_{10} is the A-weighted sound level that is exceeded 10% of the measurement period, L_{50} is the level exceeded 50% of the period, and so on. L_{50} is the median sound level measured during the measurement period. $L_{90,}$ the sound level exceeded 90% of the time, excludes high localized sound levels produced by nearby sources such as single car passages or bird chirps. L_{90} is often used to represent the background sound level. L_{50} is also used to provide a less conservative assessment of the background sound level.

The maximum sound level (L_{max}) and the minimum sound level (L_{min}) are the maximum and minimum sound levels respectively, measured during the measurement period. When a sound meter is set to the "slow" response setting as is typical for most community noise measurements, the Lmax and Lmin values are the maximum and minimum levels measured over a one second period.

Ambient Sound

Ambient sound is the all-encompassing sound associated with a given community site, usually being a composite of sounds from many sources, near and far, with no particular sound being dominant.

Sound Source	Sound Level (dBA)*	Response
Carrier deck jet operation	**140**	
Civil defense siren (at 100 feet)	**130**	Painfully loud
Jet takeoff (at 200 feet)	**120**	Threshold of feeling and pain
Riveting machine (at 1 foot) Rock music concert	**110**	
Pile driver (at 50 feet) Ambulance siren (at 100 feet)	**100**	Very loud
Heavy truck (at 50 feet)	**90**	
Pneumatic drill (at 50 feet) Freight train cars (at 50 feet) Garbage disposal in home	**80**	
Freight train cars (at 100 feet) Freeway traffic (at 50 feet) Vacuum cleaner (at 10 feet)	**70**	Moderately loud
Air conditioning unit (at 20 feet)	**60**	
Speech in normal voice (at 15 feet)	**50**	
Residence-typical movement of people, no TV or radio	**40**	Quiet
Soft whisper (at 5 feet)	**30**	
Recording studio	**20**	
	10	
	0	Threshold of hearing

* Typical A-weighted sound levels in decibels. "A" weighting approximates the frequency response of the human ear.

Figure E-1
Weighted Sound Levels and Human Response

Equivalencies between Various Sound Descriptors

The L_{dn} value at a site calculated from a set of measurements taken over a given 24-hour period will be slightly lower than the CNEL value calculated over the same period. Except in situations where unusually high evening sound levels occur, the CNEL value will be within 1.5 dB of the L_{dn} value for the same set of sound measurements.

The relationship between peak hourly L_{eq} values and associated L_{dn} values depends on the distribution of traffic over the entire day. There is no precise way to convert a peak hourly L_{eq} value to an L_{dn} value. However, in urban areas near heavy traffic, the peak hourly L_{eq} value is typically 2-4 dB lower than the daily L_{dn} value. In less heavily developed areas, the peak hourly L_{eq} is often equal to the daily L_{dn} value. For rural areas with little nighttime traffic, the peak hourly L_{eq} value will often be 3-4 dB greater than the daily L_{dn} value.

Working with Decibel Values

The nature of the decibel scale is such that the individual sound levels for different sound sources cannot be added directly to give the combined sound level of these sources. Two sound sources producing equal sound levels at a given location will produce a composite sound level that is 3 dB greater than either sound alone. When two sound sources differ by 10 dB, the composite sound level will be only 0.4 dB greater than the louder source alone.

Most people have difficulty distinguishing the louder of two sound sources if they differ by less than 1.5-2.0 dB. Research into the human perception of changes in sound level indicates the following:

- a 3-dB change is just perceptible,
- a 5-dB change is clearly perceptible, and
- a 10-dB change is perceived as being twice or half as loud.

A doubling or halving of acoustic energy will change the resulting sound level by 3 dB, which corresponds to a change that is just perceptible. In practice, this means that a doubling of traffic volume on a roadway, doubling the number of people in a stadium, or doubling the number of wind turbines in a wind farm will, as a general rule, only result in a 3-dB, or just perceptible, increase in noise.

Outdoor Sound Propagation

There are a number of factors that affect how sound propagates outdoors. These factors, described by Hoover and Keith (1996), are summarized below.

Distance Attenuation

As a general rule, sound from localized or point sound sources spreads out as it travels away from the source and the sound level drops at a rate of 6 dB per doubling of distance. If the sound source is long in one dimension, such as traffic on a highway or a long train, the sound source is considered to be a line source. As a general rule, the sound level from a line source will drop off at a rate of 3 dB per doubling of distance. If the intervening ground between the line source and the receptor is acoustically "soft" (e.g., ground vegetation, scattered trees, clumps of bushes), an attenuation rate of 4.5 dB per doubling of distance is generally used.

Attenuation from Barriers

Any solid structure such as a berm, wall, or building that blocks the line of sight between a source and receiver serves as a sound barrier and will result in additional sound attenuation. The amount of additional attenuation is a function of the difference between the length of the sound path over the barrier and the length of the direct line of sight path. Thus, the sound attenuation of a barrier between a source and a receiver that are very far apart will be much less than the attenuation that would result if either the source or the receiver is very close to the barrier.

Molecular Absorption

Air absorbs sound energy as a function of the temperature, humidity of the air, and frequency of the sound. Additional sound attenuation on the order of 1 to 2 dB per 1,000 feet can occur.

Anomalous Excess Attenuation

Large-scale effects of wind speed, wind direction, and thermal gradients in the air can cause large differences in sound transmission over large distances. These effects when combined result in anomalous excess attenuation, which can be applied to long-term sound-level estimates. Additional sound attenuation on the order of about 1 dB per 1,000 feet can occur.

Other Atmospheric Effects

Short-term atmospheric effects relating to wind and temperature gradients can cause bending of sound waves and can influence changes in sound levels at large distances. These effects can either increase or decrease sound levels depending on the orientation of the source and receptor and the nature of the wind and temperature gradient. Because these effects are normally short-term, it is generally not practical to include them in sound propagation calculations. Understanding these effects, however, can help explain variations that occur between calculated and measured sound levels.

Guidelines for Interpreting Sound Levels

Various federal, state, and local agencies have developed guidelines for evaluating land use compatibility under different sound-level ranges. The following is a summary of federal and state guidelines.

Federal Agency Guidelines

The federal Noise Control Act of 1972 (Public Law 92-574) established a requirement that all federal agencies administer their programs to promote an environment free of noise that jeopardizes public health or welfare. The U.S. Environmental Protection Agency (EPA) was given the responsibility for:

- # providing information to the public regarding identifiable effects of noise on public health or welfare,
- # publishing information on the levels of environmental noise that will protect the public health and welfare with an adequate margin of safety,
- # coordinating federal research and activities related to noise control, and
- # establishing federal noise emission standards for selected products distributed in interstate commerce.

The federal Noise Control Act also directed that all federal agencies comply with applicable federal, state, interstate, and local noise control regulations.

Although EPA was given major public information and federal agency coordination roles, each federal agency retains authority to adopt noise regulations pertaining to agency programs. EPA can require other federal agencies to justify their noise regulations in terms of the federal Noise Control Act policy requirements. The Occupational Safety and Health Administration retains primary authority for setting workplace noise exposure standards. The Federal Aviation Administration retains primary jurisdiction over aircraft noise standards, and the Federal Highway Administration (FHWA) retains primary jurisdiction over highway noise standards.

In 1974, in response to the requirements of the federal Noise Control Act, EPA identified indoor and outdoor noise limits to protect public health and welfare (communication disruption, sleep disturbance, and hearing damage). Outdoor L_{dn} limits of 55 dB and indoor L_{dn} limits of 45 dB are identified as desirable to protect against speech interference and sleep disturbance for residential, educational, and healthcare areas. Sound-level criteria to protect against hearing damage in commercial and industrial areas are identified as 24-hour L_{eq} values of 70 dB (both outdoors and indoors).

The FHWA has adopted criteria for evaluating noise impacts associated with federally funded highway projects and for determining whether these impacts are sufficient to justify funding noise mitigation actions (23 CFR 772). The FHWA noise abatement criteria are based on peak hourly L_{eq} sound levels, not L_{dn} or 24-hour L_{eq} values. The peak 1-hour L_{eq} criteria for residential, educational, and healthcare facilities are 67 dB outdoors and 52 dB indoors. The peak 1-hour L_{eq} criterion for commercial and industrial areas is 72 dB (outdoors).

The U.S. Department of Housing and Urban Development has established guidelines for evaluating noise impacts on residential projects seeking financial support under various grant programs (44 FR 135:40860-40866, January 23, 1979). Sites are generally considered acceptable for residential use if they are exposed to outdoor L_{dn} values of 65 dB or less. Sites are considered "normally unacceptable" if they are exposed to outdoor L_{dn} values of 65-75 dB. Sites are considered unacceptable if they are exposed to outdoor L_{dn} values above 75 dB.

State Agency Guidelines

In 1987, the California Department of Health Services published guidelines for the noise elements of local general plans. These guidelines include a sound level/land use compatibility chart that categorizes various outdoor L_{dn} ranges into up to four compatibility categories (normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable) by land use. For many land uses, the chart shows overlapping L_{dn} ranges for two or more compatibility categories.

The noise element guidelines chart identifies the normally acceptable range for low-density residential uses as less than 60 dB and the conditionally acceptable range as 55-70 dB. The normally acceptable range for high-density residential uses is identified as L_{dn} values below 65 dB, and the conditionally acceptable range is identified as 60-70 dB. For educational and medical facilities, L_{dn} values below 70 dB are considered normally acceptable and L_{dn} values of 60-70 dB are considered conditionally acceptable. For office and commercial land uses, L_{dn} values below 70 dB are considered normally acceptable and L_{dn} values of 67.5-77.5 are categorized as conditionally acceptable.

These overlapping L_{dn} ranges are intended to indicate that local conditions (existing sound levels and community attitudes toward dominant sound sources) should be considered in evaluating land use compatibility at specific locations.

The California Department of Housing and Community Development has adopted noise insulation performance standards for new hotels, motels, and dwellings other than detached single-family structures (24 CCR T25-28). These standards require that "interior CNELs with windows closed, attributable to exterior sources, shall not exceed an annual CNEL of 45 dB in any habitable room".

The California Department of Transportation uses the FHWA criteria as the basis for evaluating noise impacts from highway projects.

Reference

Hoover, R. M., and R. H. Keith. 1996. Noise control for buildings and manufacturing plants. Hoover and Keith, Inc. Houston, TX.